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Frontier Topics in Banking

Investigating New Trends and Recent
Developments in the Financial Industry



Edited by
Elisabetta Gualandri
Valeria Venturelli
Alex Sclip

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PREFACE

The continuous, multifaceted process of financial innovation is a strong driver in the evolution of the financial industry, implying challenges for both regulators and financial institutions. The evolving nature of the financial landscape requires research and in-depth analysis in order to highlight on the one hand the emergence of new issues related to new financial instruments, markets, intermediaries, and non-financial competitors, and on the other hand in which longstanding issues evolve in a new scenario.

This book discusses recent developments in research fields regarding new and longstanding issues in the financial industry by bringing together the relevant papers presented at the European Association of University Teachers of Banking and Finance Conference (Wolpertinger Conference), held in Modena, Italy, August 29–September 1, 2018: “Recent Trends in the Innovation of Financial Systems: Challenges for Regulators and Financial Institutions”.

Each chapter is written by academics who specialise in the topics investigated, all from prestigious universities and research centres.

The book’s contents have been subdivided into four main sections.

To introduce the general theme of the influence of the study of economics on the financial industry, the first part of the book, “Overture”, investigates the choices made by the Royal Swedish Academy when selecting Nobel Laureates in Economic Sciences. The second part is dedicated to “The Financing of SMEs”, a key theme for economic growth, with contributions on new financing mechanisms—Minibonds and equity crowdfunding—and a detailed look at the role of gender. The third part,

“Banks and Their Customers”, includes chapters focusing on recent developments in new and longstanding themes in banking and finance: financial inclusion, banking litigation, corporate governance, corporate social responsibility, and banks and the role of the social media. The fourth part, “Regulation and Bank Management”, deals with the recent evolution of consolidated financial themes applied to different international contexts: bank asset quality review, credit risk disclosure, cross-border banking, and the role of government funding (the case of China).

The *Overture*, Part I of the book, consists of Chap. 1, *Nobel Prize in Economic Sciences: The Role of Financial Studies*, where Gianfranco Vento and Paola Vezzani analyse the influence of Nobel Prize-winning financial theories on strategic and managerial decisions relating to financial markets and intermediaries. As the study explains, the Royal Swedish Academy of Sciences has been responsible for selecting Nobel Laureates in Economic Sciences since 1969. In these 49 years, 79 academics have been awarded the Nobel Prize in Economic Sciences, and the Royal Swedish Academy has assigned the Prize to pure economists, experts in finance, and scholars investigating topics on the borderlines between economics and finance. The chapter provides a brief introduction to this important Prize and its origin, and then analyses the fields and research in financial economics which have received it. The core part of the chapter investigates the decisions of the Royal Swedish Academy, with a special focus on the financial theories selected for the Prize in order to highlight the contributions of the Nobel Prize-winning academics to the development of the most accredited financial theories and practices.

Part II, *The Financing of SMEs*, opens with Chap. 2, *Risk and Pricing on the Italian Minibond Market*, whose authors, Alessandro Grasso and Francesco Pattarin, investigate the determinants of the issuing prices of Minibonds in the ExtraMotPro market from 2013 to 2016, with a special focus on small listings by non-financial issuers and on default risk. The authors find evidence that the rating of Minibond issuers did not help investors to reduce information asymmetries related to the valuation of a firm’s creditworthiness. Investment grade Minibonds had credit risk premia similar to speculative grades and higher than those of the non-rated issues. They evaluate the credit standing of issuers through a statistical and a financial approach. In both cases, they find that issuers rated as investment grade by agencies are generally as risky as those rated speculative grade. Furthermore, the premia related to our credit risk assessment are higher for riskier than for safer firms. However, they also find evidence

that safer borrowers might have signalled their quality to investors through underpricing.

Equity crowdfunding, a topic of great current interest, is analysed from two perspectives in the following chapters of the second section. The objective of Chap. 3, *Exploring Factors Influencing the Success of Equity Crowdfunding Campaigns: Findings from Italy*, by Stefano Cosma, Alessandro Grasso, Francesco Pagliacci, and Alessia Pedrazzoli, is to examine which factors influence the performance of equity crowdfunding campaigns in the Italian equity market. The study is based on proprietary data that consider the entire Italian equity market and analyses 175 projects from all Italian equity crowdfunding platforms between 2013 and 2018. Campaigns' success is driven by the characteristics of the network related to the platform and company, including factors such as a large number of shareholders and the presence of an industrial partner among them. Since Italian equity crowdfunding is still in its infancy, the study is the first to explore success drivers right across the market.

The focus of Chap. 4 is on female investment behaviour in equity crowdfunding. *From Seeker Side to Investor Side: Gender Dynamics in UK Equity Crowdfunding Investments*, by Elisabetta Gualandri, Alessia Pedrazzoli, and Valeria Venturelli, provides an empirical analysis of 5966 investors taking part in 81 equity crowdfunding campaigns on Crowdcube, a British equity crowdfunding platform, from 2011 to 2016. Results show that equity crowdfunding facilitates the availability of capital for female entrepreneurs, thanks to a similarity effect between seekers and investors. From a practical perspective, these findings shed new light on how individual characteristics can be important factors in financing situations. The findings provide entrepreneurs and equity crowdfunding platforms with a better understanding of potential investor behaviour and highlight the role of equity crowdfunding as a tool for the financial inclusion of minorities and the empowerment of women entrepreneurs.

Part III—*Banks and Their Customers*—starts with Chap. 5, *Financial Inclusion: Trends and Determinants*, in which the authors, Mais Sha'ban, Claudia Girardone and Anna Sarkisyan, provide a background on financial inclusion and examine the progress and trends across different financial inclusion indicators and different macro and income regions. The data show positive growth in a variety of financial inclusion indicators over recent years; however, the variation across regions and the gender gap are still considerable. The chapter also reviews factors that could explain variations in financial inclusion across countries and reports key correlations

between financial inclusion indicators and selected country characteristics. The authors find differences in the associations with country characteristics when comparing traditional banking services and mobile money services.

Chapter 6—*Framing, Overconfidence and Regret in Italian Mortgage Banking Litigations* by Caterina Lucarelli and James Mazzocchini—sets out to analyse banking litigations from a behavioural perspective. The purpose of the chapter is to uncover the intensity of affection for distortions or cognitive biases suffered by customers. The authors used the dataset managed by the Italian alternative dispute resolution mechanism, that is the Arbitro Bancario Finanziario, to examine three well-known cognitive biases: narrow framing, overconfidence, and regret. The results indicate that if a litigation arises in a situation where cognitive bias is present, the probability that the appeal will be successful is low, after controlling for time and for the variability of the composition of the arbitration commission

The theme of banks' usage of social media is developed in Chap. 7, '*Share this pic!': A Picture of the Adoption of Online Social Media by Italian Banks*, by Elisa Giarretta and Giusy Chesini. Banks are increasingly using online social media to engage with their existing and potential customers; however, the use of technology can both strengthen and weaken these "virtual" relationships. The chapter analyses the adoption of online social media for 151 Italian banks and tests how it affected bank profitability in 2013–2016. Although the adoption rate is lower than customers would like and banks' popularity on online social media is poor, the authors find that the effects of online social media vary. In particular, banks' presence and popularity on Facebook negatively affect their profitability, whereas their presence on YouTube and in interactions on LinkedIn increases banks' performance.

Chapter 8—*Central Banks' Commitment to Stakeholders: CSR in the Eurosystem, 2006–2016*—is by Vincenzo Farina, Giuseppe Galloppo, and Daniele Previati. The authors underline that Central Banks' commitment to the public interest goes beyond monetary policy. Central Banks are accountable for a wide range of areas (price and financial stability and services for the economy—e.g. economic analyses, payments, financial education, and customer protection), with specific responsibilities towards external and internal stakeholders. Corporate social responsibility (CSR) and stakeholder management (SM) should be the focus of special care and attention on the part of Central Bank managements. The academic literature about Central Banking ignores these topics: some theoretical thoughts about this lack of analysis are presented. Adopting an initial exploratory

approach, this chapter sets out to assess the attention shown to CSR by the communication practices of Central Banks in the Eurosystem (European Central Bank [ECB] and National Central Banks [NCBs]) by applying text analysis tools to annual reports for the period 2006–2016. The findings reveal the degree of development of CSR communication practices and the insights provided may be useful for designing Central Banks' CSR communication tools.

Part IV is dedicated to *Regulation and Bank Management* and contains Chap. 9—*Bank's Asset Quality Review Using Debt Service Coverage Ratio: An Empirical Investigation Across European Firms*—by Maurizio Polato and Federico Beltrame. In the Asset Quality Review (AQR) framework, bank authorities have defined several financial measures for use to determine loan portfolio risk and consequently the adequate level of provisioning and capitalisation. In concrete terms, with regard to a firm's loans, the AQR exercises and ECB non-performing loans (NPLs) guidelines highlight a strict dependence between provisions and some financial and economic ratios. Among them, the Debt Service Coverage Ratio (DSCR) is largely used to detect the firm's ability to repay its debts. In this chapter, the authors analyse the structure and economic meaning of the DSCR, in particular suggesting a dynamic approach to the DSCR, using a simple stochastic model. They also provide a general picture of the creditworthiness of the larger European firms, and consequently, of the intrinsic quality of European banks' loans.

The theme of risk disclosure is analysed in Chap. 10, *Credit Risk Disclosure Practices in the Annual Financial Reporting of Large Italian Banks*, by Enzo Scannella and Salvatore Polizzi. Risk disclosure in banking is particularly important for the efficacy of market discipline, the assessment of bank performances, the efficiency of the financial market, and the overall stability of the financial system. The European banking union and the financial crisis have enhanced the strategic role of credit risk disclosure in banking. The topic of this chapter is the evaluation of credit risk disclosure practices in banks' annual financial reporting. The empirical research is conducted on a sample of ten large Italian banks. The authors employ content analysis and provide a hybrid scoring model for the assessment of credit risk disclosure. The chapter provides empirical findings which reveal significant differences between banks' credit risk reporting practices, even though they are subject to similar regulatory and accounting frameworks.

Chapter 11—*The Impact of Recent Regulatory Reforms on Cross-Border Banking: A Study of the Nordic Markets*—is by Viktor Elliot, Ted Lindblom,

and Magnus Willeson. This chapter investigates the relationships between banks in different countries through an empirical study based on interviews with the six leading Nordic banks and the Swedish export credit agency. The authors find that although all six banks have significantly reduced the number of correspondent banking relationships, they approach the reduction in different ways. This means that their regulatory responses are similar at an aggregate level but quite different on the individual level. The results further indicate that compliance costs have risen extensively with potential implications on trade. The topic is interesting in light of the new Basel III regulatory agenda and with regard to money laundering and terrorist financing norms.

The theme of financial liberalisation and financial stability in China is investigated in Chap. 12—*The Effectiveness of the ‘Belt and Road’ Initiative in Tackling China’s Economic Slowdown and Its Financial Implications Within a Policy Trilemma Context* by René W. H. van der Linden and Piotr Łasak.

The research question is to what extent the Belt and Road initiative (BRI) plan will be effective in helping China bounce back from its economic slowdown and what its financial implications are in a policy trilemma context. The BRI was implemented in 2013 as a response to the economic slowdown in China and was intended to help the country transition to a slower, but structurally more balanced “new normal” economic growth model. At the same time, China is facing many serious problems, such as a credit binge, a debt problem, and international trade and investment conflicts. The implementation of BRI and the accompanying financial liberalisation and exchange rate and monetary adjustments will test the theory that it is impossible to combine free capital mobility, stable exchange rate management, and monetary autonomy.

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PART I

Overture



Nobel Prize in Economic Sciences: The Role of Financial Studies

Gianfranco Vento and Paola Vezzani

1 THE NOBEL PRIZE

1.1 Alfred Nobel, His Will, and the Nobel Foundation

The Nobel Prize is the most prestigious award given in recognition of academic, cultural, and/or scientific advances. It was conceived by Alfred Bernhard Nobel, a Swedish chemist who was born in Stockholm in 1833 and died in San Remo in 1896. Nobel was an accomplished chemist, inventor, entrepreneur, and industrialist. As such, he became one of the most notable and wealthy men of the late nineteenth century. The cultural environment in which he lived, along with his high level of education thanks to his father's support, almost certainly contributed to his success. Indeed, as early as age 17, Alfred already spoke five languages fluently and was very

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familiar with subjects such as engineering and chemistry. Another factor that likely contributed to his genius was his cosmopolitan personality, to the extent that Victor Hugo described him as “*Europe’s richest vagabond*”. His popularity is mainly ascribed to the invention of dynamite, but Nobel must also be remembered for patenting over 355 inventions during his intense entrepreneurial life. His discoveries became his fortune, as he showed the ability to combine a scientist’s mind with the skills of a businessman.

While at the beginning of his entrepreneurial life Alfred showed a tendency toward recklessness when dealing with dangerous experiments (his own brother was killed in an explosion), once he was thwarted by Swedish authorities, he endeavored to improve the conditions of the products he traded, spending a lot of time in order to figure out safer solutions for his factories.

Nobel’s philanthropic interests may have crystallized after reading his own obituary in a Paris newspaper. Several newspapers in Paris erroneously reported his death, when it was his brother, Ludvig, who had died in 1888 in Cannes, while Alfred was living in Paris. The Parisian newspaper mistook Ludvig for Alfred and reported Alfred’s supposed death with the headline “*Le marchand de la morte est mort*” (“*The merchant of death is dead*”). The obituary highlighted his involvement with the manufacturing of explosive chemicals and the development of armaments, portraying him as an arms merchant. The journalist who mistakenly published his obituary stated that Nobel “*became rich by finding ways to kill more people faster than ever before*”.¹

Nevertheless, in one of his last acts before his death, Alfred rewrote his will in order to donate his entire fortune toward the establishment of a prize to be awarded to people of any nationality who made the most compelling achievement for the benefit of mankind in the fields of chemistry, physics, physiology or medicine, literature, and peace among nations. In 1895, the Nobel Foundation was founded, along with a set of regulations for awarding the five Nobel Prizes. However, it took five years to realize his vision, since he had left no specific instructions for its implementation. Nobel’s decision that Norway, not Sweden, should award the Nobel Peace Prize was felt as a personal offense by the Swedes, and the royal family in particular. At the time Norway was seeking independence from Sweden, and the relationship between the two countries was rather conflictual. The Swedish King interpreted Nobel’s will as an expression of support for Norway’s separation from Sweden and even considered rejecting the will’s instructions to establish the Foundation.

¹ See Lichtman (2017).

The Nobel Foundation was established to manage the funds, supervise the selection of awardees, and organize the award of the prizes. Ragnar Sohlman, an engineer working in Nobel's Karlskoga laboratory, and the Swedish industrialist Rudolph Lilljequist were the executors of his will.² Once they realized that the financial resources of Nobel's inheritance were scattered in different countries all over Europe, Sohlman and Lilljequist worked ceaselessly to bring them back to Sweden, where they eventually established the Foundation on 26 April 1897, following the approval by the Swedish Parliament and approximately one year after Nobel's death. The institution envisaged the presence of a board of directors in charge of the financial management of the assets, while the prizes would be awarded by bodies independent of both the Foundation and other national authorities. This allowed for an autonomous and objective appointment process.

At the time of the establishment of the Foundation, the inheritance of Alfred Nobel amounted to 31 million Swedish crowns, equivalent to about 200 million euros. A change helped the maintenance of the amounts: since 2000 the return from the sale of the assets could be used for the allocation, provided that this operation did not reduce capacity in the long term. The prize awarded to the winner(s) in recent years was around €900,000.

As mentioned above, Nobel's will foresaw the presence of a foundation with the task of asset management. Over the years, the nominations have been made approximately with the same modalities across all the disciplines, while the commissions and the awarding institutions have changed and still differ on the basis of the type of award. Self-nominations are not accepted and the Nobel Foundation still recognizes awardees as Nobel Prize winners in their records whether they accept the prize or not.

Initially, the Nobel Foundation was required to pay taxes on its earnings. This requirement markedly reduced the net annual income available for the prizes until 1946, when the Foundation was granted a permanent tax exemption. The Foundation also provides funds for the expenses of the institutions and committees making selections for the awards, arranges travels and accommodation for the winners, organizes the annual award ceremony, and hosts scientific symposia.

² See "Alfred Nobel's Life and Work – For Grade schoolers". *Nobelprize.org*. Nobel Media AB 2014. Web. 6 May 2018. http://www.nobelprize.org/alfred_nobel/biographical/articles/life-work/gradeschool.html; Nils Ringertz: "Alfred Nobel – His Life and Work". *Nobelprize.org*. Nobel Media AB 2014. Web. 6 May 2018. http://www.nobelprize.org/alfred_nobel/biographical/articles/life-work/.

Originally, the prize was supposed to be awarded to those who had made an outstanding contribution to the discipline in the year prior to the awards ceremony. However, this rule was practically never implemented, as the awards have always referred to discoveries made over longer periods of time, especially in the medical economics field. Indeed, Nobel Prizes are frequently the result of the efforts of a lifetime.

In Nobel's will, the Prize for Economics was not present. There are wide debates on the motivations ascribed to the inclusion—in the institution of this prestigious award—of some disciplines rather than others; the most plausible explanation, which can be inferred from the documents reported on the official website of the Nobel Prize, seems to be that Alfred Nobel included only those subjects in which he was personally interested, as well as the disciplines that affected in some way his life and his inventions.

1.2 Nobel Prize General Figures

From 1901 to 2018, Nobel Prize was awarded 590 times, for a total of 935 prizes, of which 908 were awarded to individuals, while 27 to organizations (Table 1.1). Indeed, the statute of the Foundation states that the award can be given to both people and organizations (to date, this has only occurred with the Nobel Peace Prize).

The nominations and motivations that lead to the final selection of candidates are kept secret for 50 years since the date of the awarding. At the end of this long period of time, all the candidates subject to scrutiny and the given reasons are announced. The award can be shared by a maximum of three winners. Even if the prize is shared, it maintains the same importance and honorability as the prize assigned to individuals.

Table 1.1 Quick facts (1901–2018)

<i>Field</i>	<i>Prizes</i>	<i>Laureates</i>	<i>Award to 1</i>	<i>Award to 2</i>	<i>Award to 3</i>
Physics	112	210	47	32	33
Literature	110	114	106	4	–
Chemistry	110	181	63	23	24
Medicine	109	216	39	33	37
Peace	99	133 ^a	67	30	2
Economic Sciences (since 1969)	50	81	25	19	6
Total	590	935^a	347	141	102

Source: https://www.nobelprize.org/nobel_prizes/facts/

^aOf which 27 organizations

Two rules are generally applied for the awarding: sharing the award for studies carried out in teams or sharing the award for related studies that come from different researchers; this is to avoid the possibility of committing favoritism. In addition, there are also unrelated awardings; this option was adopted a few times in economic disciplines.³

In the world ranking of Nobel Prizes, the country that has won the highest number of Nobel Prizes is the United States (251), followed by Great Britain (93) and Germany (84).

Italy is eighth, on par with the Netherlands, with 19 winners, 2 of which are women. The 19 Italian Nobel Prizes include 6 in literature, 5 in physics, 1 in chemistry, 5 in medicine, 1 in peace, and 1 in economics.⁴

The age of the winners ranges from 17 years, which is the case of the Nobel Peace Prize awarded to Malala Yousafzai in 2014, to 96 years, which is the case of Arthur Ashkin, one of the Nobel Prize winners for Physics in 2018, who is also the oldest of all winners in total (Tables 1.2 and 1.3).

Table 1.2 Youngest Nobel Prize winners by field

<i>Field</i>	<i>Laureate—Country</i>	<i>Year</i>	<i>Age</i>
Peace	Malala Yousafzai—(Pakistan)	2014	17
Physics	William Lawrence Bragg—(Australia)	1915	25
Medicine	Frederick Banting—(Canada)	1923	32
Chemistry	Frédéric Joliot—(France)	1935	35
Literature	Rudyard Kipling—(India)	1907	41
Economic Sciences	Kenneth J. Arrow—(USA)	1972	51

Source: https://www.nobelprize.org/nobel_prizes/lists/age.html

Table 1.3 Oldest Nobel Prize winners by field

<i>Field</i>	<i>Laureate—Country</i>	<i>Year</i>	<i>Age</i>
Physics	Arthur Ashkin—(USA)	2018	96
Economic Sciences	Leonid Hurwicz—(Russia)	2007	90
Literature	Doris Lessing—(UK)	2007	88
Medicine	Peyton Rous—(USA)	1966	87
Peace	Joseph Rotblat—(Poland)	1995	87
Chemistry	John B. Fenn—(USA)	2002	85

Source: https://www.nobelprize.org/nobel_prizes/lists/age.html

³ See Lindbeck (1985).

⁴ Curiously, some of them include Daniel Bovet as the Nobel Prize winner in medicine; in fact, according to the indications given on the Nobel Prize website, Bovet is ascribed to Switzerland, despite receiving the award as an Italian citizen.

2 NOBEL PRIZE IN ECONOMIC SCIENCES

2.1 *The Origin*

Nobel Prizes have been for more than a century the reflection of the life and achievements of Alfred Nobel. By establishing his eponymous prize, he wanted to transmit the idea that progress of knowledge was the engine to increase the well-being of the entire humanity.

As mentioned above, economic science was not included in the original list of disciplines envisioned by Alfred Nobel. In 1968, Sweden's Central Bank, Sveriges Riksbank, made a donation to the Nobel Foundation in order to establish a prize for economists. In 1969, 68 years after the first award ceremony, the first Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel was awarded according to the same criteria used for the original prizes. The decision was to award the prize every year to economists who made a great contribution to humanity.

The Nobel Prize in Economic Sciences has been the only addition to the initial five award categories established by the Nobel Foundation. Although there was consternation about this intrusion on Alfred Nobel's intentions, as described in his will, the prize has eventually been accepted by Sweden and the world. As of 2018, the prize has been awarded 50 times to 81 people.

Skeptics believed that economics as a discipline does not have the right to be placed on the same level as the others, since it does not have the same kind of formal rigor and is mainly based on an analysis of economic behavior and the needs and evolution of human well-being.⁵ However, this opinion was often rejected by the committees, who awarded both theoretical and empirical research with strong mathematical content.

The nomination process for the Nobel Prize in Economic Sciences (Fig. 1.1) begins—like for the other prizes—more than a year before the ceremony, and it is coordinated by the Committee of the Swedish Academy of Sciences, which consists of five to eight members of different nationalities. The Committee has developed a number of procedures over time. In the September prior to the awards, requests for nominations are sent to members of international institutions, professors at major Swedish and foreign universities and research organizations, and previous winners of the Nobel Prize. Nominations must be expressed by the end of the

⁵ On this diatribe also see Eichner (1983) and Zahka (1992).

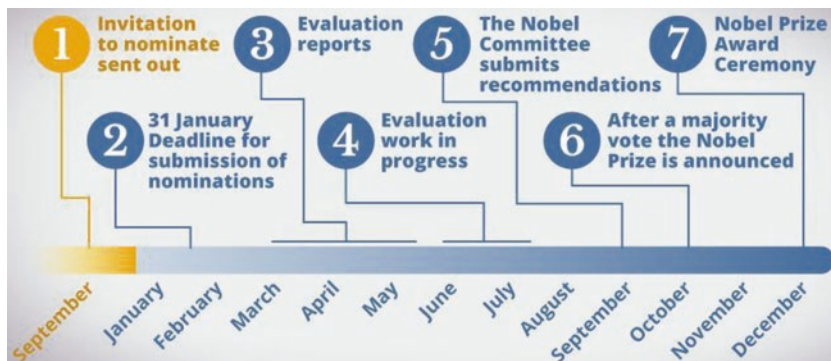


Fig. 1.1 Nomination process. Source: <https://www.nobelprize.org/nomination/economic-sciences/>

following January. Numerous requests for nominations are usually made, and these result in many candidates for each prize each year. As mentioned previously, self-nominations are not accepted.

The Committees often have to face the challenge of a long list of qualified candidates to select one, two, or at the most three recipients for each prize.

One of the most relevant discussions within the selection committee is how it is often possible to recognize a research by excluding another, when in fact both, although in different historical moments, have contributed to economic and social well-being. Scientific contributions in this matter are multidimensional and subjectivity is inherent in the selection process. The line followed by the Committee, often criticized as a result of some errors of assessment over the years, is simply due to the objective difficulty of choosing within the economic sciences. The degree of specificity of this discipline is not comparable to that of physics or chemistry; however, the leitmotif of the awards has been the search for innovative ideas that have contributed to raising the level of science in the field. The main difficulty is to understand whether a contribution is solid over time, as there is a need for a long period of observation in order to understand if the award-winning theory is truly worthy of the award. This was and is one of the major problems and the motivation of some perceived “mistakes” made by the Committee.

As previously mentioned, the awardings are made for one, two, or three specific contributions. Generally, a “common denominator” is needed among theories. In the economic sciences, the rule is used to reward

jointly those disciplines that essentially concern similar theories in terms of research. In fact, multiple awarding has been made both for cooperative work and individual research on the same subjects. Moreover, the decisions taken during the last few years have been open to multidisciplinary research, as well as the inclusion of “almost” humanistic subjects.

It is often difficult for the Committee to give only one nomination and also to give two or three, especially because in the economic discipline there are large teams of scholars working on the same topics, so selecting the winning bidders in recent years has been extremely challenging. An important point of the awarding process is that no prize can be revoked, even those awarded to theories that have been proved to be financial and economic disasters over time.

To date and until 2019 it is not and will not be possible to view discussions, comments, and documentation of the secret selection process, which can be disclosed only 50 years after the award ceremony.

2.2 *Nobel Laureates in Economic Sciences: Quick Facts*

The Nobel Prize in Economics from 1969 to 2018 has been awarded each year: 50 prizes have been awarded, of which 25 have been to a single candidate, while the other 25 were shared prizes: 6 awards for 3 scholars and 19 awards for 2 scholars. Multiple awardings with 3 prizes started only in the year 1990 (Fig. 1.2).

Table 1.4 lists all 81 Nobel laureates in economic sciences since 1969, reporting information about country, age, broad field of research, and original motivation for the Nobel Prize.

Table 1.5 lists our personal classification which synthesizes the original 30 different disciplinary fields in three large macro-areas. The Nobel Foundation specifies that the awarded theory was ascribed to the research category that has characterized the highest productivity during the scholar’s working life. In this study we have simply read the attributions of the Nobel Foundation and relocated these fields in three macro-areas that appeared to us sufficiently homogeneous and synthetic:

1. Economic fields: 19 fields with 42 Nobel Prizes (52% of the total)
2. Financial and managerial fields: 7 fields with 21 Nobel Prizes (26% of the total)
3. Quantitative fields: 4 fields with 18 Nobel Prizes (22% of the total)

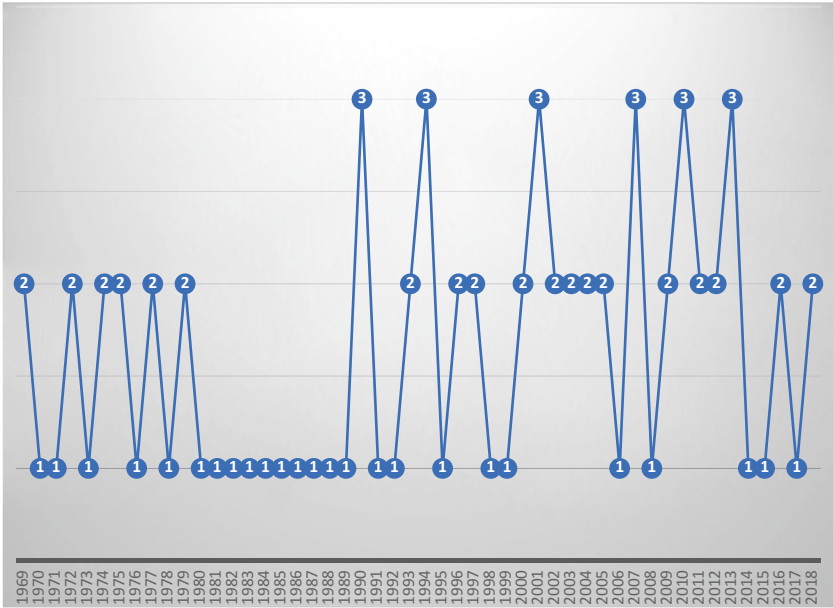


Fig. 1.2 Awarded laureates by year. Source: Own processing from Nobel Prize website database

In this regard, it is pointed out that it has been difficult, and at times even arbitrary, to attribute the awarded theories to single thematic macro-areas. Thus, it is possible that we have committed some “lesser sins”. For example, where to place the field “input-output analysis” (Leontief, 1973)? Does it represent an economic framework or a more quantitative one?

Figure 1.3 shows these three macro-areas—numbered as in the text—over time: every little rhombus identifies a year from 1969 to 2018 and an award of the prize, for a total of 50 rhombuses, although as mentioned several times, there were 81 winners due to numerous multiple awardings.

Starting from the 1980s–1990s, we can observe an increasing importance of research-related financial issues and behavioral paradigms.

Figure 1.4 shows, in percentage terms, the proposed subdivision with a specific zoom on the “financial and managerial” sub-areas that will be examined to answer the research questions of this paper.

Table 1.4 Laureates in economic sciences—quick facts and details

<i>Year</i>	<i>Name</i>	<i>Surname</i>	<i>Country</i>	<i>Age</i>	<i>Broad field</i>	<i>Motivation</i>
1969	Ragnar Jan Paul A.	Frisch Tinbergen Samuelson	Norway Netherlands USA	74 66 55	Econometrics Partial and General Equilibrium Theory	“For having developed and applied dynamic models for the analysis of economic processes” “For the scientific work through which he has developed static and dynamic economic theory and actively contributed to raising the level of analysis in economic science”
1971	Simon	Kuznets	Russia	70	Economic Growth	“For his empirically founded interpretation of economic growth which has led to new and deepened insight into the economic and social structure and process of development” “For their pioneering contributions to general economic equilibrium theory and welfare theory”
1972	John R. Kenneth Wassily	Hicks Arrow Leontief	UK USA Russia	68 51 68	General Equilibrium Theory Input-Output Analysis	“For the development of the input-output method and for its application to important economic problems”
1974	Gunnar Fredrich	Myrdal Von Hayek	Sweden Austria	76 75	Institutional Economics	“For their pioneering work in the theory of money and economic fluctuations and for their penetrating analysis of the interdependence of economic, social and institutional phenomena”
1975	Leonid V. Tjalling C. Milton	Kantorovich Koopmans Friedman	Russia Netherlands USA	63 65 64	Theory of Optimal Allocation of Resources Macroeconomics	“For their contributions to the theory of optimum allocation of resources” “For his achievements in the fields of consumption analysis, monetary history and theory and for his demonstration of the complexity of stabilisation policy”
1976	Bertil James E.	Ohlin Meade	Sweden UK	78 70	International Economics	“For their pathbreaking contribution to the theory of international trade and international capital movements”

1978	Herbert A.	Simon	USA	62	Management Science	<i>"For his pioneering research into the decision-making process within economic organizations"</i>
1979	Theodore W. Arthur	Shultz Lewis	USA Saint Lucia	77 64	Development Economics	<i>"For their pioneering research into economic development research with particular consideration of the problems of developing countries"</i>
1980	Lawrence R.	Klein	USA	60	Macroeconometrics	<i>"For the creation of econometric models and the application to the analysis of economic fluctuations and economic policies"</i>
1981	James	Tobin	USA	63	Macroeconomics	<i>"For his analysis of financial markets and their relations to expenditure decisions, employment, production and prices"</i>
1982	George J.	Stigler	USA	71	Industrial Organization	<i>"For his seminal studies of industrial structures, functioning of markets and causes and effects of public regulation"</i>
1983	Gerard	Debreu	France	62	General Equilibrium Theory	<i>"For having incorporated new analytical methods into economic theory and for his rigorous reformulation of the theory of general equilibrium"</i>
1984	Richard	Stone	UK	71	National Income Accounting	<i>"For having made fundamental contributions to the development of systems of national accounts and hence greatly improved the basis for empirical economic analysis"</i>
1985	Franco	Modigliani	Italy	67	Macroeconomics	<i>"For his pioneering analyses of saving and of financial markets"</i>
1986	James M.	Buchanan Jr.	USA	67	Public Finance	<i>"For his development of the contractual and constitutional bases for the theory of economic and political decision-making"</i>
1987	Robert M.	Solow	USA	63	Economic Growth Theory	<i>"For his contributions to the theory of economic growth"</i>
1988	Maurice	Allais	France	77	Partial and General Equilibrium Theory	<i>"For his pioneering contributions to the theory of markets and efficient utilization of resources"</i>

(continued)

Table 1.4 (continued)

<i>Year</i>	<i>Name</i>	<i>Surname</i>	<i>Country</i>	<i>Age</i>	<i>Broad field</i>	<i>Motivation</i>
1989	Trygve	Haavelmo	Norway	78	Econometrics	"For his clarification of the probability theory foundations of econometrics and his analyses of simultaneous economic structures"
1990	Harry M. Merton M.	Markowitz Miller	USA	63	Financial Economics	"For their pioneering work in the theory of financial economics"
1991	William Ronald H.	Sharpe Coase	USA UK	56 81	Theory of Market Institutions	"For his discovery and clarification of the significance of transaction costs and property rights for the institutional structure and functioning of the economy"
1992	Gary S.	Becker	USA	62	Economic Sociology	"For having extended the domain of microeconomic analysis to a wide range of human behaviour and interaction, including non-market behaviour"
1993	Robert W. Douglass	Fogel North	USA USA	67 73	Economic History	"For having renewed research in economic history by applying economic theory and quantitative methods in order to explain economic and institutional change"
1994	John C. John F.	Harsanyi Nash	Hungary USA	74 66	Game Theory	"For their pioneering analysis of equilibria in the theory of non-cooperative games"
1995	Reinhard Robert E.	Selten Lucas Jr.	Poland USA	64 58	Macroeconomics	"For having developed and applied the hypothesis of rational expectations, and thereby having transformed macroeconomic analysis and deepened our understanding of economic policy"
1996	James A.	Mirrlees	UK	60	Economics of Information	"For their fundamental contributions to the economic theory of incentives under asymmetric information"
1997	William Robert C.	Vickrey Merton	Canada USA	82 53	Financial Economics	"For a new method to determine the value of derivatives"
1998	Myron S. Amartya	Scholes Sen	Canada India	56 65	Welfare Economics	"For his contributions to welfare economics"

1999	Robert A. Mundell	Canada	67	International Macroeconomics	<i>"For his analysis of monetary and fiscal policy under different exchange rate regimes and his analysis of optimum currency areas."</i>
2000	James J. Heckman	USA	56	Econometrics	<i>"For his development of theory and methods for analyzing selective samples"</i>
	Daniel L. McFadden	USA	63	Econometrics	<i>"For their analyses of markets with asymmetric information"</i>
2001	George Akertlof	USA	61	Economics of Information	
	Michael Spence	USA	58	Economics of Information	
2002	Joseph E. Stiglitz	USA	58	Economic Psychology	
	Daniel Kahneman	Israel	68	Economic Psychology	<i>"For having integrated insights from psychological research into economic sciences, especially concerning human judgment and decision-making under uncertainty"</i>
2003	Vernon L. Smith	USA	75	Econometrics	<i>"For having established laboratory experiments as a tool in empirical economic analysis, especially in the study of alternative market mechanisms."</i>
	Robert F. Engle	USA	61	Econometrics	<i>"For methods of analyzing economic time series with time-varying volatility (ARCH)"</i>
2004	Clive W.J. Granger	UK	69	Econometrics	<i>"For methods of analyzing economic time series with common trends (cointegration)"</i>
	Finn E. Kydland Edward C. Prescott	Norway USA	61 64	Macroeconomics	<i>"For their contributions to dynamic macroeconomics: the time consistency of economic policy and the driving forces behind business cycles"</i>
2005	Robert J. Aumann	Israel	62	Game Theory	
	Thomas Shelling	USA	84	Game Theory	<i>"For having enhanced our understanding of conflict and cooperation through game-theory analysis"</i>
2006	Edmund S. Phelps	USA	73	Macroeconomics	<i>"For his analysis of intertemporal trade-offs in macroeconomic policy"</i>
2007	Leonid Hurwicz	Russia	90	Microeconomics	<i>"For having laid the foundations of mechanism design theory"</i>
	Eric Maskin Roger Myerson	USA USA	57 56	Microeconomics	

(continued)

Table 1.4 (continued)

<i>Year</i>	<i>Name</i>	<i>Surname</i>	<i>Country</i>	<i>Age</i>	<i>Broad field</i>	<i>Motivation</i>
2008	Paul	Krugman	USA	55	International and Regional Economics	“For his analysis of trade patterns and location of economic activity”
2009	Elinor	Ostrom	USA	76	Economic Governance	“For her analysis of economic governance, especially the commons” “For his analysis of economic governance, especially the boundaries of the firm”
	Oliver	Williamson	USA	77		“For his analysis of economic governance, especially the boundaries of the firm”
2010	Peter	Diamond	USA	70	Labor Economics	“For their analysis of markets with search frictions”
	Dale	Mortesen	USA	71		
	Cristopher A.	Pissarides	Cipro	62		
2011	Thomas J.	Sargent	USA	68	Macroeconometrics	“For their empirical research on cause and effect in the macroeconomy”
	Christopher A.	Sims	USA	69		
2012	Alvin E.	Roth	USA	61	Applied Game Theory	“For the theory of stable allocations and the practice of market design”
	Lloyd S.	Shapley	USA	89	Game Theory	“For their empirical analysis of asset prices”
2013	Eugene	Fama	USA	74	Econometrics	
	Lars P.	Hansen	USA	61	Financial Economics	
	Robert J.	Shiller	USA	67		
2014	Jean	Tirole	France	61	Industrial Organization	“For his analysis of market power and regulation”
2015	Angus	Deaton	UK	70	Welfare Economics ^a	“For his analysis of consumption, poverty, and welfare”
2016	Oliver	Hart	UK	68	Labor Economics ^a	“For their contributions to contract theory”
	Bengt	Holmström	Finland	67	Labor Economics ^a	
2017	Richard	Thaler	USA	72	Economic Psychology ^a	“For his contributions to behavioural economics”
2018	William D.	Nordhaus	USA	77	Macroeconomics ^a	“For integrating climate change into long-run macroeconomic analysis”
	Paul M.	Romer	USA	63	Macroeconomics ^a	“For integrating technological innovations into long-run macroeconomic analysis”

Source: Own processing and classification from the Nobel Prize website database. The attribution of the “broad field” is the one found on the Nobel Prize website and proposed by the Nobel organization; it seemed correct to us to leave the original decision and not to change this subdivision with subjective and subsequent attribution

^aOwn attribution due to lack of update on the Nobel Prize website

Table 1.5 Laureates in economic sciences—macro-fields (no. of laureates)

1. Economic	42	2. Financial and Managerial	21
Macroeconomics	9	Financial Economics	7
Labor Economics	5	Economics of Information	5
General Equilibrium Theory	3	Economic Psychology	3
Microeconomics	3	Economic Governance	2
Partial and General Equilibrium Theory	2	Industrial Organization	2
Theory of Optimal Allocation of Resources	2	Management Science	1
Welfare Economics	2	Theory of Market Institutions	1
Development Economics	2		
Institutional Economics	2	3. Quantitative	18
International Economics	2	Econometrics	8
Economic History	2	Game Theory	6
Economic Sociology	1	Macroeconometrics	3
Economic Growth	1	Applied Game Theory	1
Economic Growth Theory	1		
National Income Accounting	1		
Public Finance	1		
International and Regional Economics	1		
International Macroeconomics	1		
Input-Output Analysis	1	Total	81

Source: Own processing and classification from the Nobel Prize website database

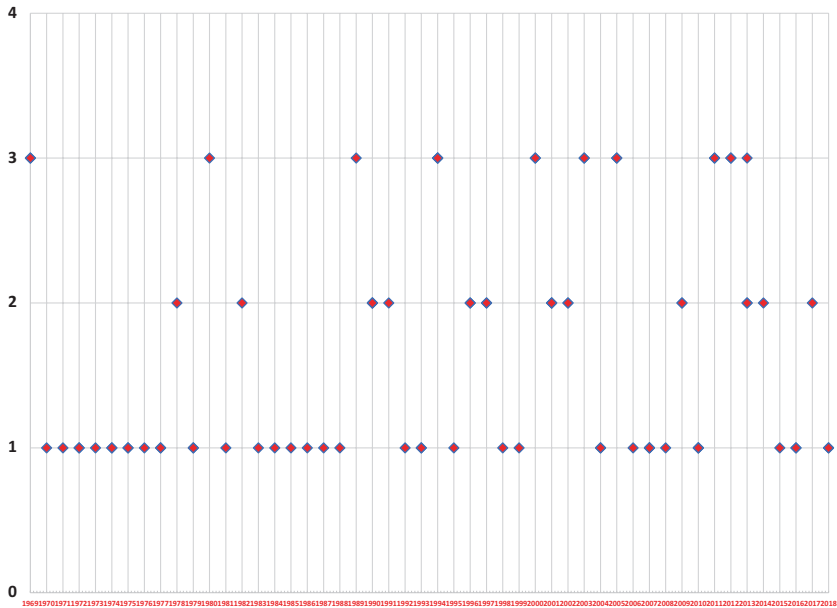


Fig. 1.3 Fields across time. Source: Own processing from the Nobel Prize website database

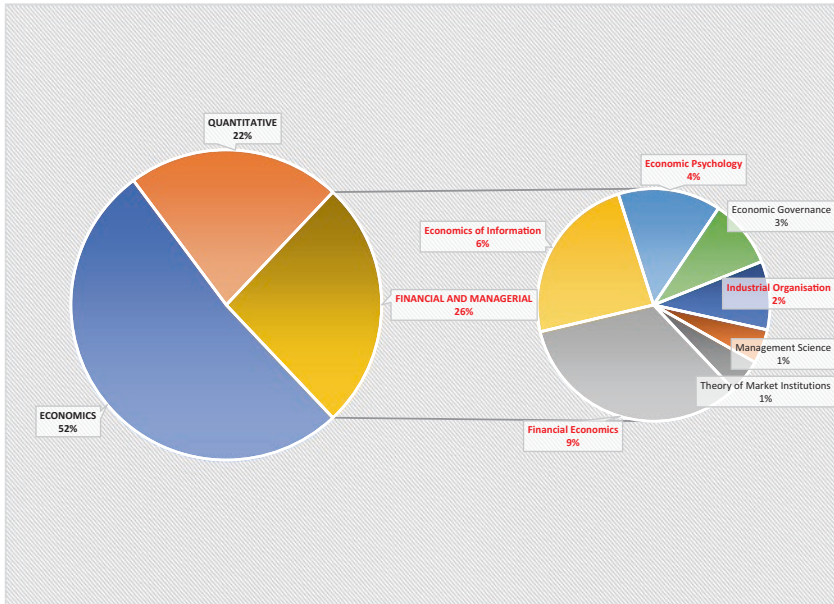


Fig. 1.4 Fields' distribution. Source: Own processing from the Nobel Prize website database

As anticipated, a little more than half of the prizes awarded over the years fall into the “economic” areas (42), which include disciplines such as macroeconomics, microeconomics, labor economics, equilibrium theories, plus those exploring national accounting data and public finance up to those relating to the field of development economy.

A little less than a quarter of the prize winners are ascribed to absolutely “quantitative” areas, that is, to econometric and mathematical studies, as well as to game theory (18 winners). It is highlighted in the chapter how different winners in the financial field (but not only) have backgrounds in physics and mathematics.

Interestingly, about 26% of the Nobel Prize winners have won the prestigious award thanks to studies, research, and discoveries in “financial and managerial” areas (21). Maybe not in an unreasonable way, it is possible to place this cluster halfway between the two previous ones. And it is in this cluster that we place the majority of the Nobel Prizes that we will examine, in order to try to answer the research questions.

Table 1.6 Laureates in economic sciences—our sample

<i>Year</i>	<i>Laureate</i>	<i>Country</i>	<i>Age</i>	<i>Broad field</i>
1981	Tobin	USA	63	Macroeconomics
1982	Stigler	USA	71	Industrial Organization
1985	Modigliani	Italy	67	Macroeconomics
1990	Markowitz	USA	63	Financial Economics
1990	Sharpe	USA	56	Financial Economics
1990	Miller	USA	67	Financial Economics
1996	Vickrey	Canada	82	Economics of Information
1996	Mirrlees	UK	60	Economics of Information
1997	Merton	USA	53	Financial Economics
1997	Scholes	Canada	56	Financial Economics
2001	Stiglitz	USA	58	Economics of Information
2001	Spence	USA	58	Economics of Information
2001	Akerlof	USA	61	Economics of Information
2002	Smith	USA	75	Economic Psychology
2002	Kahneman	Israel	68	Economic Psychology
2013	Fama	USA	74	Econometrics
2013	Hansen	USA	61	Financial Economics
2013	Shiller	USA	67	Financial Economics
2014	Tirole	France	61	Industrial Organization
2017	Thaler	USA	72	Economic Psychology

Source: Own processing and classification from the Nobel Prize website database

Although we are aware of a certain subjectivity of our decisions, we agreed to limit the sample of examination to only 20 winners—out of 81—who can be considered of pivotal importance in the field of research that concerns us (Table 1.6).

Within this sample, 17 winners belong to fields which we classified within the macro-area “financial and managerial”; then we added James Tobin and Franco Modigliani (originally ascribed to the field “macroeconomics”) and Eugene Fama (originally ascribed to “econometrics”, but also—by the Nobel Organization—to “financial economics”).

Other interesting aspects to investigate are related to the age and the university of origin.

The median age of the Nobel Prizes in economics at the time of graduation is 67 years, while the distribution of the 81 Nobel prizes has three very frequent ages (61, 63, and 67 years, with 6 cases each). The youngest Nobel Prize winner was Arrow (1972), who received the award at 51, and the oldest was Hurwicz (2007), who had to wait until 90.

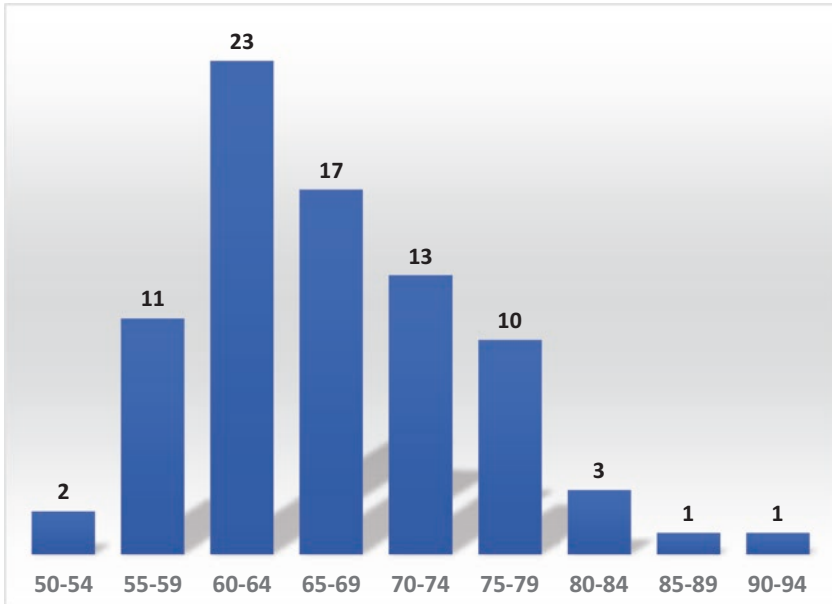


Fig. 1.5 Age distribution (laureates in economic sciences from 1969 to 2018). Source: Own processing from the Nobel Prize website database

Figure 1.5 shows the age distribution of all winners in economic sciences, which follows a right-skewed normal distribution shape.

Unlike other scientific disciplines where the average age of the winner is lower due to the fact that sometimes discoveries and inventions of the previous year are really rewarded, in economics it takes much longer for a theory to be applied and validated. Indeed, the Nobel Prizes in economics on average are the oldest. Moreover, the average age of laureates of all disciplines has risen over the course of the century, and it has been growing steadily since 1951.⁶

Where were Nobel Prize winners “academically” at the time of their nomination? Many of the scholars were in the universities of the so-called *Ivy League*,⁷ that is, the eight oldest universities in the USA, but the one that emerges above all the others with 13 winners is the University of Chicago.

⁶See for these figures: https://www.nobelprize.org/nobel_prizes/lists/laureates_ages/all_ages.html.

⁷Harvard University (1636), Yale University (1701), University of Pennsylvania (1740), Princeton University (1746), Columbia University (1754), Brown University (1764), Dartmouth University (1764), Cornell University (1865).

What are the reasons for this? The University of Chicago is recognized as one of the world's leading centers of study and research, which has now produced 89 Nobel Prizes and appears constantly among the top ten most prestigious universities in the world. Of these 89 winners, 13 are in economics. Chicago is followed by Princeton (6), Harvard (5), MIT (5), Berkeley (5), Columbia, and Yale (4), and only in the seventh place we find a European university (Cambridge, with 3 Nobel Prizes, at par with New York University).

The competitive academic environment at these universities nurtures and encourages innovative approaches to solve economic and financial problems; moreover, mentoring relationships and college scholarships can be suggested as explaining factors in order to answer why so many American academics have been selected as of 2018.

Unfortunately, we did not manage to figure out the parental background, the choice of economics as a field of study (if it was economics and not as in many cases other quantitative or different subjects), and detailed mentoring information regarding Nobel laureates.⁸

2.3 *Literature Review in a Nutshell*

It is not quite easy to review the main strands of literature on this topic. We are not analyzing a managerial or a specific financial theme, but something completely different.

Nobel laureates produce by definition a huge amount of research themselves, but this is not the point and we do not want to analyze their research, but articles and studies which have been written about them in order to figure out some interesting relationships or systematic results.

In the usual task of writing a “standard” literature review, it is necessary to skip many papers which are duplicates. In this case, on the contrary, we did not discover (and maybe it is our fault) a huge number of studies regarding specific theoretical and empirical analyses about Nobel laureates.

Another point to be made is that we decided to avoid those studies concerning sciences other than economic sciences. In this case the number of papers would have been quite high, but it would not have given completely comparable results to economic sciences.

Having in mind these few—but in our opinion fundamental—considerations, the literature research read on this “topic”, as far as we know, can be organized in these two macro-clusters.

⁸ See Zahka (1992) for an overview of this information from 1969 to 1989.

I. *Positive literature*

A. Theoretical studies

1. Classification of different fields and the evolution of this important Nobel Prize during decades (Karier 2010; Fini 2013; Galimberti and Galimberti 2016). These studies sometimes also describe the criteria and difficulties for awards and try to focus on and answer whether the prize reflects new trends in economic awards (Lindbeck 1985, 1999; Offer and Söderberg 2016).
2. Studies which examine the careers, lives, and biographies of Nobel laureates (Vane and Mulhearn 2005; Horn 2009; Migliorini 2016; Zahka 1992). We learned a lot from these lectures even if sometimes they offered a pure descriptive look at these scientists.
3. Interviews and conversations with Nobel laureates (Samuelson and Barnett 2007), walks inside the minds of Nobel laureates (Solow and Murray 2014), and studies understanding the link between biography and the development of modern economic thoughts (Breit and Hirsch 2009).

B. Empirical studies, that is, relationships between Nobel winners and different variables

1. Nobel laureates and the origin of their scientific achievement (Berry 1981).
2. Being a Fellow of a scientific society and receiving the Nobel Prize (Chan and Torgler 2012).
3. Age and academic productivity of Nobel laureates (van Dalen 1999; Jones et al. 2014).
4. University's affiliation and Nobel Prize (Schlagberger et al. 2016).
5. Life cycle of Nobel laureates in economic sciences (Weinberg and Galenson 2005).
6. Time series citation data of Nobel laureates and the prize itself (Bjork et al. 2014).

II. *Negative literature*

- A. Studies regarding the fact that “economics” is not considered a science like others (Eichner 1983; Zahka 1992).
- B. Critiques to the late institution of this sixth Nobel Prize (Brittan 2003; Gertchev 2011).
- C. Studies which analyze big mistakes and failures of some Nobel Prizes (Dunbar 2003; Ng 2011; Orati 2016).

3 NOBEL PRIZE FINANCIAL THEORIES

The purpose of this section is to analyze a specific cluster of Nobel Prizes, namely, those that are considered most important for financial subfields. It is a small sample and we are aware that we should probably have added other important laureates to this list.

It would have been very interesting to do this with the entire universe of 81 Nobel laureates, but it would not have been possible in a single study, so we postponed this analysis to future research with the hope of being able to carry it out with expert colleagues belonging to other awarded economic fields.

We will try to present in the following Sect. 3.1, in a few words, Nobel Prize laureates’ theories and reasons for the award. When there are multiple Nobel Prizes in a year, they will be analyzed together, at least for the awarded research field. Subsequently, Sect. 3.2 tries to answer some questions, and we give our comments on the topic.

3.1 *Laureates and Awarded Financial Theories*

- **1981—Tobin (USA)**—*For his analysis of financial markets and their relations to expenditure decisions, employment, production, and prices*

Tobin’s work significantly extended the usefulness of Keynesian economic analysis by greatly clarifying issues such as risk, portfolio management, and the role of financial markets in conveying information about underlying conditions. Tobin’s contributions to the theoretical formulation of investment behavior were of great practical value in understanding financial markets and instruments.

The day that a Nobel Prize in economics is announced in Stockholm, national media interview the winners and ask them to explain their main contributions and works. When this happened to Tobin and he was asked to explain his theory in simple language, he might have aimed a bit too low when he said, “*You know, don’t put your eggs in one basket*”.⁹ As simple as that!

Tobin’s way of modeling interactions between financial and real sectors quickly became an integrated part of macroeconomic models for national economies, with an important role played by the relation between the market value of a capital asset and its replacement costs—the so-called “**Tobin’s q**”.

Another important reason for Tobin’s fame was the **Tobin tax**. In 1972, Tobin floated a proposal that gained surprising popularity, but not in the way that he had hoped. Tobin’s idea was to dampen the animal spirits of international currency traders by taxing transactions.

- **1982—Stigler (USA)**—*For his seminal studies of industrial structures, functioning of markets, and causes and effects of public regulation*

Stigler dedicated his career to attempting to explore and study the cost of acquiring information. Information is not perfect, nor should it be. It is like any other commodity and is purchased only if the benefits of using it are greater than the cost of acquiring it. With this simple insight, Stigler attempted to solve a problematic inconsistency between the real world and the basic competitive model; he launched the field called “**economics of information**”, where he was one of the pioneers introducing information costs explicitly in his analysis. People would want to avoid having not only too little information but also too much. Mistakes could be costly. This idea was the primary reason for his Nobel Prize, and Stigler himself thought it was his most important contribution.

Another reason for Stigler’s Nobel Prize was his work on government regulation. This work consisted mostly of an **attack on all forms of government regulation**, whether it was intended to limit monopoly activity or protect consumer safety. He suggested the (new) idea that regulation

⁹To be honest, Tobin was not the first to measure the value of a diversified portfolio. This is credited to Markowitz, and Tobin merely used this idea to solve a puzzle in Keynesian theory and explain why people hold money.

benefited the companies under government control. Stigler wrote that “*as a rule, regulation is acquired by the industry and is designed and operated primarily for its benefit*”.¹⁰ In reality, government regulation protects some industries such as airlines, telecommunications, and trucking from competition. Stigler was not interested in improving government; he was interested in minimizing it.

The Nobel Committee also credited Stigler with another surprising discovery, that is, proving that there were **no benefits from** large-scale production, in other words, **economies of scale**. Stigler attempted to demonstrate that whether a firm succeeds or not has little to do with its size.¹¹

- **1985—Modigliani (Italy)**—*For his pioneering analyses of saving and financial markets*

Modigliani developed two important building blocks in macroeconomic models related to private consumption and financial sector. He was a great observer of reality, considering it the humanistic part of a problem.

In his **life-cycle theory of saving**, Modigliani studied the consequences of changes in demography and economic growth for household saving. He observed that savings were often determined by a person’s age or, more precisely, where they were in their life cycle. A young family may borrow money (negative savings) to buy houses, cars, and furniture that they pay off (positive savings) during their lifetime. When they retire, their savings are again negative as they live off their accumulated wealth. Therefore, when a family is most income-poor (when they are very young or very old), their savings are negative. At all other times, their savings are positive and correlated to their income. Later studies seemed to confirm Modigliani’s theory, finding a fairly constant savings rate for middle-age groups and lower savings rates for the seniors and very young. Modigliani also needed to explain why the national savings rate did not rise with higher national income. As income goes up for all families, their savings go up, but so does their borrowing. The net result had little effect on the national savings rate. We need to underline that there were also, after

¹⁰ See Stigler (1971).

¹¹ Sixteen years later, in 2008, the Nobel Committee seemed to reverse itself when the Nobel Prize went to Paul Krugman for applying the concept of economies of scale to international trade.

decades, different opinions regarding the *tout court* validity and correctness of his theory.¹²

Modigliani, together with Miller (later awarded with Nobel Prize in 1990), also laid the foundation for the field of corporate finance. The **Modigliani-Miller Theorem** states the conditions under which the value of a firm in the stock market is influenced (or not influenced) by the dividend policy of the firm, and the way the firm finances its investment, for example, via equity capital or borrowing. Beyond the criticisms that followed the importance of taxation and costs of failure ignored by the model, the theorem represents not only one of the most important contribution to financial economy, but is universally considered a milestone in the modern theory of finance and its developments during the last half-century.

Today no business finance course can start without explaining the Modigliani-Miller theorem and no scholar can have a complete picture of corporate finance without it.¹³

- **1990—Markowitz, Miller, and Sharpe (USA)**—*For their pioneering work in the theory of financial economics*

¹²In the household savings function, intergenerational bequests are significant, as the increase in income unquestionably increases the propensity to save, making the disposable income exponentially influential on this function; moreover, retired people, those who according to the life cycle should erode their provisions, seem to have a propensity for positive accumulation and an aversion to consumption. It is also necessary to reconsider the theory of the life cycle with reference to the decline in household savings, which occurred from the 1990s till today.

¹³A peculiar point was the answer of a Modigliani's interview where he said: "*The theorem, which by now is well known, was proven very laboriously in about 30 pages. The reason for the laboriousness was in part because the theorem was so much against the grain of the teachings of corporate finance—the art and science of designing the 'optimal capital structure'. We were threatening to take the bread away, and so, we felt that we had to give a "laborious" proof to persuade them. Unfortunately, the price was paid by generations of students that had to read the paper; I have met many MBA students that remember that paper as a torture, the most difficult reading in the course. It's too bad because, nowadays, the theorem seems to me to be so obvious that I wonder whether it deserves two Nobel Prizes. All that it really says is that (with well-working markets, rational-return-maximizing behavior for any given risk, and no distorting taxes) the value of a firm—its market capitalization of all liabilities—must be the value of its assets*" (Samuelson and Barnett 2007).

Even though financial economics relies on similar analytical techniques as traditional microeconomics, over time it has become a field of its own, with a huge expansion during the last few decades.

As mentioned above, Tobin and Modigliani constructed important financial building blocks. However, the field of financial economics today is built mainly on foundations laid in the 1950s and 1960s by Markowitz, Miller, and Sharpe, who were jointly awarded the Nobel Prize in 1990. While Markowitz' contribution was to construct a micro-theory of portfolio management of individual wealth holders, Merton and Sharpe developed equilibrium analysis in financial markets. More specifically, Sharpe developed a general theory for the pricing of financial assets. Miller made important contributions in the field of corporate finance (as already said, partly in cooperation with Modigliani). Miller clarified which factors determine share prices and capital costs of firms.

Markowitz is best known for his pioneering work in **modern portfolio theory**, where he studied the effects of asset risk, return, correlation, and diversification on probable investment portfolio returns. A **Markowitz efficient portfolio** is one where no added diversification can lower the portfolio's risk for a given return expectation, and alternately, no additional expected return can be gained without increasing the risk of the portfolio. The **Markowitz efficient frontier** is the set of all portfolios that will give the highest expected return for each given level of risk.

These concepts of efficiency were essential to the development of the **Capital Asset Pricing Model**¹⁴ (CAPM) developed by Sharpe (and later also by Mossner and Lintner). The Capital Asset Pricing Model has become the backbone of modern price theory of financial markets. The so-called beta values models, which measure the degree of covariation between the return on a specific share and the stock market as a whole, are today a standard tool in the analysis of financial markets and investment decisions. Sharpe also created the **Sharpe ratio** for risk-adjusted investment performance analysis and contributed to the development of the **binomial method** for option valuation, the **gradient method for asset allocation optimization**, and **return-based style analysis** for evaluating the style and performance of mutual funds.

¹⁴Sharpe submitted the paper describing CAPM to the Journal of Finance in 1962. However, ironically, the paper which would become one of the foundations of financial economics was initially considered irrelevant and rejected. Sharpe had to wait for the editorial staff to change before he finally got the paper published in 1964.

Miller was recognized as one of the most important developers of theoretical and empirical analysis in the field of corporate finance. His research interests were strongly based on economic and regulatory problems of the financial services industry, and especially of the **securities and options exchanges**. We have already mentioned his fundamental contribution together with Modigliani for the **Modigliani-Miller Theorem**.

- **1996—Mirrlees (UK) and Vickrey (Canada)**—*For their fundamental contributions to the economic theory of incentives under asymmetric information*

Nobel Prizes have also been given to the field of economics of information. Mirrlees and Vickrey did pioneering work about the consequences of various limitations in the information of individuals, including “**information asymmetries**” among economic agents. It turns out that such information asymmetries are of great importance for the functioning of markets such as insurance and credit markets.

Mirrlees also did fundamental work on the **consequences for taxation of asymmetric information** between the government and private agents.

Vickrey’s clarified the **properties of various types of auctions**. His insights have been crucial for the efficient functioning of auctions of rights to broadcast, landing permits at airports, television rights, as well as sales of government assets (privatization).

- **1997—Merton (USA) and Scholes (Canada)**—*For a new method to determine the value of derivatives*

These two professors were given the Nobel Prize for their analysis of price formation of so-called derivative instruments, such as options. Black, cooperating with Scholes, was also instrumental to this achievement.¹⁵

In 1973, Black and Scholes published the so-called **Black-Scholes formula**¹⁶ for pricing stock options, which solved the evaluation problem.

¹⁵ Though ineligible for the prize because of his death in 1995, Black was mentioned as a contributor by the Swedish Academy. See Press Release of the 1997 Nobel Prize (https://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1997/press.html).

¹⁶ A further theme can be mentioned when explaining the 1997 Nobel Prizes. In finance there are two fields, quantitative and corporate, which, although belong to the same subject, deal with different themes. These two fields seem to meet when it comes to assessing the equity of a company. In fact, the Black-Scholes-Merton Model, developed for option pricing,

Merton had a direct influence on the development of the formula and has generalized it in many important ways. Soon afterward, the formula was applied on the new options exchange in Chicago and, later, used daily by thousands of agents on markets all over the world. More important than the formula itself, however, was the method that the laureates used to derive it. In one stroke they solved the problem which had been an obstacle in the pricing of all kinds of options, that is, what risk premium should be used in the evaluation. Black, Merton, and Scholes made a vital contribution by showing that it is in fact not necessary to use any risk premium when valuing an option. This does not mean that the risk premium disappears; instead, it is already included in the stock price. These contributions were a necessary condition for the subsequent development of today's huge markets for various types of derivative instruments. These markets have increased the possibility for individual agents to choose adequate risk levels according to their own preference, regardless of whether they choose low or high exposure to risk.

We need to underline that assumptions of the Black-Scholes model are not all empirically valid. The model is widely employed as a useful approximation to reality, but proper application requires the understanding of its limitations. Among the most significant limitations are the underestimation of extreme moves, the assumption of instant costless trading, and the assumption of a stationary process. The 1997 laureates are also famous for the *Long-Term Capital Management* (LTCM), which was a large hedge fund founded in 1994 by John W. Meriwether, the former vice-chairman and head of bond trading at Salomon Brothers, and led—among others—also by them. LTCM collapsed in 1998 due to its high-risk arbitrage trading strategies.

In his 2008 letter to the shareholders of Berkshire Hathaway, Warren Buffett wrote: *“I believe the Black–Scholes formula, even though it is the standard for establishing the dollar liability for options, produces strange results when the long-term variety are being valued ... The Black–Scholes formula has approached the status of holy writ in finance ... If the formula is applied to extended time periods, however, it can produce absurd results. In fairness, Black and Scholes almost certainly understood this point well. But*

represents an alternative to the discounted-cash-flow model, in particular to explain why distressed companies, i.e. companies nearly close to default (debt value close to asset value), present a positive equity. In this context, the company's equity is handled as a call option, with all the limitations and implications that this entails.

their devoted followers may be ignoring whatever caveats the two men attached when they first unveiled the formula".¹⁷

Merton, in the aftermath of the crisis in 2009, did not seem to regret his theory and so stated in an interview: "*We do not need a new economic paradigm, but on the contrary we have to use the crisis as an opportunity to improve the global financial system, where there are no safe havens and above all without looking in the rear-view mirror of the story, to the models of the '30s*". ... "*The mathematics of the models was precise, but not the models, being only approximation to the complexity of the real world*".¹⁸

- **2001—Akerlof, Spence, and Stiglitz (USA)**—*For their analyses of markets with asymmetric information*

A more general theory of **asymmetric information** was later developed by 2001 Nobel laureates.

Akerlof studied markets where sellers of products have more information than buyers about product quality. In a very famous seminal paper written when he was only 26 years old—**The Market for “Lemons”**—he showed that low-quality products may squeeze out high-quality products in such markets, and that prices of high-quality products may suffer as a result. The analysis helps to explain, for instance, extremely high borrowing rates in poor countries and the difficulties for broad markets for health-care insurance to emerge. Indeed, it is probably the single most important contribution to the literature on the economics of information.¹⁹ Can we adopt *Akerlof's* studies in nowadays' banking events? Probably this is true if we think, for example, of the *Non Performing Loans (NPLs)* world. Several impediments affect the prices of NPLs to a different extent in the various euro-area countries. This market can be compared to what Akerlof defined as the “Market for ‘Lemons’”. This is a situation in which investors demand a premium to protect themselves against uncertainty about

¹⁷ See Buffett (2009), p. 19.

¹⁸ See da Rold (2009).

¹⁹ As has been the case for other seminal works by Nobel Prize laureates, the paper, written in 1966–1967, found a home only after a fairly protracted struggle by its author. In fact, it was rejected in turn by the *American Economic Review*, the *Review of Economic Studies*, and the *Journal of Political Economy*. The first two rejections were on the grounds of triviality, the last was because the argument Akerlof had advanced was, in the view of the *Journal's* referee, simply wrong. The paper was subsequently accepted and published in the *Quarterly Journal of Economics* in 1970. See Vane and Mulhearn (2005), p. 293.

the possibility that the best-informed banks attempt to sell them credit assets lower than they might appear at first sight. This results in limited market activity since prices that investors are willing to pay for NPLs are much lower than those to which the banks would be willing to sell them.

Spence and Stiglitz analyzed various types of spontaneous adjustment mechanisms in such markets.

Spence showed in his seminal article of 1973 how better-informed agents may improve the market outcome by taking costly actions for the purpose of transmitting information to poorly informed agents. Important examples of such “**signaling**” are education as a signal of individual productivity in labor markets, and dividend payments to signal high profitability of individual firms.

Stiglitz instead analyzed the role of “**screening**” in markets with asymmetric information. An example is the attempt, by insurance companies, to partition contracts into risk classes, hence offering different types of contracts among which customers can choose. Stiglitz has also shown how a number of market phenomena may be explained by the theory of asymmetric information, for example, unemployment, credit rationing, and sharecropping contracts in the agricultural sector in some developing countries.

- **2002—Kahneman (Israel)**—*for having integrated insights from psychological research into economic science, especially concerning human judgment and decision-making under uncertainty*—**Smith (USA)**—*for having established laboratory experiments as a tool in empirical economic analysis, especially in the study of alternative market mechanisms*

The awarding of the 2002 Nobel Prize was notable for the bold choice of the awarded field: economic psychology. Those were years where economic analysis was being increasingly influenced by research in psychology. The awarding of the prize to Kahneman and Smith is a reflection of this development. They really integrated insights from psychology into economics, thereby laying the foundation for a new field of research.

Kahneman, in cooperation with Tversky (who died in 1996), has made particularly important contributions to the topic of **decision-making under uncertainty**. They have also shown how individuals’ specific perceptions of alternatives systematically influence their choices, and how the exact framing of those alternatives is important for their choices. Their empirical findings challenge the assumption of human rationality which

was at that time prevailing in modern economic theory. With Tversky and others, Kahneman established a cognitive basis for common human errors that arise from heuristics and biases. Kahneman and Tversky also developed an alternative to the traditional theory of choice under uncertainty, namely, the **prospect theory**. This theory can capture behavioral patterns in human decision-making better than the traditional economic theory. A key element in prospect theory is that individuals compare uncertain outcomes with a reference level which depends on the situation where the decision is made, instead of evaluating the outcome according to an absolute scale.

Smith has analyzed the interaction among individuals' inside markets. He has also demonstrated that experiments can be used in more complex situations, where economic theory does not provide precise results. In the same way that wind tunnel tests with prototypes can guide engineers before a real airplane is sent into air, Smith has shown that **laboratory experiments** can lead economists before they launch new market methods, for instance, in connection with deregulation or privatization.

We ought to remember that different scholars have contributed to this development, including previous Nobel laureates: Simon (1978) and Allais (1988) brought psychological perspectives into decision theory, while Nash and Selten (both in 1994) conducted early experimental studies.

- **2013—Fama, Hansen, and Shiller (USA)**—*For their empirical analysis of asset prices*

Asset pricing is one of the fields in economics where academic research has had the most impact on non-academic practice. Even though there is still no broad consensus regarding the interpretation of certain results, the research initiated by Fama, Shiller, and Hansen produced a body of strong empirical findings which still have important practical implications.

These three 2013 Nobel Prize winners developed empirical methods in order to gain important and lasting insights about the determination of asset prices. Their methods have shaped subsequent research in the field and their findings have been highly influential, as mentioned above, both academically and practically, and the waves of research following the original contributions of these Nobel Prize laureates constitute a landmark example of the highly fruitful interplay between theoretical and empirical work.

Fama is known for his empirical work on portfolio theory and asset pricing, but above all, he is most often thought of as the father of the **efficient-market hypothesis**, beginning with his PhD thesis, where he proposed three types of efficiency: strong-form, semi-strong form, and weak form. These types of efficiency are explained in the context of the information sets that are factored in price trend. Moreover, his 1969 article “*The Adjustment of Stock Prices to New Information*” (written with several co-authors) was the first **event study** that sought to analyze how stock prices respond to an event. Later, Fama became controversial for a series of papers—co-written with French—which lifts doubts about the validity of the CAPM. The traditional model uses only one variable to describe the returns of a portfolio or a stock with the returns of the market as a whole. In contrast, the **Fama-French three-factor model** uses three variables. In fact, Fama and French started with the observation that two classes of stocks tended to do better than the market as a whole, small caps and stocks with a high book-to-market ratio (value stocks), so they then added two factors to CAPM to reflect a portfolio’s exposure to these two classes.

Hansen is best known as the developer of the econometric technique called the **Generalized Method of Moments (GMM)**. This method has been widely adopted in economics and other fields and applications where fully specifying and solving a model of a complex economic environment is unfeasible. Using this method, Hansen was able to show that standard risk-based theory could not explain the movements and predictability of share prices. Hansen has focused on the difference between **risk and uncertainty** and the measurement of so-called systemic risk, as well as its role in the 2008 financial crisis and how it should be contained during the post–Great Recession recovery.

And what about Shiller? It is quite hard to present in a nutshell the titanic academic research done by Shiller. Let us give to the reader just some quick facts. In the early 1980s, Shiller presented surprising findings that suggested a very different perspective on asset prices. He discovered there was significant **predictability over longer time horizons**. Using a combination of share price and dividend data, he demonstrated that high prices relative to dividends were followed by low prices relative to dividends three to seven years later (not always, but on average). His interpretation was that the asset market is not always fully rational. This hypothesis, and Shiller’s subsequent work, has stimulated the emergence of a new research field, **behavioral finance**, which borrows from psychology in

order to improve our understanding of asset prices. His book **Irrational Exuberance** (2000) warned that the stock market had become a bubble in March 2000 (the very height of the market top), something which could lead to a sharp decline. In September 2007, almost exactly one year before the collapse of Lehman Brothers, Shiller wrote an article in which he predicted an imminent collapse in the US housing market and subsequent financial panic.²⁰ On this theme, Shiller noted that there was a strong perception across the globe that home prices were continuously increasing, and that this kind of sentiment and paradigm may be fueling bubbles in real estate markets. Shiller, together with Karl Case, created the **Case-Shiller Home Price Index**, which is an important house price index for the United States.

- **2014—Tirole (France)**—*For his analysis of market power and regulation*

Tirole was awarded the Nobel Prize in 2014 and he contributed significantly in a wide range of financial themes and many other fields. Tirole's research focused on industrial organization, game theory, banking and finance, economics, and psychology. He has made several important contributions to the area of **financial regulation**. The question is why financial intermediaries, such as banks and insurance companies, need to be regulated at all. A common theme in Tirole's work is the design of financial regulations that optimally trade off ex post efficiency, for example, intervening to avoid systemic crises, with ex ante efficiency, for example, mitigating the moral hazard problems that produce the prospect of crisis. Tirole also worked on **interbank markets**, comparing the properties of different clearing and settlement systems, and on **consumer interests**, focusing on the problem of many bank lenders, such as depositors, who are too small and dispersed to exercise any control over the bank; the role of regulation is to represent the interests of these lenders, exercising control over banks and mitigating excessive risk-taking by bank managers. Together with Dewatripont, Tirole used a financial-contracting framework to analyze optimal regulation regarding solvency rules, recapitalizations, accounting, and securitization. Together with Holmström, Tirole has made a number of influential contributions that explore the effect of liquidity on financial markets and intermediation.

²⁰ See Shiller (2007).

Tirole, like Shiller, has made fundamental contributions to the theory of rational bubbles and has also made several contributions to corporate finance.

- **2017—Thaler (USA)**—*For his contributions to behavioral economics*

A behavioral approach that mixes psychology and economics helps to understand better the mixture of rationality and emotions behind economic decisions. This is why the 2017 Nobel Prize was awarded to Thaler, one of the pioneers of this discipline. Important suggestions to the design of public policies came from his insights, for example, on the greater effectiveness of the **nudge** as an alternative to imperative requirements of governments and legislators. The book *Nudge* discusses how public and private organizations can help people make better choices in their daily lives.

Thaler’s theory of mental accounting describes how our **limited cognition** makes us use simple rules-of-thumb when making financial decisions, leading to systematic patterns and biases. **Behavioral economics** in the true sense of the term recognizes the notion that people do not make the best economic decisions, but are strongly influenced by values, emotions, and fears, especially with regard to investment and savings decisions. This leads to errors of assessment due to personal expectations about the future. There is a sort of mental accounting that does not allow us to choose objectively when faced with situations of investment and finance, but also in the face of much simpler situations related to our economic behavior. This is one of the reasons why behavioral theories can be considered very modern and have become one of the aspects to the explanation of the economic system, of the crises that continue to follow, partly motivating the financial bubbles that cyclically happen within the markets.

Immediately following the announcement of the 2017 prize, Peter Gärdenfors, Member of the Economic Sciences Prize Committee, said in an interview that Thaler had “*made economics more human*”. Thaler is also the founder of an asset management firm, together with Russell Fuller: Fuller & Thaler Asset Management. Fuller, in charge of the firm’s daily operations, said that Thaler has changed the economics profession, in that “*He doesn’t write papers that are full of math. He writes papers that are full of common sense*”.²¹

²¹ See Karp (2012).

3.2 *Research Questions and Future Directions of Nobel Prize*

After this summary of awarded financial theories, we want to face some questions regarding the relationship between the Nobel Prize and financial topics and give some hints and comments in terms of room for improvement for the future. Bearing in mind that we will be very schematic, we will do this exercise asking ourselves some questions and immediately answering them on the basis of the past and current history of these “financial” Nobel Prizes.

1. *Which Nobel Prizes had the most significant impact on financial paradigms?*

Although some well-known financial theories have seen failed creatures born and built on the award-winning formulas,²² it must be recognized that all studies done by these scientists (think of Tobin and Markowitz, for example) have helped make the stock market and other financial instruments more modern and efficient.

It would be a mistake to underestimate the influence that these seemingly financial theories can have on the well-being of millions of individuals and investors.

2. *Which financial theories that have been awarded the Nobel Prize later turned out to be quite far from the real world, and what is the biggest gap between awarded financial theories and current financial practices? In other words, are they incorporated into the managerial, strategic, or evaluation models of banks, or do such theories remain mainly readings for PhDs and pure academics?*

The fact that some financial Nobel ideas are important does not necessarily mean that they are all relevant or even original, and the fact that

²²The big breakthrough came with the possibility of applying, on a large scale, Black and Scholes Model to compute the value of an option. Since that moment traders, who were really disoriented on how to evaluate these new financial instruments, had a common standard and exchanges exploded. The trader was an expert in finance, very able to understand and manage complex risk assessment models, and then he/she (the trader) began to work in harmony with the so-called quants. Following the example of Black and Scholes, finance became a field of application of high math applications once closer to physics. See for more details Onado (2017), p. 122.

financial ideas can be important and have far-reaching repercussions is not the same as saying that they are always correct.

Just because financial (but not only financial) theories are presented in complex mathematical formulas or win a Nobel Prize, it does not mean that they will always work in the real world. Some of those presented have not fared particularly well. Although laureates spent considerable effort proving concepts in theory, the test of a financial idea is its value and functioning in the real financial system.

Where were the Nobel laureates who could explain the risk to the US financial system in 2008 under the strain of subprime mortgages? Tobin himself was extraordinarily intuitive in advance when in a 1984 article he wrote: “*I confess to an uneasy Physiocratic suspicion, perhaps unbecoming in an academic, that we are throwing more and more of our resources, including the cream of our youth, into financial activities remote from the production of goods and services, into activities that generate high private rewards disproportionate to their social productivity*”.²³

3. *What is going to be the next big financial topic in the future?*

We suggest a simple message: stop trying to emulate the Nobel Prize in Physics and Chemistry! Good economic ideas do not have to be proven mathematically in a journal article.

To this extent the future mission of the Nobel Prize Committee would be also to prioritize awards for important economic and financial issues. As mentioned in the previous section, some Nobel Prizes have been awarded for their potential to refine auctions, and while this topic may be very interesting, it is not the single most important issue.

The Nobel Committee has to attract attention toward “*important issues such as poverty, underdevelopment, financial crises, the business cycle, environmental degradation, discrimination, mass marketing, resource depletion, corporate power, and the costs of war. Rather than gravitate toward smaller, more manageable topics, the Nobel committee could prioritize topics that are most important to people*”.²⁴ And we strongly agree with this thought because the financing of industrial ecology, environmental issues, pollution land use, non-renewable resources, and so on, offers plenty of topics connected to financial issues. The 2018 choice is a very good signal in this direction.

²³ See Tobin (1984), p. 14.

²⁴ See Karier (2010).

4. *Are the recent regulatory interventions on financial system, especially those on banks' capital, NPLs, investor protection, and so on, linked to any financial theory awarded with the Nobel Prize?*

As already mentioned, we think that Akerlof's studies and results can be useful in understanding today's NPLs pricing and every situation where there are asymmetries.

Stigler's studies concerning the adequate amount of available information to investors are impressively modern, and we can think, for example, of Mifid II, Kid, and Kiid prospects related to investor's protection.

Akerlof and Shiller wrote a book to underline traps in which savers and consumers fall systematically. Therefore, although the economic theory of the consumer and the investor is based on the assumption of rational and patient operators, those (consumer and savers) of the real world are manipulable and sometimes act like "crazy people".

Thaler's nudge theory is useful for various types of pension programs and can influence government policies in very significant ways.

However, we also think that past Nobel laureates were not the only important thinkers all around the world.

For instance, if the Nobel Prize had been won by Hyman Minsky, the author of "*Can 'It' Happen Again*" published in 1982, we might have understood how fragility undermined the financial system in 2008.²⁵ Or if Walter Adams, the author of the "*Bigness Complex: Industry, Labor, and Government*" published in 1986, had won the prize, we could have anticipated the bailout of large banks and insurance companies because they were "*too big to fail*".²⁶

Another example: one of the most important benefits of a Nobel Prize in economics is the opportunity to educate the world about great and important ideas in order to fulfill its mission of honoring those scientists who have given the greatest service to mankind. The award of a Nobel Prize in 2006 to Muhammad Yunus served this purpose because it informed the world about how microlending has supported economic development in some of the most impoverished areas of the world. Unfortunately, this was a Nobel Peace Prize, but it should have been a prize in economic sciences.

²⁵ Minsky devoted his career to proving how debt crisis are a recurring and exogenous phenomenon in market economies. See on this topic Onado (2017), p. 192.

²⁶ See Karier (2010).

5. *How brave and pluralistic has the Nobel Committee been in awarding the Nobel Prizes?*

The Committee has tried to be broad and pluralistic of outlook in its decisions about the awards and has also tried to emphasize the multidimensional nature of economic research.

It is important to continue to embrace diversity and accept the fact that economists and professors of finance will disagree. The recent awards for behaviorists and institutionalists represent a good step in this direction, and as already mentioned, the 2018 choice represents a very innovative step forward.

6. *Why do those awarded with the Nobel Prize for Economic Sciences come from a limited number of universities? Could potential candidates come from more peripheral universities?*

With few exceptions, the world of Nobel Prize in Economic Sciences is big and small at the same time. More specifically, of 81 Nobel laureates, 42 had an important academic relationship with other Nobel Prize laureates. Twenty-five of them had a Nobel Prize as doctoral advisor (two of them had 2 Nobel Prize magister, Scholes and Spence), 12 of them trained and educated other Nobel Prize winners (Arrow and Leontief 4 each), and 6 of them had both.

Another aim for the future would be the broadening of the nomination process, to prevent it from being dominated by past winners. As long as past winners have a major role in choosing future winners, no big changes will be observed. Some great economists have won the prize, but not all winners attained the same level of achievement.

The Nobel Prize environment, and especially the financial sub-environment, are very small, and we hope that the Nobel Prize Committee will widen the strands of topics and research in the future.

7. *How can we and our students benefit from the work of 50 years of Nobel Prize laureates?*

Many textbooks of economics and financial themes do not discuss in depth the major contribution of past and contemporary writers and Nobel laureates. In other words, academia explains main financial theories from textbooks with formulae and exercises, but without reading the original

paper. Moreover, textbooks do not fully discuss the contributions of the giants in contemporary financial thought, such as Nobel laureates.

In order to fill this gap, academics can start—if they do not apply this already—to assign supplementary readings of selected Nobel lectures in their courses.

We think (or we hope) that the reaction to the readings will be most favorable, especially in MBA courses, where students can appreciate them, while finding them not only interesting but also challenging.

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PART II

The Financing of SMEs



Risk and Pricing on the Italian Minibond Market

Alessandro Giovanni Grasso and Francesco Pattarin

I INTRODUCTION

In the aftermath of the financial crisis, the Italian government took measures to facilitate bond financing by unlisted companies as a complement to the thinning traditional credit-financing through banks, especially for SMEs. Bonds issued by such companies are called ‘Minibonds’. In 2013, Borsa Italiana organized a new market, the ExtraMotPro, to accommodate the listings and transactions of Minibonds. ExtraMotPro is a segment of the ExtraMot market, the multilateral facility of Borsa Italiana for the trading of corporate bonds of Italian and non-Italian issuers already listed on other regulated markets of the European Union; while retail investors can trade on the ExtraMot, the ExtraMotPro segment is open to professional investors and specialist market-makers only.

ExtraMotPro allows first-time issuers to enter at looser conditions than those required in other segments of ExtraMot. Basically, the listing requirements are (1) to publish annual financial statements for the past

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2 years, the last of which must be audited, and (2) to provide an admission document with just some essential information. Issuance prospectuses are not subject to any regulatory standard. After a bond is listed on the ExtraMotPro, the issuer is required to publish annual audited financial statements and to disclose its rating if it has any; also, any change in bondholders' rights must be disclosed and made public.

'Minibond' is a term used for debt securities that were born within the new legal and fiscal framework first introduced by the Italian government in 2012.¹ This framework is similar to that found in other European countries, such as Germany, France, Spain and Norway (Osservatorio Minibond 2018). Specifically, from the sell side point of view, the main innovations that were introduced are: (1) lowering the balance-sheet conditions and the face-value requirements set by the Italian Commercial Law for companies that want to issue bonds; (2) easing the conditions set by the Fiscal Law that allow companies to post interest payments as costs that reduce taxable income; (3) streamlining of issuing procedures. Some incentives were also introduced for the buy side in order to entice potential investors: (4) the existing exemption from the 20 percent withholding tax on interests from securities issued by listed companies was extended to those issued by unlisted companies, provided that they are held by qualified investors; (5) the streamlining of securitization procedures and the extension of the existing legislation on corporate bonds to bonds issued by unlisted companies; (6) the possibility of using Minibonds, as well as the shares of investment funds whose portfolios are mainly made of Minibonds, as assets covering technical reserves of insurance companies; (7) the overriding of investment limits for pension funds' portfolios with respect to the holdings of Minibonds.²

At the end of December 2016, there were 165 securities listed on the ExtraMotPro market by 137 companies, totaling a face value of 6.241 billion euro. From December 2013 to December 2016, the number of securities on the ExtraMotPro has grown more than fivefold—net of delistings over the same period. In the year 2016, there were 68 new listings, which, net of delistings, increased the size of the market by 900 million euro or

¹Laws 34-2012 and 212-2012, later augmented and amended by Laws 9-2014, 116-2014 and 232-2016.

²Beyond these, starting from 2017, retail investors in personal long-term savings plans ('Piani di Individuali di Risparmio') have some fiscal incentives if they hold at least 70 percent of the plan's asset value in securities issued by companies with stable operating activities in Italy.

by about 17 percent. In the same year, 978 contracts were traded for a total value of 105 million euro and a turnover on the average market value of 1.8 percent. Indeed, this figure is typical of the ExtraMotPro trading activity since its birth and means that Minibonds are basically buy-and-hold securities for investors (Osservatorio Minibond 2017).

Previous research on first-time corporate bonds issuers in Italy documented that local SMEs could have used the opportunity to enter the Minibond market in order to increase leverage and correct maturity mismatches in their assets and liabilities, so that they might rebalance their financial structure, and to reduce the financing gap between internal and external financing (Accornero and co-authors 2015). Accornero and co-authors also found that the number of SMEs entering in the Italian corporate bond market for the first time decreased sharply from 2009 to 2013, when their average number dropped from 100 to 54 per year—while large corporations witnessed the same phenomenon to a far lesser extent. Their investigation does not extend beyond 2013, when the new Italian Minibond market became fully operational, but they argued that the introduction of a new legal framework that was aimed at easing the access of SMEs to bond financing could hopefully reverse the trend they revealed. With the support of a logistic regression on a comprehensive dataset of issuing and non-issuing firms, they came to estimate a potential additional supply of corporate bonds in Italy ranging from 180 to 1870 companies by the end of 2013—with a 95 percent confidence and not considering the effect of the new legislation introduced in 2012.

If we compare Accornero and co-authors' assessment of potential new issuers with the actual development of the Italian Minibond market from the beginning of 2014 to the end of 2016, the outcome is somewhat disappointing, since the total number of issuers—first-time and seasoned—was 238 (Osservatorio Minibond 2015 to 2017), a figure that is definitely at the lower end of their forecasting range.³ So, it looks that there might have been an important and unexpressed demand of bond financing by Italian SMEs (i.e. a large residual potential of Minibond supply). Why is this the case, then?

In this chapter, we try to contribute answering this question by investigating the functioning of the primary Minibond market in Italy from 2013 to 2016. We analyze the behavior of the demand and supply sides of the market by estimating a system of simultaneous equations that help us identify what were the determinants of the observed combinations of

³ Minibond issuers were 86 in 2014, 54 in 2015 and 88 in 2016.

prices and quantities in equilibrium. To this end, we used an original sample of 100 non-financial issuers, who listed 127 Minibonds over that period, and we collected a wide range of data about the features of each issue and of all issuers.

Our estimate of the price equation reveals that, *ceteris paribus*, the yields-to-maturity of investment-grade Minibonds did not differ significantly from the yields-to-maturity of speculative-grade ones, but both are significantly higher than those of bonds that did not come out with a rating. This fact is quite surprising, since in informationally efficient markets where ratings correctly signal the quality of borrowers, low-quality issuers should pay more than high-quality ones; and issuers for whom there is no rating information should not pay less than low-quality issuers. Therefore, the question of how credit rating effectively helps in reducing information asymmetries between Minibond issuers and investors arises.

To address this question, we evaluated the credit risk of the companies in our sample with two different credit scoring models: a model based on a logistic regression, that we developed on a sample of 4000 Italian firms similar to (but not overlapping with) them, and a simple financial model proposed by researchers at the Bank of Italy (De Socio and Michelangeli 2015). When we compared these scores with the ratings of credit rating agencies (CRAs), we found that investment-grade issuers have significantly higher credit risk than speculative grade's according to both measures. Also, the distributions of credit risk of companies with and without a rating are indistinguishable.

Furthermore, we matched the yield-to-maturity of each Minibond in our sample to the average yield-to-maturity of Italian government bonds by year of issuance and time duration. This allowed us to compute the spreads of Minibonds and to compare their distributions by buckets of our scores. We found that, if we partial-out Minibonds features from spreads, the residual component relates positively and significantly to both scores; but this does happen when residual spreads are examined by rating status, whereby investment-grade issues have residual premia that are larger than speculative grade's and non-rated issues have premia that lie in between. Our results provide evidence that creditworthiness is an important component of price in the Minibond market and that investors seem not to rely on ratings to evaluate it.

Finally, while the residual spread increases with our risk scores, there is evidence of a relevant overlap in its distributions by their quartiles. This suggests that some high-quality issuers might have underpriced their issues

relative to low-quality ones; that is, they might have paid spreads that were larger than what would have happened if investors were able to assess their actual credit standing. This interpretation matches the anecdotal evidence that managers and entrepreneurs have complained about the Minibond market being a quite expensive financing channel and with the results of previous research on the German market (Schweizer and Proells 2015; Feihle and Lawrenz 2017). If our explanation of the interplay of price and risk on the Minibond market is correct, then it motivates the observed lack of attractiveness of this market for Italian SMEs.

The rest of the chapter is organized as follows. In Sect. 2, we provide an essential background of the financial literature that addresses the effects of asymmetric information on first-time security issues, its impact on pricing and the role that credit rating agencies may play, and actually play, in reducing information gaps; we also state and explain our research questions. Section 3 describes our dataset and provides some prima-facie evidence about the Italian Minibond market from 2013 to 2016. Section 4 is devoted to explaining our models and their results. In Sect. 5, we sum up and provide hints for further directions of research. Some statistics on Minibond issuers—not included in the main body of the chapter—and the technical details of our econometric procedures are confined in the appendices.

2 BACKGROUND AND RESEARCH QUESTIONS

The capital structure of firms is a multifaceted topic and has been the subject of extensive research in finance over the past 60 years. Starting from the Modigliani and Miller's irrelevance theorem to date (Modigliani and Miller 1958), researchers have investigated the determinants of capital structure taking into account taxation, institutions, the law and regulations, interactions of firm's managers, equity owners and other stakeholders, the functioning of financial markets, the role of financial intermediation and other market players in a non-frictionless market where information is asymmetric (Myers 2001; Bolton and Freixas 2000; Harris and Raviv 1991).

Our chapter tackles the issue of debt financing from an empirical point of view and can be set within the background of recent theoretical and empirical contributions that focus on information asymmetries. De Fiore and Uhligz (2011) state that information availability helps to explain the composition of debt financing. They argue that differences in the financial structure of US and Euro-Area firms, such as the lower share of bank

finance in total debt and the debt-to-equity ratios in the US relative to the Euro Area, can be explained by a relatively low level of disclosure of information about firms' credit risk in the Euro Area relative to the US and by a higher need of European firms for the flexibility and information acquisition role provided by banks. Faulkender and Petersen (2006) claim that asymmetric information between company insiders and investors influences the source of capital decision that firms use. They make the point that firms that have access to the public bond markets, as measured by having a credit rating, have significantly more leverage. The quality of ratings is, therefore, relevant for the proper functioning of the financial system.

Indeed, the relationship between bond prices and the presence of a rating has been investigated for some time. In particular, the ability of major credit-risk pricing models to explain bond-yield spreads over treasury securities received significant attention. Weinstein (1977) studied the effect of a rating change announcement on bond price, finding some evidence of price change during the period from 7 to 18 months after a rating change is announced. According to Wasserfallen and Wydler (1988), borrowers who have the most to gain from certification by a credit rating agency are those who experience the largest increases in investment. In fact, firms that obtain a loan rating double both asset growth and cash acquisitions relative to other firms. Before the financial crisis, Gabbi and Sironi (2005) investigated international corporate bonds markets; they claimed that bond ratings look like the most important determinant of yield spreads, with investors' reliance on rating agencies' judgments increasing over time. The efficiency of primary markets and the expected liquidity on secondary markets are not relevant explanatory factors of spreads' cross-sectional variability. Sufi (2009) argues that loan ratings allow borrowers to expand the set of creditors beyond domestic commercial banks toward less-informed investors, such as foreign banks and non-banking institutional investors. Boot et al. (2006) found that credit ratings are critical to attracting funds from investors without specialized monitoring or screening skills. Loan ratings afford informational-opaque borrowers easier access to the capital of uninformed investors. Furthermore, credit ratings derive their value primarily from two institutional features: the monitoring role of credit rating agencies, which is most apparent in their credit watch procedures; and the specific role that credit ratings play in the investment decisions of some investors (e.g. pension funds, insurance companies). Becker and Milbourn (2011) state that for these reasons,

ratings constitute a key channel of information dissemination in financial markets and are thus considered important by legislators, regulators, issuers and investors alike.

The failure of credit rating agencies to provide information relevant to investors may then hinder the efficiency of corporate bond markets, and this imposes costs on both investors and issuers. If investors cannot tell high-quality issuers from low-quality ones, a ‘market for lemons’ problem arises. High-quality borrowers are the first to suffer if this happens; therefore, they may try to credibly signal their quality for separating themselves from low-quality firms. This can be done in several ways, such as through the underpricing of issues on the primary market, covenants and other indentures in bonds contracts or by providing collaterals to subscribers. The topic of underpricing has been studied for both equity and bond IPOs. Allen and Faulhaber (1989) look at equity IPOs and show that high-quality firms tend to sell their equity too cheaply. Underpricing is perceived by investors as a positive and reliable signal of a high-quality firm offering where companies go public for the first time and subsequently seek to issue further equity through seasoned offerings. Cai and co-authors (2007) and Welch (2000) found that underpricing in the US bond market is larger for opaque firms, such as private firms for which debt IPOs are the very first public security offering, firms that have not been issuing in the corporate bond market for a long time and firms that only recently issued equity in the public markets. Closer to our focus, Schweizer and Proells (2015) investigate the German Minibond market from 2010 to 2014 and claim that Allen and Faulhaber’s (1989) prediction hold: ratings on the market did not provide reliable information to investors and high-quality issuers reacted through underpricing. The authors compared default probabilities associated with initial ratings of Minibonds to those implied by statistical credit-risk models; they concluded that in many cases CRAs issued overly favorable ratings. Furthermore, their analyses of the dynamics of prices on the secondary market support the hypothesis that high-quality borrowers on the German Minibond market bore additional financing costs as they tend to signal their quality through underpricing (i.e. paid higher rates than they could have if investors were aware of them being good and sound borrowers). The authors argue that low-quality firms did not have any incentive for underpricing because their primary aim was to raise the highest possible amount of cash in ‘one-shot’ since investors might then realize their low quality and consequently not provide further capital.

Germany is perhaps the most important case of failure among European Minibond markets. The German ‘Mittelsand-Anleihen Bonds’ market segments were created in the years 2009 and 2010 on several German exchanges and were characterized by minimum issuance volumes, as small as 10 million euro, and by lower standards for investment prospectuses and disclosure than in traditional corporate bonds market segments (Feihle and Lawrenz 2017; Trentman 2017). The German Minibond market witnessed a strong growth in issuances for a few years; then defaults on coupon and principal payments happened with increasing frequency. By 2014, the issuance activity almost stopped completely (Hasler 2014). In 2015, Minibonds defaulted for a total of 165 million euro, a figure that increased to 890 million euro in 2016 (Trentman 2017); by 2017, around one-third of all-time issuers had defaulted (Feihle and Lawrenz 2017). A possible explanation of the failure of the German market is provided by Feihle and Lawrenz (2017), who investigated the post-issuance performance of firms that accessed the Minibond market from 2009 to 2014 with a case-control study approach. They conclude that issuers display lower operating and economic performance than comparable non-issuers, which amplified their financial fragility over time. Also, they argue that, while high financing costs on the Minibond market have played a role in reducing economic performance, the deterioration of operating performance (i.e. gross of interest expenses) was a major cause of financial fragility, mainly because of the low quality of issuers’ investment projects, something that they claim was hardly predictable by investors who only looked at the financial information before the issuance.

With regard to Italy, Altman and co-authors (2017) assessed the creditworthiness of Italian SMEs Minibond issuers with the proprietary Z₁-Score Model, based on logistics regression specialized by broad economic sectors and run on a sample of about 14.5 thousand Italian SMEs. Comparing their results to the ratings assigned by CRAs, they reveal that the amount of information asymmetry is still high in the Minibond market and claim that this fact ‘is affecting the level of risk/return trade-off potentially reducing the number of investors and small businesses that would be interested in using this new channel to fund their business growth’.

To date, the Italian Minibond market has suffered for some cases of defaults, while not to the extent that Germany did. The Italian Observatory on Minibonds has recorded eight events of defaults from 2013 to 2017 (Osservatorio Minibond 2015 to 2018); two of them were single missing payments of coupons, while the rest were more serious and triggered

either insolvency or bankruptcy filings. The size of these cases was 31.7 million euro in terms of the total face value of the Minibonds involved. There are four such cases in our sample of 127 Minibonds (which does not cover the year 2017), corresponding a total size of 18.9 million euro at face value and to a failure rate of about 3.1 percent. This is substantially higher than the 1.7 percent average rate for all incorporated firms in Italy over the 2013 to 2016 period.⁴ These facts lead us to think that, albeit defaults have not been a serious problem in the Italian Minibond market until today, issuing companies look more vulnerable than most Italian companies from a historical perspective.

Because of this background, we think that the relationship between risk and pricing of Italian Minibonds is worth investigating. We raise three research questions. First, what were the determinants of issue prices in the Minibond market? Second, was the rating mechanism effective in reducing information asymmetries about default risk between issuers and investors? And, third, if it was not, what were the consequences of the persistence of information gaps in the joint behavior of demand and supply in the Minibond market? These questions are clearly interconnected and answering them helps to understand how efficient the Italian primary Minibond market was, and how functional it was as a financing channel for companies—mainly SMEs—beyond bank credit. We believe that shedding light on these issues is important for gaining insight about the prospects of the Minibond market in Italy.

3 DATA AND PRELIMINARY ANALYSES

Our dataset consists of 127 Minibond issues that were listed on the ExtraMotPro market segment of Borsa Italiana from its start, in February 2013, to the end of December 2016, by non-financial companies. Since the focus of our investigation is on small issues, the cases that make our sample were selected from all Minibonds listed over that period to have a maximum face value of 50 million euro. We collected data on the basic features of each issue from the public online database of Borsa Italiana; further information was collected by parsing the issuance prospectuses of each security.

⁴We owe this information to KF Economics Srl (<http://kfeconomics.com/wordpress/>). From 2013 to 2016, the failure rate of Italian SMEs was 1.7 percent and 1.1 percent for larger companies.

Years 2014 and 2015 were the period when the listing of Minibonds by non-financial companies was more intense, both by number of issues and by volume: 54 percent of all issues over the 2013–2016 period belong to those years for a total volume at face value of 654 million euro, which equals 67 percent of the value of all sampled issues. Although 2016 was the year when there were most listings, the average issue face value fell by 28 percent from the previous year, to 5.2 million euro, and by more than 50 percent from the peak-year 2014.

We show some features of the new issues of Minibonds in Table 2.1. Most Minibonds came with a fixed coupon rate; only 3 percent of issues were floating rate. Covenants on the issuing company were present in 67 percent of all contracts and became very common after the first year of life of the market. Guarantees on interest and repayment of the principal were also common, as they were present in 40 percent of all cases. These were of two main kinds: either Minibonds were assisted by a third-party guarantee supplied by a public agency, or they were backed by real or financial collaterals posted by the issuer itself.

Over 20 percent of all Minibonds came with a credit rating assigned to the issuing company by Italian Credit Rating Agencies registered under EC Regulations 1060/2009 and 462/2013 (hereafter ‘CRA’).

More than 60 percent of all Minibonds listed from 2013 to 2016 are of very small size, not greater than 5 million euro, and only 31 percent have a face value from 5 to 20 million euro; in just two cases out of 127, the size was near the 50-million-euro limit of our sample (Fig. 2.1).

Table 2.1 Features of first securities issues on the Italian Minibond market from 2013 to 2016

<i>Year</i>	<i>New issues</i>					<i>Face value</i>
	<i>Count</i>	<i>Guaranteed %</i>	<i>With rating %</i>	<i>With covenant %</i>	<i>Floating rate %</i>	<i>(Average €)</i>
2013	11	45.5	36.4	18.2	9.1	7,506,227
2014	39	20.5	28.2	64.1	5.1	11,197,436
2015	30	30.0	23.3	83.3	0.0	7,243,333
2016	47	61.7	10.6	70.2	2.1	5,214,094
2013–2016	127	40.2	21.3	66.9	3.1	7,729,377

Note: Minibonds issued on the ExtraMotPro market by non-financial companies

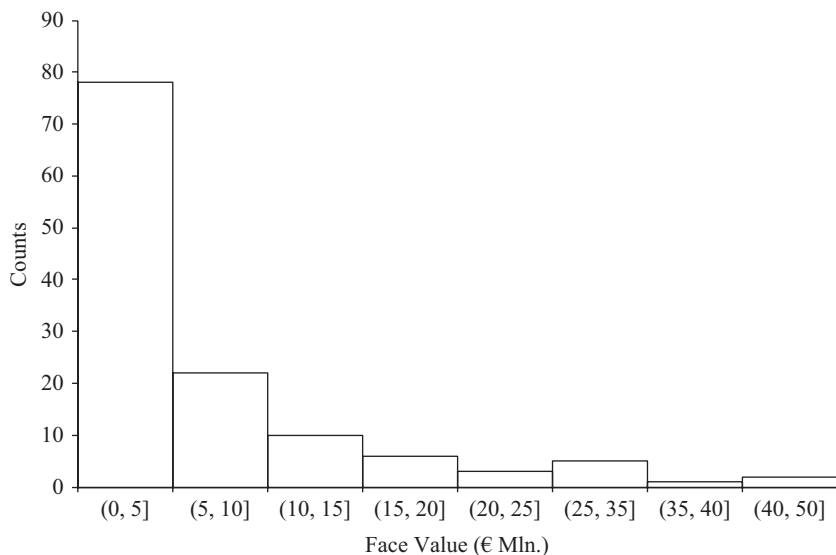


Fig. 2.1 Distribution of all Minibond new issues from 2013 to 2016 by face value. Note: Minibonds issued on the ExtraMotPro market by non-financial companies

Table 2.2 Features of Minibond issuers

<i>Statistics</i>	<i>Sales</i>	<i>Total assets</i>	<i>Employees</i>
	<i>€ million</i>	<i>€ million</i>	
Minimum	0	2818	0
Quartile I	12,191	14,697	52
Median	23,798	44,633	99
Mean	43,710	91,030	194
Quartile III	48,278	107,481	191
Maximum	347,339	1,210,644	1194

Note: 100 non-financial companies that issued Minibonds on the ExtraMotPro from 2013 to 2016

We collected balance-sheet and descriptive data on the companies that issued Minibonds from the AIDA database of Bureau-van-Dijk.⁵ It is evident from the statistics shown in Table 2.2 that Minibond issuers were

⁵We gratefully acknowledge KF Economics Srl for granting us access to this database.

mostly small- to medium-sized companies according to annual sales, total assets and the number of employees. If one looks at turnover only, 9 out of 100 issuers were very small firms, 67 were SMEs and just 24 had the size of large corporates.

We computed the yield-to-maturity for all Minibonds in our sample. This was quite straightforward, as all securities were issued at par-value and most of them have fixed coupon rates; for floating coupon rate bonds, we assumed that the rate set for the first coupon to be paid after the issue date holds through maturity.⁶ For each Minibond, we also matched its own yield to that of Italian government bonds (or Bills) with the same maturity. For doing this, first we retrieved the par yield curve of Italian government bonds ('Govies' henceforth) for key maturities from the Bank of Italy public database, then we found the matching yield by linear interpolation for all those Minibonds with a time duration that falls between two key maturities.⁷ These steps allowed us to compute the yield spread of Minibonds against Italian Govies, which, if not risk-free, are likely to have had a much lower default risk than Minibonds did. Table 2.3 shows the key statistics of the distribution of yield spreads by year. Spreads range from 40 to 760 basis points, but the central 50 percent bulk of the distributions ranges from 381 to 566, with median values that were 412 basis points in 2013 and peaked

Table 2.3 Distribution of Minibonds spreads over Italian government bonds by year (%)

<i>Years</i>	<i>Minimum</i>	<i>Quartile I</i>	<i>Median</i>	<i>Mean</i>	<i>Quartile III</i>	<i>Maximum</i>
2013	3.30	3.81	4.12	4.86	5.65	7.60
2014	1.60	3.65	4.78	4.29	5.25	6.93
2015	1.00	4.38	4.90	4.88	5.66	7.00
2016	0.40	4.03	4.50	4.44	5.20	6.20

Note: 127 Minibonds issues on the ExtraMotPro from 2013 to 2016. Spreads are over yields-to-maturity of Italian government bonds (Bills) matched by maturity

⁶This is a good working approximation in half of the cases, which had maturities below 12 months, but we admit it can be loose for the rest, which will reach maturity after March 2019, as long as investors might have expected money market rates to rise from that date onward. However, these potentially problematic cases are just two out of 127.

⁷Key maturities range from 6 months to 10 years and are equally spaced at 6-month intervals. We collected the quarterly time series of 19 par yields from 1st January 2013 to 1st January 2017.

Table 2.4 Yield-to-maturity and spreads of Minibonds by year and maturity bucket

<i>Year</i>	<i>Maturity class (years)</i>			
	<i>0–3</i>	<i>3–4</i>	<i>4–5</i>	<i>5–</i>
2013	6.94	7.25	6.88	7.13
	551	540	453	403
	3	2	4	2
2014	6.12	6.00	6.27	5.46
	515	485	484	303
	8	8	16	11
2015	4.95	5.64	5.56	5.33
	473	495	464	420
	6	11	14	4
2016	4.40	5.47	5.45	4.41
	449	508	487	333
	19	13	5	10

Note: The top figure in each cell is the average percent yield-to-maturity; the mid figure is the average spread on Italian government bonds matched by maturity in basis points; the bottom figure is the number of issues. 127 Minibonds issued on the ExtraMotPro from 2013 to 2016

to 490 basis point in 2015. Overall, these spreads are substantial, more so since, as we argued above, most Minibonds had covenants or came with some form of guarantee and some had a rating. This suggests that default-risk premia were an important component of the pricing of Minibonds at their issuance.

The implications of such spreads for the pricing of Minibonds are evident from the figures shown in Table 2.4, where average yields-to-maturity and spreads are shown in detail by year and maturity class. In the zero to 3 years maturity class, spreads were generally higher in 2013 and 2014 than they were later; this pattern is somewhat replicated, but not so sharply, for the 3 to 4 years maturity bucket, but does not hold for longer buckets. In all years, the lowest average spread is found in the maturity bucket above 5 years.

This suggests that longer Minibonds—or their issuers—were perceived as less risky than shorter ones. While this evidence may seem counterintuitive, because it is at odds with liquidity premium considerations, we think that it is justified by the Minibond market being mostly a buy-and-hold market for institutional investors. Our interpretation is grounded on two facts: first, only professional investors are allowed to trade on the

ExtraMotPro; second, as we have noticed in the previous section, the trading activity on the ExtraMotPro has been quite low since it started. Therefore, we maintain that marginal investors on the Minibond market are mainly long-term ones and do not command a significant liquidity premium because their investment horizon extends to maturity.

Overall, across all maturity buckets, Minibonds' yields were in the 4.4 to 7.3 percent range, with an average yield of about 5.6 percent for the shortest (up to 3 years) and longest (more than 5 years) maturities, and an average yield of about 6 percent in the middle buckets.⁸

Besides covenants, guarantees, type of coupon rate and default risk, there are some other contractual features of Minibonds that are relevant for their price at issuance. First, 120 out of 127 Minibonds had embedded options (Table 2.5). About half of them came with both a put and a call option: the first gives to the holder the faculty of selling the bond to the issuer before it matures; the second allows the issuer to buy back the bond before its repayment date. Eleven percent of Minibonds with options had only an embedded call, and almost 37 percent just an embedded put. While puttable Minibonds had been quite common from 2014 onward, callable issues were about 20 percent until 2014 but declined to just 4 percent by 2016.

A further feature that we examined is the repayment method. Slightly less than 60 percent of all issues are amortizing bonds, where interest and principal are paid to the holder with a fixed periodicity until maturity; the

Table 2.5 Optionality in issues on the Italian Minibond market from 2013 to 2016

<i>Year</i>	<i>Without optionality</i>	<i>With embedded options</i>			
		<i>Counts</i>	<i>Callable %</i>	<i>Puttable %</i>	<i>Call&Put %</i>
2013	4	7	14.3	0.0	85.7
2014	2	37	24.3	40.5	35.1
2015	0	30	3.3	40.0	56.7
2016	1	46	4.3	37.0	58.7
2013–2016	7	120	10.8	36.7	52.5

Note: Minibonds issued on the ExtraMotPro market by non-financial companies

⁸Take heed of the fact that, over the 2013 to 2016 period, the par-yield curve of Italian Govies was basically and constantly upward sloping.

Table 2.6 Ratings of issues on the Italian Minibond market from 2013 to 2016

<i>Year</i>	<i>With rating</i>							
	<i>Investment grade</i>		<i>Speculative grade</i>		<i>Total</i>		<i>Without rating</i>	
	<i>Count</i>	<i>%</i>	<i>Count</i>	<i>%</i>	<i>Count</i>	<i>%</i>	<i>Count</i>	<i>%</i>
2013	0	0.0	4	100.0	4	36.4	7	63.6
2014	9	81.8	2	18.2	11	28.2	28	71.8
2015	6	85.7	1	14.3	7	23.3	23	76.7
2016	5	100.0	0	0.0	5	10.6	42	89.4
2013–2016	20	74.1	7	25.9	27	21.3	100	78.7

Note: 127 Minibonds issued on the ExtraMotPro market by 100 non-financial companies

rest are bullet bonds, where the repayment date of the principal is the same as its maturity (Table 2.7). While bullet bonds were the most common in 2013, this became true for amortizing bonds from 2014 onward. Put options and amortizing schemes give the holder some protection against default risk beyond covenants and guarantees.

Putting it all together, it is apparent from our analyses that all devices meant to make investors safer against default risk were more common in 2016 than in 2013, the first year of life of the Minibond market. This fact suggests that investors became more concerned about default risk as the Minibond market matured. On the other hand, from 2013 to 2016, the share of issues that came with a CRA rating declined sharply and constantly from 36 percent to about 11 percent (Table 2.6). At the same time, by 2016, all Minibonds issued by rated companies were judged as investment grade, while in 2013 none of them were so. These trends may be interpreted as investors progressively looking for ‘hard’ indentures protections as opposed to relying on default-risk assessments by CRAs.

4 MODELS AND RESULTS

In order to investigate what were the determinates of Minibond prices from 2013 to 2016, we propose a simple system of two simultaneous equations that represent the interplay of the supply and the demand side on the primary market. By ‘supply side’ we mean companies that issued Minibonds, and by ‘demand side’ we mean institutional investors that subscribed these issues before they were listed on the secondary ExtraMotPro market. The supply and demand equations are:

$$\log(\text{Face Value of Issue}) = \alpha_0 + \alpha_1 \text{Yield} + \bar{\alpha} \text{Supply Features} + \eta \quad (2.1)$$

$$\begin{aligned} \text{Yield} = & \beta_0 + \beta_1 \log(\text{Face Value of Issue}) + \beta_2 \text{Government Bond Yield} \\ & + \bar{\beta} \text{Demand Features} + \varepsilon \end{aligned} \quad (2.2)$$

where α and β vectors accommodate the coefficients on the exogenous explanatory variables in each equation. The ‘Government Bond Yield’ variable in the demand equation is also exogenous and is meant to catch the effect of maturity and the default-risk-free par yield on the Minibond yield-to-maturity.⁹ ‘Yield’ and ‘log (Face Value of Issue)’ are the jointly determined endogenous variables.

The supply equation represents the equilibrium quantity as a function of the equilibrium price and of exogenous features, such as the composition of the issuer’s assets and liabilities structure, as observed one fiscal year before the date of issuance; the maturity of the Minibond; the presence of covenants and the type of options in the Minibond contract—if there are any.

The demand equation represents the equilibrium price as a function of the equilibrium quantity and of exogenous features such as the presence and grade of the rating assigned to the issuer by a CRA, either investment or speculative; the issuer’s leverage and asset liquidity, as observed one fiscal year before the date of issuance; covenants, guarantees and options that came with the Minibond; the type of coupon rate, either fixed or floating; the mode of repayment of capital and interest to bond holders, either amortizing or bullet¹⁰; the total number of Minibonds listed on the ExtraMotPro market by the issuing company until the issuance date. This variable is meant to represent the possibility that investors might have been keener to require different (possibly lower) yields from companies that had a more or less consolidated track record and for those that did not.

In Table 2.7, we show the results of the two-stage least squares (2SLS) estimation of our model.¹¹

⁹ Italian government bonds (bills) were not really free of default risk over the 2013 to 2016 period, but were definitely less so than small Italian Minibonds issues such as those in our sample.

¹⁰ In one case, a Minibond was proposed to investors as bullet, but then was issued as amortizing, a fact that is controlled for explicitly.

¹¹ Before proceeding to 2SLS estimation, we run OLS on the reduced form equations associated with our system. As there are nine exogenous variables in each equation that are significant at least at the 5 percent size of t -tests, the system meets the rank condition for

Table 2.7 Demand and supply equations on the Minibond market from 2013 to 2016: 2SLS estimates

<i>Coefficient</i>	<i>Demand equation</i>			<i>Supply equation</i>		
	<i>Estimate</i>	<i>Standard error</i>	<i>P-value</i>	<i>Estimate</i>	<i>Standard error</i>	<i>P-value</i>
Intercept	19.350	3.137	<0.001	9.293	0.981	<0.001
Log(face value of issue)	-0.883	0.207	<0.001			
Yield-to-maturity of Govies %	1.067	0.264	<0.001			
Yield-to-maturity %				0.197	0.080	0.015
Maturity (years)				0.231	0.027	<0.001
With covenant	0.226	0.304	0.459	0.273	0.156	0.084
No optionality	0.295	0.583	0.614	0.152	0.344	0.659
Puttable	0.001	0.380	0.999	-0.079	0.224	0.724
Puttable & callable	-0.813	0.387	0.032	-0.616	0.214	0.005
With guarantee	-0.283	0.278	0.312			
Bullet repayment	-0.402	0.278	0.152			
Turned amortizing from bullet	2.508	1.192	0.038			
Floating rate coupon	-1.427	0.586	0.017			
No rating	-0.685	0.336	0.044			
Speculative grade	-0.540	0.711	0.450			
Cumulated number of issues	-0.089	0.101	0.382			
Debt-to-equity ratio %	0.040	0.015	0.009			
Quick ratio %	-0.503	0.205	0.016			
Cost of incumbent debt %				-0.27	0.026	0.084
Bank debt/Financial debt %				-0.01	0.003	0.002
Working capital/Total assets %				-0.006	0.003	0.04
Fixed capital/Total assets %				0.056	0.042	0.185
Log(total assets)				0.461	0.069	<0.001
Test for overidentifying restrictions	22.162	DoF = 20	0.332	23.188	DoF = 20	0.280
Standard error of residuals	1.059	<i>F</i> -statistic	3.291	0.649	<i>F</i> -statistic	32.309
Multiple <i>R</i> -squared	0.335	<i>P</i> -value	0.006	0.777	<i>P</i> -value	<0.001
Number of observations	114	DoF	98	114	DoF	102

Note: Minibonds issued on the ExtraMotPro market by non-financial companies. The response variable of the demand equation is yield-to-maturity percent, the response variable of the supply equation is the natural logarithm of the face value of issue. Instrumental variables for 2SLS estimation pass the Sargan–Hansen test for exogeneity (Hansen 1982; Sargan 1988). The McElroy’s *R*-squared of the system is 0.675. The linear correlation coefficient of residuals is 0.127. We excluded ten cases from the original dataset because some balance-sheet explanatory variables are missing; three cases are influential outlier cases and were also excluded

The model was estimated on 114 cases out of the sample of 127 Minibond issues. Ten issues were excluded because of missing values on important exogenous balance-sheet variables. Three more cases were excluded as they are influential outliers, since they had large anomalous values on few balance-sheet indices, probably because of misrecording that we could not correct. Before commenting on our results, we notice that the Sargan–Hansen tests for exogeneity on overidentifying restrictions (Hansen 1982; Sargan 1988) are safely passed for both equations of the system. Both equations are significant overall, with F -tests rejecting that all coefficients are null at the 1 percent level at least. Considering that our dataset is a time series of cross sections, multiple R -squares are quite high for both equations: 0.335 for the demand and 0.777 for the supply equation.

In the supply equation, the size of issues, measured as the logarithm of their total face value actually bought by investors, is naturally higher for large than for small companies; if we compared two issuers, one with double total assets than the other, we would expect the face value of the former's Minibond to be 46 percent larger than the latter's. The size of issues was also larger for longer-maturity Minibonds, as a 1-year increase in maturity is expected to raise the face value by almost 20 percent. Minibonds with covenants had a generally larger size, 27 percent more than those without; however, this effect is weaker than the former, as its p -value is just 0.084. The presence of embedded options is not significantly associated with size, except when both puts and calls were present; this was more frequent in small than in large issues, as put-and-call Minibonds are expected to have a face value that is 62 percent less than all others. High-yield Minibonds were slightly larger than low-yield ones, as a 1 percent increase in yield is expected to be associated with a 2 percent higher face value. Minibonds of companies with relatively higher cost of incumbent debt, measured as total interest costs expressed in percentage of total financial debt 1 year before the listing date, had marginally smaller face value than those of other companies: a 1 percent increase in the cost of debt is expected to be connected to issues 27 percent larger.

The asset and liability profile of the issuer was also relevant for supply. Minibonds size was inversely related to the intensity of working capital on total assets: a 10 percent increase is expected to reduce the face value by

identification. We also checked the endogeneity of 'Yield' and 'log(face value of issue)' with the Durbin-Wu-Hausman test (Davidson and MacKinnon 1993), and did not reject it at the 10 percent level for both variables.

6 percent. Also, we found that size was inversely related one-to-one to the share of bank debt on total financial debt, so that a company with a 50 percent share of bank debt is expected to have issued a Minibond 50 percent smaller than a company that did not have any bank debt at all. This suggests that Minibonds were actually a complementary source of finance to banks for the issuing companies, as was expected when they were introduced in the Italian law.

We believe that there are two main motivations that drove companies to tap the Minibond market: first, issuers aimed at financing fixed capital assets (material or immaterial) over a medium- to long-term horizon; second, they needed to finance working capital in the short term. If medium- to long-term debt came at higher yield spreads over government bonds than short-term's and if it was more frequently protected by covenants then our estimates of the supply equation can be interpreted as longer-term Minibonds having financed mainly fixed capital assets and shorter terms' mainly working capital. This is also supported by the signs and values of the coefficients on the capital intensity explanatory variables.

Our estimate of the demand equations shows, as expected, a one-to-one direct relationship of Minibonds' yield-to-maturity with government bonds', capturing par yield curves effects connected to maturity—for example, duration risk and possible liquidity premia. Smaller issues are connected to lower yields (i.e. higher notional prices), as expected: our point estimate of elasticity implies that a 10 percent increase in face value is expected to have reduced yield by a factor of about 0.09 (e.g. from 5 percent to 4.55 percent).

The only optionality feature that seems to have had influenced prices is embedding both puts and calls, which reduced yields by 81 basis points on average. Covenants and guarantees were not significant price drivers on the demand side, nor it was the repayment method—the 'Turned to Amortizing from bullet' variable is just a control for a single special case in our sample (see Footnote 9). Floating rate Minibonds, that were normally benchmarked on 3-month or 6-month Euribor rates and had an average contractual spread of about 400 basis points in our sample, had average yields 2.5 percent higher than fixed rates'. This is consistent with the argument that, historically, market returns on floaters decline with inflation (Bennyhoff and Zilbering 2013), a situation that occurred in the years from 2013 to 2016.

The most striking evidence from the estimated demand equation is that the fact of Minibonds coming with a rating attributed by CRAs to their issuers, and the grade of the rating, when present, did not have significant and different effects on prices. The ‘No Rating’ and ‘Speculative Grade’ explanatory variables are not significant statistically and have unexpected negative signs; meaning that, with respect to investment-grade Minibonds, speculative ones and those issued by non-rated companies should have had lower yields. If the Minibond market was informationally efficient with respect to the pricing of default risk and ratings were informative, the signs on these coefficients would be positive and significant, because investors require a yield premium for speculative bonds above investment grades’. Also, since issues without rating lacked information about default risk, they should have also commanded some premium overrated Minibonds—or, at least, over those with investment-grade ratings. So, it seems that investors did not use ratings to evaluate the credit risk of Minibond issuers. On the contrary, the two financial indices that are in the demand equation, namely, debt-to-equity ratio and immediate liquidity on total assets (‘Quick ratio’ %), which are simply and strictly connected to credit risk, have coefficients with expected signs and good or very good statistical significance.¹² A 10 percent increase in leverage is expected to increase yield by 40 basis points, and a similar increase in liquidity to lower it by 5 percent—as investors appreciate companies that already have enough cash or quickly cashable assets ready to pay installments of bonds.

The evidence from our estimation of the demand-supply system of equations raises an important issue: why were ratings not material in determining equilibrium prices? For the above arguments, we do not think that this was because investors do not care about default risk; we rather think that this was because ratings were not actually informative. Partial support of our claim comes from the fact that, from our descriptive analysis of the Minibond market, the number and the share of issues that came with a rating declined over time, while contractual protections for investors became more common from 2013 to 2016.

¹²The reader can argue that, in our estimated system, the importance of the rating variables is somewhat reduced exactly because of the presence of these indices. We claim that this is not the case for two reasons: first, there is no relevant difference in the distributions of both indices by rating grade in our sample; second, when we removed both indices from the demand equation, the coefficients on the rating variable did not change much and did not become statistically significant. Details about this are available from the authors upon request.

However, the evidence we provided so far is not completely conclusive about the effectiveness of CRAs in evaluating default risk, about investors' attitudes toward default risk and about the implications of both for the pricing of Minibonds. Therefore, we evaluated the default risk of Minibond issuers with two independent and simple quantitative models. We developed and estimated the first model, which is based on a logistic regression of bankruptcy-related events against financial and economic indices, using a subset of Italian companies that matches our sample by size, economic activity and period of observation. This subset consists of 4000 companies; half of them had filings for bankruptcy or insolvency from 2013 to 2016, and half of them did not. In both instances, companies were selected so that they do not overlap with our sample of Minibond issuers.¹³ We used our model to assign a score between 0 and 100 to Minibond issuers in our sample; insolvency risk increases with the score. We call this 'Insolvency Score'.

For the sake of robustness, we also computed a second score, based on a single financial index and aimed at detecting companies that are financially vulnerable: the ratio of net financial costs to Ebitda. This index was originally proposed by De Socio and Michelangeli (2015) and we call it 'Vulnerability Score'. Similar to the Insolvency Score, the Vulnerability Score ranges from 0 to 100; companies with negative Ebitda are always scored 0, and companies with a percentage ratio above 100 are always scored 100; companies in between get a score that equals the percentage value of the ratio.¹⁴

We used both scores to evaluate default risk independently from CRAs' assessments for rated Minibond issuers and to assess default risk for non-rated issuers. We do not claim a priori that our scores are superior to CRAs' ratings, but we believe they may catch important features of issuers' credit risk—that ratings might or might not have signaled to investors. The distribution of both scores for rated issuers is represented by the

¹³ Companies were randomly drawn from a comprehensive database of about 1.2 million cases of Italian companies, solvent and insolvent, observed from 2013 to 2016. We gratefully acknowledge KF Economics Srl for granting us access to these data (see Footnote 3).

¹⁴ De Socio and Michelangeli (2015) suggest that a score above 50 signals financial vulnerability. This makes the Vulnerability Score somewhat comparable to our Insolvency Score, since the latter can be interpreted as the probability of insolvency of company drawn from a pool where the average insolvency rate is 50 percent.

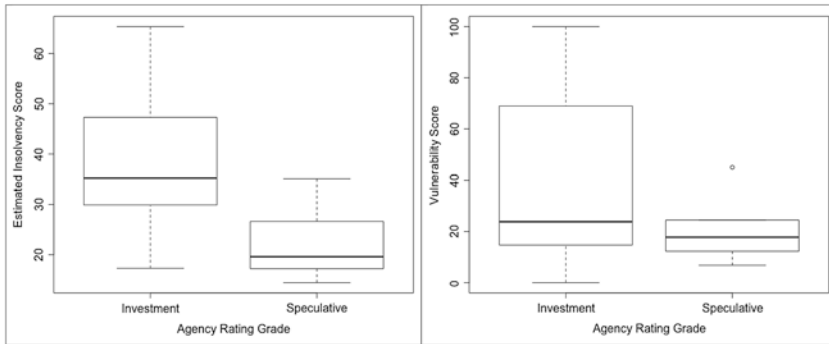


Fig. 2.2 Distributions of Insolvency and Vulnerability Scores by agency-assigned rating grade. Note: Data on non-financial issuers of 27 rated Minibonds issued on the ExtraMotPro. Insolvency Scores are on the 0 (*safest*) to 100 (*riskiest*) scale and are computed with our logistic regression model. Vulnerability Scores are on the same scale and are computed according to De Socio and Michelangeli (2015)

boxplots in Fig. 2.2. It is apparent that issuers rated as investment and speculative grade have different distributions, both by location and spread, that do not overlap much. The fact that speculative-grade issues get lower scores than investment grades' is quite odd. So, either our scores are grossly faulty, or CRAs' ratings did not convey enough information of default risk to investors. Albeit our scores are not extremely accurate, we think that both provide a viable assessment of default risk.

We further investigated the relationship between yield spreads on Minibonds and (1) CRA ratings, or their absence, (2) Insolvency Scores and (3) Vulnerability Scores. The key descriptive statistics of the distributions of yield spreads by each of these measures are shown in Table 2.8. Here, yield spreads have been adjusted by partialling out all effects of maturity, indentures and other price-sensitive contractual features of Minibonds issues by OLS linear regression; we call these spreads 'residual spreads'.¹⁵

The average and the median values of residual spreads increase quite regularly by quartiles of the Insolvency and the Vulnerability Score. Also, the distributions of spreads tend to shift toward larger values as both

¹⁵In plain words, the distributions that we examine are those of the residuals of Minibonds' yield spreads regressed against all variables that describe the bonds' contractual features.

Table 2.8 Distributions of residual spreads by measures of default risk

<i>Measures of default risk</i>	<i>Minimum</i>	<i>Quartile I</i>	<i>Median</i>	<i>Mean</i>	<i>Quartile III</i>	<i>Maximum</i>
CRA rating grade						
Not rated	-325.7	-59.7	-16.4	-3.6	50.3	218.1
Investment grade	-116.8	-36.6	18.2	16.9	76.0	108.5
Speculative grade	-195.4	-59.5	-10.8	0.7	110.2	158.8
Insolvency Score						
Quartile I	-260.0	-65.0	-34.4	-36.1	33.7	83.9
Quartile II	-325.7	-59.7	-18.0	-9.0	39.3	195.9
Quartile III	-135.4	-34.1	36.4	26.8	84.4	199.0
Quartile IV	-65.0	-34.2	25.2	32.6	93.5	218.1
Vulnerability Score						
Quartile I	-259.9	-59.7	-24.3	-18.5	33.6	185.9
Quartile II	-135.4	-47.7	19.2	29.7	87.1	199.0
Quartile III	-16.6	26.1	26.1	44.6	67.2	120.0
Quartile IV	-325.7	-38.9	37.1	21.9	120.5	218.1

Note: 127 Minibonds issues on the ExtraMotPro from 2013 to 2016. Spreads are over yields-to-maturity of Italian government bonds (Bills) matched by maturity. Residual spreads are spreads partialled out of the linear regression effects of covenants, guarantees, optionality, repayment mode, type of coupon rate, and the interactions of maturity and indicators of the years of listing. Effects were estimated by OLS. For Insolvency and Vulnerability Scores, Quartile I means ‘safest’ and IV means ‘riskiest’

measures increase. As expected from the results of our simultaneous equation model, this does not happen to the distributions of spreads by rating grade. Average and median spreads are higher for investment than for speculative-grade Minibonds. The distributions of spreads by rating grade overlap significantly, and also overlap with the distribution of non-rated Minibonds spreads. This evidence supports our claim that default risk was important for pricing but CRA ratings were not relevant indicators of it.

We further tested this claim by regressing residual spreads against each of our measures of credit risk—transformed to logarithms—and on rating grade. The results are reported in Table 2.9. The coefficients on the Insolvency and the Vulnerability Score are both positive and significant at the 5 percent level or less. When the Insolvency Score doubles, residual spreads increase by about 39 percent; the same variation in the Vulnerability Score is associated with a 14 percent variation. As we expected, in the CRA rating grade regression, all coefficients are not statistically significant.

A distinctive feature of residual spreads and distributions of both our risk measures is that, while spreads increase as we move from safer to riskier groups of Minibond issues, distributions overlap to a significant extent.

Table 2.9 Regressions of residual spread on measures of default risk

<i>Coefficients</i>	<i>Estimate</i>	<i>Standard error</i>	<i>P-value</i>
CRA rating grade			
Intercept	-3.600	9.480	0.705
Investment grade	20.535	22.732	0.368
Speculative grade	4.269	42.396	0.920
Standard error of residuals	92.400	<i>F</i> -statistic	0.408
Multiple <i>R</i> -squared	0.007	<i>P</i> -value	0.666
Number of observations	120	DoF	117
Insolvency Score			
Intercept	-130.22	50.33	0.011
Log(Insolvency Score)	38.58	14.71	0.010
Standard error of residuals	89.75	<i>F</i> -statistic	6.876
Multiple <i>R</i> -squared	0.055	<i>P</i> -value	0.010
Number of observations	120	DoF	118
Vulnerability Score			
Intercept	-40.300	21.212	0.060
Log(1 + Vulnerability Score)	14.408	6.982	0.041
Standard error of residuals	90.70	<i>F</i> -statistic	4.258
Multiple <i>R</i> -squared	0.035	<i>P</i> -value	0.041
Number of observations	120	DoF	118

Note: 120 Minibonds issued on the ExtraMotPro market by non-financial companies for which Insolvency Scores and Vulnerability Scores are available

For example, looking back at Table 2.8, the first quartiles of spreads in the Insolvency Score I and Insolvency Score IV groups are -65 and -34.2 and the fourth quartiles are 33.7 and 93.5, respectively. The distributions of spreads by Vulnerability Score groups have similar features. We think of two possible explanations for this: first, our measures are not precise enough, or not as informative as investors' own assessments of risk, to fully explain yield spreads; second, some high-quality issuers (i.e. some of those with lower scores) underpriced their Minibonds to signal their quality to uninformed investors. While we believe that our analysis is quite robust, we admit that the measures that we used are viable but not perfect approximations of possibly better alternative quantitative evaluations of default risk. Therefore, we cannot directly check whether one explanation is stronger than the other, but they can co-exist. So, it is possible that underpricing occurred in some cases and that information asymmetries imposed significant costs to issuers, potentially making the Italian Minibond market less than ideally attractive to SMEs that might have been interested in

using it to fund their businesses. This interpretation is consistent with the predictions of existing models of firms' capital structure based on signaling, with previous findings on the German Minibond market and with the evidence provided by others about the Italian Minibond market, which we referred to in Sect. 2.

5 CONCLUDING REMARKS

We investigated pricing on the Italian Minibond market from 2013 to 2016, focusing on small issues by non-financial firms and collecting yield, rating, company- and issue-specific detailed features on a sample of 127 cases. We estimated a simple system of simultaneous demand-supply equations. The evidence from it together with descriptive analyses of issues and issuers lead us to conclude that Minibonds were a complementary financing channel beyond bank credit that was tapped both by companies that wanted to finance their operations in the short term and by companies that aimed at financing fixed capital in the medium- to long term; the typical size of Minibond issues is larger for the latter than for the former. The expected yield of large issues is higher than that of small issues; also, subscribers of large issues were often protected by indentures, especially covenants, against default risk.

We found that credit ratings assigned to issuers by credit rating agencies were not a significant price driver. We further investigated this matter. First, we compared CRAs' rating grades with our own evaluation of credit risk based on a statistical and a financial model; we found that investment- and speculative-grade issuers, as assessed by CRAs, do not show relevant differences in the scores of our models. Then, we examined yield spreads with respect to these scores and found that they increase with our own risk assessment. This provides evidence that investors cared about default risk but did not rely on CRAs' ratings. Finally, we provide evidence suggesting that some companies tapping the Italian Minibond market might have underpriced their issues in order to signal their quality to investors. If this was the case, then asymmetric information imposed extra costs to existing issuers and might have made the Minibond market less attractive to potential ones.

Our results improve on and are consistent with previous research on the Italian and German Minibond markets and call for evaluating possible interventions to reduce possible information gaps between companies and investors. We believe that any action in this direction should be aimed at

improving information disclosure and transparency, since any intervention aimed at providing economic or fiscal incentives to either the demand or the supply side (beyond those already in place) is not likely to be effective, as it will not solve the information asymmetry issue. We believe that the additional costs that market players would bear to provide disclosure and transparency might be recouped through lower financing costs for issuing companies and a better risk-to-return trade-off for investors. We do not address these topics here, but we think they are worth investigating further.

There are other lines of further research that we deem promising and useful. We think that, while our chapter takes an *ex ante* perspective in analyzing the listing activity on the Italian Minibond market, a follow-up study of what have been the performances of issuing companies after their bonds were listed is worth pursuing. This may be done through a case-control approach and by directly analyzing defaults and covenant breaches and renegotiations over time, in the spirit of what Feihle and Lawrenz (2017) and Schweizer and Proells (2015) did for Germany. These investigations could provide useful insights for policy interventions aimed at improving information efficiency on the Italian Minibond market; possible solutions could be evaluated through simulations in a cost-benefit perspective, extending the scope of Accornero and co-authors' (2015) analyses.

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Exploring Factors Influencing the Success of Equity Crowdfunding Campaigns: Findings from Italy

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I INTRODUCTION

Over the last few decades, the number of players and investment methods in the entrepreneurial finance market has been expanding rapidly; venture capitalists, business angels and finally crowdfunding through equity crowdfunding platforms are becoming crucial for supporting start-ups in the seed and early-stage segments.

Equity crowdfunding is an initial public offering of equity using an online platform that provides the means for the transactions (the legal groundwork, preselection, the ability to process financial transactions, etc.). So equity crowdfunding is part of the online alternative financial

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markets, and it is receiving close scrutiny from policymakers and regulators due to its rapid growth and its different practices across European countries. The European online alternative finance industry—comprising equity crowdfunding, peer-to-peer lending and other activities—has grown from €1019 million in 2015 to €2063 million in 2016. This represents a substantial increase in annual growth from 72% in 2015, and is also above the average annual growth rate of 85% between 2013 and 2016 (Ziegler et al. 2018).

The existing literature in crowdfunding studies has mostly focused on project success, considering aspects related to the company and campaign on only one single platform (Ahlers et al. 2015; Lukkarinen et al. 2016; Vismara 2016a, 2016b). Unlike previous works, our exploratory chapter attempts to investigate success factors, with the focus of the analysis extended to all campaigns appearing on the Italian equity crowdfunding platforms. Italy is an interesting context to study for many reasons: it was the first country to regulate equity crowdfunding investment and platforms with a specific regulation “Decreto Crescita 2.0” in 2012. The legislative changes introduced in 2018 contribute to enlarging the development of equity funds through a crowdfunding campaign to new subjects: limited companies, collective investment undertakings (investment funds) and investment companies (holdings), which invest primarily in innovative start-ups and innovative SMEs. Secondly, there is a high level of wealth held in bank accounts¹ that could potentially finance SMEs; and finally, due to Italy’s particularly large number of SMEs, the potential market for the use of crowdfunding campaigns could be vast.

In this study, we analyse the performance of 175 projects—funded and not funded—which used equity crowdfunding campaigns and the activity of all platforms on the Italian market from 2013 to May 2018. This proprietary dataset represents the entire Italian market of equity crowdfunding. The main contributions of the chapter are related to the exploration of country-specific campaigns’ success factors.

Our findings confirm the importance of the company’s number of shareholders and the presence or absence of an industrial shareholder on its board before the campaign in explaining the probability of success.

¹ 25.8% of financial assets held by Italian households is in the form of current accounts. Bank of Italy, 2018, Annual Report for 2017, Rome.

We also find that the difference between maximum and minimum capital targets is relevant for the campaigns' likelihood of reaching the maximum target.

Our findings are relevant both for equity crowdfunding platforms and for entrepreneurs, because understanding campaign success factors, especially in a country where equity crowdfunding is in its infancy but at the height of its potential, could offer a practical contribution to the development of the market.

The remainder of this chapter is organised as follows: Sect. 2 presents the sample and the Italian equity crowdfunding market; in Sect. 3 we discuss the variables used in the study on the basis of the current literature; Sect. 4 explains our empirical approach and describes the methods and the models; and the results are discussed in Sect. 5. Section 6 concludes and discusses the implications of our findings.

2 THE SAMPLE: THE ITALIAN EQUITY CROWDFUNDING MARKET

Data about all Italian equity crowdfunding campaigns were collected by the authors in an ongoing process that started in 2013 and ended in May 2018, constantly monitoring the campaigns published on all Italian platforms. Thus, this proprietary dataset is unique and generates an up-to-date picture of the state of the art of the Italian equity crowdfunding market, with data referring to the whole set of campaigns that have taken place in Italy.

In Italy, the legislation of equity crowdfunding is the result of an evolutionary process started in 2012,² which involved both the buy side and the sell side. Italian legislation provides a number of benefits for issuers and a series of tax benefits for investors. Originally, only innovative start-ups were authorised to raise money, via offers to the public of equity participation, through specific online portals. With effect from 2018, after almost 5 years of gestation, the authorised bidders are:

²Legislative Decree no. 179 of 18 October 2012 converted by Law no. 221 of 17 December 2012; Decree Law no. 76 dated 28 June 2013, also known as “Decreto Lavoro” (duly implemented by Law n. 99 dated 9 August 2013); Decree Law no. 3 dated 24 January 2015 (known as “Investment Compact” and duly implemented by Law no. 33 dated 24 March 2015); Law no. 232 dated 11 December 2016 (so-called 2017 Legge di Stabilità).

1. small and medium-size enterprises, as defined by Article 2, comma 1, point f, introductory sentence, of EU Regulation no. 2017/1129 of 14 June 2017³;
2. innovative start-up companies, including start-ups with a social vocation, as defined by Article 25, commas 2 and 4, of the Decree, and tourism start-ups pursuant to Article 11-b of Decree Law no. 83 of 31 May 2014, converted with amendments by Law no. 106 of 29 July 2014. A start-up is defined as innovative if it develops, produces and trades innovative goods or services having high technological value and if these activities represent the start-up's sole or prevailing core business. Moreover, an innovative start-up must meet at least one of the following alternate requirements: (a) the costs allocated to research and development must be equal to or higher than 20% of the higher value between (i) the company's production costs and (ii) the company's production value; (b) at least one-third of its workforce must consist of people who have or are engaged in a PhD or who have a degree and have completed a three-year research programme at a public or private research organisation in Italy or abroad; (c) it must be the owner or assignee, or have applied for the registration with the relevant authorities, of an industrial property right (e.g. a patent) related to its core business. Innovative start-ups also have special advantages with regard, for example, to tax benefits and crisis management;
3. innovative small and medium-sized enterprises ("innovative SMEs"), as defined by Article 4, comma 1, of Decree Law no. 3 of 24 January 2015, converted with amendments by Law no. 33 of 24 March 2015. An innovative SME is defined as a company operating in the field of technological innovation, regardless of its date of incorporation, economic sector of business or stage of maturity;
4. collective investment schemes ("UCITS") which invest mainly in small and medium-sized enterprises, as defined by Article 1, comma 2, point e, of the Ministry of Economy and Finance Decree of 30 January 2014;
5. companies which invest mainly in small and medium-sized enterprises, as defined by Article 1, comma 2, point f, of the Ministry of Economy and Finance Decree of 30 January 2014.

³ Companies, which, according to their last annual or consolidated accounts, meet at least two of the following three criteria: an average number of employees during the financial year of less than 250, balance-sheet total not exceeding EUR 43,000,000 and annual net turnover not exceeding EUR 50,000,000.

In Italy, these entities may raise capital by offering new shares to the public through online platforms enrolled in a register⁴ held by the public authority responsible for regulating the Italian financial markets, Consob. The register includes an “ordinary” and a “special section”. In the “ordinary section”, registered portal managers are authorised by Consob to further verify the requirements established by law.⁵ The “special section” includes banks and investment firms (SIM) already authorised to provide the relative investment services, who have notified Consob of their intention to manage a portal before starting this activity.

An initial crowdfunding offering is a less expensive process than a traditional initial public offering on a regulated market. For example, the legislation provides an exemption from prospectus requirements for public offerings of shares or stocks made through an authorised equity crowdfunding platform which do not exceed the overall amount of 5 million euros.

Investors can be divided into two categories: (1) unsophisticated investors, individuals or legal entities and (2) sophisticated investors. Investors in the first category are subject to some investment limits: €500 per single order or €1000 annually for individuals or €5000 and €10,000, respectively, for investments by legal entities. No MiFID application is required for single investments less than EUR 500 and overall investments during the year less than EUR 1000. The second set is more copious: certified incubators, banks, financial intermediaries and professional investors. Sophisticated investors must invest at least 5% or 3% of the minimum funding target to permit positive conclusion of the campaign. This aims to provide safeguards concerning integrity and protection against investor fraud, since more sophisticated investors are deemed by Consob to be more astute in selecting offers.

As of 2018, the Italian market contained 28 authorised platforms (Table 3.1) but only 17 had operated in the market. In 2018, 15 platforms were still in operation, 2 platforms had closed down, 10 platforms were authorised but not yet operational and 1 portal had closed down without presenting a campaign. In the Italian markets, only one active platform is specialised in real estate, while the other platforms have no restrictions on their activities.

⁴The register is established pursuant to Article 50, comma 5, of Legislative Decree No. 58/1998.

⁵TUF and the regulation adopted by Consob by means of resolution no. 18592 dated June 26, 2013.

Table 3.1 Number of platforms started per year

	2013	2014	2015	2016	2017	2018	Total
Platforms	2	10	6	1	6	3	28

Table 3.2 Number of campaign per year and platform

	2013	2014	2015	2016	2017	2018	Total	%
Platform 01		6	8	4	11		29	16.6
Platform 02		3		1	1		5	2.9
Platform 03		1					1	0.6
Platform 04			2	3	5	1	11	6.3
Platform 05			3	1	1		5	2.9
Platform 06		1	1	9	26	1	38	21.7
Platform 07				3	1		4	2.3
Platform 08				6	16	7	29	16.6
Platform 10	1	3					4	2.3
Platform 11			1	3	7		11	6.3
Platform 12				7	2		9	5.1
Platform 13			1		1		2	1.1
Platform 16				5			5	2.9
Platform 18				3	14	4	21	12.0
Platform 19					1		1	0.6
Total	1	14	16	45	86	13	175	100.0

Our sample considers 175 campaigns.⁶ As shown in Table 3.2, the first four platforms cover around 70% of the market. There is a time gap between the date of establishment of the platform and the start of activity with the publication of the first campaign.

The number of issuer companies is 169⁷ and their characteristics vary widely. Consistent with the legislation, 149 of the issuers are innovative start-ups, 2 are start-ups, 13 are innovative SMEs, 1 is an SME and 4 are Special Purpose Acquisition Companies (Table 3.3). Companies are relatively young when they decide to run a crowdfunding campaign: the average time between the year of the campaign and the year of companies' foundation is 2.38 years.

Considering the distinction between funded and not funded, Table 3.4 shows that the percentage increased over the period, meaning that the market is developing, with a learning effect allowing campaigns to be designed more effectively.

⁶We excluded the offering regarding real estate companies.

⁷Five issuers undertook more than one campaign.

Table 3.3 Types of issuers

<i>Type of issuer</i>	<i>Number</i>	<i>%</i>
SME	1	1
Innovative SME	13	8
SPAC	4	2
Innovative start-up	149	88
Start-up	2	1
Total	169	100

Table 3.4 Percentage of successful campaigns per year

<i>Success of campaign</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>Total</i>	<i>%</i>
No		9	7	18	27	2	63	36
Yes	1	5	9	27	59	11	112	64
Total	1	14	16	45	86	13	175	100
% Yes	100	36	56	60	69	85	64	64

Table 3.5 Amount requested and effectively raised (euro)

	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>Total</i>
Total amount required	147,000	4,665,400	6,743,829	12,324,893	27,746,768	3,604,000	55,231,889
Effective amount raised	157,731	2,063,298	2,621,812	4,936,619	15,856,884	2,817,567	28,453,911
	107%	44%	39%	40%	57%	78%	52%

Table 3.6 Number of non-professional investors per year

	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>Total</i>
Number	72	94	347	1349	4413	587	6862

The total amount requested by the 175 campaigns closed is more than 55 million euro, and nearly 52% of the capital requested, more than 28 million euro, was received (Table 3.5).

Finally, the number of non-professional investors has grown to 6862, although it is still a long way from the idea of a real crowd (Table 3.6).

3 THE DETERMINANTS OF EQUITY CROWDFUNDING CAMPAIGNS' SUCCESS

The current literature on equity crowdfunding is mainly focused on a specific research question: *what are the most important factors associated with fundraising success?* On the basis of the main literature, we distinguish issuer company-related variables from campaign-related variables.

3.1 *Issuer Company-Related Variables*

In the context of entrepreneurial finance, the presence of market imperfections due to information asymmetries between the management team and potential investors is well documented. In the case of equity crowdfunding, these problems are more severe due to the presence of start-ups and small investors, the crowd. Start-ups aim to collect capital from a large number of mostly anonymous investors, who contribute small amounts of money via the Internet (Belleflamme et al. 2014). Start-ups appear more opaque due to the absence of a track record, while small investors, unlike professional investors, are less likely to possess the financial expertise or have adequate time to perform due diligence to investigate firms and their business models in detail (Schwienbacher and Larralde 2012; Ahlers et al. 2015; Lukkarinen et al. 2016). In addition to limited expertise, small investors might have limited incentives to evaluate investment opportunities owing to their lower financial stake (Mohammadi and Shafi 2018). The costs associated with sifting through a large number of potential projects to identify those worth investing in may outweigh the benefits for small investors. Agrawal et al. (2014) observe a potential free-riding situation on the due diligence efforts of other investors, which may lead to an underinvestment in due diligence.

Due to the specific characteristics of equity crowdfunding, establishing personal relationships to reduce information asymmetries, as in the case of business angel or venture capital investments, is not feasible in equity crowdfunding markets.

One important way to deal with information asymmetries is signalling (Spence 1973). Hence, companies need to find alternative ways to communicate their quality to potential investors, gaining legitimacy and credibility, in order to receive financing.

Company-related aspects that influence the likelihood of campaign success may stem from traditional criteria used by business angels and venture capitalists in their decision-making process (Vismara 2016a; Courtney et al. 2017; Lukkarinen et al. 2016). The most widely used factors are:

- a large number of team members with high human capital (Ahlers et al. 2015; Vismara 2016b; Piva and Rossi-Lamastra 2017);
- the presence of a previous professional investor in the company and third-party endorsement alleviate the information gap concerning start-up opportunities (Courtney et al. 2017). Kim and Viswanathan (2013) find that early investments have a strong impact on later investments in profit-sharing crowdfunding; in particular, they reveal that less experienced investors are strongly influenced by the investment decisions of experts. Agrawal et al. (2016) show that the syndicate structure and incentive system may be quite effective for equity crowdfunding;
- geographical distance between the investor and the company (Agrawal et al. 2015; Vismara 2016a);
- networks and crowdfunding success are strongly linked and connected with company aspects and, in particular, with the proponent and composition of the Board (Colombo et al. 2015; Vismara 2016a; Skirnevskiy et al. 2017; Butticcè et al. 2017). The network reduces informational asymmetries, particularly pronounced in an equity crowdfunding context due to the fact that small investors also tend to have limited experience in evaluating company propositions.

We take into account several variables in line with those identified in the literature review: company's age (a), company's number of shareholders (b), company's number of directors (c), presence of business angels or other professional investors (d), presence of an industrial shareholder (e), and the adequacy of the proponents' professional skills (f).

We use the company's age (a), measured as the difference between the year of the campaign and the year of the company's foundation. The age of the company is considered as a measure of entrepreneurial skill in business development. Older companies in terms of business visibility appear to be less risky: the products and services that they produce are identifiable, and the customer target and the supplier relationships are defined. They achieve positive cash flow and are therefore able to attract more investors.

To analyse the network effects, we use two different variables: company's number of shareholders (b) and company's number of directors (c).

Network effects are present if users give importance to participation and look at the decisions of other users as a signal of projects' quality and sustainability. Network effects may emerge in a large variety of contexts and may be positive or negative depending on the circumstances. Networks and business linkages are important channels through which firms can access additional, and often complementary, resources. As argued by Baum and Silverman (2004), larger management teams are not only likely to possess higher human capital but may also have more extensive networks. This does not conflict with the idea that equity crowdfunding should allow the raising of capital and render the role of networks superfluous, as firms and investors are brought together seamlessly via third-party internet platforms. However, many studies (Brown et al. 2016, 2017; Vismara 2016a; Colombo et al. 2015; Agrawal et al. 2015; Frydrych et al. 2014; Mollick 2014) suggest that networks are important for the success of the campaign.

Networks, and especially social relationships, can provide access to valuable information. Mollick (2014) showed that the number of a founder's social network connections is associated positively with the capital raised from a project. Colombo et al. (2015) found that the founder's social capital plays a crucial role in attracting backers in the early days of a campaign, which, in turn, mediates the success of the offer. Vismara (2016a) found that the projects of founders with more connections have a greater probability of success. Moreover, the number of members in entrepreneurial ventures is related positively to campaign outcome, reflecting this variable's perception by outside investors as a positive signal of a firm's ability to cope with market uncertainty. In a similar direction, Kuppuswamy and Bayus (2017) found that the majority of funds collected in rewards-based crowdfunding originate from companies' existing networks. Moreover, networks can enhance a venture's legitimacy (Baum and Silverman 2004) and reputation, and may thus serve as a signal of quality (Hoang and Antoncic 2003; Stuart et al. 1999).

The presence of informational asymmetries, limited experience in evaluating investment propositions and the difficulties in performing effective checks mean that the "crowd" has limited knowledge about the legitimacy of an entrepreneurial venture. As a signal of legitimacy and quality, we use the measures of the presence of business angels and other professional investors (d) and/or industrial operators as shareholders (e).

The certification theory is related to the signalling theory, as it emphasises the ability of reputable third-party agents to address adverse selection problems by sending effective signals that certify venture quality (Megginson and Weiss 1991).

Hornuf and Schwienbacher (2014) affirm that in some cases crowd investors and business angels complement each other, as the crowd can rely on the financial negotiating skills and monitoring abilities of business angels, which also provide hands-on advice and lend their reputation to the entrepreneurial firm (Hsu 2004; Ferrary and Granovetter 2009). Dorff (2013) analyses data on angel investing and states that angel investing is the closest analogue to equity crowdfunding. Manchanda and Muralidharan (2014) compare equity crowdfunding and venture capital investing, concluding that while venture capitalists may face some direct competition from equity crowdfunding, the two forms possess distinct characteristics that may make them complementary to each other. Kim and Viswanathan (2013) find that early investments have a strong impact on later investments in profit-sharing crowdfunding. In particular, they show that less experienced investors are strongly influenced by the investment decisions of experts. Agrawal et al. (2016) show that the syndicate structure and incentive system may be quite effective for equity crowdfunding.

Zacharakis and Meyer (2000) find that venture capitalists list experience and management skills among their most important selection criteria, and Piva and Rossi-Lamastra (2017) also show that entrepreneurial experience has a positive effect on crowdfunding success; we therefore use the variable adequacy of professional skills of the proponent (*f*). This variable has a qualitative rating, on a scale from one to three, and is obtained by reading the proponent's CV and looking at different aspects: industry expertise, track record, educational background, experience and fit with the project. Ahlers et al. (2015) found that a higher number of board members with an MBA is positively, statistically significantly related to funding success.

3.2 *Campaign-Related Variables*

Campaign characteristics that influence fundraising success offer signals which help to reduce the information asymmetries between ventures and investors and play a meaningful role in determining investors' willingness to pay (Hornuf and Neuenkirch 2017). For example: the percentage of equity offered, since the retention of ownership after funding has a positive

influence on funding success (Ahlers et al. 2015; Vismara 2016a); different share allocation mechanisms (Hornuf and Schwienbacher 2018); the quality of the information provided in the campaign, such as the use of project updates during the launch, financial forecasts and reporting of some income statement data, which may be considered a sign of credibility and capability (Moritz et al. 2015; Block et al. 2018; Lukkarinen et al. 2016); and minimum investment level—according to Lukkarinen et al. (2016), the minimum investment has a strong negative relationship with the number of investors and the amount raised. Large minimum investments may discourage many investors' thresholds for an investment decision. Investors may be discouraged because of both the higher requirement for liquid funds and the relatively high risk of losing money. Hornuf and Schwienbacher (2015) state that levying a high minimum investment ticket attracts more sophisticated investors and essentially filters the crowd.

We focus on five key campaign characteristics: (a) the percentage of share capital offered post campaign; (b) the maximum target with share premium account; (c) the difference between maximum and minimum targets; (d) the minimum investment; and (e) the share premium account.

The percentage of share capital offered post campaign (a) is calculated as the ratio of the number of shares offered to the total share capital after the campaign. Traditionally, one of the commonly considered signals of quality in the literature is the retention of equity; Leland and Pyle (1977) argue that entrepreneurs' willingness to invest in their own projects sends a positive signal to investors. Entrepreneurs who are confident of the potential of their business are likely to retain more equity, as offering more equity to new investors would dilute their future wealth. Ahlers et al. (2015) and Vismara (2016a) confirm this result, while Ralcheva and Roosenboom (2016) did not find that retaining equity seems to meaningfully influence success.

The second variable refers to the maximum target with share premium account (b). This measure, expressed in thousand euros, is a measure of the total (overall) size of the campaign and is calculated as the sum of nominal face value and the share premium requested for each share multiplied by the maximum number of shares issued. This variable is only used for the Logit Model. Many studies on equity crowdfunding indicate that campaigns with higher funding targets are more likely to succeed, for example, Duyen et al. (2017), Lukkarinen et al. (2016) and Belleflamme et al. (2014).

The difference between the maximum and minimum targets (c), expressed in thousand euros, is the difference between the maximum and the minimum targets set in the campaign. It is only used for OLS Models (as an alternative to the maximum target with share premium account) because it enables us to distinguish between the use of the “All-or-Nothing” (AON) and “Keep-It-All” (KIA) campaign models. These two types of campaigns are related to two different ways to manage a campaign. In the AON model, entrepreneurial firms set a capital-raising goal below which the entrepreneurial firm does not keep any of the pledged funds. In the KIA model, by contrast, the entrepreneurial firm can keep the entire pledged amount, albeit at higher fees as explained below, regardless of whether or not the stated capital-raising goal is reached. Cumming et al. (2014) provide large-sample evidence consistent with the view that the usage of AON is a credible signal to the crowd that the entrepreneur commits not to undertake the project if not enough capital is raised. This signal reduces the risk to the crowd, thereby enabling AON entrepreneurial firms to set higher goals, raise more money and be more likely to reach their stated goals. In contrast, KIA projects tend to be less successful since the crowd bears the risk that an entrepreneurial firm will undertake a project that is underfunded and hence more likely to fail after the campaign.

The minimum investment (d), expressed in thousand euros, represents the amount required to enable a single investor to take part in the campaign. According to Lukkarinen et al. (2016), the minimum investment has a strong negative relationship with the number of investors and the amount raised. Large minimum investments may increase many investors’ threshold for making an investment decision. Investors may be discouraged because of both the higher requirement for liquid funds available and the relatively high risk of losing money. Hornuf and Schwiendbacher (2015) state that levying high minimum investment tickets attracts more sophisticated investors and essentially filters the crowd.

The share premium account (e) is the difference between the value at which the shares were issued by the company and their nominal face value. The value of this measure could be viewed as a measure of risk, because the greater its value, the higher the increase in wealth needed. In fact, a higher pre-valuation implies a lower share of future cash flow per single investment ticket, and consequently, could make the investment less attractive. Conversely, a high pre-valuation signals a potentially lucrative investment, as an increase in these variables is associated with a higher premium.

4 METHODS

4.1 *Dependent Variables*

The main variables of interest in our study aim to capture the success of the campaign. We define a simple success dummy variable which is equal to one if the target capital was raised at the end of the campaign and zero otherwise. This measure of success is widely used in crowdfunding success studies (Ahlers et al. 2015; Vismara 2016a, 2016b). Then, for an in-depth examination of the relevance and the role of the two subjects—issuer company and campaign characteristics—we consider the funds raised as a percentage of the total maximum amount of funds originally requested (Lukkarinen et al. 2016; Mamonov and Malaga 2018). This variable is intended as a more accurate way of measuring campaigns' degree of success (or failure) than the dichotomous success/failure variable.

4.2 *Independent Variables*

The independent variables are:

- company-related variables: company's age, company's number of shareholders, company's number of directors, presence of business angels or other professional investors, presence of an industrial shareholder and the adequacy of the proponents' professional skills;
- campaign-related variables: the percentage of share capital offered post campaign; the maximum target with share premium account; the difference between the maximum and the minimum targets; the minimum investment and the share premium account.

Description of variables is presented in Table 3.7.

4.3 *Methods and Models*

Given the aforementioned list of selected variables, the empirical part of this chapter is grounded on a twofold strategy.

Firstly, a logit model is implemented in order to assess whether the success of a given campaign is influenced by issuer company and campaign characteristics. The dummy variable “success/failure” of the campaign is taken (Table 3.7) as a dependent variable.

Table 3.7 Description of variables

<i>Dimension</i>	<i>Variables</i>	<i>Measure</i>
Company	Company's age	Age of the issuer (in years) at the time of the campaign
	Number of shareholders before the campaign	Number of the company's shareholders before the campaign
	Number of administrators before the campaign	Number of the company's administrators before the campaign
	Presence of business angels or other professional investors before the campaign	It is equal to 1 in case there is a business angel or a professional investor in the board of the company before the campaign, and 0 otherwise
	Presence of industrial shareholder before the campaign	It is equal to 1 in case there is an industrial shareholder in the board of the company before the campaign, and 0 otherwise
	Adequacy of professional skills of the proponent	Categorical variable which could be limited, middle, high
Campaign	Percentage of share capital offered post campaign	Ratio of the number of shares offered to the total share capital after the campaign
	Difference between the maximum and the minimum targets	Expressed in thousand euros
	Maximum target with share premium account	Expressed in thousand euros
	Minimum investment	Expressed in thousand euros
	Share premium account	Difference between the value at which the shares were offered by the company and their nominal face value

The traditional estimates of the coefficients in log-odds form are not particularly helpful for the analysis. In this case, they just indicate that, when a regressor increases by one unit, the expected change in the log odds is given by the coefficient itself. Thus, these coefficients only single out whether the effect of a given predictor is positive or negative. To overcome this, odds ratios (OR) are also explicitly computed and commented. OR simply shows the effect of a unitary increase in the regressor for the odds of $y = 1$.⁸

As the logit model only allows identification of the determinants of the success/failure of an issue in the Italian crowdfunding market, it does not consider the actual amount of money collected by the issuer. A second empirical approach is therefore needed in order to also assess the drivers

⁸ Odds ratio is obtained by taking the exponential of the logit coefficient.

Table 3.8 Logit model: odds ratios

	<i>Odds ratios</i>	
Constant	1.860	
Company's age	1.077	
Number of shareholders before the campaign	1.025	
Number of directors before the campaign	1.142	
Presence of business angels or other professional investors before the campaign	1.466	
Presence of an industrial shareholder before the campaign	6.768	***
Adequacy of the proponents' professional skills = high	0.346	
Adequacy of the proponents' professional skills = medium	0.315	
Percentage of share capital offered post campaign	0.983	
Minimum investment	1.083	
Share premium account	1.000	
Difference between maximum and minimum targets (€1000)	0.999	
Observations	175	
Log-likelihood	-100.449	
Akaike information criterion	224.897	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

that lie behind issuers' ability to raise funds. In this latter case, alternative OLS models were implemented. All of them adopt the funds raised as a percentage of the total maximum amount of funds originally requested as a dependent variable.

With regards to this dependent variable, three different OLS models are implemented (Table 3.8).

Model 1 (M1) only includes information about the features of the company, including its age (in years at the time of the issue), its shareholders and directors before the issue, and the dummy variable Presence of business angels, the dummy variable Presence of industrial shareholder before the issue, and the categorical variable Adequacy of professional skills of the proponent. Model 2 (M2) focuses on the campaign itself and includes the Percentage of share capital offered post campaign, the Minimum investment (in thousand euros), the Difference between the maximum and the minimum targets and the Share premium account. Model 3 (M3) is the most comprehensive model and includes all the aforementioned variables.

All the models were estimated using the R software package (R Core Team 2018).

5 RESULTS

Tables 3.8 and 3.9 contain the results from the logit model. Models are estimated on the sample of 175 observations previously discussed.

Results from these models show only one regressor is significant in explaining campaign success. Keeping all other variables constant, the presence of an industrial shareholder supporting the company makes the odds of the campaign being successful seven times higher than in the opposite case. The presence of an industrial shareholder conveys credibility and gives prospective investors confidence in the campaign.

For a clearer explanation of the drivers that could have a positive impact on campaign success, three different OLS models previously discussed are

Table 3.9 Logit model

	<i>Estimate</i>	<i>Std. error</i>	<i>Z-value</i>	<i>P-value</i>
(Intercept)	0.621	0.904	0.686	0.493
Company's age	0.074	0.063	1162	0.245
Number of shareholders before the campaign	0.024	0.018	1346	0.178
Number of directors before the campaign	0.133	0.133	1000	0.317
Presence of business angels or other professional investors before the campaign	0.383	0.371	1031	0.302
Presence of an industrial shareholder before the campaign	1912	0.649	2944	0.003 **
Adequacy of the proponents' professional skills = high	-1062	0.857	-1239	0.215
Adequacy of the proponents' professional skills = medium	-1156	0.920	-1257	0.209
Percentage of share capital offered post campaign	-0.018	1200	-0.015	0.988
Minimum investment	0.079	0.103	0.773	0.440
Share premium account	0.000	0.000	1063	0.288
Difference between maximum and minimum targets (€1000)	-0.001	0.001	-0.850	0.395

Signif. codes: 0 '****' 0.001 '***' 0.01 '**' 0.05 '.' 0.1 ' ' 1

Null deviance: 228.7 on 174 degrees of freedom

Residual deviance: 200.9 on 163 degrees of freedom

1 observation deleted due to missingness

AIC: 224.9

Number of Fisher scoring iterations: 6

Table 3.10 OLS model

	<i>M1</i>		<i>M2</i>		<i>M3</i>	
Intercept	0.618	**	0.705	***	0.677	***
	(0.187)		(0.070)		(0.192)	
Company's age	-0.001				0.003	
	(0.011)				(0.011)	
Number of shareholders before the campaign	0.004	***			0.005	***
	(0.001)				(0.001)	
Number of directors before the campaign	0.028				0.038	
	(0.028)				(0.028)	
Presence of business angels or other professional investors before campaign = yes	0.114				0.104	
	(0.080)				(0.080)	
Presence of an industrial shareholder before the campaign = yes	0.385	***			0.392	***
	(0.106)				(0.104)	
Adequacy of the proponents' professional skills = high	-0.240				-0.214	
	(0.188)				(0.184)	
Adequacy of the proponents' professional skills = medium	-0.143				-0.128	
	(0.204)				(0.200)	
Difference between the maximum and minimum targets (€1000)			-0.007	***	-0.001	***
			(0.000)		(0.000)	
Percentage of share capital offered post campaign			-0.501		-0.110	
			(0.276)		(0.261)	
Share premium account			0.000		0.000	
			(0.000)		(0.000)	
Minimum investment			0.014		0.022	
			(0.023)		(0.021)	
Observations	175		174		174	
<i>F</i>	5.504	***	1.273		4.485	***
<i>R</i> ²	0.153		0.005		0.194	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

estimated (Table 3.10). Our dependent variable is the funds raised as a percentage of the total maximum amount of funds originally requested.

Model 1 is concerned with platform and issuer company's features, Model 2 with campaign aspects and, finally, Model 3 is the most comprehensive. In Model 1, the number of company shareholders has a positive and significant effect on the percentage of funds raised, together with the presence of an industrial shareholder. These two variables may also be related to the number of different kinds of partners that collaborate with the platform and may offer a perspective on the issuer company's network and the platform's selection ability. In Model 2, only the coefficient for the

difference between the maximum and the minimum targets (€1000) is significant, with a negative impact on the funds raised as a percentage of the total maximum amount originally requested. As mentioned in paragraph 3, crowdfunding campaigns can be offered under one of two basic models: AON, where the entrepreneur sets a funding goal and receives the money invested only if the goal is achieved, and KIA, where the entrepreneur sets minimum and maximum funding goals and keeps any funds collected. This result confirms that AON campaigns have more chances of achieving the amount required than KIA campaigns. Probably, investors take a negative view of the request for a large amount of money in excess of the minimum target, because it seems to be unclear how much funding is really needed to realise the project. It may even be seen by investors as a slight signal of opportunistic behaviour on the part of issuers.

6 CONCLUSIONS

This chapter attempts to identify and assess the role of the characteristics of the company, the company's issuers and campaigns on equity crowdfunding campaigns' success by analysing all Italian campaigns and platforms. For entrepreneurs wishing to run an equity crowdfunding campaign, the number of shareholders and the presence of an industrial shareholder before the campaign may be crucial for the future campaign's success, as well as the features of the campaign itself. In terms of these features, requesting a target capital closer to the minimum target increases campaign success. Investors may perceive the maximum amount as not really necessary, leading them to focus their investment on the minimum level requested. Investors may not understand the necessities potentially covered by the maximum amount requested and they may be keener to invest in a precise target focusing on the minimum required, the success of which appears more likely. This behavioural aspect could be studied in greater depth in future studies. The entrepreneur must therefore find a balance between seeking sufficient funds and aiming to ensure that the minimum threshold is reached.

However, it must be noted that all the models under consideration here are actually characterised by a small R-squared value, which could point to the presence of additional variables, capable of affecting the dependent variable considered. From a theoretical perspective, this means there are some other factors that should be taken into account—first of all, the characteristics of the platforms, which, to the best of our knowledge, have not

yet been considered. Moreover, the informational aspect related to campaigns could be investigated, because Italian legislation establishes specific requirements for financial disclosure and the documents necessary for the campaign. The quality of the information provided, especially voluntary disclosure and its accuracy level, is a possible subject for future study.

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From Seeker Side to Investor Side: Gender Dynamics in UK Equity Crowdfunding Investments

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I INTRODUCTION

Equity crowdfunding has been a rapidly growing financial instrument since 2012, and regulators and policymakers from different countries are paying a great deal of attention to this relatively new phenomenon. Thanks to the web context in which crowdfunding takes place, it is expected to democratise funding by increasing the availability of capital to traditionally underrepresented groups, thus enabling entrepreneurs to enlarge their appeal for investments and to create a more social, interconnected world, able to drive future innovation as well as a new wave of investors (Barasinska and Schäfer 2014; Mollick and Robb 2016).

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A group of studies in the crowdfunding field has focused its attention especially on gender dynamics and the benefits for female entrepreneurs who decide to raise money from the crowd. In fact, due to the disadvantages faced by female entrepreneurs compared to male ones in the traditional financial markets (including banks, private equity funding and institutional capital), they tend to seek funding from alternative sources (Harrison and Mason 2007; Muravyev et al. 2009). Female-led ventures are set up with lower start-up capital than are male ones, and they are generally found to be smaller compared with those owned by men (Brush 1992; Manolova 2006; Bruin et al. 2007). Among sources of entrepreneurial finance, venture capital investment companies are overwhelmingly male, and women angels represent only a small slice of the angel market (Mollick and Robb 2016). The academic literature noticeably documents that women are not participating in either entrepreneurship or the investment market at the same rates as men. Compared to reward-based crowdfunding, where Marom et al. (2014) find that 44% of the investors on Kickstarter are female, in investment-based crowdfunding, equity and real estate, Hervé et al. (2017) show that 93% of equity crowdfunders are men. The same situation emerges in the study by Geiger and Oranburg (2018) on US equity crowdfunding campaigns, where 84% of investors are male and 14% female, meaning that the crowdfunding investment market is no different from other financial markets, such as business angels and VC, which are predominantly male-dominated (Brush et al. 2004; Harrison and Mason 2007).

By analysing both the seeker and the investor sides, it is possible to establish whether there is a gender gap in the crowdfunding market as well (Leitch et al. 2018). Since little is known about investor characteristics from both the company and the platform perspectives, a better understanding would reduce ex ante search costs and facilitate ex post matching (Polzin et al. 2018).

Our research aims first to verify whether female-led campaigns are related to a high success rate, where for campaigns' success we consider the overfunding level and the number of backers that have supported the project. Secondly, we adopt the investor perspective to explore which factors increase the percentage of female investors involved in the campaign, the percentage of the amount invested by female investors, and finally, which drivers influence the likelihood of female investment.

For this purpose, we collected shareholder information for 81 equity crowdfunding campaigns posted on Crowdcube, a British Platform, from 2011 to 2016. We obtained information about firms running campaigns from the Crowdcube website and shareholder information—name and amount invested—from the filed documents hosted on the Companies House website (companieshouse.gov.uk). As in previous studies (Greenberg and Mollick 2015; Mohammadi and Shafi 2018; Geiger and Oranburg 2018), we use the genderize.io tool for identifying investors' gender.

Our data show that in equity crowdfunding campaigns, the proposer's gender does not influence the level of campaign success, which is more closely related to the characteristics of the company and the campaign. Female investors tend to support other female entrepreneurs, especially in innovative sectors.

Crowdfunding is an apparently unlimited market thanks to the web context within which it functions, which allows entrepreneurs to enlarge their potential funding supply side. Our study offers an important contribution, enabling especially female entrepreneurs to better understand potential investor behaviour and highlighting the role of equity crowdfunding as a tool for financial inclusion and women's empowerment.

The chapter is organised as follows. In Sect. 2, we present the literature and research questions. Section 3 presents the data, variables and summarised statistics used in the empirical section. Sections 4 and 5 present findings concerning the campaign's success and female investment decisions. Section 6 concludes and discusses the implications and possible future development of this study.

2 GENDER IN CROWDFUNDING STUDIES

In reward-based projects and peer-to-peer lending, women are more likely to successfully raise capital than male founders: female-led projects achieve a higher average pledge amount than male-led projects, especially in sectors where they are historically underrepresented, as in the case, for example, of technological projects (Greenberg and Mollick 2015).

In reward-based context, Marom et al. (2014) collect information on a sample composed of 16,641 successful projects, 8432 failed projects, 22,580 entrepreneurs and 1,108,186 investors on Kickstarter, and their findings show that women had lower goals and lower raises across project categories.

However, they also find that women enjoy higher rates of success in funding their projects, even after controlling for category and goal amount. Female Kickstarter campaigns on average set goal amounts that are 9% lower than those of men; the underperformance of men-led campaigns is due to over-estimation of the demand for their products, which leads them to set higher campaign target amounts, to pursue lower marginal quality projects and to fail more frequently (Lin and Pursiainen 2018).

In greater depth, considering specific project categories, Meek and Sullivan (2015) analysed sustainably oriented agriculture businesses, and their study shows that there are no significant differences in the funding goals of men and women or in the amount of money raised. So this result suggests that gender differences in crowdfunding campaign performance may be due less to the particular sex of the business owner and more to environmental influences, such as industry differences and the size of the business, or the type of crowdfunding model adopted.

In equity crowdfunding, field research is much more limited and gives different results: Vismara et al. (2016), studying UK campaigns, find a high success rate for female-led projects, although Geiger and Oranburg (2018), using data collected from the population of US equity crowdfunding campaigns, find that campaigns receive significantly less funding when the primary signatory is female compared to male signatories, even when controlling for other factors related to the amount raised, including the target amounts of the campaign, firm characteristics, and project categories. Horvat and Papamarkou (2017), in their study on two UK equity crowdfunding platforms, on the one hand, confirm that female-led campaigns enjoy a higher success rate, but on the other hand, they find that campaigns with a higher participation rate from female investors more likely tend to fail in raising the target amount. Due to the different results presented, we investigate the following research question:

Rq1: Are female entrepreneurs related to a high level of campaign success?

Even if the equity crowd and entrepreneurs are mainly male, female entrepreneurs are more likely to succeed in crowdfunding campaigns thanks to the positive emotional message and inclusive language used in the campaign and to the support of other female backers (Greenberg and Mollick 2015; Gorbatai and Nelson 2017; Horvat and Papamarkou 2017).

With regard to the support of other female backers, in a reward-based and equity-based model Greenberg and Mollick (2015) and Vismara et al. (2016) refer to similarity theory, and their studies show a strong correlation

between female gender of the entrepreneur and backer profiles. Similarity effect is the tendency of the members of a group to display a preference for associating with other members of the same group. In financial literature, similarity effect is justified, among others, by issues of soft information, trust and personal social network (Ruef et al. 2003; Hegde and Tumlinson 2014; Bengtsson and Hsu 2015; Hochberg et al. 2015). More generally, in entrepreneurial finance, sharing of personal characteristics by seeker and investor reduces the cost of funds and facilitates collaborations (Gompers et al. 2016; Alsos and Ljunggren 2017). This result is also confirmed in the case of equity crowdfunding campaigns. Vismara et al. (2016), analysing 58 equity offerings of UK crowdfunding platform Seedrs and comparing campaigns launched by firms with a female CEO with those launched by a male CEO, show that on average women invest 34% more than males. Therefore, the percentage of firms with a female CEO is higher in successful campaigns, while the number of male investors is slightly higher in campaigns launched by male-led firms, leading to the conclusion that female investors strongly prefer firms led by females.

Preference differences between the genders are observed in a variety of decision-making processes, including investment decisions. One aspect that influences female investment decisions is the perception of risk. Women may be more risk-averse than men (Croson and Gneezy 2009) and invest less in risky assets than do men (Agnew et al. 2003; Charness and Gneezy 2012; Sundén and Surette 1998). In a study on a Swedish equity crowdfunding platform, Mohammadi and Shafi (2018) confirm this tendency, showing that in the equity crowdfunding context, female investors prefer to invest in less risky ventures, where risky ventures are considered to be those which are high-tech, young and with a higher percentage of equity offered. Hervé et al. (2017) focus their study on equity and real estate crowdfunding campaigns in the French market, and their findings reveal that women invest more in less risky investments, such real estate projects, in terms not only of numbers but also of amounts.

In the framework of the above literature, we consider three principal research questions:

Rq2: Which factors increase the number of female investors involved in the campaign?

Rq3: Which factors increase the percentage of the amount invested by female investors?

Rq4: Which factors increase the investment probability for female investors?

3 DATA AND METHODS

3.1 *Sample*

We collected data from Crowdcube, the largest crowdfunding platform in the UK (Beauhurst 2017). Our sample included shareholder investors in 81 equity crowdfunding campaigns posted on Crowdcube from October 2011 to the end of October 2016. These campaigns were successfully closed and all investments collected. We restricted our attention to these campaigns since these were the ones for which we could access reliable data on the number of shareholders.

We collected firm information about each campaign from the Crowdcube website. We were able to extract the names of the investors and the number of shares underwritten by comparing the full list of shareholders on the Annual Return form, filed in accordance with Section 854 of the Companies Act 2006, at the dates immediately before and immediately after the date of the campaign. The AR101 form is published on the Companies House website. Share prices, when not disclosed directly in form AR101, were obtained by dividing the amount collected during the equity crowdfunding campaign by the total number of shares underwritten by investors during the campaign. The final sample included 8683 investments by 6030 unique investors, who founded 81 unique companies. Of those 6030 investors, we skipped the 83 investments made by companies, which gave us a final dataset of 8600 investments made by 5996 unique personal investors. The dataset covered a timeframe of six years, from 2011 to 2016. Our sample was a broad cross section of companies, industries and ages at the time of equity crowdfunding. Descriptive statistics are presented in Table 4.1.

3.2 *Investors' and Proponents' Gender*

Gender

The documents filed do not publish shareholders' gender, so to infer it we rely on automated methods. In our study we use the genderize.io tool, comparing first names with a database including 86,710 distinct names across 81 languages (Greenberg and Mollick 2015; Mohammadi and Shafi 2018; Geiger and Oranburg 2018). Our final dataset includes:

Table 4.1 Descriptive statistics

	<i>Obs</i>	<i>Mean</i>	<i>Min</i>	<i>Median</i>	<i>Max</i>	<i>SD</i>
<i>Panel A: Sample overview</i>						
Number of companies (ECF campaigns)	81					
Number of investments made by personal investors	8600					
Number of investments made by female investors	1603					
Number of investments made by male investors	6997					
Number of unique female investors	1361					
Number of unique male investors	4635					
<i>Panel B: Summary statistics of key variables for companies</i>						
Company age at the date of ECF (in years)	81	2.3	0.0	2.0	11.0	2.3
Company sector Innovative (1 = yes; 0 = no)	81	0.22				0.42
Team size (number)	81	3.20	0.0	3	12	3.18
<i>Panel C: Summary statistics of key variables for campaigns</i>						
Total amount raised (£)	81	223,153	12,000	139,900	1,962,730	223,153
Total amount required (£)	81	185,032	10,000	1,000,000	1,900,000	271,360
Total equity offer (in %)	81	17.7%	4.0%	16.8%	48.0%	0.08
Exit strategies (1 = yes; 0 = no)	81	0.80	0	1.00	1.00	0.40
<i>Panel D: Summary statistics of key variables for entrepreneur</i>						
Proponents (number)	81	1.3	1.0	1.0	3.0	0.5
At least 1 female proponent	81	0.22	0	0	1.0	0.42
<i>Panel E: Summary statistics of key variables for investors</i>						
Investors per campaign (number)	81	106	8	83	394	81
Female investors per campaign (number)	81	20	1	12	125	24
Fraction of female investors per campaign (%)	81	17.5%	3.6%	15.4%	45.6%	0.09
Fraction of dollar amount female investors invested per campaign (%)	81	23.0%	1.7%	17.3%	50.6%	0.17
Dollar amount invested by personal investors (£)	8600	2102	0.23	250	1,394,612	16,186
Dollar amount invested by female investors (£)	1603	1766	2.3	200	139,461	6284
Dollar amount invested by male investors (£)	6997	2179	0.23	263	1,394,612	17,690

- 18 ventures with at least one female proponent and 63 ventures in which the sole or all the proponents are male;
- 1361 unique female investors and 4635 unique male investors. Women investors are also underrepresented in the case of equity crowdfunding campaigns (Vismara et al. 2016; Hervé et al. 2017).

Co-gender cases (cases for which the gender of backers and proponents matches) count for nearly 67% of recurrences. Of the 1946 investments made in female-led ventures, 21.8% (425) are associated with female investors.

The average amount raised in our sample is £185,032, with a maximum of £1.9m and a minimum of £10,000. The average amount invested by female investors is lower than the amount provided by male investors: £1766 vs £2179—male investors invest on average 10.47% more than female investors. The same conclusion emerges when analysing the median amount invested (£200 vs £263). These figures are opposite to the average investment figures reported by Vismara et al. (2016) from Seedrs, where female investors invest on average 34% more than men.

3.3 Variable Description

There are several observed characteristics that enable us to evaluate campaign success and investment likelihood after controlling for company, campaign and entrepreneur characteristics.

Dependent Variables for Campaign Success

As measures of campaign success, we collected the **overfunding level (%)** measured at the end of the campaign. Our sample only contains funded projects, so by definition they have obtained at least 100% of the initial target. The Crowdcube platform gives campaigns the possibility of raising more funds than the initial target, meaning that the most successful campaigns can be overfunded. On average, campaigns are financed 27% more than the amount requested.

Another measure of success is the **number of investors** that have participated in the project. The average number of investors per campaign is 107, lower than the average number of investors for Seedrs (124) reported by Vismara et al. (2016) and higher than a previous study (84) on Crowdcube investors (Vismara 2016). The most crowded campaign in our sample involves 394 investors.

Dependent Variables for Female Shareholders' Investment

Different variables were used to isolate the gender pattern in shareholders' investment. **Number of female investors (%)** denotes the proportion of investors who are female in relation to the total count of all investors in a campaign. On average, the percentage of females per campaign is 17.5%, with the highest value for any campaign being 45.6%. The share of female investors can be related to the overall attractiveness of the campaign for women due to shared preferences borne out of gender similarity (Horvat and Papamarkou 2017)—Model 1. **Amount invested by female investors (%)** denotes the dollar amount invested by investors who are female as a proportion of the total funds raised by the campaign. The percentage of the amount in pounds sterling invested by female investors per campaign is on average 16.3%—Model 2. **Female investor** is a dummy variable equal to 1 for female investors and 0 for male investors—Model 3. In our sample, 1362 investors are female and 4635 are male.

Independent Variables

Variables related to the **entrepreneur** profile principally deal with gender characteristics. **Gender of entrepreneur**: since due to homophily female investors are more likely to invest in projects with a female proponent (Greenberg and Mollick 2015; Vismara et al. 2016), this is a dummy variable equal to 1 in case of at least one female proponent among the overall number of proponents and 0 otherwise.

Control Variables

There are several variables that might influence the rate of success and investment decisions which we need to control for. Some of them refer to company features, others to campaign structure and a third group to entrepreneur characteristics.

Company features are inserted in terms of **firm age**—the numbers of years from the firm's establishment to the date of the campaign. On average, the firms in the sample are 2.3 years old. The sector of activity, captured by the **Innovative** dummy variable, equals 1 in case of companies active in highly innovative sectors identified, as in Nesta 2009 (Collins and Pierrakis 2012), on the basis of the SIC code¹; 18 companies (22.2%) in

¹ 64.20; 72.20; 72.30; Telecommunication, Computer Programming and Software Service Industries; 72.40; 72.60; 73.10; Data Processing, Misc. Computer Services, R&D in Natural Sciences and Engineering; 30.01; 30.02; 32.20; 32.30; Office Equipment; Computers and

our sample belong to highly innovative sectors. We also insert the **Inn_female** variable, which is a dummy variable that has the value of 1 for innovative companies founded by a female entrepreneur and 0 otherwise. Finally, we insert the **Team size** variable, calculated as the log of the number of people listed on the site as belonging to the group of executives around the entrepreneur. Smaller teams may be riskier since they might be more recently founded, and a higher number of board members is correlated to a higher number of investors and larger funding amount achieved during the campaign (Ahlers et al. 2015; Horvat and Papamarkou 2017). In our sample the average team consists of 3.2 people.

Campaign structure is proxied by the following variables. **Equity offering** is the percentage of equity offered during the campaign. Equity offering can be considered as a proxy of firm risk (Leland and Pyle 1977). On average, firms in our sample offer nearly 18% of equity; more or less the same (18.6%) as the investments. **Target Amount (ln)** is the target amount of money required at the beginning of the campaign and its level may influence the venture's ability to raise funding. Low target amounts are correlated with high success rate (Lukkarinen et al. 2016). **Target amount_female (ln)** is the interaction between funding targets and female entrepreneurs. Female entrepreneurs set lower target amounts than their male counterparts (Lin and Pursiainen 2018). **Exit** is a dummy variable equal to 1 if the exit strategy is explicit in the campaign and 0 otherwise. A planned exit strategy influences the success of the campaign, since a return on the money invested is typically only attained through an exit or liquidity event, so the presence of an exit strategy may make a campaign more attractive (Ahlers et al. 2015). In our sample, 65 campaigns (more than 80% of the total) envisage at least one exit option.

other Information Processing Equipment; Television and Radio Transmitters and Apparatus for Line Telephony and Line Telegraphy; Television and Radio Receivers, Sound or Video Recording and Reproducing Apparatus; 33.20; 33.30; 33.40 Electronic Instruments and Appliances for Measuring, Checking (except Industrial Process Control); Electronic Industrial Process Control Equipment; Optical Instruments; Photographic Equipment; 24.41; 24.42; 33.10 Pharmaceutical Products and Preparations; Medical and Life Sciences Surgical Equipment and Orthopaedic Appliances; 24.16; 24.17; 31.10; Plastics and Synthetic Rubber in Primary Form; Electric Manufacturing; 31.20; 32.10; 35.30. Motors, Generators and Transformers; Electricity Distribution and Control Apparatus; Electronic Valves, Tubes and other Components; Aircraft and Spacecraft Manufacturing (Roper et al. 2009).

4 DRIVERS OF CAMPAIGNS' SUCCESS

We conducted ordinary least square (OLS) regression analyses to find out whether female-led campaigns are related to the percentage of funding raised and the number of investors (Table 4.2). Additionally, we explored how gender moderates the relationship between the campaign's funding targets and the overfunding level (Model 1), apart from all other variables. In Model 2, our dependent variable is the number of investors. The variance inflated factor (VIF) underlines the absence of multicollinearity between the predictor variables.

Model 1 and Model 2 show that the percentage of funding raised and the number of investors involved in the campaign are not related to the proponent's gender but rather to the campaign's and company's characteristics ($Rq1$). In particular, the percentage of the funding raised is higher for companies with a large team and when the campaign presents an exit strategy and a low funding target. The number of investors increases for larger funding targets.

5 DRIVERS OF FEMALE INVESTMENTS

Table 4.3 presents the findings concerning the evidence of a gender similarity effect between backers and proponents. We use ordinary least square (OLS) regression when the dependent variable is the number of female investors (Model 1) or the fraction of the amount invested by female investors (Model 2) as a fraction of the total figure for the campaign. However, we employ probit regression when the dependent variable is the dummy variable equal to 1 for female investors and 0 for male (Model 3). We use the following specification

$$Y = \alpha + \beta_1 X + \beta_2 \text{Controls} + \varepsilon \quad (4.1)$$

Y separately defines the dependent variables, X the independent variables and Controls the covariates included in the model specifications. The standard errors are robust and clustered around investors to control for non-independence of observations for investors across the campaigns. We perform formal variance inflated factor (VIF) tests, which do not suggest serious multicollinearity issues. To capture possible temporal trends, we insert year-fixed effect dummies in all models. Table 4.4 shows the correlation matrix for the variables used in the models.

Table 4.2 Model estimations for campaigns' success

	<i>Overfunding level (%)</i>	<i>Number of investors</i>
	<i>Model 1</i>	<i>Model 2</i>
Constant	0.000*** (55.72)	0.001*** (100.0)
Gender of entrepreneur	0.342 (154.7)	-0.251 (277.7)
Firm age	0.712 (1.965)	0.211 (3.527)
Innovative	0.858 (10.65)	-0.147 (19.12)
Team size	0.002*** (1.612)	0.126 (2.894)
Equity offering	0.408 (0.574)	0.373 (1.030)
Exit	0.021** (12.40)	-0.541 (22.26)
Target amount (Ln)	-0.034** (4.977)	0.000*** (8.933)
Target amount_female	-0.341 (13.36)	0.251 (23.99)
Observations	81	81
Specification	OLS	OLS
R-squared	0.289	0.375
Adj. R-squared	0.210	0.305
Pseudo R-squared		

Notes: This table reports the results of an OLS regression when the dependent variable is the overfunding level (Model 1) or the number of investors (Model 2) over the total figure for the campaign. **Gender of entrepreneur** is a variable related to the entrepreneur's characteristics and is a dummy variable equal to 1 in case of at least one female proponent among the overall number of proponents and 0 otherwise. Controls for the following company features are included in the regression: **Firm age** is the number of years from the firm's establishment to the date of the campaign; **Innovative** is a dummy variable equal to 1 in case of companies active in highly innovative sectors; **Team size** is calculated as the log of the number of people listed on the site who make up the group of executives around the entrepreneur. Two campaign structure controls are included as follows: **Equity offering** is the percentage of equity offered during the campaign, and **Exit** is a dummy variable equal to 1 if the exit strategy is explicit in the campaign and 0 otherwise. **Target amount (Ln)** is the target required at the beginning of the campaign. **Target amount_female** is the target amount required by female-led campaigns. The standard errors are reported in brackets ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively

Table 4.3 Model estimations for female investments

	<i>Number of female investors (%)</i>	<i>Amount invested by female investors (%)</i>	<i>Female investors</i>
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
Constant	0.235*** (0.005)	0.226*** (0.008)	
Gender of entrepreneur	0.058*** (0.003)	0.082*** (0.003)	0.061*** (0.012)
Firm age	0.002*** (0.000)	-0.005*** (0.001)	0.002 (0.002)
Innovative	0.013*** (0.004)	-0.043*** (0.004)	0.010 (0.013)
Inn_female	-0.097*** (0.005)	0.068*** (0.006)	-0.079*** (0.023)
Team size	0.027*** (0.002)	0.012*** (0.003)	0.028*** (0.009)
Equity offering	-0.082*** (0.011)	-0.310*** (0.013)	-0.107* (0.056)
Exit	-0.026*** (0.009)	0.008 (0.013)	-0.028 (0.034)
Year-fixed effect	Yes	Yes	Yes
Observations	8600	8600	8600
Specification	OLS	OLS	Probit
R-squared	0.182	0.282	
Adj. R-squared	0.181	0.281	
Pseudo R-squared			0.0119

Notes: This table reports the results of an OLS regression when the dependent variable is the fraction of the number of female investors (Model 1) or the fraction of the amount invested by female investors (Model 2) over the total figure for the campaign. However, we employ probit regression when the dependent variable is the dummy variable equal to 1 for female investors and 0 for male (Model 3). **Gender of entrepreneur** is a variable related to the entrepreneur's characteristics and is a dummy variable equal to 1 in case of at least one female proponent among the overall number of proponents and 0 otherwise. Controls for the following company features are included in the regression: **Firm age** is the the number of years from the firm's establishment to the date of the campaign; **Innovative** is a dummy variable equal to 1 in case of companies active in highly innovative sectors; **Inn_female** is a dummy variable that takes a value of 1 for innovative companies founded by a female entrepreneur and 0 otherwise; **Team size** is calculated as the log of the number of people listed on the site to make up the group of executives around the entrepreneur. Two campaign structure controls are included: **Equity offering** is the percentage of equity offered during the campaign and **Exit** is a dummy variable equal to 1 if the exit strategy is explicit in the campaign and 0 otherwise

Note that we offer results of probit regressions, reporting marginal effects. We report the value of parameter dE/dx for discrete change of dummy variable from 0 to 1

All models include year-fixed effect dummies. The standard errors are robust and clustered around investors and are reported in brackets

***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively

Table 4.4 Correlation matrix

	<i>Log amount inv.</i>	<i>Age</i>	<i>Innovative</i>	<i>Inn_female</i>	<i>Team size</i>	<i>Gender of entrepreneur</i>	<i>Equity offering</i>	<i>Exit</i>	<i>Female investor</i>	<i>Co-gender</i>
<i>Log amount inv.</i>	1									
<i>Age</i>	0.1310	1								
<i>Innovative</i>	-0.0316	0.0052	1							
<i>Inn_female</i>	-0.0260	0.0108	0.3411	1						
<i>Team size</i>	-0.0959	-0.3396	0.0946	0.1080	1					
<i>Gender of entrepreneur</i>	-0.1072	-0.0339	-0.0941	0.2727	0.0845	1				
<i>Equity offering</i>	-0.0177	-0.2601	-0.1909	-0.0477	-0.0202	-0.0233	1			
<i>Exit</i>	-0.0286	-0.0542	-0.0179	0.0593	0.5604	0.1405	0.0787	1		
<i>Female investor</i>	-0.0567	-0.0055	0.0112	-0.0064	0.0431	0.0444	-0.0338	-0.0196	1	
<i>Co-gender</i>	0.0792	0.0419	0.0427	-0.1560	-0.0785	-0.6096	0.0185	-0.0493	-0.5098	1

As expected, the results of Model 1 confirm previous studies on similarity effect in crowdfunding (Greenberg and Mollick 2015; Vismara et al. 2016): female investors' preferences are related to female proponents, so there is a similarity effect between female investors and female proponents ($Rq2$). The presence of female investors is higher in older companies with a large number of members in the team, where the campaign offers a lower equity amount. These characteristics could be linked to a greater risk aversion in female versus male investors (Mohammadi and Shafi 2018).

The percentage of the amount invested by female investors (Model 2) is lower in younger and innovative companies, but when the founder is female the investment increases ($Rq3$). In particular, the Innovative variable has a negative effect on the fraction of the amount invested by female investors, but if the company is led by a female entrepreneur the sign becomes positive. This result is consistent with Greenberg and Mollick (2015), and means that similarity effect increases the chance of success, especially in an innovative sector, for female proponents.

The likelihood of finding a female investor (Model 3) is higher in campaigns characterised by a lower equity offering and a large team, as well as in older companies ($Rq4$). These characteristics might be related to a low-risk business. Women are more sensitive to risk than men and this will be reflected in all aspects of their decision-making, including investment decisions. Our results are consistent with those of Mohammadi and Shafi (2018), who show that female investors are less likely to invest in risky firms compared to their male counterparts. In this model the presence of a female proponent again positively influences the probability of having a female investor.

6 RESULTS AND CONCLUSION

This study explores gender dynamics in UK equity crowdfunding investments from both the seeker and the investor sides. We find that in equity crowdfunding campaigns, the proponent's gender does not influence the level of campaign success, but it is more strongly related to the company's and campaign's characteristics. In line with prior studies, although there are fewer women investors in the equity crowdfunding market, female investors show a clear preference for female-led campaigns. In particular, the female fraction of the amount invested is lower in younger and innovative companies; however, if the founder of the innovative company is female, the fraction of the amount invested increases.

We contribute to the nascent literature in equity crowdfunding in several ways. Firstly, from the seeker side, our study enables women entrepreneurs to identify the investor behaviours and campaign characteristics that maximise fundraising opportunities through equity crowdfunding campaigns. From the supplier side, we provide a snapshot of how women perceive and invest in equity crowdfunding projects.

From a practical perspective, the results are relevant not only for female but for all entrepreneurs, investors and crowdfunding platforms alike, as understanding crowd composition and investment dynamics are in each group's interest. This knowledge may have a positive impact on the probability of campaign success, in which, especially for the equity model, studies show different results (Lukkarinen et al. 2016).

Nonetheless, some caveats associated with this study must be presented. Firstly, although Crowdcube is one of the leading equity crowdfunding platforms at the European level, our research does not consider the entire market. Future research could extend the analysis to other platforms or compare different crowdfunding models (i.e. reward-based vs equity-based) to find out whether the amount invested by female investors is different from that invested by male investors, or from a cultural perspective, how cultural differences influence female and male investment decisions and entrepreneurs' success. Secondly, regarding the team variable, we do not control for the quality and the composition of the team itself. Future developments could add qualitative data to the analysis, for example, textual data about the female entrepreneur's pitch. Finally, we focus our empirical analysis on 81 campaigns from 2011 to 2016; future research could encompass a broader number of campaigns in the sample.

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PART III

Banks and Their Customers



Financial Inclusion: Trends and Determinants

Mais Sha'ban, Claudia Girardone, and Anna Sarkisyan

I INTRODUCTION

Financial inclusion refers to enabling all individuals and businesses in an economy to have access to useful and affordable financial services that meet their needs. The importance of financial inclusion is linked to the role it plays in the development of a country. Studies on financial inclusion show its positive impact on different social and economic indicators such as economic growth, income equality, wealth, households' well-being, innovation, employment, female empowerment, creation of small businesses, in addition to combating money-laundering and terrorist financing (Aportela 1999; Honohan 2004; Beck et al. 2007; Guiso et al. 2009; Karlan and Zinman 2009; Ashraf et al. 2010; Prasad 2010; Force 2011; Montgomery and Weiss 2011; Khan 2011; Raj et al. 2014). Hence, significant efforts and commitments have recently been made to improve global financial

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inclusion so that all individuals, regardless of their income, gender, and geographic location, have access to appropriate financial services.

According to the latest research, the share of adults owning an account increased from 51 per cent in 2011 to 69 per cent in 2017 mainly driven by government policies and the use of technology. However, the variation across countries is still significantly high: as of 2017, 94 per cent of adults in high-income countries have an account, compared to only 35 per cent in low-income countries (Demirguc-Kunt et al. 2018). The variation in financial inclusion across different groups (for instance, women, poor individuals in rural areas, and small firms) in the same country is also considerably high.

This chapter provides a background on financial inclusion and examines the progress and trends across different indicators of financial inclusion using a sample of 189 countries over the period 2004–2016. This analysis shows a significant growth in the number of ATMs (automated teller machines) and loan and mobile accounts and a lesser growth in the number of bank branches across all countries. Analysis of macro regions reveals that North America has the highest number of banks' physical outlets (ATMs and branches), whereas Europe and Central Asia have, on average, the highest number of deposit accounts. It also shows that sub-Saharan Africa has the highest number of mobile money accounts and agent networks that seem to be substituting traditional bank services. Overall, high and upper-middle-income countries¹ have substantially higher financial inclusion levels than low- and lower-middle-income countries across all traditional tools, whereas low- and lower-middle-income countries have a significantly higher number of mobile money accounts, thus providing evidence for the importance of innovative channels to reach the unbanked in these countries. Moreover, our analysis shows a considerable gender gap in financial access, particularly in the Middle East and North Africa (18.2 per cent as of 2017) and the trend shows only a slight improvement.

The chapter also reviews factors that may explain variations in financial inclusion across countries. Prior research demonstrates the importance of macroeconomic conditions, social development, technological advancements, institutional quality, and banking system conditions in advancing financial inclusion. We report key correlations between financial inclusion indicators and selected country characteristics, and find a

¹The World Bank classifies economies based on estimates of gross national income (GNI) per capita. As of 1 July 2016, low-income economies are defined as those with a GNI per capita of \$1025 or less in 2015; lower-middle-income economies are those with a GNI per capita between \$1026 and \$4035; upper-middle-income economies are those with a GNI per capita between \$4036 and \$12,475; high-income economies are those with a GNI per capita of \$12,476 or more.

positive and significant correlation between the traditional measures of financial inclusion and the national level of income, mobile subscriptions, rule of law, financial freedom, and secondary school enrolment, and a negative association between unemployment, income inequality, banks' market power, and gender inequality. However, mobile money services seem to have opposite associations with these characteristics.

The chapter is structured as follows. Section 2 provides a background on financial inclusion. Section 3 presents data related to the progress and trends in financial inclusion. Section 4 provides a review of the literature relevant to the country-level determinants of financial inclusion and correlation analysis. Finally, Sect. 5 concludes.

2 BACKGROUND ON FINANCIAL INCLUSION

Financial inclusion refers to making formal financial services accessible and affordable to all segments of the economy. The policies promoting financial inclusion target two main types of inclusion. First, inclusion of individuals that aims to ensure that all adults (regardless of their income or any other characteristics) are part of the formal banking system. Second, inclusion of businesses that aims to provide financial services to all firms (regardless of their size, age, and other characteristics). There are several definitions and ways to measure financial inclusion provided by different policymaking bodies, and these definitions and measurements might also vary based on the country's situation (e.g., inclusivity, development, and income). However, among different bodies and development banks, there seems to be agreed-on aspects/dimensions to measure financial inclusion. The first relates to the availability of financial services and the outreach of banks' physical outlets that can be measured by the number of branches or ATMs. The second refers to the accessibility or outreach of financial services to adults (customers) that can be measured by the number of deposit, loan, and mobile money accounts or by barriers that prevent the unbanked from participating in the financial system, for example, cost or information. The third relates to the actual usage of financial services and can be captured by deposit or credit to GDP (gross domestic product). Finally, the fourth aspect relates to quality that captures the extent to which the financial products and services provided meet customers' needs and understanding; however, this is a less straightforward attribute to measure.

The benefits of financial inclusion are well documented from the perspective of both individuals and the economy as a whole. At the individual level, financial inclusion allows people to have the opportunity to secure their savings, make payments and transactions, obtain financing for small projects

and businesses, and manage expenses related to unexpected shocks such as health issues (Karlán and Zinman 2009). Recent research has also shown a positive impact of financial inclusion on the economy as a whole, economically and socially, including enhancing inclusive growth, generating employment, and lowering poverty and inequality (Kpodar and Andrianaivo 2011; Burgess and Pande 2005; Mookerjee and Kalipioni 2010). Hence, the World Bank has set a global goal to reach Universal Financial Access (UFA) by 2020, and a considerable number of emerging countries have made commitments to enhance financial inclusion (World Bank 2017). In the next section we review progress trends in financial inclusion in different regions.

3 PROGRESS IN FINANCIAL INCLUSION

To analyse the progress in financial inclusion over recent years, we use the IMF's (International Monetary Fund) Financial Access Survey (FAS) that contains supply-side cross-country annual data and covers different dimensions of financial inclusion. We also employ the World Bank's Findex database that contains demand-side cross-country data and is conducted every three years (i.e., in 2011, 2014, and 2017). From the Financial Access Survey, we consider the demographic outreach of banks' physical outlets measured by the number of branches or ATMs (per 100,000 adults), the accessibility of financial services to customers measured as the number of deposit or loan accounts (per 1000 adults), the actual usage of financial services captured by bank deposits or credit to GDP, in addition to mobile money indicators that capture innovations in financial access including the number of registered mobile money accounts, as well as value and volume of mobile money transactions. As for the Findex database, we use the percentage of male and female respondents who report having an account at a bank or another type of financial institution to analyse gender gap in account ownership.

Table 5.1 presents the mean values of the financial inclusion indicators for 189 countries included in the Financial Access Survey over the years 2004–2016.

The data show that, on average, there seems to be a year-on-year positive growth in all financial inclusion indicators over the period, except for 2009–2012 when some remain stable or decline which could be explained as an effect of the global financial crisis and the Euro sovereign debt crisis. The reduction is mostly evident for the number of loan accounts in 2010–2011 and domestic credit to GDP over the years 2010–2012, compared to 2009. In terms of traditional services, over the entire period the highest growth seems to be in loan accounts and the number of ATMs

Table 5.1 Financial inclusion indicators—progress

Year	Branches of commercial banks per 100,000 adults	Automated Teller Machines (ATMs) per 100,000 adults	Registered mobile money agents per 100,000 adults	Deposit accounts with commercial banks per 1000 adults	Loan accounts with commercial banks per 1000 adults	Registered mobile money accounts per 1000 adults	Domestic credit to private sector by banks (% of GDP)	Outstanding bank deposits to GDP (%)	Value of mobile money transactions (% of GDP)	Number of mobile money transactions per 1000 adults
2004	16.2	32.4	57.5	925.6	172.1	19.2	38.6	40.2	0.0	38.0
2005	16.2	33.2	81.1	957.4	212.7	27.2	41.8	41.3	0.0	68.9
2006	16.4	34.6	64.6	967.3	224.3	29.5	44.2	42.7	0.0	81.5
2007	17.0	38.3	19.2	1015.3	277.5	26.5	47.4	45.6	0.2	86.1
2008	17.7	39.4	22.5	1029.0	294.9	51.1	49.8	45.8	1.1	494.8
2009	17.4	41.2	36.1	1029.8	302.5	80.6	51.7	49.4	1.9	1014.7
2010	17.4	40.6	32.9	1078.4	286.1	97.3	51.4	49.3	2.2	1335.1
2011	17.3	41.4	43.2	1113.8	287.4	116.0	50.5	49.1	2.4	1411.4
2012	17.4	42.5	52.1	1125.9	312.9	154.3	50.7	49.5	3.5	2438.6
2013	17.6	45.2	83.3	1151.0	309.9	197.5	51.5	51.4	4.4	3440.9
2014	18.2	47.1	122.6	1213.3	326.8	292.5	52.1	53.9	6.3	4553.8
2015	18.2	49.1	161.0	1253.0	339.1	370.4	53.6	56.9	8.1	6198.9
2016	18.9	52.2	190.2	1375.0	388.6	448.2	55.2	62.7	8.9	8392.5
Growth (%)	17	61	231	49	126	2234	43	56	317,731	21,982

Data source: Financial Access Survey

Note: The table presents the annual mean values of the financial inclusion indicators for 189 countries over the years 2004–2016. Growth (%) is the growth rate between 2004 and 2016

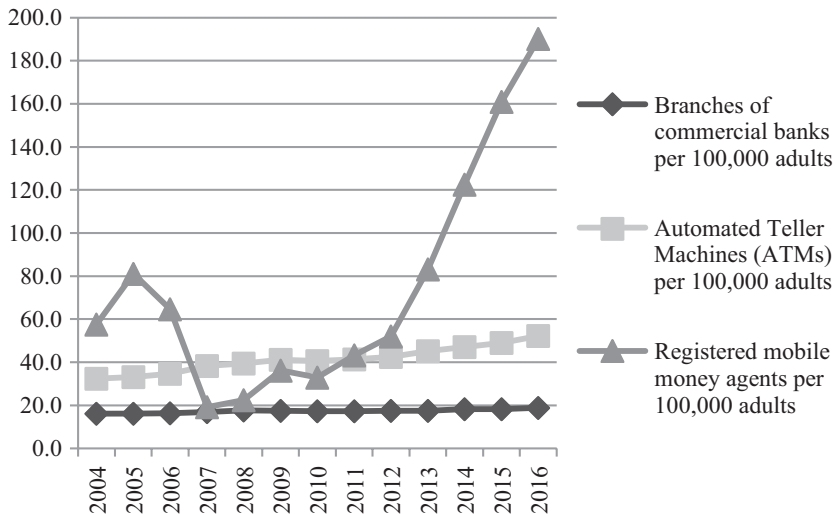


Fig. 5.1 Financial inclusion progress—availability dimension. Data source: IMF's Financial Access Survey. Note: The graph plots the trend in the availability dimension of financial inclusion for a sample of 189 countries over the period 2004–2016

and the lowest in the number of branches. As for mobile money indicators, there seems to be a rapid increase particularly over the period 2014–2016. The number of registered mobile money accounts increased from 19 in 2004 to 448 in 2016 showing that digital financial services are being promoted to increase financial inclusion among the unbanked.

Figures 5.1, 5.2, and 5.3 show the progress trends in selected financial inclusion indicators by dimension. Specifically, Fig. 5.1 illustrates the trend in the availability dimension and shows a rapid growth in registered mobile money agents. Figure 5.2 displays the evolution of the accessibility dimension and shows a considerable growth in all types of accounts (i.e., deposits, loans, and mobile money). Lastly, Fig. 5.3 depicts the trend in the usage dimension and shows that the value of mobile money transactions is marginal as compared to credit and deposit to GDP.

Table 5.2 presents the mean values of the financial inclusion indicators by region as of 2016. The data suggest that there seems to be a substitution of traditional bank services with mobile accounts in sub-Saharan Africa, a region with the lowest number of bank branches, ATMs, deposit accounts, and financial deepening (as measured by deposit/credit to GDP), but the highest number of mobile money accounts and agents. Interestingly, mobile

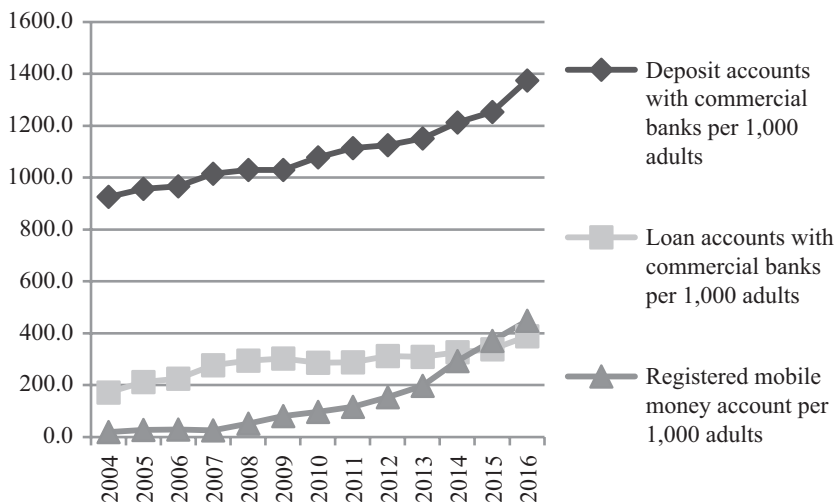


Fig. 5.2 Financial inclusion progress—accessibility dimension. Data source: IMF’s Financial Access Survey. Note: The graph plots the trend in the accessibility dimension of financial inclusion for a sample of 189 countries over the period 2004–2016

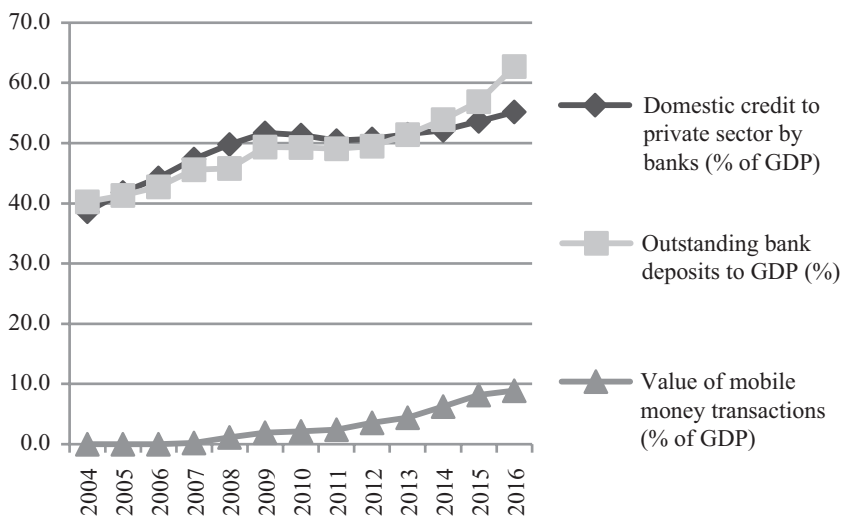


Fig. 5.3 Financial inclusion progress—usage dimension. Data source: IMF’s Financial Access Survey. Note: The graph plots the trend in the usage dimension of financial inclusion for a sample of 189 countries over the period 2004–2016

Table 5.2 Financial inclusion indicators—macro regions

<i>Region</i>	<i>Branches of commercial banks per 100,000 adults</i>	<i>Automated Teller Machines (ATMs) per 100,000 adults</i>	<i>Registered mobile money agents per 100,000 adults</i>	<i>Deposit accounts with commercial banks per 1000 adults</i>	<i>Loan accounts with commercial banks per 1000 adults</i>	<i>Registered mobile money accounts per 1000 adults</i>	<i>Domestic credit to private sector by banks (% of GDP)</i>	<i>Outstanding bank deposits to GDP (%)</i>	<i>Value of mobile money transactions (% of GDP)</i>
East Asia & Pacific	16.77	62.55	30.47	1701.34	246.19	448.90	80.34	99.83	0.70
Europe & Central Asia	25.18	73.84	7.75	1983.64	593.17	116.72	72.21	57.85	0.67
Latin America & Caribbean	25.99	52.06	36.40	1286.74	614.68	112.84	45.42	52.18	0.19
Middle East & North Africa	16.33	53.03	1.49	1228.29	452.69	54.05	69.25	89.06	0.22
North America	27.80	222.99	–	–	–	–	52.99	71.36	–
South Asia	10.57	15.98	228.08	986.74	96.97	179.56	39.52	51.07	7.18
Sub-Saharan Africa	7.31	15.23	278.84	584.63	128.21	611.65	24.15	44.40	15.30
Total	18.87	52.20	190.19	1375.04	388.56	448.16	55.16	62.70	8.90

Data source: Financial Access Survey

Note: The table presents mean values of the financial inclusion indicators for different macro regions for the year 2016. “–” indicates missing values

money accounts are least used in the Middle East and North Africa. North America seems to have the highest number of banks' physical outlets (ATMs and branches), whereas Europe and Central Asia have, on average, the highest number of deposit accounts.

Table 5.3 presents the difference-in-means test for the financial inclusion indicators by income region. The data reveal that high- and upper-middle-income countries have significantly higher financial inclusion than low- and lower-middle-income countries across all traditional indicators (i.e., deposit and loan accounts in commercial banks, financial deepening, and physical

Table 5.3 Financial inclusion indicators—income regions

<i>Financial inclusion indicator</i>	<i>High- & upper-middle-income countries</i>	<i>Lower-middle & low-income countries</i>	<i>Difference in means</i>		
			<i>Abs</i>	<i>%</i>	<i>p-value</i>
Branches of commercial banks per 100,000 adults	24.60	8.28	16.32	197	0.000
Automated Teller Machines (ATMs) per 100,000 adults	62.84	11.62	51.22	441	0.000
Registered mobile money agents per 100,000 adults	40.62	132.74	-92.12	-69	0.000
Deposit accounts with commercial banks per 1000 adults	1656.30	505.04	1151.27	228	0.000
Loan accounts with commercial banks per 1000 adults	469.55	96.26	373.28	388	0.000
Registered mobile money accounts per 1000 adults	205.17	273.77	-68.6	-25	0.000
Domestic credit to private sector by banks (% of GDP)	67.96	25.11	42.84	171	0.000
Outstanding bank deposits to GDP (%)	61.07	33.16	27.92	84	0.000
Value of mobile money transactions (% of GDP)	0.40	7.75	-7.35	-95	0.000

Data source: Financial Access Survey

Note: The table presents mean values of the financial inclusion indicators for the high- and upper-middle-income countries and low- and lower-middle-income countries for the period 2004–2016. The last three columns report the difference in means calculated as the difference between high- and upper-middle-income countries' and low- and lower-middle-income-countries' means in absolute (Abs) and percentage (%) values, with the *p*-values of the tests reported in the last column

outlets); the difference is most pronounced in the number of ATMs (441 per cent higher in high- and upper-middle-income countries), loan accounts (388 per cent higher in high- and upper-middle-income countries), and deposit accounts (228 per cent higher in high- and upper-middle-income countries). However, compared to high- and upper-middle-income countries, low- and lower-middle-income countries have a significantly higher number of mobile money accounts (25 per cent higher) and registered agents (69 per cent higher), thus revealing that innovative channels can indeed substitute traditional banking services in these countries.

We next use the Findex database to analyse gender gap in account ownership. Figure 5.4 presents account ownership by gender for the years 2011, 2014, and 2017. The data show a substantial growth in account ownership from 2011 to 2017 for both genders. Although the gender gap decreased from 8.1 per cent in 2011 to 6.9 per cent in 2017, it is still persistent.

We further analyse the gender gap in account ownership by distinguishing between different macro regions (Fig. 5.5). The data indicate a decline from 2011 to 2017 for all regions except sub-Saharan Africa where the gender gap increased from 5 per cent in 2011 to 11 per cent in 2017. The highest gender gap in financial access seems to be in the Middle East and

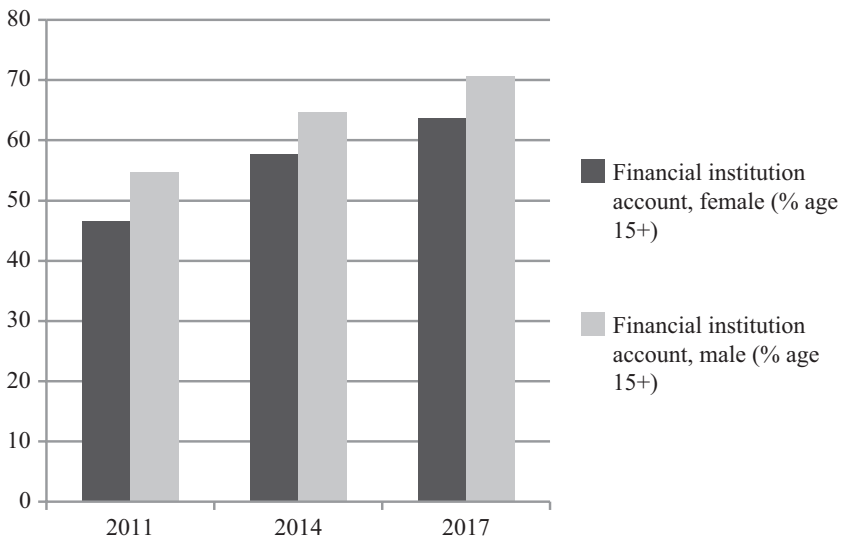


Fig. 5.4 Account ownership by gender. Data source: Global Findex Database. Note: The graph plots the account ownership by gender for the years 2011, 2014, and 2017

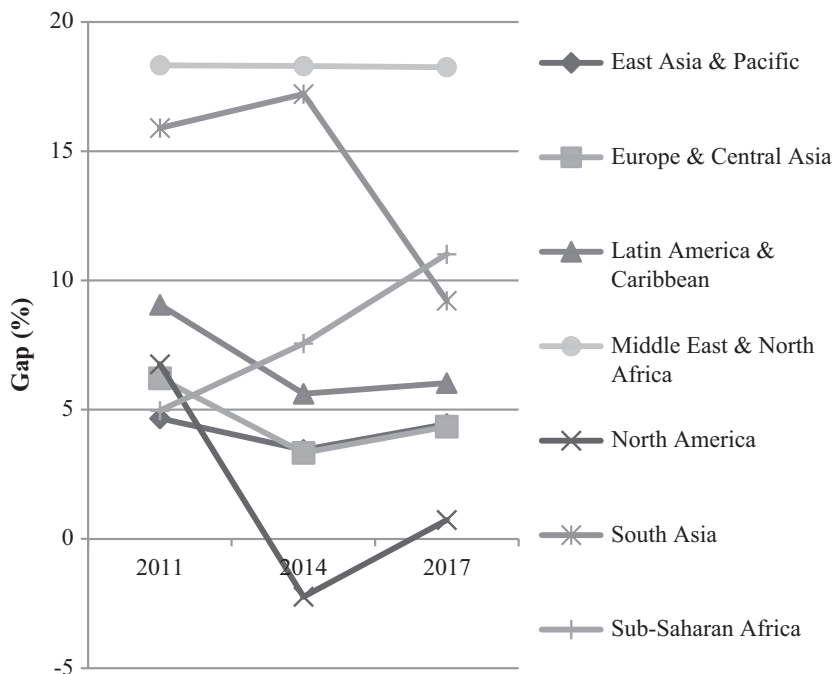


Fig. 5.5 Gender gap in account ownership by region. Data source: Global Findex Database. Note: The graph shows the gender gap in account ownership in financial institutions (% male-% female) by region for the years 2011, 2014, and 2017

North Africa (18.2 per cent as of 2017) and the trend shows only a slight improvement. On the other hand, the gender gap in account ownership in North America improved significantly from 6.7 per cent in 2011 to around zero in recent years (2014 and 2017).

4 WHAT DRIVES THE HETEROGENEITY IN FINANCIAL INCLUSION ACROSS COUNTRIES?

The empirical literature points to certain country characteristics that play a role in determining the level of financial inclusion. Analysing these determinants can be beneficial to inform policymakers about the factors that should be prioritised to achieve greater financial inclusion. Prior research demonstrates that the level of financial inclusion is related to specific macroeconomic factors, technology and infrastructure, institutional quality, banking market conditions, and social variables.

First, in terms of macroeconomic factors, the empirical literature has shown that financial inclusion is positively associated with economic conditions, including the level of income, income equality, employment, and economic growth. In particular, individuals in countries characterised by a high level of income tend to be more integrated into the financial system as wealthier people demand and utilise more financial services (Ardic et al. 2011). Moreover, high income inequality in the economy can lead to a lower level of financial inclusion as it can be linked to uneven economic opportunities and marginalisation of the lower-income segment of the economy, and hence to a considerable proportion of the population not being able to afford the costs of banking services (Evans and Alenoghena 2017; Demirgüç-Kunt and Klapper 2013; Rojas-Suarez 2010). As for employment, it has been shown that formally employed population is more likely to be included or motivated to participate in the financial sector and typically needs a bank account to receive salary (Allen et al. 2012). Finally, financial inclusion has been shown to be positively associated with output growth, specifically in high- and middle-income countries (Park and Mercado Jr 2018).

Second, technology offers innovative channels through which banks can reach the unbanked segment of the economy and provide them with affordable financial services. The use of mobile phones to boost the use of accounts among the unbanked in many countries in Africa proved to be an effective and affordable technological tool. Moreover, digital identification is also important to overcome the documentation barriers faced by people who lack identity proof when applying for a bank account, as witnessed in India, where the use of biometric identification cards reduced the gender gap in access to financial services (Demirguc-Kunt et al. 2018). Prior empirical research relied on the number of individuals using the internet and the number of mobile subscriptions to capture the technology infrastructure aspect and showed a positive association between these indicators and financial inclusion (Kabakova and Plaksenkov 2018; Honohan 2008; Park and Mercado Jr 2018).

Third, higher institutional quality is linked to the enforcement of rule of law, higher regulatory quality, and political stability under which debtors' and creditors' rights are respected and contracts are observed. Therefore, better institutional quality increases the trust in the financial system and enhances financial inclusion (Rojas-Suarez 2010; Demirgüç-Kunt and Klapper 2013; Honohan 2008).

Fourth, as banking institutions have a crucial role in achieving financial inclusion targets, it is important to review findings related to the relationship between banking system conditions such as market structure, competition, regulation, and financial inclusion. Previous studies suggest that a

higher degree of competition is associated with higher financial inclusion, as competitive financial systems tend to be more efficient and focus more on the quality of financial services and innovation, which in turn improves the availability and the variety of financial services provided to customers (Love and Martínez Pería 2014; Owen and Pereira 2016). The literature provides mixed evidence on the relationship between concentration, as a structural measure of banking market conditions, and financial inclusion. On the one hand, studies suggest that a high level of concentration is negatively associated with financial inclusion as banks become less motivated to assess riskier individuals and smaller businesses due to the lack of competitive incentives (Demirgüç-Kunt and Klapper 2013; Ardic et al. 2011). On the other hand, large banks in highly concentrated markets achieve higher efficiency through economies of scale, and thus have the capacity to invest in information acquisition and provide more opportunities for risky individuals and younger/smaller firms (Owen and Pereira 2016; Petersen and Rajan 1995). Moreover, banking systems differ in terms of financial freedom that relates to their independence from government control, openness to foreign competition, and efficiency. Rojas-Suarez (2010) finds a positive association between financial freedom and financial inclusion as government control can deter the ease of access to financial services while efficiency and foreign competition can enhance the quality and variety of financial services provided to customers and hence improve financial inclusion. This suggests that restrictions on banking activities can limit creation of new products and services.

Finally, social factors impact people's behaviour and decision-making related to the financial system and their ability and willingness to be part of this system. Social factors include age dependency, health, education, and culture among others. Education and financial literacy are at the core of social development that can enhance financial inclusion, impacting the demand side of financial inclusion as it helps people make informed financial decisions and use innovative financial tools rather than holding cash and depending on their social circles for borrowing (Allen et al. 2012; Rojas-Suarez 2010; Grohmann et al. 2018). Furthermore, gender gap in health, empowerment, and labour can be associated with gaps in financial inclusion. Demirgüç-Kunt et al. (2013) find that there are large disparities between the genders in financial inclusion and that gender norms can explain cross-country variation in access to financial services.

In Table 5.4 we report key correlation coefficients between the financial inclusion indicators and selected country characteristics explaining some of the factors described above. The coefficients are largely in line with a priori

Table 5.4 Correlation matrix for financial inclusion and country characteristics

	<i>Branches of commercial banks</i>	<i>Automated Teller Machines (ATMs)</i>	<i>Registered mobile money agents</i>	<i>Deposit accounts with commercial banks</i>	<i>Loan accounts with commercial banks</i>	<i>Registered mobile money accounts</i>	<i>Domestic credit to private sector by banks</i>	<i>Outstanding bank deposits</i>
Automated Teller Machines (ATMs)	0.4953***							
Registered mobile money agents	-0.1711***	-0.2238***						
Deposit accounts with commercial banks	0.3697***	0.7078***	-0.1176*					
Loan accounts with commercial banks	0.4083***	0.6669***	-0.0534	0.5727***				
Registered mobile money accounts	0.1112*	-0.1001*	0.8078***	0.0155	-0.0373			
Domestic credit to private sector by banks	0.5206***	0.6468***	-0.1796***	0.6318***	0.547***	-0.0727		
Outstanding bank deposits	0.2713***	0.3448***	-0.1496**	0.3697***	0.2786***	0.0088	0.6309***	
Value of mobile money transactions	-0.2066***	-0.2832***	0.7179***	-0.1918***	-0.1638**	0.6713***	-0.1663***	-0.1133*
GDP per capita	0.5115***	0.7227***	-0.2477***	0.6533***	0.6857***	-0.1494**	0.6834***	0.4272***
Unemployment	0.041	-0.1153***	-0.1141	-0.0561*	0.1084***	-0.0524	-0.1359***	-0.1344***
Gini index	-0.1355***	-0.2568***	0.2832**	-0.4742***	-0.1559***	0.3194**	-0.3265***	-0.1526***
Mobile Subscriptions	0.3749***	0.5296***	-0.0904	0.4593***	0.5407***	0.0354	0.4996***	0.4017***
Rule of law	0.4566***	0.6443***	-0.0504	0.6482***	0.58***	0.0641	0.7487***	0.4442***
Lerner index	-0.0269	-0.0889***	-0.1541*	-0.0194	-0.0766*	-0.0763	-0.1434***	-0.2635***
Financial freedom	0.3864***	0.4871***	-0.083	0.3839***	0.4795***	0.0303	0.5308***	0.3267***
Secondary school	0.4963***	0.6089***	-0.2785***	0.5819***	0.6093***	-0.1125	0.5887***	0.2842***
Gender inequality	-0.5312***	-0.7025***	0.1366*	-0.675***	-0.6459***	0.1067	-0.723***	-0.4339***

Data sources: Financial Access Survey; World Development Indicators; World Governance indicators; Global Financial Development Database; and Heritage Foundation

Note: The table reports key correlations for the financial inclusion indicators and different country characteristics

*, **, and *** indicate significance at 10 per cent, 5 per cent, and 1 per cent levels, respectively

<i>Value of mobile money transactions</i>	<i>GDP per capita</i>	<i>Unemployment</i>	<i>Gini index</i>	<i>Mobile Subscriptions</i>	<i>Rule of law</i>	<i>Lerner index</i>	<i>Financial freedom</i>	<i>Secondary school</i>
-0.2983***								
-0.1542*	-0.1613***							
0.2334*	-0.3899***	-0.0417						
-0.0734	0.6918***	-0.1398***	-0.296***					
-0.1572***	0.7954***	-0.1449***	-0.4344***	0.4869***				
0.033	-0.0572**	0.0086	0.0227	-0.0989***	-0.0872***			
-0.0594	0.5622***	-0.0063	-0.1999***	0.3653***	0.6655***	-0.0938***		
-0.3366***	0.8207***	-0.0589**	-0.3898***	0.6455***	0.6702***	-0.0673**	0.4661***	
0.204***	-0.8184***	0.0457	0.6233***	-0.6148***	-0.7538***	0.087***	-0.5373***	-0.8102***

expectations. However, there seem to be differences in the associations when comparing traditional banking services and mobile money services. On the one hand, traditional financial services seem to be positively correlated with the level of national income (GDP per capita), technology (mobile subscriptions), institutional quality (rule of law), financial freedom, and education (secondary school enrolment), and negatively related to unemployment, income inequality (Gini index), banks' market power (Lerner index), and gender inequality. On the other hand, mobile money services seem to have opposite correlations with these characteristics. This can be expected as these services are being used as substitutes to traditional banking services in low-income countries that have higher unemployment and income and gender inequality, and lower institutional quality and education level. Further analysis on specific country characteristics that may drive financial inclusion could provide useful guidance to policymakers worldwide; however, this is beyond the scope of this chapter.

5 CONCLUDING REMARKS

Advancing financial inclusion is crucial to supporting equal opportunity, reducing poverty, fostering economic growth, and generating employment. Hence, efforts have been made to reach more inclusive financial systems, particularly in emerging economies. This chapter provides a background on financial inclusion, progress and trends, and offers a review of country characteristics that are reliably related to financial inclusion.

The analysis shows an improvement in different measurements of financial inclusion over the period 2004–2016, particularly in the number of ATMs, loan, and mobile accounts. It also shows a high variation between different macro and income regions, where traditional tools of financial inclusion are significantly higher in high- and upper-middle-income countries and mobile money services are significantly higher in low- and lower-middle-income countries, specifically in sub-Saharan Africa. The variation is also evident in terms of gender. The analysis shows a decrease in gender gap in recent years, yet it is still high particularly in certain macro regions, such as the Middle East and North Africa.

Prior research shows that the level of financial inclusion is related to specific macroeconomic factors, technology and infrastructure, institutional quality, banking market conditions, and social variables. We show significant associations between financial inclusion and selected proxies of these factors. However, further research is needed to inform policymakers on the factors that should be prioritised to achieve more inclusive financial systems that would facilitate inclusive growth.

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Framing, Overconfidence and Regret in Italian Mortgage Banking Litigations

Caterina Lucarelli and Francesco James Mazzocchini

I INTRODUCTION

In times of innovations and rapid evolutions, economic theory has changed as well. The modern economic literature suggests that the concept of rationality is purely utopic and is rather time varying and has many shades. In other words, the much-vaunted concept of the fully rational *homo oeconomicus* does not fit the reality and is replaced by a mere human being, mortal and fallible (Simon 1976). This kind of agent is influenced by many factors, such as environment, emotions, social culture, timing (Tversky and Wakker 1995). Hence, the decision-making process can hardly lead to a perfectly optimal outcome and is often biased towards less efficient solutions. In other words, whenever a decision-making process is distorted from its ideal path, the reason might lie in a misinterpretation or miscalculation of pieces of information due to those factors. This concept is usually referred to as “cognitive bias” (Kahneman 2003).

This idea can be applied to every domain of everyday life. In economic and finance domain, for instance, cognitive biases may induce entrepre-

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neurs/managers to opt for wrong strategies or miss the optimal one; they might induce wrong individual choices (Lucarelli and Brighetti 2010), such as unsuitable investment decisions or mistaken budgeting plans (Ackert 2014). Awareness of rationality pitfalls might as well be applied to the understanding of the relationship between banks, or financial intermediaries in general, and customers. A cognitive bias may affect the perception of customers' need prior to the service rendered or throughout the performance. Clients could have ex ante undersigned contracts with no knowledge of the facts or demanded unsuitable financial services. They may also undertake inefficient choices during the contract, thus resulting in an ex post irrationality. We have selected three main biases that we considered particularly relevant and recurrent in the customer-bank relationship: narrow framing, overconfidence and regret (an exhaustive analysis is provided by Haselton et al. 2005). In a nutshell, they respectively refer to erroneous processing of information, to the tendency of giving excessive confidence to own abilities and to the remorse and reversal of a decision.¹

In this chapter we investigate the distortion degree of financial decisions from the plaintiffs' perspective. We previously found that mortgages and financing schemes were notably prone to be affected by a cognitive bias (Mazzocchini 2018). Hence, we have focused on this area and investigated 75 decisions. The results are in line with our predictions, but still very surprising.

Concerning the table of contents, Sect. 2 contextualizes explored behavioural biases in the literature, and then we introduce our assumptions and explain further our research question in Sect. 3. Section 4 explains the method of analysis that has been adopted and describes our model. In particular, it presents the investigation tools that we have chosen. We have selected three recurrent cognitive biases and pointed out a sort of scheme which highlighted their manifestation parameters. It briefly describes the sampling procedure and presents the methodology of analysis of each single observation. Even though a bias disclosure might not be objective, we have tried to reduce the subjective aspects as much as possible.

Section 5 offers empirical findings and the statistical hypothesis testing for proportions that we have implemented in order to infer the results from the sample to the population. Then, it presents our descriptive statistics and results in both bivariate and multivariate terms. Section 6 concludes.

¹Ackert Lucy and Richard Deaves. "Behavioural Finance: Psychology, Decision-making and Markets", 2010, Mason, OH: South-Western Cengage Learning.

2 FRAMING, OVERCONFIDENCE AND REGRET FROM THE LITERATURE

The main pioneers of the recent behavioural theories might be identified in Daniel Kahneman and Amos Tversky. The two authors have firstly confuted the precepts of the neoclassical models by asserting that an economic agent might not always be capable of evaluating an outcome in the same way. Many factors might be involved: the perceived utility varies according to the starting point and to the prospect of gains or losses (Kahneman and Tversky 1979), and even given probabilities might be evaluated differently depending on the situation (Tversky and Kahneman 1992). Additionally, Kahneman (2011), following the work of Seymour Epstein (Epstein 1994), assumed that the human brain operates in a dual-process mode. In other words, the brain is bipartite into two systems (Evans 2003): the first one is active continuously and generates fast, impulsive and intuitive decisions, whereas the second one is slower, analytical and employed only in deliberate decision-making processes (Kahneman 2003). Therefore, every decision depends on which system is activated and affected by the intensity degree of analytical thinking (Kirchler et al. 2017). In particular, system 1 is more prone to be influenced by mental laziness (Barrett et al. 2004) and behavioural shortcuts to wit heuristics and biases (Kahneman and Tversky 1982). The former might occur whenever an individual faces reduced mental effort and looks for ease of information processing, thus generating a quicker but eventually sub-optimal choice (Evans 1984). The latter concerns a deviation from the optimal path of a decision-making process due to various factors, such as heuristics, emotions (Lucarelli et al. 2015a), sociocultural factors, mental schemes and information asymmetries (Ackert and Deaves 2010). The manifestation of a behavioural bias leads to inefficient choices and possibly to irrational or mistaken decisions (Kahneman et al. 1982). These concepts find application in many economic and financial aspects. Hence, we have decided to investigate their application among the sphere of banking-customers relationships. In a nutshell, as already stated, the purpose of this chapter is to uncover the intensity of affection for distortions or cognitive biases suffered by customers when embarking on litigation filed to an Italian ADR mechanism and to do an impact assessment.

Several different kinds of cognitive biases have been identified in the literature. Among the most notorious ones present in the financial sphere are narrow framing, hindsight bias, overconfidence, confirmation bias, self-attribution, primacy and recency effect, mental accounting, sunk-cost fallacy, disposition effect, house-money effect, regret, gambler's fallacy, hot hand belief.

The self-attribution bias concerns the inclination to attribute an odd success to someone's own skills and capabilities rather than to circumstances or even luck. It is basically driven by the need of enhancing someone's self-esteem (Dale and Ross 1975). The primacy and recency effects, which are usually clustered in the name of serial position effect, define the tendency to ignore or overlook the middle part of a situation and instead to acquire best pieces of information in the first and last parts (Frensch 1994). Mental accounting refers to the fact that people do virtual book-keeping and compartmentalize their savings and expenses, even if it is purely abstract (Thaler 1985). This generates two effects: the sunk-cost fallacy and the disposition effect. The sunk-cost fallacy effect occurs whenever an individual feels himself obliged to perform an action for which has already paid and whose cost is irretrievable (Arkes and Blumer 1985). The most common example is the one of the concert tickets: once the price is paid a person feels forced to go to the show even if he might be unable to do so (Thaler 1999). The disposition effect is highly common in financial markets and concerns the inclination to sell performing assets in order to collect the gain and, vice versa, to keep non-performing ones in the hope of future returns (Shefrin and Statman 1985). The house-money effect takes place after a gain and induces people to be less risk-averse because they consider prior gain as a cushion against future losses (Thaler and Johnson 1990). The opposite situation happens in case of an initial loss. It is called "snake-bite effect" and makes people less risky. The gambler's fallacy and the hot hand belief are the other cases of miscalibration of probabilities (Kahneman and Tversky 1972; Huber et al. 2010). In the former, a gambler is induced to think that if an event has happened more frequently in a time interval, it will happen less in the future. The latter asserts that whenever a gambler experiences success in random events, he is inclined to give more likelihood to them (Stockl et al. 2015).

However, for our work, we decided to focus only on three of those well-known behavioural biases: narrow framing, overconfidence and regret. The reason is that those biases are the most recurring and frequent in this scenario. To cut a long story short, narrow framing occurs whenever individuals do not process properly all the information they should, (Tversky and Kahneman 1986) or act with blinkers rather than considering all the factors involved, to wit in a narrower frame instead of a broader one (Druckman 2001). It might induce miscalculations due to a myopic evaluation of the parameters within the decision-making process (Lucarelli et al. 2015b). Overconfidence is related to excessive optimism about one's

own ability and might induce a riskier attitude (Moore and Healy 2008). The confirmation bias and hindsight bias, introduced in the literature by Scott Plous (1993), together with the self-attribution bias, generally exacerbate it. The former is a predisposition to search only for data to prove one's own belief and reject the contradictory one. The second one is an ex post inclination to see events as foreseeable only afterwards; to wit, it is the creeping determinism of thinking that, in retrospect, an event was inevitable. It is also called "knew-it-all-along" effect (among others see Roesch and Vohs 2012) because afterwards people tend to see themselves as good clairvoyants and give more likelihood to an event that has already happened. Anyway, the only rational explanation is that they have a better picture of the whole process at the end and are simply able to interpolate the clues. Briefly, they tend to overestimate the precision of their knowledge, thus fostering overconfidence. Hence, they represent one of the most harmful logical fallacies in the financial area and may create some serious situations. For example, it might induce investors to take on too much risk by underdiversifying their portfolio due to excessive confidence in their choices (self-attribution bias). Or it may cause excessive reliability on their analysts' estimates or on stocks which have been previously successful (confirmation bias). Or maybe price drops or bubbles might be taken lightly due to hindsight bias (Palan 2013). Investors might also be induced to increase the iteration of trading as the previous outcomes have been positive (pure overconfidence), and so on. Most importantly, overconfidence (and its shades, together with the hindsight bias, confirmation bias and self-attribution bias) is one of the most responsible factor for financial bubbles since it plays a key role in the expansion period and fosters their inflation and subsequent burst (Barberis 2013). Concerning a niche sphere of the financial world, such as financial lending, those biases are similarly dangerous, and many examples could be found. For instance, overconfident borrowers might overstate their need for instant liquidity and ask for an underutilized financing scheme or rather they might overestimate their abilities to respect the contract terms. Overconfidence might also occur whenever individuals are excessively excited about the object of their financing requests (a project, a new house or maybe a new car) that they mis-weight the different financing schemes and opt for the less feasible one (Grubb 2015).² Clearly, confirmation bias, hindsight bias

²Michael D. Grubb (2015). "Overconfident Consumers in the Marketplace," Boston College Working Papers in Economics 877, Boston College Department of Economics. He actually applies those concepts to the consumers' choices in the marketplace.

and self-attribution bias play a role in the form of overconfidence in this field. The former might happen, for example, whenever borrowers opt for a type of loan or a financial intermediary that is considered trustworthy since it might have been already chosen previously by them or their friends or relatives. The hindsight bias might take place, for example, whenever individuals underestimate a non-payment of a mortgage tranche or a delay, considering it is just a one-off event, and overestimate their abilities of being regular on their future payments. The latter, for example, might induce people to take on over-indebtedness due to erroneous reliability on a precedent financing scheme that might have been concluded successfully by chance (e.g., particularly favourable macroeconomic cycle or momentary favourable domestic conditions). Finally, regret is related to second thoughts and miscalculations of future outlooks (Roese 2005). Clearly, all those biases could lead not only to *ex ante* inefficiencies for consumers, that is, in the choice or completion of a financing scheme, but also to *ex post* ones. It means that whenever they lead to conflicts between parties, they could also affect the behaviour within the litigation procedure. A clear example, which will be explained further in the next paragraphs, is an overstatement of reimbursement requests or a clearly unreasonable complaint. However, those three biases (framing, overconfidence and regret) have been selected as investigating tools for our analysis and thus will be analysed more thoroughly in the pertaining paragraph.

3 THE ABF, “ARBITRO BANCARIO FINANZIARIO”

Our database is the Italian banking and financial ombudsman (in Italian: Arbitro Bancario Finanziario, or simply ABF), which is an Italian Alternative Dispute Resolution mechanism. It was instituted in 2009 by the Bank of Italy with the introduction of the Article 128-bis in the Consolidated Law on Banking, enforced by Law 262/2005, namely Investor Protection Law. Its aim is to quicken and ease the resolution procedure of litigations between banks or financial intermediaries and their customers and to provide a compelling alternative to the ordinary trials. The ABF is an out-of-the-court settlement alternative of disputes (Lynch 2001) that to a certain extent might be assimilated to arbitration or mediation but must not be confused with them (Buhring-Uhle and Kirchhof 2006). When the parties agree upon this scheme, they submit themselves to the decision of a third party, which is an impartial and representative panel. Once it has accepted the query, the panel evaluates the supporting evidence presented and delivers a verdict, namely, a decision. It is important to note that decisions are

taken according to the applicable Italian law (Civil Code, Consolidated Law on Banking and Consolidated Law on Finance) but are not legal judgments. In other words, they are not legally binding, and the parties are able in any case to submit the litigation to the ordinary court thereafter. However, the ABF guarantees the cogency of decisions by providing a public list of the intermediaries that are not complying with them.

Additionally, the panel has jurisdiction only on certain aspects. It can decide on banking and financial services, such as current accounts, mortgages, ATMs, credit in general, payment systems and cards. If the plaintiff asks for a refund, the amount must not exceed the value of 100,000€. Conversely, the ABF has no jurisdiction on investing services, litigations already submitted to the Civil Court or Arbitration, facts occurred prior to January 2009 and other aspects different from banking or financial services. Another important prerequisite for appeal is that, before submitting the query, the two parties have tried to mediate and find a satisfactory solution. If the financial intermediate does not give an adequate answer within 30 days, the plaintiff is allowed to file a formal complaint to the Ombudsman within 12 months from the first formal contact with the intermediary. The procedure then is very simple: he has to send the formal request along with the supporting material to the technical secretariat or to a branch of the Bank of Italy. He just has to pay an almost negligible fee of 20€, which is reimbursed from the intermediary in case of acceptance of the complainant's request. In that case, the intermediary also needs to pay a charge of 200€ to the ABF in addition to possible refunds due to the complainant. Importantly, every intermediary (Italian or international) has to adhere and pay annual dues to the ombudsman, wit banks, financial intermediaries, post office, finance companies, payment institutions, electronic money institutions and so on.

Concerning its structure, the ABF is organized as follows. It is under the jurisdiction of the Bank of Italy, which supervises its activities, sets its regulations and chooses three-fifths of its members. Then proceeding according to a top-down approach, the extrajudicial scheme is divided into seven territorial panels: Milan, Turin, Bologna, Rome, Naples, Bari and Palermo. Each panel is composed of five members. As we have seen, three-fifths of them, including the president, are nominated by the Bank of Italy; the remainder is selected by associations of category or rather Confindustria along with Confcommercio, Confartigianato, Confagricoltura for managers and entrepreneurs, National Consumer Council for clients, and lastly Banking and Financial Conciliator for the intermediaries. Thus, impartiality and representativeness are guaranteed.

4 RESEARCH QUESTION AND PERIMETER OF THE ANALYSIS

Our aim, here, is to investigate the degree of inefficiencies present in Alternative Dispute Resolution (ADR) banking litigations based on requests described by claimants. In fact, sometimes it could occur that the client sues his own bank or intermediary because of inconsistencies. Generally, litigations are costly and time-consuming and generate friction between the two parties. The Nash equilibrium³ very often lies in the lawsuit between them, whereas the Pareto efficiency would suggest finding an agreement previously or to avoid certain behaviours. On the contrary, the ADR procedure is cheap and does not necessarily involve the professional support of lawyers. Therefore, clients are prone (and even stimulated) to address requests to the ADR system based on their personal evaluation of the problem they perceive. This clearly streamlines the issue but has a flipside. In fact, moral hazard behaviors could be stimulated. In other words, due to its easy accessibility, clients might take on risky behaviours or simply do not put their full effort into their decision-making process. This causes a problem of endogeneity in the relation “biased judgement”–“litigation”. Therefore, it would be interesting to find out whether a significant share of those litigations could be avoidable, thus contributing to spare time and money, thanks to improved and more aware decision-making.

Our research question is focused on the analysis of how many of those litigations might be affected by biases. The purpose of the chapter is to evaluate whether biased decisions may affect and possibly foster those litigations, thus causing inefficiencies in the system among the agents, clients and intermediaries. How many of them could have been avoided, prevented or settled amicably? The goal is to examine each sentence and establish whether it could have been preventable (*ex ante bias*) or it could have been ceased with an amicable settlement of the matter, thus avoiding *ex post* biases. The former situation has consequences on the relationship between the parties and its respective performance; the latter has consequences on the conclusion of a dispute and on the investigation phase.

³According to Game Theory, it is the outcome of non-cooperative strategies adopted by the players. It does not always coincide with the Pareto efficient equilibrium. See: Osborne, M. J., and Rubinstein, A., “*A Course in Game Theory*”, Cambridge, MA: MIT, 1994.

Observing the analysis via backward induction, another key aspect comes to light. In fact, it would also be interesting to study whether the decisional outcome of a litigation changes in the presence of a misevaluation or a decisional distortion suffered from a plaintiff, and thus if a judgment panel is able to recognize those cognitive limitations. In particular, it is interesting to analyse whether there is a certain degree of ex post protection when a customer makes wrong decisions due to behavioural inefficiencies. It means that if those cognitive mistakes are detected by the judgment panel, the decisional outcome should not lessen them and protect the biased side. Vice versa, if an ex post protection scheme is carried out, it might lead to inefficiencies both in the banking-customer relationship (fostering the distortion) and in the economic system (in terms of costs). Ultimately, we need to point out that this chapter analyses only a specific category of case laws. In preceding research, we have run a similar analysis in which we have taken into consideration 22 of the most relevant categories of the ABF's database.⁴ We have drawn observations according to the relative weight of each category to guarantee proportion and homogeneity among the sample. The procedure of the investigation was similar and implemented the same three biases (framing, overconfidence and regret) as investigation tools, albeit with some due variations in terms of parameters of detection. The sample was made up of 100 observations allotted according to their respective share among the 22 categories. Unsurprisingly, the results showed that the majority of those litigations (53%) was affected by some degree of distortions. In other words, 53 cases out of 100 presented at least one or more biases, thus affecting their efficiency. Additionally, we found that a few categories were more prone to present some degree of distortion. Thus, we decided to deepen the research and investigate intensely the mortgage and financing subject. Hence, this analysis was entirely based on mortgage and personal financing cases.

⁴Precisely: Credit line, Banking and postal cheques, Debit cards and ATMs, Credit transfer, Credit cards, Central credit register, Central financial risks register, Interbank alarm office, Discontinuance of the matter, Banking and postal current accounts, Banking contracts, Consumer credit, Damage suffered, Savings accounts, Security deposit, Credit backed by one-fifth, Lack of jurisdiction, Leasing, Mortgage, Evidence, Credit reference agencies. See Mazzocchini F.J., "*Framing, Overconfidence and Regret in Italian Banking Litigations*", LAP Lambert Academic Publishing, 2018.

5 METHODS AND SAMPLE

Our investigation procedure relies on the assumption that there are a few main biases that recur very frequently and pertain to the intermediary-client relationship. Once those biases have been identified, the subsequent step is to articulate a prospect with their fundamental features and indicative parameters. We have then followed this predetermined statement as a guideline to examine each litigation and state its degree of distortion. Additionally, we decided to select a number of decisions sufficient to run a statistical hypothesis testing of proportion; coherently, we extracted and analysed 75 cases of mortgage banking litigations. Therefore, we have based our investigation on two main pillars. The first one concerns impartiality and objectivity and the second one concerns homogeneity and representativeness. The former is ensured by the choice of three biases only among all that have been identified in the literature and using a guideline to plumb them through each litigation. The latter is ensured by the random sampling from a public and fully available archive, where each litigation is independent and has the same probability of being drawn. In addition, the sample consists of 75 cases, which is sufficient for applying some inferential statistical measurements in order to infer conclusions on the representativeness of the sample. However, these aspects will be discussed further in the following paragraphs.

The procedure of investigation, in a nutshell, consists of five stages. It begins with the random draw of litigation by means of an algorithm. Once extracted, each litigation has to be examined deeply and interpreted. In fact, the typical structure of an ABF decision is made up of five main sections: the header (contains the date and decision number), the judgment panel (specifies the judgment district involved and its composition), the description of the facts (describes the dispute in chronological order and contains the inferences of the plaintiff and the counterarguments from the defendant), the in-law section (in which the ombudsman recalls for regulations or laws applicable to the case) and the decision (the panel issues the final judgment, its motivations and its provisions). The third stage consists of collecting all the useful data and information available. The next one is the real bias plumbing and is probably the most critical one since it determines the main aspect of our investigation. As already stated, this phase has to be completed with the aid of a guideline in order to ensure objectivity as much as possible. Finally, the last step consists of a countercheck of the results by looking for similar cases or precedents.

5.1 *Analysis Tools: Parameters for Biases*

We deliberately selected a limited number of biases as an inspective tool because, otherwise, the work would result in a vague and non-specific investigation, thus limiting its significance. The assumption is that there are a few biases that are relevant and recurring in ABF litigations. Therefore, we have inspected the presence of framing, overconfidence and regret biases, along with written motivations that in the ABF database include a description of “facts” (FATTO). The main features for each bias, summarized in Table 6.1, represent indicative parameters used as bias detectors and measure the presence of distortion of each litigation case.

Table 6.1 Prospect: Detectors for the presence of behavioural bias

	<i>Definition in banking litigation</i>	<i>“Typical” cases</i>
Framing	<ul style="list-style-type: none"> • The plaintiff ignores communications or regulations (not read); • Inadmissibility of a litigation due to ignorance of the ABF rules; • The plaintiff accuses the bank of something that is not in the bank’s responsibility area; • Time horizon; • Other factors not taken into consideration. 	<ul style="list-style-type: none"> • A lack of information or understanding of rules and regulations comes out in the appeal; • Despite having already filed a civil lawsuit, the plaintiff appeals to the ABF. He ignores the regulations; • The plaintiff contests usury interest rates, but he makes mistakes in the computation. He usually adds up the legal interest with the default interests and compares it to the legal threshold. It is a mistaken interpretation; • The plaintiff sues the broker (typically a bank) for an issue related to an optional product (e.g., insurance policy), which was originated by a third party.
Overconfidence	<ul style="list-style-type: none"> • Neglects on purpose guidelines or other communications (Illusion of control); • Insists on repayment of financial loss or non-material loss, which are significantly overstated or not verified. 	<ul style="list-style-type: none"> • The plaintiff requires excessive reimbursement or asks for overstated non-material damages or pretended opportunity costs.
Regret	<ul style="list-style-type: none"> • Prepayment (early redemption or resolution); • Cancellation of a procedure. 	<ul style="list-style-type: none"> • Whether a financing contract is terminated before the stated end with no valid reason, the plaintiff shows inadequate financial planning.

Narrow framing, or just framing, occurs whenever individuals do not process properly all the information they should, and make inefficient or even wrong decisions, coherently with a seminal definition of James Druckman.⁵ Individuals could rather take superior decisions if they would consider a broader frame, which means that they should take into account all the variables involved. In a nutshell, it might be expressed as a kind of decisional rigidity or stubbornness. However, it is important to note that it is not a deliberate attitude but is rather a kind of mental laziness.

Applying this concept to case laws, the main observable features are threefold. First, according to the basic definition of framing, claimants might not have taken into consideration all the relevant aspects of an operation, such as risk factors (Diacon and Hasseldine 2005), and have taken decisions in a narrow context. People may ignore or do not read all the contracts or regulations; this implies that they may incur unforeseen penalties or be subject to unfavourable or unexpected treatment. In some cases, plaintiffs do not even read the ABF regulations and bring lawsuits improperly. That is to say that they do not prepare all the required evidence material, they do not follow the procedures or their recourse is inadmissible.

Another feature concerns the time horizon. Sometimes clients might act with blinkers and do not take into consideration future periods or pay attention to deadlines; that is, plaintiffs become aware of an issue beyond the deadline and the recourse must be rejected. According to the behavioural literature, the concept of time horizon is a key factor in framing formation (Gentile et al. 2015), and many authors emphasize it extensively in their research.⁶ Moreover, the framing bias arises when clients press mistakenly charges against their intermediaries, but the guilt lies with the third party or even the clients themselves. Again, it is necessary to point out that it is not a deliberate behaviour but rather they are convinced of that.

The second bias is overconfidence. It concerns excessive self-confidence and reliability on one's own competencies and skills, very relevant in finance as suggested in the literature (Moore and Healy 2008). It is frequently related to self-attribution bias, which occurs to someone who thinks of being better than average (Kent et al. 1998). People affected by

⁵ It is examined in depth in: Druckman, J.N. (2001). "The Implications of Framing Effects for Citizen Competence". *Political Behavior*. 23 (3): 225–256.

⁶ For examples, see the following paper: Alemanni B. and Lucarelli C., (2015): "Individual behaviour and long-range planning attitude", *The European Journal of Finance*. <https://doi.org/10.1080/1351847X.2014.1003313>.

this bias also have an illusion of control on all aspects and environment. This causes primarily miscalibration of risks and probabilities due to its excessive optimism and mistrust of other people and even of experts and practitioners. Overconfident people may increase their risk attitude and take on more hazard than expected.

In the context of ABF litigations, this bias shows up with the following recurring features. Firstly, plaintiffs display an excessive illusion of control. To be more detailed, they neglect on purpose recommendations or guidelines from experts. They rely completely on themselves and think that they do not need pieces of advice and that they can do better than others can. Additionally, they may even neglect important communication or regulations. Secondly, the overconfidence bias occurs whenever claimants ask for excessive or inconsistent refunds. In particular, when they insist on requesting the repayment of financial losses or non-material losses, which are significantly overstated, not verified or lack supporting evidence. We have decided to establish a threshold above which the refund request would result in a clear overconfident attitude; specifically, whenever the request exceeds 150% of the granted amount.

The third bias that we have chosen is regret, introduced by Neal Roesch (2005). Regret occurs *ex post*, whenever people have remorse on decisions already taken, thus showing second thoughts and reconsiderations (Alemanni and Lucarelli 2015). Furthermore, some researchers have empirically found that in the short term people suffer more from regrets of commission than from omission (Gilovich and Medvec 1995). It means that it is worse for individuals to leave the status quo in order to pursue an erroneous idea rather than remaining at their own reference point (Benartzi and Thaler 1999); the loss aversion plays a role in this duality (Fox and Tversky 1995). Evidence of regret in ABF appeals can be found in the following aspects. Firstly, the regret bias appears whenever a client decides to call a procedure off without a valid reason. In fact, it might happen that a client, having opened a credit facility, opts for the early redemption and prepayment of the debt. This operation might entail the charge of penalties or an income lost. There are cases of litigations in which the plaintiff has extinguished ahead of time a financing scheme that involved the charge of a penalty. Secondly, the client might recognize *ex post* the impossibility to respect the initial conditions of a financing scheme, thus asking for the recalculation of the amortization scheme or for an early redemption. It is an inefficient decision that could have been prevented *ex ante* after a more accurate contemplation of the initial conditions.

5.2 *Dataset Sampling*

The Italian ABF provides a complete and accessible archive of decisions on its website.⁷ All the litigations concluded and settled are available and are clustered according to the subject matter under dispute.

At the beginning of our analysis, on the date of November 2017, the database contained 43,650 decisions, arranged in 41 categories. However, as already mentioned, our focus was only in the mortgage category. This means that our population was initially made of 3269 decisions. Thus, the first step was to create our own sample. The basic assumption was to draw a significant number of litigations that would have allowed a statistical hypothesis testing of proportions. Hence, we have solved this constraint by fixing a target of 75 observations, which is greater than the inferior limit of 30 cases for the hypothesis test. To be more precise, the probability density function of the biased litigation is unknown, so we need a number of observations sufficiently high in order to use the central limit theorem⁸ and approximate the distribution of a normal; this is why the threshold of at least 30 units is necessary.

The ABF database is organized as follows. It is first classified by the subject of the matter under dispute, and second, the litigations are listed in chronological order of decision. Those litigations are respectively collected into different and subsequent web pages (or folders) of five case laws in each one. Clearly, the only exception may be the last page which may have less than five litigations. Hence, the mortgage category, which contained 3269 cases, was composed of 654 pages of roughly five litigations each. We have extracted our sample by implementing an algorithm capable of generating two random numerical parameters within a predetermined range. The first one was related to the choice of the web page number and varied between 1 and 654; the second one was related to the specific decision case to draw among all the litigations on that page and varied between 1 and 5. As already pointed out, the randomness of extraction is essential in this research because it is the ground for inferential statistical analysis.

⁷<https://www.arbitrobancariofinanziario.it/homepage/index.html>.

⁸This argument can be examined in depth in Mood A. M., Graybill F. A., Boes D. C., “*Introduction to the Theory of Statistics*”, McGraw-Hill, 1989.

5.3 *Representativeness of the Sample*

During the analysis of each case, we consider whether there might be applicable one of the parameters listed in Table 6.1, independently from the outcome of the decision. Whenever a litigation result was impartially affected by at least one of those biases, we have assigned it the value of 1; vice versa if there were no biases clearly identifiable, it assumed the value of 0. Those two values are useful in order to run a statistical hypothesis testing of proportion, which is based on the density function of Bernoulli. This function, which regulates the parameters of each single observed litigation, is dichotomous and takes on only two values: 1 in case the event occurred (success) and 0 in the opposite case (failure). In fact, the Bernoulli test is useful in order to run hypothesis testing to qualitative variables, which may only switch from one condition to another instead of representing a scale of different values.

A basic hypothesis of this statistical test is that all the observations must be independent and identically distributed random variables (i.i.d.); to wit, the sample must be randomly extracted and with the identical density distribution function of its population. In our model this condition is satisfied since all the draws are made in a completely random procedure. However, our sample density distribution is yet unknown, but thanks to the central limit theorem and the Slutsky's theorem,⁹ we can assume that it converges to a binomial (or Gaussian) function, since we have drawn more than 30 observations; 75 to be exact.

$$^9 \frac{\bar{x} - E(\bar{x})}{\sqrt{V(\bar{x})}} \xrightarrow{D} N(0,1), \text{ where } E(\bar{x}) \text{ is the sample mean, } V(\bar{x}) \text{ is the sample variance,}$$

$N(0,1)$ stands for normal distribution, P is the probability that an event occurs, $E(X)$ is the population mean, $V(X)$ is the population variance and n is the sample numerosness. Moreover, considering that a Bernoulli distribution has its mean equal to the probability of success and its variance equal to the product between the probability itself and its counter-probability, we have:

$$\left\{ \begin{array}{l} E(X) = P \\ V(X) = P \cdot (1 - P) \end{array} \right. \xrightarrow{\text{yields}} \left\{ \begin{array}{l} E(\bar{x}) = P \\ V(\bar{x}) = \frac{P \cdot (1 - P)}{n} \end{array} \right.$$

Hence, having set down our hypothesis, we have defined the confidence intervals, which are boundaries that contain, with a certain tolerable risk of error (significance level: α), the parameter we are studying. In fact, our goal is to estimate the mean of our distribution, which is represented by the proportion of success among the whole population. In other words, the confidence intervals define with a certain probability (level of significance) the proportion of population that will be successful to the test (in our case, litigations affected by the three biases). The values that determine the boundaries of those intervals are called pivotal quantities.¹⁰ Again, we do not know their statistical distribution, but we can assume that they converge to a normal one thanks to the functional invariance property of the maximum likelihood estimators.

In a nutshell, we have found that with a significance level of 5%, the share of litigations that might result biased among the whole population is included between 54.56% and 76.10%.

We then decided to run a hypothesis test for proportions in order to strengthen the validity of the confidence intervals. This type of test is based on two contrasting hypotheses: the rejection of one implies the acceptance of the other one. The first one (null hypothesis) asserts that the proportion is larger or equal to a certain value; the second hypothesis asserts the opposite.¹¹ We have decided to set a threshold value of 60% since it is included in the confidence intervals and it might further strengthen (if positive) the validity of the former test. In order to accept or reject the null hypothesis, we have to check whether the quantile of this distribution is larger than the lower boundary of the normal distribution. Otherwise, it means that the probability that it is a mistaken statement is high, and conversely, the probability that it belongs to that distribution function is rather low. Proceeding with the computation, we might con-

$$^{10} \text{CI}_{1-\alpha} = \left[\bar{x} - z_{1-\frac{\alpha}{2}} \cdot \sqrt{\frac{\bar{x} \cdot (1-\bar{x})}{n}}; \bar{x} + z_{1-\frac{\alpha}{2}} \cdot \sqrt{\frac{\bar{x} \cdot (1-\bar{x})}{n}} \right], \text{ where } z_{1-\frac{\alpha}{2}} \text{ represents the quantile}$$

of the normal distribution and is a constant.

$$^{11} \begin{cases} H_0 : P \geq 60\% \\ H_1 : P < 60\% \end{cases}$$

clude that a share of disputes greater than 60% within the population might be affected by behavioural inefficiencies.¹² Therefore, from this test, we can ensure that the sample can be considered statistically comparable to the entire population of the ABF litigations in the mortgage subject.

6 RESULTS

6.1 *Descriptive Analysis*

The examination of each case is collected neatly, with the collection of the following integrative information, when available: (1) technical features underlying the request, such as the loan amount (principal), the presence of legal advisory/support, the type of loan contract and the contracting year; (2) presence of behavioural biases by typology potentially involved; (3) features of the judgment, in terms of the Judging Court, decision date and arbitral decision outcomes. Table 6.2 reports the descriptive statistics of this information.

As far as the technical features of the request are concerned, the median amount of the loan is 120,000 euros, while the mean amount is much higher, almost 170,000 euros, because of the presence of big outliers (note the maximum amount of almost 1,300,000 euros). The presence of an external legal support is a small fraction of the sampled cases (13.7%), and this is coherent with the nature and “ratio” of the ABF procedure that should ease the cheap and direct access to the solution of bank-customer litigation, within a do-it-by-yourself procedure. More importantly, the rare presence of an external advisor is relevant to support that the starter of the litigation is an individual, stimulated by his/her decision-making

¹² If we assume that the null hypothesis asserts that the proportion of biased litigations among the population is larger or equal to 60%, it must be accepted since the quantile Z is larger than the lower boundary of the normal distribution.

$$Z = \frac{\bar{x} - 0.6}{\sqrt{\frac{0.6 \cdot (1 - 0.6)}{75}}} = 0.94, \quad Z > -1.96$$

Table 6.2 Descriptive statistics

	<i>Technical features of the request</i>					
	<i>Num.</i>	<i>Mean</i>	<i>Median</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Loan amount (euros)	37	168,515	120,000	233,335.3	7,934	1,306.863
Presence of legal support	73	13.7%			0	1
<i>Type of contract</i>						
Land mortgage	14	18.67				
Personal loan	11	14.67				
Mortgage	40	53.33				
Others	10	13.33				
Total	75	100				
<i>Year of loan</i>						
Before 2007	11	14.7%				
2007	10	13.3%				
2008	6	8.0%				
2009	14	18.7%				
2010	8	10.7%				
2011	3	4.0%				
2012	1	1.3%				
2013	4	5.3%				
2014	3	4.0%				
2015	3	4.0%				
2016	2	2.7%				
N/A	10	13.3%				
<i>Presence of behavioural bias in the request</i>						
	<i>Obs Num.</i>	<i>Mean</i>		<i>Min</i>	<i>Max</i>	
Biased requests	75	65.3%		0	1	
<i>Due to</i>						
Framing	75	36.0%		0	1	
Overconfidence	75	22.7%		0	1	
Regret	75	14.7%		0	1	
<i>Features of judgment</i>						
	<i>Num.</i>	<i>Mean</i>		<i>Min</i>	<i>Max</i>	
<i>Judging court</i>						
North Court		41.3%		0	1	
Center Court		32.0%		0	1	
South Court		26.7%		0	1	
Total		100				

(continued)

Table 6.2 (continued)

<i>Features of judgment</i>				
	<i>Num.</i>	<i>Mean</i>	<i>Min</i>	<i>Max</i>
<i>Decision date</i>				
2010	2	2.67		
2011	2	2.67		
2012	7	9.33		
2013	2	2.67		
2014	13	17.33		
2015	19	25.33		
2016	20	26.67		
2017	10	13.33		
Total	75	100		
	<i>Num.</i>	<i>Mean</i>	<i>Designated score</i>	
<i>Decision</i>				
Inadmissible and rejected	13	17.33	-2	
Rejected	38	50.67	-1	
Partially approved	3	4	0.75	
Approved	20	26.67	1	
Action becoming devoid of purpose	1	1.33	2	
Total	75	100		

and his/her perception of a problem/damage received because of the banking deal. The majority of the contract are mortgages with a distribution of contracting year concentrated in 2009 and 2010.

As far as the presence of behavioural bias in the request, the descriptive analysis of Table 6.2 shows evidence mainly in line with our expectation. At a glance, we have found out that 65.3% of the observations were affected by a cognitive bias or distortion. That is to say that among 75 litigations, 49 presented at least one of the biases' indicative parameters. Figure 6.1a presents the partition of the total observations into biased and unbiased. In greater detail, we have detected 55 biases over the 49 litigations that turned out to be positive to the test. This means that a few of them presented a combination of multiple biases.

In particular, a biased observation is on average affected by 1.12 biases simultaneously. The total amount of biases is made up of 27 cases of framing, 17 of overconfidence and 11 of regret; Fig. 6.1b shows the share of

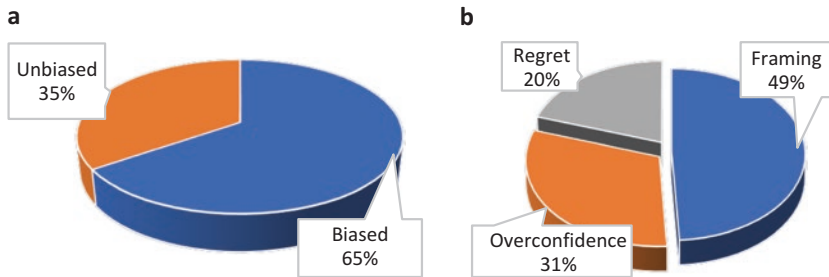


Fig. 6.1 (a) Degree of distortion among 75 observations; (b) biases composition. Note: Number of cases affected by framing equals 27; by overconfidence equals 17, by regret equals 11; of the total 75 cases, 26 cases are not biased. The left pipe indicates the biases composition within the 49 biased cases

each bias among the 49 distorted litigations. Narrow framing covers the overwhelming majority with 49% of the share, followed by overconfidence (31%) and regret (20%).

It is not surprising because the regret is more case-specific bias, compared to the others, and in some cases, it is difficult to be objectively detected. Framing, on the contrary, covers different aspects and is easier to be investigated.

As far as the judging features are concerned, the distribution of judgment is quite well distributed among judging courts, with a dominance of the North Court (quite 41%) and an inferior presence of the South Court (almost 27%). The decision date seems to be concentrating in most recent years (except for 2017, the year when we sampled the cases, maybe within an uncompleted dataset). This is coherent with the progressive development of the ABF system in Italy since its inception in 2010.

In addition, and not surprisingly, the overwhelming majority of biases is found among the litigations which have been concluded with an adverse decision for the plaintiff (see Fig. 6.2). In fact, 79% of the litigations concluded with a negative response (30 out of 38), namely “Reject”, are affected by at least one bias, whereas only 13% of those with a positive ending for the plaintiff came out to be distorted (3 out of 23). Similarly, 79% of the inadmissible appeals involved a bias (7 cases out of 9). Then, 100% (4 out of 4) of those concluded due to a lack of jurisdiction of the ABF were distorted. These results give clearly supporting evidence to our

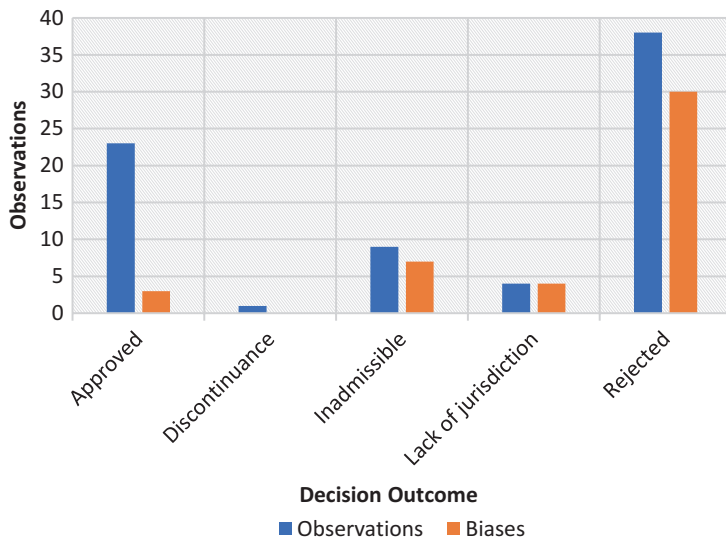


Fig. 6.2 Bias distribution for decision outcome

hypothesis. It is also remarkable that the majority of our sample resulted in a negative outcome for the plaintiff. In greater detail, 51% were rejected by the ABF, whereas only 31% were approved.

The residual part (19%) is composed of inadmissible appeals (12%), appeals rejected due to lack of jurisdiction of ABF (5%) and discontinuance of the matter in issue (1% in the following section defined “Action becoming devoid of purpose”). Nevertheless, these results are preliminary descriptive statistics and need to be supported by a multivariate analysis, as in the following section.

A preliminary check of the relationships among variables is presented in Table 6.3, which shows results of statistical significance test of differences, pairwise, based on a *t*-test for continuous variables (loan amount and year of the loan signature), and a chi-square test, for categorical/binomial variables (type of contract and presence of the legal support), in relation to the presence/absence of biases.

Results of Table 6.3 indicate that the presence/absence of biases does not differ by loan amount underlying the request and by contractual typology. On the contrary, such difference appears significant for loan date and

Table 6.3 Bivariate analysis

	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>
<i>Loan amount</i>			
Unbiased requests	15	129,687.5	145,010.9
Biased requests	22	194,988.4	278,397.4
Combined	37	168,515	233,335.3
$t = -0.8322$			
<i>Loan date</i>			
Unbiased requests	26	2007.6	5.3
Biased requests	39	2009.2	3.7
combined	65	2008.6	4.4
$t = -1.4114^*$			
	<i>Unbiased requests</i>	<i>Biased requests</i>	<i>Total</i>
<i>Type of contract</i>			
Land mortgage	5.3	13.3	18.7
Personal loan	6.7	8.0	14.7
Mortgage	21.3	32.0	53.3
Others	5.3	8.0	13.3
Total	38.7	61.3	100.0
Chi-square			
<i>Legal advisor</i>			
NO	26.0	60.3	86.3
YES	11.0	2.7	13.7
Total	37.0	63.0	100.0
Chi-square***			

*Statistically significant parameters at 0.10 confidence levels; **statistically significant parameters at 0.05 confidence levels; ***statistically significant parameters at 0.01 confidence levels

presence of legal advisors: firstly, biased requests are statistically higher for loans signed in more recent years. Secondly, as a further confirmation of soundness of our assumptions, those cases non-supported by a loan advisor (third-party) are significantly more biased compared to the legally supported ones.

6.2 *Multivariate Analysis*

In the multivariate frame, we first estimate determinants of judges' decision based on nuances of outcomes defined by the Designated Score

Table 6.4 Multivariate estimations

<i>Dep Variable</i>	<i>Model 1</i>			<i>Model 2</i>		
	<i>DECISION</i>			<i>REJECT</i>		
	<i>Coef.</i>	<i>Std. Err.</i>	<i>p-value</i>	<i>Coef.</i>	<i>Std. Err.</i>	<i>p-value</i>
BIAS	-1.1092	0.2764	***	1.4108	0.3971	***
CK Year of loan	0.0060	0.0287		0.0095	0.0465	
Legal advisory	0.0431	0.3887		-0.1987	0.5007	
JK Decision date	0.0887	0.0757		-0.1429	0.1244	
Judging court North	-0.2154	0.3256		0.2801	0.4743	
Judging court Centre	-0.4170	0.3477		0.6920	0.5329	
α	-190.3455	154.4032		268.4049	250.5850	
Number of obs	63			Number of obs	63	
Prob > F	0.0016			LR chi ² (6)	21.05	
R-squared	0.3077			Prob > chi ²	0.0018	
Adj R-squared	0.2335			Pseudo R ²	0.2673	
Root MSE	0.9782			Log likelihood =	-28.8453	

Note: Model 1 shows ordinary least square of Eq. 6.1 and Model 2 indicates probit estimations of Eq. 6.2. *Statistically significant parameters at 0.10 confidence levels; **statistically significant parameters at 0.05 confidence levels; ***statistically significant parameters at 0.01 confidence levels

shown in Table 6.4, and we set the first model that is described by the following equation:

$$\text{DECISION}_i = \alpha_i + \beta_i \text{BIAS}_i + \sum_{j=1}^2 \lambda_j \text{CK}_{j,i} + \sum_{m=1}^2 \delta_m \text{JK}_{m,i} + \varepsilon_i \quad (6.1)$$

where DECISION_i is a categoric variable, for the case i , with the following scores: Inadmissible and rejected, -2 ; Rejected, -1 ; Partially Approved, 0.75 ; Approved 1; Action becoming devoid of purpose, $+2$.

BIAS_i is the binomial variable that is 1 if the request is biased, 0 elsewhere.

CK_i indicates the two controls for contract type, that is the year of loan and the presence a legal advisory;

JK_i indicates the two controls for the judge condition, that is the year of the decision and the Judging Court;

As a robustness check, we state the judges' decision based on a binomial variable, REJECT, that is 1 for cases that are stated either as inadmissible and rejected or as rejected. Coherently, we define the following probit scheme as follows:

$$\Pr(\text{REJECT}_i = 1 | \mathbf{BIAS}, \mathbf{CK}, \mathbf{JK}) \quad (6.2)$$

Due to estimation formalization, all variables are included in a comprehensive vector \mathbf{X} , and Model 3 is presented as follows:

$$\Pr(Y_j = 1 | \mathbf{X}) = \Phi(\mathbf{X}'\beta) \quad (6.3)$$

where \Pr denotes probability and Φ is the cumulative distribution function of a standard normal distribution. Parameters, indicated by the vector β , are estimated by maximum likelihood.

Results of estimations, shown in Table 6.4, definitively confirm what it could be arguable since the descriptive statistics: when a case appears to be affected by a behavioural bias, it is significantly negatively related to a good outcome for the plaintiff, in term of approval, also partial. Probit estimations of Model 2 confirm, in robustness, this result and indicate, even more clearly, that the condition of the case being related to a decision affected by a behavioural bias increases the probability of its rejection, considering in a multivariate frame all the available controls for the features of the loan and for the judging procedure.

7 CONCLUSIONS

Alternative resolution mechanisms are mature and fair systems of right protection that have been considerably developing in Italy in recent years, in the banking and finance domain, with the form of ABF. Ease and low-cost access facilitate clients to address requests to the ADR system based on their personal evaluation of the problem they perceive. A correlation between “biased judgement” and “ADR litigation” is theoretically predictable and seems to be confirmed by our evidence. In fact, several cases

of litigation in the mortgage domain, when observed through the lens of the “behavioural biases”, appears to be affected by decisional pitfalls induced by framing, overconfidence or regret.

Besides this descriptive result, from our multivariate frame we find that the higher the presence of biases, the lower the probability the appeal is accepted, and this result holds controlling for the judging committee responsible of the decision. This means that when customers take a decision that could be perceived as a mistake, in their perspective, and are induced to litigation in front of a(n alternative) judge, this judge most of the times is not able to find the responsibility of the bank and reject the customer’s request.

A final deduction from this result is that when cognitive limitation induces customers to make wrong financing decisions, they cannot rely on an external compensatory measure. Even an Alternative Dispute Resolution mechanism, cheap and easy, such as the ABF system, does not (and cannot) offer protection/amendment for these decisional mistakes. On the contrary, the ABF system has been proven, with our results, to be able to recognize such inconsistencies of requests.

Therefore, institutional priority should be in the direction of enhancing ex ante measures addressed to prevent such kind of behaviours and mistakes, such as investments in educational programmes and information campaigns.

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‘Share this pic!’: A Picture of the Adoption of Online Social Media by Italian Banks

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I INTRODUCTION

Online social media have become one of the Internet’s most popular destinations since their early launch in the first decade of the twenty-first century. In 2017, popular platforms Facebook and YouTube, respectively, reached 2.06 billion and 1.5 billion monthly active users worldwide on their sites (Statista 2017). These platforms provide a variety of new online information about products and services that are created, circulated and used by consumers (Blackshaw and Nazzaro 2004). Therefore, online social media are one of the major factors for companies in influencing various aspects of customer behaviour, including information acquisition, communication and evaluation (Mangold and Faulds 2009).

Moreover, for banks and financial institutions, the adoption of online social media may enable them to communicate with their customers more easily; however, the lack of human contact in these transactions may also lead to a loss of trust (Proença et al. 2010). Indeed, while the ease of

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information propagation through online social media can be beneficial for banks, it can also have a negative dramatic impact on their reputation (Kim and Ko 2012; Bakshy et al. 2012). Further, the adoption of online social media represents a cost for banks—which includes the expenses for dedicated staff, marketing research firms, public relations consultants and advertising agencies that deal with the management of online social media and costs for promoting insights—and there is lack of evidence on whether such investments lead to financial returns (Kapoulas and Mitic 2012). This hampers banks' ability to obtain the financial resources needed to undertake such activities (Kapoulas and Mayer 2004; Pry 2010).

In light of all these, academic research is needed to survey the presence of banks on online social media and to test how these investments affect banks' economic results. To that end, we study the adoption of online social media in a sample of 151 Italian banks and run a statistical regression model to examine the effects on their economic performance.

Our contribution is as follows. First, the adoption of online social media by banks is a novel theme and so the academic literature on the topic is scarce, confined to a few case studies and analyses of registered users rather than banks. Second, we create a new, hand-collected dataset, defining and measuring key metrics for the adoption of online social media that enable us to describe the presence of the banking sector on online social media. Third, we treat together topics that are usually split because different skills are required to analyse them—the adoption of online social media and bank profitability. This empowers us to answer a new research question. Fourth, most of the literature on business adoption of Internet usage and bank profitability is outdated because the primary focus is on emails; in this chapter, we deal only with online social media. Finally, we analyse a geographical area—Italy—that is interesting because of its competitiveness and market concentration. Nevertheless, our results can be generalized for banks located all over the world.

The remainder of the chapter is organized as follows. Section 2 analyses the academic literature related to this topic, focusing on positive and negative aspects of the usage of online social media for the banking industry, and presents the research question. Section 3 surveys the adoption of online social media in a sample of Italian banks. Section 4 describes the data-collection process and the research methods applied. Section 5 reports the results of our analyses, and finally, Sect. 6 restates the major conclusions and discusses the implications for practitioners.

2 LITERATURE REVIEW

Online social media are popular platforms for interaction with the hundreds of millions of registered users who can put information on their user profiles that they want to share with any number of peers. A unique characteristic of online social media is the diffusion of behaviour from one user to several others. When one user likes a product or service, that user will start to influence friends on social media to use it, and these friends will influence their friends and so on; thus, through an electronic word-of-mouth effect, a large population on online social media will adopt this product or service (Bakshy et al. 2012).¹ Thus, the value of one customer is worth far more than what that person initially spends.

Recently, because online social media sites are already integrated into consumers' everyday life and a significant percentage of people are passing along information to others, many of these sites have become part of a huge dissemination and marketing platform for companies (Chen et al. 2009). DEI Worldwide (2008) states that companies not engaging in online social media are missing opportunities to reach consumers.²

Further, online social media enable the creation of online communities of interest around specific firms or products. To gain business value, companies need to collaborate in new ways with their customers, engaging with them on a regular basis and co-creating content. If these relationships are successful, customers feel like company insiders, often serving as champions for testing the company's products. Such customers are more likely to be loyal, willing to try the company's new offerings and resistant to negative information about the company (Culnan et al. 2010; Kim and Ko 2012).

For financial and banking institutions, the adoption of online social media is critical. Indeed, a relationship with customers is essential in these businesses (Proença et al. 2010). The banking crisis occurring in Europe

¹ Manski (1995) suggests three basic categories of reasons why we might observe behavioural imitation within social networks. The first is a correlated effect, in which individuals in the same group tend to behave similarly because they face similar environments or they self-select into a given social network. The second category is a contextual effect, in which the propensity for a given type of behaviour varies with the background characteristics of the people in a social network. The third category is an endogenous effect.

² The report provides the following statistics: 70% of consumers have visited online social media sites to obtain information; 49% of these consumers have made a purchase decision based on the information they found through online social media sites; 60% said they were likely to use online social media sites to pass along information to others online; and 45% of those who searched for information via online social media sites engaged in word-of-mouth.

over the past 10 years has increased the need for bank customers to perceive banks as more credible, stable and trustworthy, so the importance of banks staying close to their customers has increased (Stone 2009). Further, the banking industry is becoming increasingly undifferentiated (Barnes and Richard 2014), and survival in this new unpredictable context is no longer based on the size of banks but rather on their ability to innovate. In the long term, relationships can become fragile, especially when customers are faced with offers from competitors and the episodes of dissatisfaction that inevitably occur in their lives (N'Goala 2010). Thus, some banks are using online social media to overcome these incidents, to engage with prospective customers and to build loyalty towards their brand (Miranda et al. 2013).

Online social media have quickly become an important channel of two-way communication between banks and customers. These platforms enable banks to both receive and give information to customers in powerful interactive dialogues and reciprocal relationships. In this way, customers are brought closer and are ultimately more satisfied (Proença et al. 2010; Özeltürkay and Mucan 2014).

The use of online social media helps the development of innovative financial products and services because financial institutions are able to obtain a real-time, 360-degree view of their customers' attitudes. Online social media can become new forums for customers to add value to personalized and tailor-made services, thus empowering banks to decrease product feedback loop and enabling customers to benefit from greater convenience and flexibility (Proença et al. 2010).

Further, banks can use online social media as tools to improve their brand image, to manage their reputation, to reach new potential customers and to promote new products and services with no limits on advertising space. Additionally, banks can achieve considerable reductions in transaction costs: customers can speed up their transactions with online-initiated processes or they can raise issues quickly through online social media with increased convenience and better accessibility, avoiding having to go to the physical branch to speak with an operator (Klimis 2010; Goi 2014).

However, the adoption of online social media does not only entail potential benefits for banks; it may also have negative consequences for them. First, there is no consensus as to whether bank–customer relationships are strengthened or weakened by the use of technology (Harden 2002). This is due to the 'virtualization' of relationships: online social media interactions involve no human communication, which is essential in

reducing customers' perceived risks. It can be argued that online social media interactions contain some human interaction and tend to be more human oriented than online banking is with its automatic response systems because customer posts are responded to by a member of the customer services team. However, the relationship between banks and customers via online social media may be more vulnerable since the distance between banks and customers and the lack of face-to-face contact may lead to a loss of trust, which affects loyalty and customer retention (Liang et al. 2008; Johns and Perrott 2008; Proença et al. 2010). The disappearance of time, place and social factors deprive the traditional relationship of the characteristics that define it, since in virtual relationships, the connection between the company and its customers is diluted, with exchanges mediated by computer (Harden 2002; Egan 2003; Gummesson 2004). In fact, recent studies demonstrate that banks with a steady presence and strong bonds with clients should avoid engaging in such unconventional online relationships and instead focus on promoting reliability in the organization and its services (N'Goala 2010; Kapoulas and Mitic 2012).

Indeed, while the ease of information propagation in online social media can be beneficial, it can also have a dramatic impact on a brand's reputation (Kim and Ko 2012; Bakshy et al. 2012). Historically, companies have been able to control the information available about them through strategically placed press announcements and good public relations managers. Today, banks are increasingly relegated to being mere observers, with no opportunity, or even right, to alter publicly posted comments provided by their customers (Kaplan and Haenlein 2010). In online social media, the ability to edit content and share it across networks is in the hands of a wide audience, which opens up the possibility of fraud (Pry 2010). This is a significant concern because online social media platforms are mostly used by one-to-many reach customers to express their dissatisfaction with the bank through a negative word-of-mouth process (N'Goala 2010; Kapoulas and Mitic 2012). Further, in online social media, recommendations are typically from unknown individuals, so users have difficulty determining the credibility of information (Bronner and De Hoog 2011). Thus, the information about banking available through online social media should not be relied on (Kapoulas and Mitic 2012). However, Ernst and Young (2012) estimated that one-third of customers who use online social media to interact with their banks use them to actively comment on the service they receive.

Problems may also arise in relation to the use of online social media to promote banking products. Online social media are used mostly for entertainment, so banks do not sufficiently acknowledge the importance of disseminating accurate information through them. Moreover, banks have to follow specific regulations on promoting new products and services, which limits their promotion of activities on online social media.

The use of online social media to communicate with customers (potential or existing) is subject to the rules of transparency as required by the Italian Consolidated Banking Act ‘Testo Unico Bancario’ and is part of ‘*distance communication techniques*’ which apply to all transactions and banking and financial services, including those taking place outside branches (‘off-site’) or via the Internet. Specifically, detailed rules have been introduced in the case of distance communication, which apply only when the activity is carried out in Italy and when the recipients are resident or are based in Italy.

This regulation precedes that the customer, before concluding the contract, must have access to information on the product or service. Therefore, banks must make all documents available with the same technique used to send the contract and must give all the information on how to find other useful information. Furthermore, when distance communication techniques are used, the contractual text must, in any case, be provided to the customer in paper form or other durable format.

In light of all these, the banking industry may show reluctance towards any online social media and their unfamiliar territory (Klimis 2010; Miranda et al. 2013). Non-financial companies have recently penetrated the online social media scene, offering direct links from their corporate websites to the most popular online social media platforms, and using these tools to promote their brands and support the creation of brand communities (Kaplan and Haenlein 2010), but banks seem to be lagging behind.³ In this regard, Miranda et al. (2013) find that banks that have joined online social media have not clearly thought out what goals they are pursuing, but have just followed the fashion or the lead of a competitor. In most cases, the result is considered a failure. The majority of the largest banks in the world have a profile on online social media, but many of these are not properly managed. They need to have a previously defined communication strategy and use the online social media presence appropriately to achieve their strategic objectives.

³It has been estimated that the number of banks with a presence on the most popular platform, Facebook, is still very low, at only about 60% (Miranda et al. 2013).

Considering the potential of online social media to be a double-edged sword in building, or weakening, relationships between banks and customers, this work aims to identify the effects of online social media on bank profitability. Currently, there is no evidence of the effects on bank balance sheets of the adoption of online social media that justify such investments (Jaser 2010; Pry 2010; Vemuri 2010). Hence, our research question is the following: All else being equal, how do online social media affect bank profitability?

3 ADOPTION OF ONLINE SOCIAL MEDIA

There are numerous types of online social media platforms with global reach capabilities that banks may join. In this study, we analyse banks' adoption of two social networks (Facebook and LinkedIn), one micro-blogging service (Twitter), one video-sharing platform (YouTube) and one photo-sharing platform (Instagram). What follows is a description of online social media analysed in this research.

Facebook is the most widely used social networking service in the world. This platform enables users to post their messages—text, web links and other electronic files—on their pages (called 'walls'), which other users may comment on and share. Companies may run the same social activities by opening a 'Facebook page'. LinkedIn is the largest professional online social network; users and companies may create a page and post messages on their wall, with a limit of 600 characters. In contrast to Facebook, LinkedIn's interface caters for those who need to promote themselves professionally, offering novel opportunities for deception that is not possible in face-to-face settings. Twitter is a blog service where users post their messages (called 'tweets') within a 140-character limit and are connected with other users to receive their tweets. YouTube, the third-most-trafficked website in the world, is a platform that allows users to upload videos filtered out in predetermined categories without space limit onto a customized YouTube channel. Unlike other online social media in which non-registered users can only see preview pages, it is not necessary to have a YouTube channel to watch others' videos. Finally, Instagram is a relatively new form of communication in which users can share updates through photos, which they can tweak using filters.

Through the common use of online social media, well-defined jargon has evolved: *friends* or *followers* are other users in connection with a specific user, @ followed by a user nickname identifies that user, # followed by a word or unspaced phrase represents a hashtag that makes it possible for

other users to easily find messages with this specific theme or content, *like* means that the user cares about the information encased, and *share* and *retweet* are mechanisms to spread information beyond the reach of the original user.

One important contribution of this chapter is the novel database to describe the presence of banks on online social media. Following Miranda et al. (2013),⁴ we measure the adoption rate of online social media by banks with three indexes that respectively evaluate content, popularity and interactivity on social media sites. The index ‘content’ is measured by evaluating the presence or absence of the institution. The index ‘popularity’ is used to evaluate the effectiveness of firms’ use of online social media and measures the number of followers or fans of their pages. Finally, the index ‘interactivity’ measures the number of comments posted on the wall; it can measure the total number of wall posts made by the organization since it joined the online social media platform or the number of posts in the most recent period. These indexes may not be the best measure of the effectiveness of online social media pages because they depend to a great extent on the firm’s industry; however, in this chapter, we study only banks, and hence companies operating in the same industry. We highlight that we only study institutional messages on banks’ official pages and do not analyse personal messages on professional activity by banks’ employees on unofficial channels.

Table 7.1 reports the measures of the three indexes collected from each online social media platform.

To ensure homogeneity in the sample, we study the adoption of online social media by banks only in one country: Italy. The Italian territory is an interesting subject for this research in light of the high level of competition among banks in the region, their uneven size and organizational form (from large international banking groups to small local banking institutions) and the presence of a banking crisis that may have deterred customers’ confidence in the banking system. The base of registered users of online social media in Italy—31 million active online social media users corresponding to 52% of Italian population (Hootsuite and we are social 2017)—is a sufficient critical mass of customers who demand this type of virtual interaction with banks. The adoption of online social media by Italian users is summarized in Table 7.2. As can be seen, the most used

⁴The authors propose a new instrument called Facebook Assessment Index (FAI), which evaluates the essential information on a firm’s Facebook page.

Table 7.1 Measures of the content, popularity and interactivity indexes for each social media platform analysed

<i>Platform</i>	<i>Index</i>	<i>Measure</i>	<i>Variable</i>
<i>Facebook</i>	Content	Presence of the organization	<i>FB_Cont1</i>
	Popularity	Number of people who like it	<i>FB_Pop1</i>
	Interactivity	Number of wall posts	<i>FB_Inter</i>
<i>LinkedIn</i>	Content	Presence of the organization	<i>LI_Cont1</i>
	Popularity	Number of followers	<i>LI_Pop</i>
	Interactivity	Number of wall posts in the most recent period	<i>LI_Inter</i>
<i>Twitter</i>	Content	Presence of the organization	<i>Tw_Cont1</i>
	Popularity	Number of followers	<i>Tw_Pop</i>
	Interactivity	Total number of tweets	<i>Tw_Inter</i>
<i>YouTube</i>	Content	Presence of the organization	<i>YT_Cont1</i>
	Popularity	Number of subscribers	<i>YT_Pop</i>
	Interactivity	Total number of videos posted	<i>YT_Inter</i>
<i>Instagram</i>	Content	Presence of the organization	<i>In_Cont1</i>
	Popularity	Number of followers	<i>In_Pop</i>
	Interactivity	Total number of pictures posted	<i>In_Inter</i>

Table 7.2 Active users of online social media (% of Internet users) in January 2017

<i>Online social media</i>	<i>Users (%)</i>
<i>Facebook</i>	55
<i>Instagram</i>	28
<i>LinkedIn</i>	19
<i>Twitter</i>	25
<i>YouTube</i>	57

Source: Hootsuite and we are social (2017)

online social media sites are YouTube and Facebook, both used by more than half of Italian Internet users (57% and 55% respectively). The third most used online social media site is Instagram (28%), followed by Twitter (25%). Finally, LinkedIn is used by only 19% of Internet users.

The bank under investigation has to fulfil the following criteria. (1) The bank has a registered office in Italy. Our sample includes 508 Italian banks.⁵ (2) The bank is a limited liability company. This is to ensure more

⁵We retrieved social data for banks from the list of banks 'Albo delle banche' by Banca d'Italia (<https://infostat.bancaditalia.it>).

information available for our study. We remain with 161 banks. (3) Data are available on Orbis database at least for one year. After dropping 10 banks with missing information, we remain with a final sample of 151 banks composed as follows. The sample includes 123 active banks and 26 dissolved (merged or taken over) banks. Ninety-three sample banks are located in North Italy, 38 sample banks are located in Central Italy and only 20 banks are located in South Italy. Most of the sample banks are unlisted (125), while 19 sample banks are listed and 7 sample banks have previously been delisted.

As for the type of banking activity, the sample includes 73 commercial banks, 27 savings banks, 12 investment banks, 11 banks specialized in private banking, 4 cooperative banks and 24 banks operating in other sectors.

We collected data by hand from each website⁶ and with the aid of social analyses websites.⁷ Descriptive statistics for the content, popularity and interaction indexes for our sample banks are reported in Table 7.3.

As can be seen in Table 7.3, only 36% of sample banks, corresponding to 54 out of 151 banks, have adopted Facebook. In contrast, banks with a LinkedIn page comprise 88% of our sample (133 banks); however, only 62% of the sample banks (95) manage their LinkedIn page, and the remaining 24% (36) have automatic pages created by the social media platform.⁸ It follows that the demand for banks on this online social media platform is greater than the presence of these banks, and there is a pool of potential followers that they can exploit by joining the social network. The percentages of banks that have a Twitter account are 34% of the sample banks. Another 34% of the sample banks (51) manage a YouTube channel: messages shared on YouTube can be filtered based on the topic indicated by the bank as a video category. These categories are people & blog (indicated by 21 of 51 banks), news and politics (8), entertainment (4), how-to & style (2), education (1), sport (1), and cars and vehicles (1). Furthermore,

⁶Facebook: <https://facebook.com>; LinkedIn: <https://linkedin.com>; Twitter: <https://twitter.com>; Instagram: <https://instagram.com>; YouTube: <https://youtube.com>.

⁷Specifically, Sociograph (<https://sociograph.io>), a tool for understanding how many people are interacting with Facebook groups and Facebook pages, and Likealyzer (<https://likealyzer.com>), a free tool by Meltwater for an overview of information on Facebook.

⁸A company page may exist on LinkedIn even if somebody from the organization did not create it. LinkedIn may automatically generate it when a member adds that organization as work experience on his or her LinkedIn profile or when a job is posted on LinkedIn for that organization.

Table 7.3 Descriptive statistics for content, popularity and interaction of Italian banks

<i>Variable</i>	<i>Observations</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>Min</i>	<i>Max</i>
<i>FB_Cont</i>	151	0.36	0.48	0	1.00
<i>LI_Cont</i>	151	0.88	0.32	0	1.00
<i>Tw_Cont</i>	151	0.34	0.48	0	1.00
<i>YT_Cont</i>	151	0.34	0.47	0	1.00
<i>Ins_Cont</i>	151	0.13	0.35	0	1.00
<i>FB_Pop</i>	151	15,850.34	62,753.29	0	450,672.00
<i>LI_Pop</i>	151	5839.15	18,859.50	0	153,097.00
<i>Tw_Pop</i>	151	1111.05	3654.9	0	26,200.00
<i>YT_Pop</i>	151	227.42	1028.27	0	8954.00
<i>Ins_Pop</i>	151	154.50	640.85	0	4513.00
<i>FB_Inter</i>	151	243.46	689.57	0	4345.00
<i>LI_Inter</i>	151	21.25	58.62	0	497.00
<i>Tw_Inter</i>	151	616.83	2064.79	0	12,800.00
<i>YT_Inter</i>	151	33.55	116.83	0	890.00
<i>Ins_Inter</i>	151	35.23	167.75	0	1408.00

there are 10 banks that have indicated more than one category, which in addition to those listed above are science and technology, non-profit and activism, and trends and events. It follows that messages shared by banks are not strictly connected with traditional banking activities.

Only 13% of the sample banks have adopted Instagram; nevertheless, on this platform there are more than 35,000 posts with the names of banks that have not joined the platform as hashtags, that is, posts talking about these organizations. This also means that the demand for 'social' banks is higher than what is offered.

With respect to popularity, all values present large standard deviations (from more than 62,000 for Facebook to almost 650 for Instagram): this is because the number of fans or followers varies greatly from bank to bank for each online social media platform analysed, which can be any number from 0 to 450,000. In any case, banks have, on average, around 15,000 users who have liked their Facebook page. This index has a maximum value of 450,672 (exhibited by Unicredit Italia). We should stress that this value is not high when compared with the number of Facebook fans of the most popular Italian page—Huawei Mobile IT—which is 10 times higher; additionally, no banks are included on the list of the 350 most popular Italian Facebook pages (source: Likeanalyser). The number of followers of

banks on LinkedIn is about a third of that on Facebook—exactly the same as the proportion of active Italian users of these social networks—and the mean is almost 5900 followers for each bank. The maximum value is more than 153,000 followers (achieved by Intesa Sanpaolo). On Twitter, there are only 1111 followers for each bank by mean, even though the number of active Italian users of this online social media platform is greater than that for LinkedIn, as reported above. The maximum value of Twitter's followers is 26,200 (like for Facebook, this value is exhibited by Unicredit Italia). The number of bank followers on YouTube and Instagram is much lower: there are, on average, only 227 followers of a bank on the video-sharing platform and only 154 followers on the photo-sharing one. Note that YouTube and Instagram are the first and third online social media platforms for the number of active users. The maximum number of followers is 8954 users on YouTube (again achieved by Intesa Sanpaolo) and 4531 users on Instagram (UBI).

Turning to the banks' interactivity on online social media, we find great variability expressed in terms of standard deviation. We also find four different banks that present greater interaction with their fans or followers: this means that each bank has chosen to focus on a different online social media platform. On average, there are around 243 posts per bank on Facebook (standard deviation of 689.57); the most interactive bank has created more than 4300 wall posts (CheBanca!). On LinkedIn, the average number of posts in the most recent period is 21.25 (standard deviation: 58.62). The maximum number of wall posts made in the most recent period is 497 (Banca Ifis). On Twitter, there are 616 tweets per bank (standard deviation: 2065). The maximum value is 12,800 (IW Bank). Finally, on YouTube and Instagram, there are, on average, respectively, 33 and 35 instances of sharing content by each bank (standard deviations: 116 and 167). The maximum values consist of 890 videos (Banca Mediolanum) and 1408 pictures (Banca Ifis).

Considering only the banks that have adopted online social media (Table 7.4), the average values for popularity are greater than the above-mentioned values, but still not remarkable compared with the number of Italian active users. To be precise, 'social' banks, on average, have around 44,000 fans on Facebook, 9000 followers on LinkedIn, 3000 followers on Twitter, 670 subscribers of YouTube channels and 1000 followers on Instagram. Turning to interaction by 'social' banks, the average number of tweets per bank is almost 1800, the number of Facebook wall posts is 680, the number of pictures posted on Instagram is almost 250

Table 7.4 Mean values for 'social' banks

<i>Online social media</i>	<i>Number of observations</i>	<i>Popularity</i>	<i>Interaction</i>
<i>Facebook</i>	54	44,322.26	680.78
<i>LinkedIn</i>	95	9246.24	33.77
<i>Twitter</i>	45	3226.29	1791.17
<i>YouTube</i>	51	673.33	99.33
<i>Instagram</i>	20	1166.50	248.05

and the average number of posts on LinkedIn is around 30. Finally, the number of videos posted on YouTube is almost 100. We found that 40% of sample banks with a YouTube channel have disabled the possibility for registered users to post comments on banks' video. This, on the one hand, can indicate the fear of the bank to receive negative comments and, on the other, the lack of resources dedicated to the management of comments received on the platform.

4 MODEL

We merge our database with the balance sheet information of banks to which the data refer. Accounting data were collected in euros for the period 2013–2016 from Bureau van Dijk's Orbis.⁹ The final sample includes 151 banks, with 604 observations.

Our new dataset allows us to run a statistical regression model to examine the relationship between the content, popularity and interactivity indexes to measure the extent of the banks' adoption rate of online social media compared with their financial and economic performance. Through the use of the Stata 11 software package,¹⁰ we run the following generalized least squares (GLS) regression models with random effects¹¹ for balanced panel data:

⁹ Orbis Bank Focus is a new database of banks worldwide. The information is sourced by Bureau van Dijk from a combination of annual reports, information providers and regulatory sources. Orbis Bank Focus currently contains detailed information on 43,000 banks (28,000 US and 15,000 non-US), including six years' history for listed banks and four years' history for unlisted banks.

¹⁰ Stata is an integrated statistical software package that provides tools for data analysis, data management and graphics. It was created in 1985 by StataCorp.

¹¹ For more about random-effects models, see Allison (2009).

$$\text{Profitability}_{i,t} = \alpha_0 + \alpha_1 \text{Content}_i + \alpha_2 \text{Control}_{i,t} + \varepsilon_{i,t} \quad (\text{Model 7.1})$$

$$\text{Profitability}_{i,t} = \alpha_0 + \alpha_1 \text{Popularity}_i + \alpha_2 \text{Control}_{i,t} + \varepsilon_{i,t} \quad (\text{Model 7.2})$$

$$\text{Profitability}_{i,t} = \alpha_0 + \alpha_1 \text{Interactivity}_i + \alpha_2 \text{Control}_{i,t} + \varepsilon_{i,t} \quad (\text{Model 7.3})$$

Values are calculated for each bank i in period t with $t = 2013\text{--}2016$. Here $\varepsilon_{i,t}$ is a random residual. The dependent variable measures bank returns. Hoffman and Fodor (2010) suggest that returns from online social media investments should not be measured in cash units but rather in customer behaviours tied to a particular social media application. Their so-called social media return on investment (ROI) takes into account qualitative indexes such as the likelihood of future purchases from investment in online social media. In addition, Gummesson (2004) defines an index—called return on relationships (ROR)—as the long-term net financial outcomes of establishing and maintaining an organization’s network of relationships. Accounting systems do not capture the value of customer relationships, although building relationships is clearly an investment, so Gummesson measures the intellectual capital as the total value of a company minus its book value or simply all resources except net financial assets. Analogously, Sterne (2010) measures the ability of online social media to boost profits by lowering costs.¹² Although there is a line of thought in the academic literature that argues that innovative ad hoc evaluating tools should be created to measure the profitability of online social media, we decided to use the same metrics adopted in the academic research to measure the impact of traditional channels. In this way, we do not measure the effects of online social media on intermediate objectives, such as increase in brand loyalty, but measure its effects on bank returns, which is the final objective. Consequently, following Athanasoglou et al. (2008) and Molyneux and Thornton (1992), our measures of bank profitability are return on assets (ROA) and return on equity (ROE).

Our explanatory variables are the indexes designed to measure content, popularity and interactivity—as described in Sect. 3—respectively, for Models 7.1, 7.2 and 7.3.

¹²He argues that ‘if you can show that social media is a less expensive way to measure public opinion, make friends and influence people, than you can have a larger share of budget next time around?’.

Table 7.5 Determinants of bank profitability

<i>Variable</i>	<i>Measure</i>	<i>Notation</i>	<i>Expected effect</i>
Capital	Equity/assets	EA	+
Productivity growth	Rate of change in operating revenue/employee	PR	+
Credit risk	Loan loss provisions/loans	PL	-
Size	Fixed assets in logs	S	+/-

Source: Athanasoglou et al. (2008); Bolt et al. (2012); Petria et al. (2015)

We retrieve from the academic literature four determinants of profitability that partially explain the dependent variable. The inclusion of these indexes in our regression model enables us to separate their effects on bank profitability so that the effects from the adoption of online social media are isolated from the rest. These control variables measure capital, credit risk, productivity growth and size, as explained in Table 7.5.

The descriptive statistics of the accounting variables investigated are reported in Table 7.6 for the entire period. On average, all banks present negative values for proxies for profitability. In particular, the average value for ROA is lower than -0.01 and the average value for ROE is around -0.51 . However, the sample contains both banks with negative values and banks with positive values. For all two proxies of profitability, the standard deviation is not very high (0.03 for ROA and 3.36 for ROE). The minimum value for ROA is -0.58 and the maximum value is 0.23 . The minimum value for ROE stands out with a value of -69.04 , and the maximum value is 4.63 . With respect to control variables, the index EA has an average value of 0.106 , meaning that, on average, banks' equity capital is one-tenth of their total assets. This index has a minimum value of -0.02 ; it follows that there are sample banks with negative values for the total capital. The maximum value for EA is 0.97 , meaning that there exist sample banks financed almost entirely by equity. The index PR is 0.17 by mean. This ratio goes from a—negative—minimum value of -1.00 to a maximum—positive and very high—value of 68.62 . The index PL is on average lower than 0.01 . It is enclosed in almost -8 and 1.44 . Finally, the control variable S has a mean value of 7.08 . Being a logarithmic variable, by construction it always has a positive sign, and accurately it goes from 2.14 to 10.04 .

Table 7.6 Descriptive statistics for accounting variable for Italian banks in 2013–2016

<i>Variable</i>	<i>Observations</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>Min</i>	<i>Max</i>
<i>Dependent variables</i>					
ROA	541	-0.00212	0.03786	-0.58	0.23
ROE	541	-0.20562	3.36170	-69.04	4.63
<i>Control variables</i>					
EA	541	0.10623	0.11374	-0.02	0.97
PR	497	0.17316	3.12186	-1.00	68.62
PL	539	0.00453	0.35204	-7.99	1.44
S	534	7.08079	1.15080	2.14	10.04

Source: Our elaboration on Orbis

5 RESULTS

We now present estimation results for Equations 7.1, 7.2 and 7.3. The null hypothesis of the model is H_0 : all return coefficients equal zero, meaning that there is no effect on bank profitability from the adoption of online social media. However, we expect to find a relationship between the adoption rate of online social media by banks and their economic returns, which requires α_1 in Equations 7.1, 7.2 and 7.3 to differ significantly from zero. In particular, if all α_1 are greater than zero, it follows that the adoption of online social media improves bank profitability because they enhance the bank customers' communication and relationship; in contrast, any α_1 lower than zero implies that online social media represents investments that deter bank profitability. Table 7.7 presents these coefficients. We identify some significant influence coefficients (the analogues of α_1). Therefore, the null hypothesis that all return coefficients are equal to zero is rejected.

The regression result for Model 7.1 reveals that FB_cont and YT_cont significantly affect ROA and that FB_cont significantly affects ROE. Variables of FB_cont negatively significantly affect proxies for profitability (ROE at $\alpha = 1\%$ and ROA at $\alpha = 5\%$). In contrast, the YT_cont variable is positively significantly related to ROA at $\alpha = 5\%$. This indicates that the presence of banks on Facebook negatively affects the financial performance of Italian banks and their presence on YouTube has positive effects. The values of adjusted *R*-squared of the equation for ROA suggests that the model is reliable.

Table 7.7 Random-effects GLS regression Models 7.1, 7.2 and 7.3

	1		2		3	
	ROA	ROE	ROA	ROE	ROA	ROE
<i>Explanatory variables</i>						
FB_cont	-0.00476**	-1.08840***				
INS_cont	0.00244	0.70816				
LI_cont	0.00053	-0.31444				
TT_cont	0.00131	-0.02161				
YT_cont	0.00468**	0.75032				
FB_pop			-6.31e-08**	-0.000002		
INS_pop			-0.000000	0.000024		
LI_pop			0.000000	0.000002		
TT_pop			0.000000	0.000039		
YT_pop			0.000001	0.000031		
FB_inter					0.000000	-0.00020
INS_inter					0.000000	0.00010
LI_inter					0.00005*	-0.00017
TT_inter					0.000000	0.00011
YT_inter					0.000000	0.00047
<i>Control variables</i>						
EA	0.02490**	4.33853**	0.02599***	4.96095**	0.02442**	4.96718**
PR	0.00059*	-0.02160	0.00060**	-0.02089	0.00051*	-0.02053
PL	-0.44793***	-6.43373***	-0.44842***	-6.27647***	-0.44735***	-6.23846***
S	0.00064	0.10748	0.00098	0.11849	0.00080	0.12920
Cons.	-0.00095	-0.96095	-0.00239	-1.46065	-0.00145	-1.53096
Adj. R2	0.72730	0.02460	0.72470	0.00640	0.72870	0.00690
Observations	491	491	491	491	491	491

Source: Our elaboration on Orbis and hand-collected data from online social media
 Dependent variable: ROA and ROE

*significant at $\alpha = 10\%$; **significant at $\alpha = 5\%$; ***significant at $\alpha = 1\%$

The regression result for Model 7.2 indicates that the `FB_pop` variable is statistically significant to ROA. `FB_pop` is negatively related to ROA; similar to the finding for Model 7.1, this indicates that the popularity of banks on Facebook negatively affects their economic performance. The values of adjusted *R*-squared of the equation for ROA suggests that the model is reliable.

The regression result for Model 7.3 reveals that `LI_inter` significantly positively affects ROA at $\alpha = 10\%$. This indicates that the interaction of banks on LinkedIn increases the financial performance of Italian banks.

6 CONCLUSIONS

In this chapter, we analysed the adoption of online social media on a sample of 151 Italian banks. We found that the majority of banks have adopted the professional social network LinkedIn, and the other platforms are used by less than 50% of the sample banks. The rate of adoption of online social media is lower than the demand exhibited by customers, who have created automatic pages and posted content about banking institutions. However, the popularity of sample banks on online social media is really low compared with other sectors' pages—for example, there are no banks on the list of the 350 most liked Facebook pages. With respect to interaction, there is great variability among banks: some banking institutions do not even adopt online social media and others post content more than once per day.

Our results demonstrate that the effects of online social media on bank performance vary from one bank to another.

Content and popularity on Facebook both negatively affect bank profitability. This may be because Facebook is generally not perceived as a 'formal' online social media platform but one that is used for fun and entertainment, and bank customers want professional rather than fun relationships with their banks. Moreover, the popularity of banks on Facebook is often caused by negative behaviours and malfunctions by banks, so that users make public complaints on this social network. Following Dalziel and Hontoir (2017), consumers turn to online social media when they are stressed and frustrated and have lost trust in their bank. Hence, online social media is viewed as a last resort when traditional channels have failed, and so customers have utilized the 'public' nature of online social media platforms to put pressure on banks to resolve their problem.

Banks' presence on YouTube positively affects profitability. In fact, the video-sharing platform is used by banks not only for promotion but principally to increase customers' financial literacy by teaching the fundamentals of finance and how to use their banking products. This aid in the usage of banking products results in improved bank profitability. Nevertheless, there are no effects on bank profitability deriving from their popularity on YouTube, because users of this platform can access uploaded videos without having an account. Additionally, the interaction of banks with customers on YouTube has no effect on bank profitability; the number of YouTube videos posted is not relevant because banks can share the same information by creating either a few long videos or many short videos.

The presence of banks on LinkedIn has no effect on profitability; this will be a result of the mixed presence of banks on LinkedIn with automatic pages and company pages. However, the interaction of banks on LinkedIn has positive effects on bank profitability. In contrast to Facebook, LinkedIn is a professional social network, where the customers' need for privacy and protection of their reputation in their professional self-promotion does not allow space for annoying complaints against organizations.

We found that none of the content, popularity and interaction indexes of the blog service Twitter by banks affect their profitability. In addition, the adoption of Instagram by banks generally has no effect on profitability; this may be because only 13% of sample banks have adopted this platform; hence, it is too soon to see any outcomes.

It follows that the value for banks comes not from the social media platform itself but from how a particular platform is used, by both banks and customers, as any given platform can be used for a variety of objectives (Majchrzak et al. 2009; Culnan et al. 2010). Merely creating a presence on an online social media platform does not ensure the implementation will create value, since a discrepancy between what customers expect of online social media and what banks are prepared to offer can result in customer frustration.

In any case, when a bank malfunction is solved after being posted on online social media, some customers may interpret this as the bank trying to save their reputation rather than keeping their customers' interest at heart (Dalziel and Hontoir 2017). Consequently, banks must learn how to transform customers' complaints into opportunities rather than view them as threats (N'Goala 2010).

On a global scale, online social media use is growing, and the challenge for banks is not only to effectively choose which applications to use but also to identify which consumers and elements to include in their strategy.

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Central Banks' Commitment to Stakeholders: CSR in the Eurosystem: 2006–2016

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I INTRODUCTION

The aim of this chapter is twofold. On the one hand, we want to contribute to the very interesting recent debate about the necessity of rethinking and analysing the independence, legitimacy, accountability and reputational issues of central banks (CBs) all over the world (e.g., Best 2016; Goodhart

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and Lastra 2018; Lentner et al. 2017). This intellectual and political debate is grounded in the developing mission, activities and goals of these agencies and on the consequent increased attention to communications and actions towards different audiences or external stakeholders (governments, the wider public, financial community) and internal stakeholders (employees at different hierarchical levels within the CBs' organizations).

On the other hand, beyond this theoretical and political debate, we want to empirically assess what is happening in terms of attention paid to social responsibility in the communicative apparatus of CBs. Great attention has already been devoted to monetary policy communication regarding economic agents' expectations (e.g., Braun 2015; Morris and Shin 2008; Issing 2014; Farina et al. 2018 for a recent review), but very little research has been devoted to managerial and communication practices that realize multiple responsibilities towards multiple stakeholders.

Corporate Social Responsibility (CSR) ("the responsibility of enterprises for their impacts on society", European Commission 2011, p. 6) is a managerial construct that is multidimensional by definition; it is defined as a "respect for applicable legislation, and for collective agreements between social partners, is a prerequisite for meeting that responsibility. To fully meet their corporate social responsibility, enterprises should have in place a process to integrate social, environmental, ethical, human rights and consumer concerns into their business operations and core strategy in close collaboration with their stakeholders, with the aim of maximizing the creation of shared value for their owners/shareholders and for their other stakeholders and society at large; identifying, preventing and mitigating their possible adverse impacts" (European Commission 2011, p. 6).

At this very early stage of research, we have five strictly interconnected questions with regard to CSR in CBs:

- RQ1.** Is the CSR construct relevant in CBs even though they are not enterprises?
- RQ2.** Is CSR a necessary framework for highlighting independence, legitimacy and accountability for these kinds of institutions in the post-2007 era?
- RQ3.** How can CSR orientation be made evident in the communicative apparatus of CBs?
- RQ4.** Is there a particular narrative attention paid to the most traditional external communication tool (annual report) of CBs?
- RQ5.** Which kind of dictionary can be used to analyse the annual reports?

We choose to focus our attention on the EU landscape of CBs due to two reasons. First, a comparative analysis is easier in terms of time and space considering a largely common (if not completely equal) legal environment; second, the annual reports are fully available in an easily readable format in the Eurosystem CBs.¹

The rest of this chapter is organized as follows. In the next section, we try to give some initial answers to our research questions using a critical literature analysis and a short presentation of some CBs' experiences in CSR (or stakeholder management—SM) reporting. Section 3 describes the data and methodology used in the analysis. Section 4 lays out the empirical results. Finally, Sect. 5 concludes our analysis, commenting on these first results and presenting some further research perspectives.

2 LITERATURE AND EXPERIENCES

The relevant academic literature used to underline the topics of this paper is, on the one hand, a stream of research about central banking and the development of its role and mission, especially in the post-2007 crisis era; on the other hand, a well-developed and mature body of literature about CSR management and reporting about for-profit companies and the more recent and increasing attention paid to CSR issues in other kinds of organizations (not-for-profit, governmental and non-governmental organizations) will be used.

In the following pages, we critically analyse some contributions and insights stemming from these two streams of research, trying to highlight the rationale behind our research effort and its opportunities and limits. Therefore, we describe and comment on some of the more developed experiences of CSR (or stakeholder management) communication in some CBs' annual reports (i.e., France, the Netherlands, Ireland, Austria). The literature analysis and the experience description and comment are both instrumental in answering our first four questions (we deal with the fifth one in Sect. 3).

The academic and practical literature about CSR and stakeholder management (SM) in central banks is very scarce, almost non-existent. We found only some recent contributions by employees of the Central Bank of Hungary (Magyar Nemzeti Bank 2014), which specifically focused on

¹Only in the Eurosystem CBs did we find all annual reports in pdf format for the years 2006–2016; in the US (Fed System) we did not find the same full availability.

CSR in Central Banks (Lentner et al. 2015a, b, 2017), a speech by a French former governor (Noyer 2008), and a chapter of a book about CSR in which the National Bank of Greece's experience is presented (Arapoglou 2006).² The expression "social responsibility" is present in 45 of the 154 annual reports we analysed (11 years—2006–2016; 14 CBs—ECB and 13 NCBs). Of these 45 annual reports, only a small portion have chapters or paragraphs focused on CSR; the others cite social responsibility with reference to specific management issues (environment, employees) or with no specific reference at all. From this evidence, we could affirm that CSR is not worth studying in CB management because it is not relevant for academics and practitioners. Since there has been a focus in recent academic work (in economics) on whether CSR should exist (Kitzmueller and Shimshack 2012, p. 52) in firms, should we consider CSR in CBs completely useless? In contrast, CBs are public organizations, and, similar to governments, they provide public goods; the institutional nature of CBs and the relevance of their tasks for society invite us to reflect on the usefulness and opportunity presented by CSR actions, communications and dialogue with different stakeholders in this kind of organization. If CSR has become a mainstream business activity (The Economist 2008, cited in Kitzmueller and Shimshack 2012, p. 51), a fortiori it should be a core activity in CBs, and consequently, it is a relevant construct in the world of CBs (**RQ1**).

Moving on to **RQ2**, we want to understand if a CSR framework (alongside stakeholders' dialogue, embedded in an SM approach more than a CSR one), with its communication tools and dialogue with stakeholders, is necessary to sustain the traditional characteristics of CBs (including independence, legitimacy, accountability).

Central banks have been studied for a long time as they are a fundamental institution of the economy and society and are engaged in money creation and control, price and financial stability control, payments system management and many other processes influencing society and citizens' welfare (among many, see: Goodhart 1988, 2016; Bordo et al. 2016; Haldane and Qvigstad 2016; Rochon and Rossi 2015). Consequently, we should implicitly assume that central banks are per se socially responsible and that their governance is influenced by social responsibilities; if this is not explicitly present in their goals, actions, controls and communications,

²The National Bank of Greece published its first Social Report in 1996 (National Bank of Greece 2016, p. 9).

then it should be seen through a CSR or SM framework and approach. The central banking literature is mainly focused on concepts of independence (for governments and politicians) and accountability (to society as a whole and to specific categories of stakeholders), as well as trying to gain legitimacy and credibility and reinforcing trust placed in them and their competences and activities by society, citizens and specific categories of stakeholders. We found many contributions about these concepts, which are also clearly illustrated on the ECB website, for example, with reference to the strategic intents of Eurosystem and the single supervisory mechanism (SSM).³ Some of these contributions (for a useful synthesis see Goodhart 2016) reflect on the evolution of these concepts after the big financial crisis (BFC). For many contributions, before and after the BFC, see:

- on independence, Balls et al. (2017), Braun (2017), Mersch (2018), Sullivan and Horáková (2014), Tognato (2012), Goodhart and Lastra (2018), Rochon and Rossi (2015), p. 85, de Haan (1997), Goodhart (1988), Polillo and Guillen (2005), Polillo (2014);
- on accountability, de Haan (1997), de Haan et al. (1998), Best (2016), Braun (2017), Haldane and Qvigstad (2016), p. 647, Sullivan and Horáková (2014);
- on legitimacy, Braun (2016), Goodhart and Lastra (2018), p. 54;
- on credibility, Bordo and Siklos (2016), Rochon and Rossi (2015), p. 82;
- on trust, Braun (2016), Ehrmann et al. (2013).

These contributions come from different disciplines, with the largest portion coming from economics. Management studies' contributions are formally absent but are implicitly considered in many articles and papers, including those coming from the CB area. If we consider some contributions that are more focused on the corporate governance of CBs (Andenas and Chiu 2014; Kahn 2016, 2017; Lastra 2015; Oritani 2010), other managerial topics (Adolph 2013; Haldane and Qvigstad 2016, pp. 644–647, with some useful references; Camilleri 2017, with general reference to European banks), organizational culture (Kane 2016; Mooij 2004; Schoen 2017; Tognato 2012; Polillo 2014; Shirakawa 2010),

³ <https://www.bankingsupervision.europa.eu/about/mission-statement/the-strategic-intents/html/index.en.html>.

communication, with particular reference to monetary policy (Blinder et al. 2008; Braun 2015, 2016, 2017; Brunner 1981; Clévenot et al. 2015; Eijffinger and Geraats 2006; Farina et al. 2018; Issing 2014; Morris and Shin 2008), or special reports on financial stability (Correa et al. 2017), we find many insights on different topics but rarely a general view of the social responsibilities of CBs or tight references to CSR.

In a recent essay by two practitioners (Haldane and Qvigstad 2016), some limits of the traditional literature on CBs emerge. These limits suggest we open the view of CSR and its frameworks and communication tools. Paying attention to a general and important question (“What Makes a ‘Good’ Central Bank?”, p. 639), Haldane and Qvigstad begin their answer with this sentence: “If history shows us why we need central banks, can it illustrate what makes a successful one? In his Adam Smith lecture in 2006, former Bank of England Governor Mervyn King laid out some criteria for good institution (King 2006):

1. clear objectives;
2. tools and competence to meet these objectives;
3. accountability;
4. designed to reflect history and experience.

These are timeless characteristics. Using them, it is possible to evaluate the role and responsibilities of central banks today, including in the light of the crisis as these responsibilities have expanded”.

Leaving out the deep description of these four points by Haldane and Qvigstad, the sequence traced is a typical one stemming from strategic management literature: measurable goals (1); organization design and human resources management decisions (2); performance measurement and communication systems designed around stakeholders’ needs (3); and following a long time horizon characterized by institutional memory and adaptability to institutional change (4). The academic literature on central banks has paid little attention to points (2) and (3) from a management perspective; the main focus traditionally has been on legal profiles (compliance with new rules and codes of conduct, e.g., Guideline 2015) and theoretical and empirical views of monetary policy and financial stability of macro- and micro-prudential policies, looking at CBs as a black box with reference to many issues behind the “criteria for good institution”. In our opinion, this kind of research is particularly

important currently, when the societal legitimacy of CBs is under scrutiny; formal legitimacy of CBs is still solid, but, in the future, this could change: “‘Societal’ legitimacy refers to the support by the public and is determined by the acceptance of, or loyalty to, the system. Of course, societal legitimacy can be fickle since public acceptance is also influenced by politics, the media, current events, changes in circumstances, sentiment, and other factors. In any case, when societal legitimacy weakens or is no longer present, the law is bound to change” (Goodhart and Lastra 2018, p. 54, who affirm on the same page: “An accountable central bank must give account, explain and justify the actions or decisions taken, against criteria of some kind, and take responsibility for any fault or damage”).

In summary, our answer to **RQ2** is affirmative. CSR is a necessary framework in sustaining some fundamental features of CBs’ mission and tasks in light of the evolving socio-economic environment, especially in Europe (CSR Europe 2014, 2017), where CSR has long been under the attention of the European Commission (European Commission 2002, 2011, 2014, 2018). This attention is still high and should increase in the near future for private and for-profit enterprises, non-profit organizations and public administration (D’Anselmi et al. 2017).

The CSR literature is extremely vast; it can clarify many aspects of CSR application to CBs. From the many contributions (some linked to the SM approach), we selected some on specific noteworthy issues:

- different definitions of CSR (Carroll 1979, 1991, 1999; Dalhsrud 2008; van Marrewijk 2003) and their management and reporting implications;
- SM management (Freeman 1984; Preble 2005), which helps identify the strategic intent and reasons for SM and the legitimacy and power of different stakeholders (internal and external);
- the concrete profiles of SM and CSR, which are linked to organizational, cultural and political issues (Bartkus and Glassman 2008; de Jong and van der Meer 2017; Jackson and Apostolakou 2010; Jin et al. 2013; Detomasi 2008);
- the implicit and explicit approaches to CSR (Matten and Moon 2008), which are linked to different institutional environments (see also Aguilera et al. 2015) and times.

In addition to these selected issues and contributions from the fields of CSR and SM, we also considered some articles coming from other streams of literature in answering **RQ3** and **RQ4**. These fields were: non-financial reporting and integrated reporting (IR) (Beattie 2014; Beck et al. 2017; Dumay et al. 2016; Sethi et al. 2017); language, discourse and institution creation (Phillips et al. 2004); crisis and CSR (Sigurthorsson 2012); and corporate social performance (CSP) (Wartick and Cochran 1985; Wood 1991).

Furthermore, we paid attention to institutional perspectives (at a national and at global level) on some issues addressed here (Aggarwal and Goodell 2014, on finance and accounting scholarship; Campbell 2007, Franssen 2013, Tengblad and Ohlsson 2010 and Whitley 1999 on CSR; Ioannou and Serafeim 2012, on CSP; Henisz et al. 2005, Meyer et al. 1997, and Polillo and Guillen 2005 on worldwide institutional models of organizations). In a nutshell, to better understand how CSR and SM frameworks apply to CBs and how they are put into action and communicated to internal and external stakeholders, we need to adopt an institutional and cultural view. Notably, as in Whitley (1999), we have to consider the political, financial, educational, labour and cultural systems that influence the adoption of CSR and SM frameworks. Comparing the CSR orientation of CBs in different countries and at different times, we can observe a convergent or a divergent trend. A convergent trend develops when the same kind of organization (e.g., a central bank) or the same management practice (e.g., CSR disclosure) assumes a similar configuration all around the world or around a large area of the world. The opposite (divergent trend) happens when national features of institutional environments influence the emergence of national models.

In answering **RQ3** (how to make CSR orientation evident in the communicative apparatus of CBs), we can consider all the different media and tools used by CBs: speeches, different kinds of reporting (including committees' reports), special CSR or SM reports, annual reports and so on. Our research in this area concentrates on annual reports because we think that these official documents are widely known and are at the disposal of the general public in digital format on the CBs' websites. Furthermore, it is historically the first document whose existence is largely known and communicated by traditional and digital media, and it is where CBs first publish references to social responsibilities and stakeholders. In the first stage and explorative phase of our

research project, we did not find other widespread communication tools with references to social responsibilities and different kinds of stakeholders, especially the largest ones (general public and citizens) in our search of CBs' website in the Eurosystem and in the USA. Of course, we found some references to stakeholders and social responsibilities in governors' speeches, but we think that the attention of the general public who are listening to or reading these speeches is focused on monetary policy and financial stability communications (for a review and specific research, see our recent contribution: Farina et al. 2018).

Moving to **RQ4** (is there a particular narrative attention paid to the most traditional external communication tool (annual report) of CBs?), we refer to the accounting literature (see some contributions cited above), which recently focused on non-financial information that is now regulated in the European Union (European Union 2014). The development of the integrated reporting (IR) framework, after social and sustainability reports in many industries and the financial services industry, seems to be a reaction to a loss of confidence and trust in traditional accounting, stemming from the global financial crisis (IIRC 2013). We try to reveal narrative attention about CSR and SM in the annual reports of CBs in the period 2006–2016 before using text analysis on these reports in the following paragraphs.

First, we observe a divergent trend with regard to narrative attention about CSR or SM. Only in four CBs (France, the Netherlands, Austria, Ireland) do we find some specific part of the annual report devoted to social responsibilities towards stakeholders.⁴ Some, albeit less, attention is paid to these ideas in the CBs' of Belgium, Italy and Portugal, with particular reference to employees and environmental issues. For brevity,⁵ here we underline the main features of the reports of the four CBs cited:

- France and the Netherlands offer the most developed attention to social responsibility;
- France follows the CSR framework, which is present at a national level (France's commitment to Corporate Social Responsibility (CSR)).

In the annual reports, we find narrative attention since 2006, with

⁴As previously observed (note 2), the National Bank of Greece publishes a specific Corporate Social Responsibility Report (National Bank of Greece 2016).

⁵The analysis of cases can be very useful at this stage of knowledge about CSR or SM attention in CBs, and it could be developed in the future.

increasing evidence from 2008. In 2016, a framework of CSR is illustrated (4 commitments—educational and cultural, economic and civic, environmental and towards bank staff—and 11 priority actions), and a CSR dashboard is presented (with indicators and targets for 2020 for each priority);

- The Netherlands has been paying attention to CSR in various ways since 2008. In some years, a special annex is produced; since 2011, a CSR report has been incorporated into the annual report, following the Global Reporting Initiative (see GRI 2010),⁶ and the report is certified by an external auditor. From mid-2015, a dedicated committee is used. The CSR report is characterized by a stakeholders' approach, with a materiality matrix that derives from a focused dialogue with stakeholders through surveys and other tools. Compared with other European CBs, the attention to CSR in this country seems the most developed, influenced not so much by law but by a continuous organizational and cultural change and by an internationally recognized framework (GRI);
- Austria devotes attention to employees (intellectual capital) and to the environment (environmental statement). Since 2009, intellectual capital and environmental statement have been an integral part of the annual report, with specification of quantified indicators (financial and non-financial);
- Ireland introduced a box dedicated to CSR actions (employees, other stakeholders, the environment and the community) in 2015's and 2016's annual reports.

Apart from France, where CSR is enforced by law, the narrative attention paid to these topics is generally low. Only in three cases (France, the Netherlands and Austria) are specific targets and actions plans defined with reference to some areas of CSR or stakeholders. France and the Netherlands have CBs nearest to an IR conception, if not influenced by non-financial information European Directive. It seems that a divergent trend emerges due to the national features of institutional environments and the endogenous organizational cultures of each CB. In the following paragraphs, we try to assess the attention to CSR through a quantitative approach, with the aim of comparing experiences between countries and analysing the trend of this attention.

⁶GRI is located in Amsterdam.

3 METHODS

Our sample includes all the annual reports from the European Central Bank and selected European National Central Banks for the period 2006–2016.⁷ To allow the stability, reproducibility and accuracy of the CSR communication, we apply text analysis (Stone et al. 1966).

Although we focus on the more common word categorization (bag of words) method for measuring CSR relevance, other text analysis approaches are based on vector distance, Naive Bayes classifications, likelihood ratios or other classification algorithms (e.g., Antweiler and Frank 2004; Li 2010).

The investigation is performed using computer-aided text analysis (CATA), which was widely used by previous scholars, including in the analyses of politicians' speeches (Hart 1984, 2000a, b; Hart and Jarvis 1997; Bligh et al. 2003, 2004), federal reserve policymakers (Bligh and Hess 2005a, b), annual stockholders reports (Yuthas et al. 2002), and other texts (Ober et al. 1999). Examples of recent finance applications are Tetlock (2007); Tetlock et al. (2008); Apel and Blix Grimaldi (2012); Loughran and McDonald (2014); Carretta et al. (2015); Hansen and McMahon (2016); and Farina et al. (2018).

Using CATA has several advantages over human coding. For example, search techniques based on pre-existing rules and algorithms are systematic and therefore free from researcher subjectivity bias that may exist in human coding. Importantly, the program is designed to identify subtle aspects of language that an expert human may not easily perceive (Bligh et al. 2004). Thus, this should allow greater ease in calibration versus subjective coding.

To examine text characteristics, we used a Python script based on “textstat” and “NLTK” modules and that accounts for a set of words included in specific CSR dictionaries:

- Dictionary 1: Corporate Social Responsibility content analytic dictionary developed by Pencle and Malaescu (2016). Their multidimensional Corporate Social Responsibility Words (CSRW) dictionary comprises 1002 words and has four dimensions: Social and community, Human resources, Environment and Human rights (Table 8.1).

⁷We consider the NCBs of the countries that were in the Eurosystem in 2007 (year of presentation of the 2006 annual report).

Table 8.1 Dictionary 1: Corporate Social Responsibility Words (CSRW)

<i>Dimensions</i>	<i>Example of words</i>	<i>Number of words</i>
Employee	Health benefits, educate, employed, discriminatory etc.	319
Human rights	Fairness, religious diversities etc.	297
Environment	Conservation, fossils, green engineering, renewable energy etc.	451
Social and community	Transparent, foodbank, people, social issue etc.	174

- Dictionary 2: As suggested by Grimmer and Stewart (2013), applying dictionaries outside the domain for which they were developed can lead to serious errors. For this reason, we developed the Central Banking Corporate Social Responsibility content analytic dictionary considering how words are used in the particular context of the ECB and NCBs. To this aim, we used an exploratory (inductive) approach to uncover patterns in the data by manually analysing, where present, the CSR section of the annual reports of each institution (see Sect. 2). As part of our exploratory analysis, we selected some target categories and created a profile of the most descriptive terms for each of the target categories (Table 8.2).

Finally, we measured the rate at which the words of each dictionary appear in the annual reports to classify them and to study the relevance of CSR dimensions and the relative weight of each CSR dimension.

4 RESULTS

4.1 Dictionary 1

The following tables show the average values of length and category representation for the annual reports of the ECB and European NCBs during the period of analysis.

On average, the ECB shows the highest number of words (93,611.36) of all the annual reports produced for the period 2006–2016. Other European NCBs have on average 76,867.06 words for the period of the analysis (Table 8.3).

In terms of relevance and relative weight of CSR dimensions for dictionary 1 categories (Table 8.4), “Social and community” and “Employee”

Table 8.2 Dictionary 2: Central Banking Corporate Social Responsibility (CBCSR)

<i>Category: Employee</i>	<i>Category: Educational</i>	<i>Category: Environment</i>	<i>Category: Social</i>
Career development	Cultural	Climate	Accountability
Compensation	Culture	CO ₂	Charity
Disabled	Economic research	COP21	Citizen
Discussion meeting	Education	Environment	Civic
Employee	Intellectual capital	GHG emissions	Code
Employer	Literacy	Pollution	Community
Ethics	Training	Renewable energy	Consumer assistance
Ethnic background	Workshop	Renewable sources	Consumer protection
Gay		Sustainable procurement	CSR
Gender			Democracy
Health and safety			Dialogue
Human capital			Disclosure
Human resource			Economic development
Integrity			Engagement
Intellectual capital			Financial inclusion
Lesbian			Human development
Lunch			Integration in the workforce
Quality of work			Local development
Religion			Microfinance
Sexual orientation			Over-indebtedness
Skill acquisition			Poverty reduction
Staff			Public assistance
			Public interest
			Quality approach
			Quality of life
			Relational capital
			Relationships
			Reputation
			Social capital
			Social development
			Social organization
			Social responsibility
			Solidarity
			Sponsor
			Stakeholder
			Sustainable finance
			Trust
22 words	8 words	9 words	37 words

Table 8.3 Number of words

	<i>Total words in the annual report</i>	<i>Employee</i>	<i>Human rights</i>	<i>Environment</i>	<i>Social and community</i>
ECB average values	93,611.36	2437.64	1301.55	2348.73	2569.82
European NCBs average values	76,867.06	2281.71	1292.95	1860.57	2248.88

Table 8.4 Relevance and relative weight of CSR dimensions

	<i>Employee (%)</i>	<i>Human rights (%)</i>	<i>Environment (%)</i>	<i>Social and community (%)</i>
Relevance				
ECB average values	2.45	1.31	2.36	2.58
European NCBs' average values	2.29	1.30	1.87	2.26
Relative weight				
ECB average values	28.05	15.09	27.21	29.64
European NCBs' average values	29.43	16.70	24.89	28.98

are, on average, the most relevant for ECB and NCBs. In detail, the “Employee” category is more important for NCBs, whereas “Social and community” is the most represented category for ECB.

Table 8.5 and Fig. 8.1 show the relevance of CSR dimensions per institution/year. In general, it is possible to see a certain stability for each dimension during the period 2006–2016. However, some institutions such as Belgium show a remarkably high level of relevance of CSR categories in the text (on average 20.25% of words used refer to CSR), whereas Slovenia (on average 3.71% of words that refer to CSR), Finland (on average 4.35% of words that refer to CSR), Luxembourg (on average 4.63% of words that refer to CSR), Austria (on average 4.78% of words that refer to CSR) and Germany (on average 4.79% of words that refer to CSR) show, on average, the lowest values.

Countries such as Greece, Portugal and Spain show more instability and, in general, decreasing attention during the period to all the CSR categories analysed.

In particular, the maximum variability comes from the NCBs of Portugal, Greece and Spain for all the categories in dictionary I.

Table 8.5 Relevance of CSR dimensions per institution/year

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Employee											
BCE	2.70%	2.90%	2.90%	2.90%	2.90%	2.00%	2.00%	3.00%	1.30%	2.30%	2.10%
Austria	1.70%	1.80%	1.50%	1.40%	1.40%	1.20%	1.30%	1.30%	1.20%	1.30%	1.40%
Belgium	5.10%	5.40%	5.40%	5.70%	4.90%	6.30%	5.50%	6.80%	7.30%	7.80%	7.20%
Finland	1.20%	1.20%	1.10%	1.40%	1.50%	1.40%	1.30%	1.30%	1.00%	1.10%	1.20%
France	1.30%	1.50%	1.70%	2.40%	1.80%	2.20%	2.20%	1.90%	1.60%	1.60%	1.70%
Germany	1.40%	1.50%	1.60%	1.60%	1.70%	1.70%	1.50%	1.00%	1.10%	0.90%	1.10%
Greece	5.10%	2.50%	3.30%	2.50%	2.60%	2.60%	3.50%	2.40%	2.60%	0.30%	0.30%
Ireland	1.50%	1.20%	0.90%	1.60%	1.70%	1.70%	2.00%	2.00%	1.60%	2.10%	2.30%
Italy	2.80%	2.60%	2.50%	3.10%	3.00%	3.20%	2.40%	2.40%	2.10%	1.90%	2.40%
Luxembourg	1.70%	1.50%	2.10%	1.80%	0.70%	1.10%	0.60%	1.20%	1.30%	1.20%	1.30%
Netherlands	2.70%	2.30%	2.30%	2.50%	2.10%	2.50%	3.10%	3.10%	3.30%	2.50%	2.90%
Portugal	5.10%	4.90%	5.40%	5.10%	5.70%	2.20%	2.60%	2.50%	1.60%	1.70%	1.70%
Slovenia	1.10%	0.90%	1.00%	0.70%	0.80%	1.10%	1.30%	1.50%	1.30%	0.70%	1.40%
Spain	2.80%	3.10%	3.30%	3.10%	3.00%	1.70%	1.30%	1.50%	2.90%	2.00%	1.80%
Environment											
BCE	2.50%	2.60%	2.80%	2.60%	2.80%	2.10%	2.10%	3.10%	1.40%	2.10%	1.90%
Austria	1.40%	1.70%	1.20%	1.20%	1.30%	1.10%	1.30%	1.30%	1.10%	1.30%	1.30%
Belgium	3.40%	3.70%	4.20%	4.30%	4.00%	5.20%	4.80%	5.60%	5.70%	5.90%	5.50%
Finland	1.10%	1.10%	1.10%	0.80%	1.60%	1.50%	1.20%	1.30%	1.10%	1.10%	1.20%
France	1.20%	1.40%	1.40%	2.10%	1.70%	1.80%	1.90%	1.50%	1.50%	1.10%	1.30%
Germany	1.20%	1.30%	1.30%	1.30%	1.60%	1.50%	1.60%	1.00%	0.90%	0.80%	1.00%
Greece	3.30%	1.60%	2.60%	2.00%	2.10%	2.00%	2.60%	2.30%	2.40%	0.30%	0.30%
Ireland	1.20%	0.90%	0.70%	1.10%	1.20%	1.20%	1.40%	1.50%	1.00%	1.50%	1.70%
Italy	2.20%	2.10%	2.00%	2.60%	2.40%	2.60%	2.10%	2.10%	1.60%	1.40%	1.80%
Luxembourg	1.20%	1.30%	1.60%	1.40%	0.60%	1.10%	0.60%	1.10%	1.30%	1.10%	1.20%

(continued)

Table 8.5 (continued)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Netherlands	2.20%	1.90%	2.10%	2.20%	2.00%	2.20%	2.80%	2.70%	2.90%	2.50%	2.70%
Portugal	3.30%	3.50%	4.10%	3.50%	3.60%	1.90%	1.80%	2.10%	1.30%	1.20%	1.30%
Slovenia	1.00%	1.00%	1.10%	0.70%	0.80%	1.00%	1.30%	1.40%	1.30%	0.70%	1.40%
Spain	2.30%	2.60%	2.60%	2.50%	2.40%	1.20%	1.10%	1.20%	1.70%	1.40%	1.60%
Human rights											
BCE	1.40%	1.50%	1.50%	1.40%	1.60%	1.20%	1.10%	1.70%	0.80%	1.20%	1.00%
Austria	0.90%	1.00%	0.80%	0.70%	0.80%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%
Belgium	2.80%	2.70%	2.80%	3.00%	2.80%	3.80%	3.60%	4.10%	4.20%	4.50%	4.20%
Finland	0.70%	0.70%	0.70%	0.80%	0.90%	0.90%	0.80%	0.70%	0.60%	0.70%	0.70%
France	0.80%	0.80%	1.00%	1.20%	1.00%	1.30%	1.30%	1.10%	1.00%	0.90%	1.00%
Germany	0.80%	0.80%	0.80%	0.90%	0.90%	0.90%	0.90%	0.50%	0.60%	0.50%	0.70%
Greece	2.80%	1.30%	2.00%	1.40%	1.50%	1.60%	2.10%	1.40%	1.50%	0.20%	0.20%
Ireland	0.80%	0.50%	0.40%	0.90%	1.00%	1.00%	1.10%	1.20%	0.90%	1.20%	1.30%
Italy	1.50%	1.40%	1.40%	1.70%	1.60%	1.90%	1.30%	1.40%	1.10%	1.00%	1.20%
Luxembourg	1.00%	0.80%	1.30%	1.00%	0.50%	0.80%	0.50%	0.80%	1.00%	0.80%	0.80%
Netherlands	1.70%	1.40%	1.50%	1.60%	1.30%	1.60%	1.90%	1.90%	1.90%	1.50%	1.80%
Portugal	2.80%	2.50%	2.60%	2.80%	2.90%	1.50%	1.60%	1.50%	1.00%	1.00%	1.10%
Slovenia	0.50%	0.40%	0.50%	0.40%	0.40%	0.50%	0.70%	0.80%	0.70%	0.40%	0.80%
Spain	1.40%	1.50%	1.80%	1.70%	1.70%	0.80%	0.80%	0.90%	1.40%	1.10%	0.90%
Social and community											
BCE	2.70%	2.80%	3.20%	3.10%	3.20%	2.20%	2.20%	3.30%	1.40%	2.30%	2.10%
Austria	1.60%	1.80%	1.50%	1.20%	1.40%	1.10%	1.20%	1.20%	1.10%	1.20%	1.20%
Belgium	4.60%	4.70%	5.20%	5.30%	4.80%	6.50%	5.80%	6.80%	6.70%	7.40%	6.70%
Finland	1.10%	1.10%	1.00%	1.30%	1.40%	1.50%	1.30%	1.10%	0.90%	1.00%	1.10%
France	1.20%	1.40%	1.70%	2.40%	1.80%	2.20%	2.10%	1.80%	1.60%	1.30%	1.50%

Germany	1.30%	1.60%	1.50%	1.60%	1.90%	1.80%	1.70%	1.20%	1.30%	0.90%	1.00%
Greece	4.80%	2.30%	3.10%	2.50%	2.80%	2.70%	3.50%	2.70%	2.80%	0.40%	0.30%
Ireland	1.50%	1.00%	0.80%	1.50%	1.60%	1.60%	1.90%	1.80%	1.40%	1.90%	2.00%
Italy	3.10%	2.90%	3.00%	3.60%	3.40%	3.90%	2.90%	2.90%	2.20%	2.10%	2.50%
Luxembourg	1.40%	1.40%	2.10%	1.60%	0.70%	1.20%	0.80%	1.20%	1.50%	1.30%	1.40%
Netherlands	2.40%	2.10%	2.30%	2.60%	2.30%	2.40%	3.00%	3.00%	3.30%	2.60%	3.00%
Portugal	4.60%	4.50%	5.20%	4.60%	4.90%	2.40%	2.40%	2.30%	1.60%	1.60%	1.60%
Slovenia	0.90%	0.90%	1.10%	0.70%	0.80%	1.00%	1.30%	1.40%	1.20%	0.60%	1.30%
Spain	2.80%	3.10%	3.60%	3.50%	3.60%	1.70%	1.50%	1.50%	2.50%	1.80%	2.10%

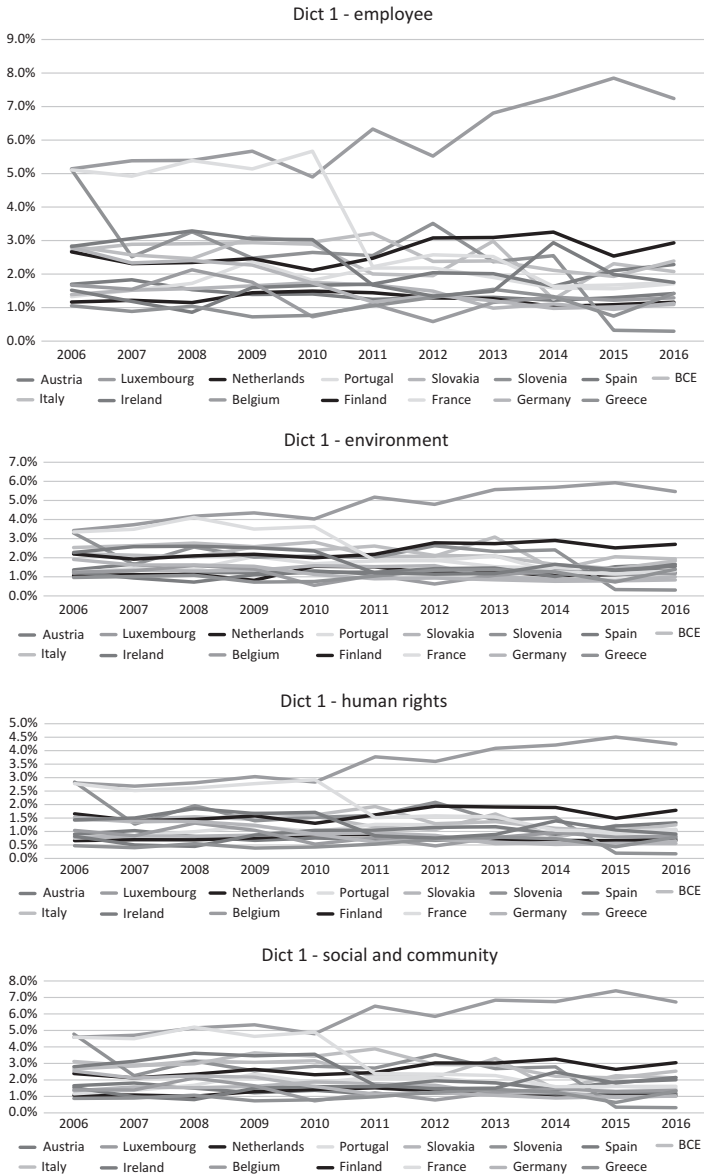


Fig. 8.1 Trend of dictionary 1 dimensions

The minimum variability is instead from the NCBs of Austria, Finland and Germany for the categories “Employee and human rights” and Austria, Finland and Slovenia for the categories “Environment” and “Social and community”.

4.2 Dictionary 2

The following tables (Table 8.6) show the average values of length and category representation for the annual reports from the ECB and European NCBs during the period of analysis.

In terms of the relevance and relative weight of CSR dimensions of dictionary 2 categories (Table 8.7), “Employee” and “Social” are, on average, the most relevant for the ECB and NCBs. In detail, the “Employee” category is the most important for both the ECB and NCBs.

Table 8.8 and Fig. 8.2 show the relevance of CSR dimensions per institution/year. Additionally, in the case of dictionary 2, it is possible to see a certain stability for each dimension during the period 2006–2016. However, confirming the result obtained using dictionary 1, Belgium also shows a remarkably high level of relevance of CSR categories in the text while Slovenia, Luxembourg and Austria show, on average, values below the average.

Table 8.6 Number of words

	<i>Total words in the annual report</i>	<i>Employee</i>	<i>Educational</i>	<i>Environment</i>	<i>Social</i>
ECB average values	93,611.36	128.82	35.27	27.27	74.09
European NCBs' average values	76,867.06	92.96	35.19	37.52	53.87

Table 8.7 Relevance and relative weight of CSR dimensions

	<i>Employee (%)</i>	<i>Educational (%)</i>	<i>Environment (%)</i>	<i>Social (%)</i>
<i>Relevance</i>				
ECB average values	0.13	0.04	0.03	0.07
European NCBs average values	0.15	0.06	0.06	0.09
<i>Relative weight</i>				
ECB average values	48.47%	13.77%	9.90%	27.86%
European NCBs average values	55.00%	20.82%	22.20%	31.87%

Table 8.8 Relevance of CSR dimensions per institution/year

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Employee											
BCE	0.12%	0.13%	0.13%	0.16%	0.17%	0.12%	0.12%	0.16%	0.07%	0.11%	0.14%
Austria	0.10%	0.09%	0.08%	0.13%	0.13%	0.12%	0.13%	0.13%	0.10%	0.12%	0.12%
Belgium	0.22%	0.29%	0.25%	0.27%	0.24%	0.31%	0.32%	0.33%	0.36%	0.44%	0.38%
Finland	0.11%	0.11%	0.10%	0.11%	0.13%	0.12%	0.07%	0.06%	0.07%	0.07%	0.08%
France	0.15%	0.14%	0.19%	0.18%	0.14%	0.13%	0.12%	0.13%	0.12%	0.15%	0.17%
Germany	0.12%	0.13%	0.14%	0.15%	0.13%	0.15%	0.10%	0.09%	0.10%	0.11%	0.31%
Greece	0.15%	0.20%	0.14%	0.14%	0.18%	0.22%	0.11%	0.13%	0.02%	0.02%	0.13%
Ireland	0.11%	0.08%	0.09%	0.08%	0.10%	0.10%	0.13%	0.07%	0.14%	0.24%	0.14%
Italy	0.10%	0.18%	0.16%	0.17%	0.20%	0.13%	0.12%	0.11%	0.08%	0.08%	0.12%
Luxembourg	0.19%	0.13%	0.16%	0.05%	0.09%	0.01%	0.09%	0.13%	0.11%	0.08%	0.16%
Netherlands	0.19%	0.19%	0.18%	0.22%	0.21%	0.29%	0.40%	0.41%	0.34%	0.22%	0.22%
Portugal	0.36%	0.33%	0.36%	0.35%	0.47%	0.24%	0.26%	0.13%	0.09%	0.09%	0.13%
Slovenia	0.02%	0.01%	0.03%	0.02%	0.03%	0.05%	0.05%	0.06%	0.05%	0.03%	0.09%
Spain	0.12%	0.13%	0.16%	0.14%	0.17%	0.15%	0.09%	0.06%	0.08%	0.07%	0.08%
Educational											
BCE	0.03%	0.04%	0.02%	0.03%	0.04%	0.04%	0.04%	0.03%	0.01%	0.01%	0.02%
Austria	0.06%	0.04%	0.04%	0.06%	0.06%	0.03%	0.04%	0.09%	0.07%	0.06%	0.08%
Belgium	0.11%	0.17%	0.16%	0.22%	0.08%	0.11%	0.10%	0.20%	0.17%	0.19%	0.20%
Finland	0.04%	0.04%	0.03%	0.02%	0.02%	0.02%	0.01%	0.02%	0.01%	0.02%	0.02%
France	0.02%	0.01%	0.02%	0.06%	0.10%	0.10%	0.07%	0.09%	0.12%	0.09%	0.12%
Germany	0.04%	0.03%	0.03%	0.06%	0.05%	0.06%	0.02%	0.03%	0.02%	0.19%	0.16%
Greece	0.05%	0.09%	0.09%	0.04%	0.04%	0.06%	0.04%	0.10%	0.01%	0.01%	0.03%
Ireland	0.01%	0.00%	0.02%	0.03%	0.01%	0.03%	0.04%	0.05%	0.04%	0.06%	0.03%
Italy	0.04%	0.05%	0.04%	0.05%	0.06%	0.02%	0.11%	0.04%	0.03%	0.08%	0.04%

Luxembourg	0.03%	0.04%	0.03%	0.01%	0.03%	0.02%	0.01%	0.03%	0.02%	0.03%	0.03%	0.04%	0.02%
Netherlands	0.01%	0.01%	0.02%	0.04%	0.06%	0.07%	0.04%	0.14%	0.08%	0.13%	0.08%	0.08%	0.09%
Portugal	0.12%	0.16%	0.17%	0.15%	0.11%	0.11%	0.15%	0.14%	0.05%	0.16%	0.05%	0.06%	0.07%
Slovenia	0.01%	0.00%	0.00%	0.00%	0.01%	0.01%	0.00%	0.01%	0.00%	0.00%	0.01%	0.01%	0.03%
Spain	0.07%	0.06%	0.07%	0.22%	0.10%	0.01%	0.22%	0.01%	0.03%	0.03%	0.09%	0.05%	0.04%
Environment													
BCE	0.10%	0.10%	0.09%	0.08%	0.08%	0.06%	0.08%	0.07%	0.08%	0.08%	0.05%	0.05%	0.06%
Austria	0.08%	0.07%	0.06%	0.05%	0.05%	0.05%	0.05%	0.06%	0.07%	0.07%	0.03%	0.03%	0.06%
BCE	0.10%	0.10%	0.09%	0.08%	0.08%	0.06%	0.08%	0.07%	0.08%	0.08%	0.05%	0.05%	0.06%
Belgium	0.10%	0.11%	0.21%	0.17%	0.16%	0.22%	0.17%	0.19%	0.25%	0.25%	0.26%	0.29%	0.25%
Finland	0.01%	0.01%	0.02%	0.08%	0.05%	0.02%	0.08%	0.03%	0.02%	0.02%	0.01%	0.02%	0.02%
France	0.06%	0.07%	0.07%	0.07%	0.06%	0.08%	0.07%	0.10%	0.08%	0.08%	0.10%	0.11%	0.14%
Germany	0.04%	0.04%	0.03%	0.05%	0.03%	0.04%	0.05%	0.02%	0.05%	0.05%	0.03%	0.05%	0.11%
Greece	0.06%	0.07%	0.07%	0.05%	0.07%	0.08%	0.07%	0.06%	0.06%	0.06%	0.01%	0.00%	0.06%
Ireland	0.03%	0.03%	0.10%	0.15%	0.16%	0.21%	0.15%	0.19%	0.16%	0.16%	0.16%	0.18%	0.06%
Italy	0.07%	0.09%	0.07%	0.05%	0.04%	0.05%	0.05%	0.04%	0.02%	0.02%	0.02%	0.03%	0.04%
Luxembourg	0.03%	0.04%	0.05%	0.03%	0.05%	0.03%	0.03%	0.05%	0.06%	0.06%	0.06%	0.05%	0.12%
Netherlands	0.20%	0.14%	0.14%	0.16%	0.14%	0.21%	0.16%	0.43%	0.45%	0.45%	0.51%	0.39%	0.57%
Portugal	0.07%	0.06%	0.08%	0.07%	0.09%	0.11%	0.07%	0.09%	0.12%	0.12%	0.04%	0.06%	0.08%
Slovenia	0.01%	0.00%	0.01%	0.02%	0.02%	0.03%	0.02%	0.04%	0.04%	0.04%	0.04%	0.02%	0.05%
Spain	0.06%	0.07%	0.05%	0.03%	0.03%	0.01%	0.03%	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%
Social													
BCE	0.03%	0.03%	0.04%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%	0.03%	0.04%	0.05%
Austria	0.03%	0.03%	0.03%	0.14%	0.10%	0.10%	0.14%	0.13%	0.08%	0.08%	0.07%	0.12%	0.08%
Belgium	0.09%	0.13%	0.11%	0.13%	0.09%	0.09%	0.13%	0.09%	0.17%	0.17%	0.12%	0.12%	0.17%
Finland	0.02%	0.01%	0.02%	0.02%	0.02%	0.04%	0.02%	0.04%	0.03%	0.03%	0.02%	0.03%	0.04%
France	0.06%	0.11%	0.05%	0.11%	0.07%	0.07%	0.11%	0.11%	0.08%	0.08%	0.06%	0.04%	0.07%
Germany	0.01%	0.02%	0.02%	0.03%	0.02%	0.01%	0.03%	0.01%	0.01%	0.01%	0.01%	0.02%	0.05%

(continued)

Table 8.8 (continued)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Greece	0.04%	0.21%	0.13%	0.11%	0.17%	0.27%	0.26%	0.22%	0.02%	0.02%	0.02%
Ireland	0.01%	0.01%	0.01%	0.01%	0.00%	0.03%	0.03%	0.03%	0.05%	0.06%	0.01%
Italy	0.01%	0.01%	0.04%	0.01%	0.02%	0.03%	0.01%	0.02%	0.02%	0.03%	0.02%
Luxembourg	0.02%	0.01%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%
Netherlands	0.02%	0.03%	0.01%	0.03%	0.02%	0.09%	0.18%	0.16%	0.16%	0.22%	0.19%
Portugal	0.08%	0.08%	0.15%	0.12%	0.08%	0.02%	0.01%	0.01%	0.01%	0.01%	0.02%
Slovenia	0.01%	0.02%	0.02%	0.02%	0.03%	0.03%	0.03%	0.04%	0.03%	0.00%	0.03%
Spain	0.07%	0.10%	0.12%	0.09%	0.07%	0.02%	0.01%	0.04%	0.03%	0.03%	0.02%

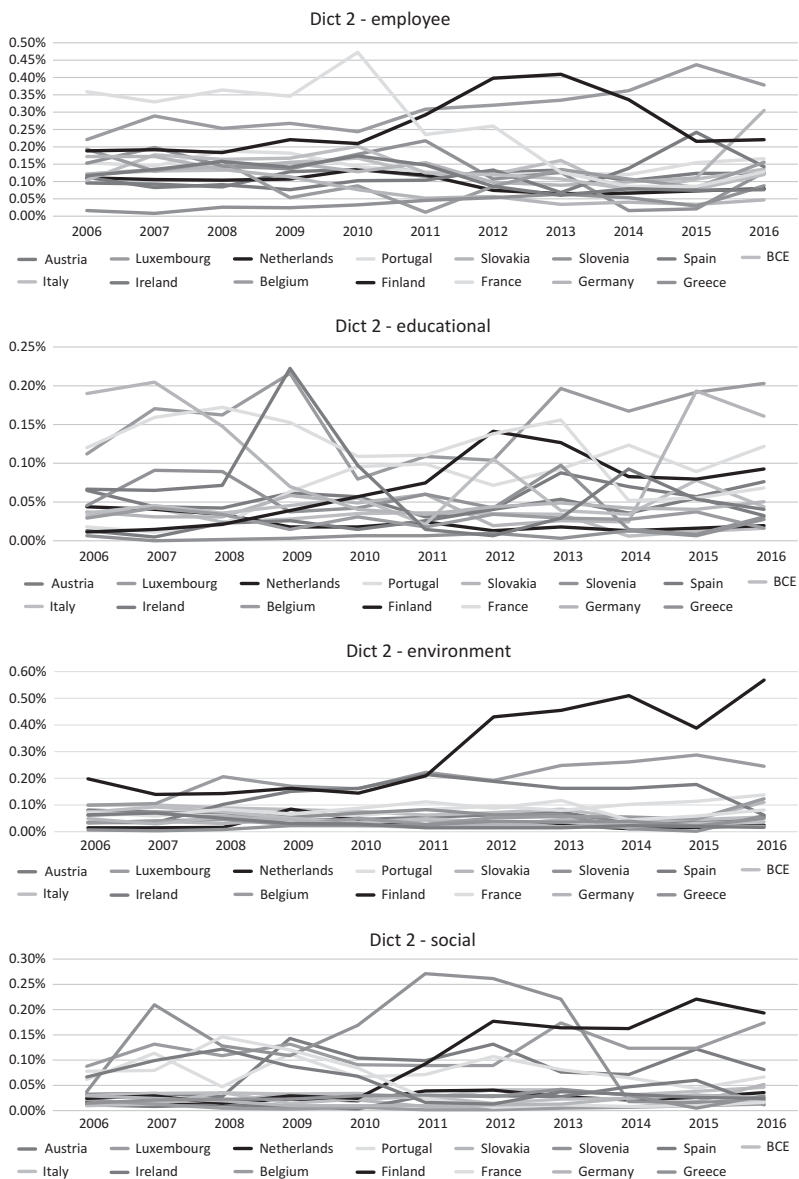


Fig. 8.2 Trend of dictionary 2 dimension

As shown in Fig. 8.2, NCBs of countries such as Belgium, Greece and Portugal show more instability and, with the exclusion of Belgium, a general decrease in attention during the period for all the CSR categories analysed.

In particular, the maximum variability comes from the NCBs of Portugal, Belgium and Greece for the category “Employee”; Germany and Spain for the category “Educational”; the Netherlands, Ireland and Belgium for the category “Environment”; Greece, the Netherlands and Portugal for the category “Social”.

The minimum variability instead comes from the NCBs of Austria, Finland and Slovenia for the category “Employee”; Slovenia, Finland and Luxembourg for the category “Educational”; Slovenia and Austria for the category “Environment”; BCE, Luxembourg and Italy for the category “Social”.

5 CONCLUDING REMARKS AND RESEARCH PERSPECTIVES

In this chapter, we studied CSR in the communication practices of the ECB and a sample of 13 NCBs in Europe, analysing annual reports from 2006 to 2016. To this aim, we used two dictionaries. The first dictionary is the four-dimension Corporate Social Responsibility content analytic dictionary developed by Pencle and Malaescu (2016). The second dictionary was developed considering how the words are used in the particular context of the ECB and NCBs by using an exploratory (inductive) approach, manually analysing the CSR section of the annual reports of each institution where those exist and analysing the references to different kinds of social responsibilities (employees, environment, community, education and support to the arts, etc.) when there is no specific CSR section.

Results show some areas of convergence between the ECB and NCBs but also specific profiles of the NCBs in terms of the relevance of categories during the observed years.

This study, the first of this kind to our knowledge, is not without limitations; in our analysis, we only consider the dictionary method for the analysis of CSR categories. Other methodologies include machine learning in the form of (1) supervised learning (e.g., Naive Bayes Classification), where humans help to train the pattern-detecting model, and (2) unsupervised learning, where the computer finds patterns in the text with minimal human intervention.

In the near future, we could start fine-tuning the process of our dictionary, organizing a panel of experts working in the ECB and NCBs and applying text analysis to other communication tools used by the ECB and NCBs.

Another interesting future research effort (following an action research perspective) is the analysis of the CSR and SM drivers in CBs, trying to understand if there is a divergent or convergent trend in Europe and other areas of the world. From this point of view, some very interesting insights stem from new institutionalism literature (Powell and DiMaggio 1991) and from the World Society's theories (Meyer et al. 1997; Henisz et al. 2005; Weber et al. 2009). Both research perspectives can help us in understanding the way central banks manage CSR and SM communication. From the first stream of literature, we learn that in the real world, rules, habits and history, or culture, matter a lot in influencing behaviours (and communication). In addition, communication and rhetoric (text and discourse: Phillips et al. 2004; Green and Li 2011; Gottweis 2007; Alasuutari 2015) are not only influenced by action but also create institutions. The World Society's theories claim that many institutions (and their characteristics and policies) diffuse worldwide through different mechanisms (Henisz et al. 2005); this is also true in the globalized world of finance (stock exchange: Weber et al. 2009; central banks' independence: Polillo and Guillen 2005). The appointment of central bankers (and their education and experience) can be a driver of these similarities (Adolph 2013) or drive their persistent differences. Of course, these theoretical frameworks need a different methodological approach, one that mixes quantitative (as here) and qualitative tools from within the central banks' organization, reviving the longitudinal methodology typically based on case histories. The results of this kind of analysis, linked with the trends emerging from text analyses, could tie the relationship of CSR efforts (words and actions) with specific characteristics for each institution and push the institutions to assess the impact of these efforts.

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PART IV

Regulation and Bank Management



Bank's Asset Quality Review Using Debt Service Coverage Ratio: An Empirical Investigation Across European Firms

Maurizio Polato and Federico Beltrame

I INTRODUCTION

On September 26, 2014, the *Comprehensive Assessment* presented the first results (divided by three different exercises, namely, the *supervisory risk assessment*, the *asset quality review* [AQR], and the *stress test*) on the most important European banks.

In this chapter, we focus our attention on the firm creditworthiness metrics used in the AQR exercise, which are described in the ECB *AQR Phase 2 Manual*, given the importance of enterprises in terms of economic growth. Among financial and economic items used to define a firm's creditworthiness, the EBITDA has a key role in proxying the cash flow produced by the firm. In particular, the AQR exercise implies using the

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EBITDA for at least three purposes: (a) defining the loan exposure segmentation; (b) detecting the firms' financial difficulties when, for example, the EBITDA decreases by 50% yearly or is consecutively negative for two years; and (c) defining an appropriate "ongoing concern" regarding the loan provision, since, as reported in the ECB *AQR Phase 2 Manual*, a firm is able to repay loans when the discounted cash flows are higher than the amount of debt.

Regarding the detection of firm financial difficulties, AQR combines the EBITDA with a firm's debt obligation, thereby arriving at an important ratio—the *debt service coverage ratio* (DSCR)—which is one of the most crucial ratios to assess dynamic debt repayment.

This indicator was initially used to assess the bankability of investment projects in the field of project finance (together with other indicators such as the loan life coverage ratio [LLCR] and the project life coverage ratio [PLCR]).

Subsequently, in the course of studies dealing with the determinants of the default probability (initiated with Altman 1968), more frequent consideration was given to indicators that compared the company's debt with its capacity to produce income or cash flows. This consideration is given because those indicators are significant, due to their complementarity with leverage ratios (Ramsay and Sarlin 2016).

The first indicator is the ratio between debt and cash flow. However, not considering the interest expenses may lead to an incorrect determination of a firm's creditworthiness, since the cost of the debt is very sensitive to business risk. For this reason, Juselius and Kim (2017) and Drehmann and Juselius (2012, 2014) have considered the relationship between debt service (interest and repayment) and income (DSR ratio) at the country level which is, in fact, the reciprocal of the DSCR.

The purpose of the present contribution is to analyse the meaning and the logic of the DSCR. First, we highlight the ratio's determinants and suggest a stochastic formulation. Second, we provide a descriptive analysis of a sample of 7323 European firms.

By developing a firm perspective, we contribute to providing a wide picture of the current creditworthiness situation of European firms. Since the DSCR varies across countries and industries, the results can be helpful to authorities in order to adapt the threshold beyond that which is defined by the financial difficulties of the firm.

The chapter is organized as follows. The next section deepens the composition of the DSCR and analyses its determinants. Section 3 analyses the DSCR in terms of the *financial covenants*. Section 4 establishes a stochastic formulation. Section 5 presents the sample and reports the descriptive statistics. The last section presents the study's conclusions.

2 DSCR DEFINITION AND DETERMINANTS

2.1 Basic Formulation

Referring to the AQR exercise, the DSCR can be defined as the ratio between EBITDA and the debt service (Interest expenses and medium long-term debt repayment):

$$\text{DSCR} = \frac{\text{EBITDA}}{\text{Interest expenses} + \text{Debt repayment}_{\text{MLTD}}} \quad (9.1)$$

where interest expenses can be defined as the sum of interest expenses on short-term debt and interest expenses on long-term debt.

2.2 DSCR and Firm Economic Performance

By dividing (9.1b) by the capital employed (the sum of the equity and debt) and multiplying the denominator by debt on debt, we have the following:

$$\begin{aligned} \text{DSCR} &= \frac{\frac{\text{EBITDA}}{\text{CE}}}{\frac{\text{Interest expenses} + \text{Debt repayment}_{\text{MLTD}}}{\text{CE}} \frac{D}{D}} \\ &= \frac{\frac{\text{EBITDA}}{\text{CE}}}{\frac{\text{Interest expenses} + \text{Debt repayment}_{\text{MLTD}}}{D} \frac{D}{\text{CE}}} \end{aligned} \quad (9.1a)$$

We can break down the numerator further into the following terms:

$$\begin{aligned} \text{DSCR} &= \frac{\frac{\text{EBITDA}}{\text{CE}}}{\frac{\text{Interest expenses} + \text{Debt repayment}_{\text{MLTD}}}{\text{CE}} \frac{D}{D}} \\ &= \frac{\frac{\text{EBIT}}{\text{CE}} \left(1 + \frac{\text{DEP}}{\text{EBIT}}\right)}{\frac{\text{Interest expenses} + \text{Debt repayment}_{\text{MLTD}}}{D} \frac{D}{\text{CE}}} \end{aligned} \quad (9.1b)$$

where DEP is the amount of depreciation and amortization of the firm. We know that the EBIT on CE is ROCE, *interest expenses* on *D* is ROD and *D* on CE represents the leverage (LEV). By setting medium long-term repayment on debt equal to λ and the DEP on EBIT equal to α , we can write the following:

$$\text{DSCR} = \frac{\text{ROCE}(1 + \alpha)}{(\text{ROD} + \lambda)\text{LEV}} \quad (9.1c)$$

Thus, the DSCR is positively related to the returns on the capital employed and the incidence of depreciation and amortization (policy) and is inversely related to the debt costs and the amount of repayment with respect to debt and leverage.

Given certain ROCE, depreciation policy (α) and leverage amounts, a DSCR equal to 1 should drive lenders to quantify interest expenses and debt repayment in the following terms:

$$\text{ROD} + \lambda = \frac{\text{ROCE}}{\text{LEV}}(1 + \alpha) \quad (9.1d)$$

A DSCR higher than 1 implies a ROCE higher than the ROD (positive leverage effect) when the following exists:

- The incidence of depreciation is equal to 0.
- The firm is totally financed by debt (LEV = 100%).
- Debt is perpetual (only interest expenses repayment).

As a consequence, the DSCR is as follows:

$$\text{DSCR} = \frac{\text{ROCE}}{\text{ROD}} \quad (9.2)$$

Whether debt is not perpetual, DSCR depends on the ROCE, debt repayment and debt costs:

$$\text{DSCR} = \frac{\text{ROCE}}{\text{ROD} + \lambda} \quad (9.3)$$

3 DSCR AS FINANCIAL COVENANTS IN A DIFFERENT THEORETICAL FRAMEWORK

The DSCR can be seen not only as an indicator of creditworthiness in the context of the AQR exercise but also as *financial covenants*. This section discusses the main theoretical strands in which the function of financial covenants has been analysed.

The basic question, from an economic point of view, is the following: can the interference of the lender in the governance of the borrower be efficient? More precisely, the main purpose of the covenant provision is to define in which circumstances it is more efficient to allocate residual decision rights to borrowers rather than to equity holders. This should happen when the dissuasive effect on management's opportunistic behaviours can be exercised more effectively by social creditors than by equity holders (covenant provisions seem to be more efficient in situations where the divergence of interests between managers and lenders is at its maximum).

In other words, the question is if the use of (for example) the DSCR in the loan agreements may be relevant in reducing behavioural opportunism and, in this way, credit risk from the banks' point of view.

As is well known, financial covenants are clauses included in loan agreements. These clauses commit the borrower to maintain the value of pre-defined economic-financial indicators within a specific range, beyond which the lender acquires the right to redefine the conditions of the loan and possibly revoke it.

It seems useful to define financial covenants on the basis of the nature of the obligation assumed by the borrower to distinguish the following: (a) the financial covenants *stricto sensu*; and (b) the information covenants,

restrictive covenants and clauses in case of default. The DSCR may be classified in the first category of covenants.

If the interference of the lender in the governance of the borrower is not efficient, the instruments that allow such interference would be to be sanctioned, and if it is efficient, they would be promoted. In truth, the economic literature on the subject presents very articulate positions and opposite conclusions.

Within the perspective of the *nexus of contracts theory* (Alchian and Demsetz 1972; Jensen and Meckling 1976), the answer should be negative. Since shareholders are the only bearers of residual claims,¹ they are also the only ones that are incentivized to make efficient choices, unlike creditors—fixed claimants—who are indifferent to the quality of the management choices because they are protected by the contracts' stipulations.

The opposite conclusion is reached by postulating the *incompleteness of the contracts* governing the borrower-lender relationship (Grossman and Hart 1986; Hart and Holmstrom 1987; Tirole 1999). In this case, in fact, the agreements would be insufficient to guarantee the efficiency of the transactions under any circumstances and to protect the interests of the lenders in every state of the world (Grossman and Hart 1986; Maskin and Tirole 1999).

Since contracts are incapable of foreseeing all the conditions that can be fulfilled (Tirole 1999, pp. 743–745), the protection that contracts provide to the lenders is incomplete. Therefore, specific situations, such as protection and the efficiency requirements, may require the attribution of decision rights to the lenders to be exercised ex post to fill the contractual gaps. The relationship between residual claims and residual decision rights, which is imperative for the nexus of contracts theory, breaks here.

The *theory of property rights* (Grossman and Hart 1986; Hart and Moore 1990; Hart 1995) places the incompleteness of contracts at the centre of its theoretical model and shows that in order to achieve efficiency conditions, the parties may have to renegotiate the contract. The ex post phase of the negotiation, therefore, becomes fundamental to the point that it also ends with the feedback in the ex ante phase.

¹The term residual claimant refers to the expectation of only a residual, therefore undetermined, remuneration of which the shareholder is normally the holder. This is unlike the fixed claimant, where the right to a fixed remuneration due to the social creditor is based on the contractual commitments defined by the company.

The residual ownership rights, in fact, are attributed ex post but according to methods defined ex ante (at the time of the contractual negotiations). This may result in the allocation of residual control rights to the lender rather than to the borrower.

The model proposed by Aghion and Bolton (1992) captures an essential aspect of debt financing: *the passage of control*. The model, however, has been the subject of many criticisms. For the sake of brevity, let us remember Tirole's observations that the model does not account for the coexistence of different types of rights with different powers of control (Tirole 2006, p. 406). In addition, remember Hart, who points out that the authors do not consider the passage of control in terms of the non-repayment of the loan a necessary, but only stochastic, effect.

Taking a broader view, the DSCR can be placed in the framework of alert systems and therefore within enterprise risk management (ERM) tools. Efficient internal alert systems strengthen corporate governance mechanisms. They also allow for monitoring a set of variables (e.g., cash flows, earnings, leverage, and coverage ratios) that can help detect signals of financial distress at an early stage and provide measures of the firms' probability of default. The functioning of internal alerts has paramount implications in terms of bankruptcy procedures, governance and reporting, access to credit and enterprise risk management (ERM) as an approach where all risks are viewed together "within a coordinated and strategic framework" (Nocco and Stulz 2006).

There are many studies investigating the governance-value construct. Literature on the topic usually analyses either the differences between countries (among others, see La Porta et al. 1999) or the interfirm variation within one country (Gompers et al. 2003; Drobetz et al. 2004). Specific features such as board composition and gender diversity and their impacts on value have been widely investigated as well.

A flourishing field of research investigates integrated reporting and disclosures. Integrated reporting provides a holistic view of the company by combining the financial and nonfinancial dimensions, that is, the firm's strategy, corporate governance, and socioeconomic environment (Brown and Dillard 2014; Adams et al. 2011) or, conversely, the factors affecting value. The information published in company reports might involve both a backward-looking and a forward-looking approach (Hussainey 2004).

Forward-looking disclosure benefits all stakeholders (Aljifri and Hussainey 2007; Bravo 2016) and includes projections on both financial

(i.e., future sales, cash flow forecasts, capital expenditures, and earning targets) and nonfinancial dimensions (i.e., strategies and risks). Kent and Ung (2003) investigate the association between forward-looking disclosures and stock return volatility and show that larger companies with less volatile earnings discloses have more future earnings volatility than smaller companies with more volatile earnings.

The relation between forward-looking disclosures and governance has not come to a conclusion, that is, whether there is an association (Elzahar and Hussainey 2012) or not (O'Sullivan et al. 2008) regarding the independence of the audit committee (Al-Najjar and Abed 2014). Kilç and Kuzey (2018) investigated the determinants of forward-looking disclosures in integrated reporting. They account for a positive relation between gender diversity and firm size with forward-looking disclosures and a negative relation with leverage.

However, the existing literature has gaps. First, risk disclosures and their management are key features of a forward-looking approach to disclosures. Nocco and Stulz (2006) argue that efficient ERM systems may help determine the optimal amount of risk, manage economic capital, and serve for planning purposes (i.e., cash flow management, key financial variables, and key financial indicators). Nevertheless, just a few studies investigate the ERM-performance relation (Hoyt and Liebenberg 2011; McShane et al. 2011; Baxter et al. 2013; Florio and Leoni 2017) or the ERM-costs of capital relation (Berry-Stölzle and Xu 2018).

Another specific gap to be filled is related to the investigation of whether signals of financial distress are promptly captured by changes in value either directly or through a moderating action on reporting and ERM systems and the role of supervisory boards or audits in driving such relations.

Finally, existing studies focus on companies that disclose reports, thereby neglecting SMEs that do not disclose formal reports apart from financial statements.

As can be easily understood, ERM decisions drive signals that banks capture, thus shaping access-to-credit conditions. Bank reactions (e.g., changing interest rates, requesting new collateral, or imposing covenants) convey signals that are captured by the firm, thus leading to adjustments to risk exposure and economic capital. The solid lines are the main effects while the dotted lines are the moderating effects.

It is therefore possible to argue that the DSCR may not be an accounting indicator merely used for monitoring the quality of the credit granted.

The DSCR, as a financial covenant, appears to be a powerful tool aimed at guiding *ex ante* and *ex post* managerial behaviours in order to guarantee the long run debt sustainability conditions.

This characteristic appears to be of particular importance for the supervisory authority, which must ascertain the maintenance of acceptable credit risk conditions.

4 STOCHASTIC APPROACH TO DSCR

In this section, we return to the analytical dimension and deepen the dynamics of the DSCR by exploiting a stochastic approach. The first step is decomposing the EBITDA by referring to the distinction between firms' variable costs and fixed costs:

$$\begin{aligned} \text{EBITDA} &= \text{EBIT}(1+\alpha) = (R - \text{VC} - \text{FC})(1+\alpha) \\ &= [R(1-c) - \text{FC}](1+\alpha) \end{aligned} \quad (9.4)$$

where

R is the revenues, VC is the firms' variable costs, FC is the fixed costs, and c is the unitary value of variable costs. The degree of operating leverage (DOL) affects the dynamics of EBIT and the firms' repayment abilities as a consequence. By inserting Eq. (9.4) into Eq. (9.1) and explicating the amount of debt, we can rewrite the calculation of the DSCR:

$$\text{DSCR} = \frac{[R(1-c) - \text{FC}](1+\alpha)}{(\text{ROD} + \lambda)D} \quad (9.5)$$

Assuming stable fixed costs, the unitary value of variable costs, and the incidence of depreciation and amortization, the relevant variable is the firm revenues. To simplify this, we can represent the variable using geometric Brownian motion.

Assuming a discrete stochastic process, the variation in the revenues can be expressed as follows:

$$R_{t+\Delta t} = R_t + \Delta R_{t+\Delta t} \quad (9.6)$$

Since $+\Delta R_{t+\Delta t}$ is equal to

$$\Delta R_{t+\Delta t} = R_t \mu \Delta t + R_t \sigma \varepsilon \sqrt{\Delta t} \quad (9.6a)$$

we can re-express (9.6) in the following terms:

$$R_{t+\Delta t} = R_t + R_t \mu \Delta t + R_t \sigma \varepsilon \sqrt{\Delta t} \quad (9.6b)$$

where R_t is the firm revenues at t , Δt is the time step, μ is the drift, σ is the volatility of the process, and ε is a variable with a normal distribution and with an average equal to 0 and a standard deviation equal to 1.

The second step decomposes the debt repayment into medium long-term repayment (capital and interest expenses) and short-term repayment (interest expenses on short-term debt).

The medium long-term repayment (capital and interests) is expressed using the present value formula when expected cash flows are stable:

$$D_{\text{MLT}} = \text{PV} = \text{Repayment}_{\text{MLT}} \frac{1 - (1 + i_{\text{MLT}})^{-n}}{i_{\text{MLT}}} \quad (9.7)$$

From this, we have the following:

$$\text{Repayment}_{\text{MLT}} = D_{\text{MLT}} \frac{i_{\text{MLT}}}{1 - (1 + i_{\text{MLT}})^{-n}} \quad (9.8)$$

The short-term repayment is as follows:

$$\text{Repayment}_{\text{ST}} = D_{\text{ST}} i_{\text{ST}} \quad (9.9)$$

By inserting (9.6b), (9.8), and (9.9) into (9.5) and assuming a drift equal to 0 (the dynamic of revenues and EBITDA depend only on the firm volatility), we can express the expected value of DSCR:

$$\text{DSCR}_{t+\Delta t} = \frac{\left[R_t (1 + \sigma \varepsilon \sqrt{\Delta t}) (1 - c) - \text{FC} \right] (1 + \alpha)}{D_{\text{ST}} i_{\text{ST}} + D_{\text{MLT}} \frac{i_{\text{MLT}}}{1 - (1 + i_{\text{MLT}})^{-n}}} \quad (9.5a)$$

Given the corporate variables of the firm contained in (9.5a), a bank should assess the probability to have a DSCR lower than a determinate value (i.e., the AQR reference equal to 1.1). Furthermore, they should be able to calculate the minimum DSCR for a determined confidence interval (i.e., 95%) and for each contractual repayment date.

In the following simulation, assuming the absence of short-term debt, we can calculate the equilibrium condition ($DSCR = 1$) at time 0. For each year of the medium long-term loan life (we assume a yearly frequency), we calculate the probability of obtaining a DSCR lower than 1.1 and a minimum DSCR reference with a confidence interval of 95%. Corporate data is reported in Table 9.1.

The following simulation assumes a DOL equal to 1 (fixed costs equal to 0) and highlights the dynamics of the DSCR for different levels of revenue volatility (Tables 9.2 and 9.3). The higher the volatility is, the lower the DSCR will be.

Assuming a volatility of 10%, we calculate the DSCR values for DOLs—the 2 and 3.5 cases (Tables 9.4 and 9.5). The higher the DOL is, the lower the DSCR will be.

Table 9.1 Corporate data

<i>Variable</i>	<i>Value</i>
Revenues	100.00
EBITDA	21.00
NFD	75
<i>i</i>	12.37%
<i>n</i>	5
Debt repayment	21.00

Source: Authors' elaboration

Table 9.2 DSCR values with DOL equal to 1 and volatility equal to 10%

	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Volatility σ				10.00%	
Drift μ				0	
DOL				1.00	
Prob<1,1	78.50%	75.00%	73.00%	72.00%	71.00%
DSCR 95%	0.80	0–74	0.71	0.69	0.67

Source: Authors' elaboration

Table 9.3 DSCR values with DOL equal to 1 and volatility equal to 20%

Volatility σ	20.00%				
Drift μ	0				
DOL	1.00				
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Prob<1,1	76.50%	70.00%	67.50%	66.50%	69.00%
DSCR 95%	0.79	0.67	0.59	0.53	0.47

Source: Authors' elaboration

Table 9.4 DSCR values with DOL equal to 2 and volatility equal to 10%

Volatility σ	10.00%				
Drift μ	0				
DOL	2.00				
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Prob<1,1	59.00%	59.50%	58.50%	57.50%	57.50%
DSCR 95%	0.61	0.50	0.46	0.40	0.33

Source: Authors' elaboration

Table 9.5 DSCR values with DOL equal to 3.5 and volatility equal to 10%

Volatility σ	10.00%				
Drift μ	0				
DOL	3.50				
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Prob<1,1	57.00%	58.00%	58.50%	57.50%	56.50%
DSCR 95%	0.30	0.16	0.03	0.01	-0.14

Source: Authors' elaboration

Lastly, we present the probability distribution of the DSCR for a firm with a DOL equal to 1 and volatility equal to 10% for the first year of a loan (Fig. 9.1).

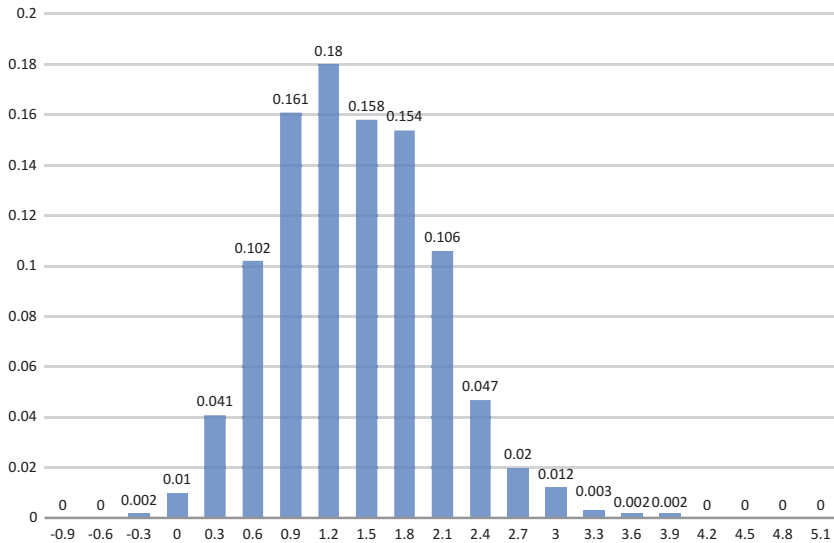


Fig. 9.1 DSCR values with DOL equal to 3.5 and volatility equal to 10%. Source: Authors' elaboration

5 STATISTICAL ANALYSIS

The purpose of the present section is to analyse the DSCRs for a sample of European firms across different sectors. We concentrate our analysis on bigger firms (2016 turnover greater than or equal to 500 million euros—7323 companies in total) from 2007 to 2016.

The DSCR calculated based on the balance sheet and income statement date suffers from some criticalities, namely, (a) the availability of the debt repayment, (b) the missing data, and (c) the great volatility of the DSCR ratio.

The first criticality can be solved by taking the depreciation and amortization modulated by the medium long-term leverage to represent debt repayment. Thus, debt repayment will be the following:

$$\lambda = D\&A \frac{D_{MLT}}{D_{MLT} + E} \tag{9.10}$$

Combining (9.1) and (9.10), we have the following formulation of the DSCR:

$$\text{DSCR} = \frac{\text{EBITDA}}{\text{Interest expense} + \text{DEP} \frac{D_{\text{MLT}}}{D_{\text{MLT}} + E}} \quad (9.11)$$

The more the firm is indebted and/or the weaker its performance with respect to the debt costs, the lower the DSCR.

Regarding the second criticality, some EU firms do not have any data referring to the EBITDA, interest expenses, medium long-term debt, and equity. Therefore, we delete the observations with missing data, which decreases the number of firms to 5270 in 2016.

Finally, the extreme volatility of the DSCR (mainly due to firms with a great EBITDA with respect to debt repayment) forces us to transform the ratio to a dichotomous variable. The variable takes the value of 1 if the firm presents a sufficient ability to repay debt (a DSCR greater than or equal to 1) or 0 if it does not present a sufficient ability to repay debt (a DSCR lower than 1). Similar results occur when using a DSCR lower or higher than 1.1 (the AQR reference).

In Fig. 9.2, we present the percentages of firms with sufficient DSCRs from 2007 to 2016.

The ratio is strongly influenced by the great financial crises in 2008 and less influenced in the post sovereign debt crises period (2011, 2012, and 2013). Finally, the percentage of firms with sufficient DSCRs is 88%, while it was 86% in 2007. Twelve percent of the larger EU firms are not able to repay the medium long-term financial debt and interest expenses. However, firms present different trends across EU countries and industries. In Tables 9.6 and 9.7, we present the trends for different EU countries and industries, respectively.

Table 9.6 provides a ranking of the percentages of firms with sufficient DSCRs among EU countries (plus Norway and Switzerland, included in the Amadeus dataset). Some countries have a lower decrease or increment in their DSCR during the 2008 great financial crisis (HU, NO, and LU).

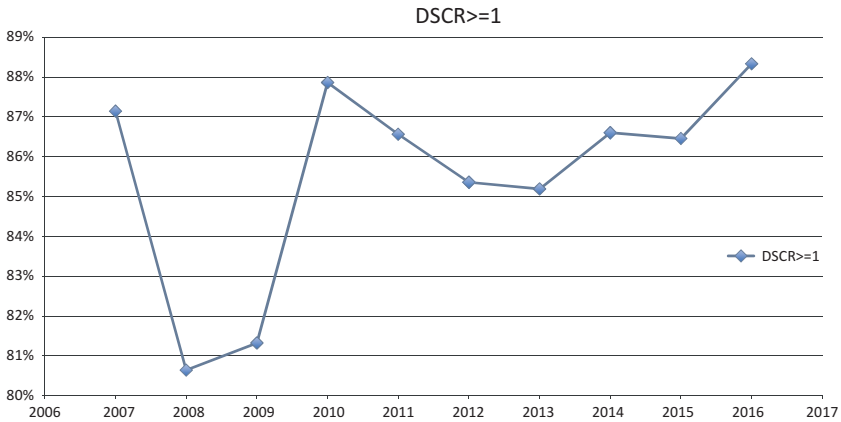


Fig. 9.2 Percentage of firms with sufficient DSCRs (DSCR greater than or equal to 1). Source: Authors' elaboration

For others, the decrease in the DSCR was in the range from 3% to 14.50%. IT, PT, DE, BE, ES, and FR present decreases from 3% to 6%. The effects of the sovereign debt crisis (years 2010–2011) were stronger for PT and GR; however, HU, PL, CH, and LU present decreases of at least 3%. Analysing the entire sample period (2007–2016), CH, SE, DE, IE, ES, LU, and GR have decreased DSCRs.

Regarding the industry analysis, Table 9.7 reports the percentages of firms with sufficient DSCRs across industries. Some industries do not have data due to the modest number of firms in the sample. Industrial, transport, accommodation and food and service activities, and other cyclical sectors have at least 5% decreases. Construction, accommodation and food and service activities, and real estate activities have at least 10% decreases. From 2010 to 2011, financial and insurance activities and public administration have larger decreases. Analysing the entire sample period (2007–2016), the industrial sector, utilities, construction, professional activities, and administrative services have decreased DSCRs.

Table 9.6 Percentage of firms with sufficient DSCRs (DSCR greater than or equal to 1) for different EU countries plus Norway and Switzerland (some countries are not listed due to the small amount of firm information)

	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
FI	98.20%	96.19%	95.28%	93.81%	93.55%	93.26%	92.13%	89.53%	87.21%	95.06%
HU	96.67%	94.83%	78.18%	85.19%	80.39%	78.00%	82.35%	81.63%	80.00%	80.65%
CZ	96.36%	93.22%	96.67%	90.00%	91.67%	91.67%	85.45%	80.70%	90.74%	95.74%
PL	95.83%	89.58%	91.49%	88.10%	90.70%	87.50%	91.49%	82.98%	86.05%	92.31%
CH	93.90%	93.18%	94.59%	97.37%	93.86%	96.40%	100.00%	91.51%	94.23%	98.99%
SE	92.20%	92.59%	91.51%	88.80%	85.77%	91.43%	91.74%	85.38%	79.76%	94.29%
IT	91.78%	90.70%	89.45%	84.49%	88.65%	90.68%	91.97%	85.21%	86.63%	89.74%
RO	91.67%	87.23%	91.30%	91.11%	89.36%	81.82%	79.55%	n.a.	n.a.	n.a.
PT	91.53%	84.48%	89.19%	80.39%	79.59%	79.17%	93.18%	73.53%	67.65%	72.73%
DE	91.50%	89.37%	89.39%	89.57%	90.74%	89.75%	90.32%	83.56%	86.29%	92.25%
DK	91.26%	91.53%	91.46%	87.04%	91.49%	n.a.	n.a.	n.a.	n.a.	n.a.
IE	90.32%	85.48%	86.21%	84.00%	91.67%	82.61%	80.00%	78.38%	80.00%	90.63%
BE	89.09%	87.21%	84.02%	81.52%	82.13%	82.44%	85.15%	76.35%	78.22%	83.67%
NO	87.29%	84.35%	92.56%	94.19%	90.32%	90.85%	92.36%	88.24%	81.54%	83.20%
ES	87.00%	82.71%	84.20%	82.54%	82.04%	85.58%	87.94%	81.03%	84.30%	88.48%
FR	86.51%	85.87%	84.99%	84.98%	83.22%	85.37%	87.25%	80.12%	81.76%	84.68%
GB	83.89%	82.43%	82.42%	81.29%	81.02%	82.69%	83.53%	76.22%	70.27%	79.83%
LU	82.76%	79.63%	85.29%	84.85%	81.25%	85.71%	89.47%	84.62%	91.67%	85.71%
GR	68.00%	68.00%	54.17%	70.00%	77.27%	73.91%	85.00%	90.91%	80.95%	95.45%

Source: Authors' elaboration

Table 9.7 Percentage of firms with sufficient DSCRs (DSCR greater than or equal to 1) for different EU industries (NACE code)

	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Agriculture, forestry and fishing	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mining and quarrying	85.71%	71.26%	82.42%	84.04%	84.27%	94.94%	90.12%	86.42%	90.14%	92.06%
Manufacturing	90.39%	88.73%	86.06%	83.83%	83.80%	87.04%	86.31%	78.37%	80.58%	87.13%
Electricity, gas, steam, and air conditioning supply	83.39%	80.59%	83.97%	83.70%	84.56%	85.29%	85.59%	87.27%	82.46%	86.84%
Water supply; sewerage; waste management and remediation activities	88.37%	97.37%	92.50%	89.19%	83.78%	89.47%	89.19%	89.19%	93.75%	89.29%
Construction	83.42%	85.11%	89.01%	86.26%	86.59%	83.33%	84.62%	77.16%	69.74%	90.97%
Wholesale and retail trade; repair of motor vehicles and motorcycles	89.28%	87.22%	86.35%	86.03%	86.02%	85.69%	88.62%	81.88%	78.17%	86.21%
Transporting and storage	81.59%	81.30%	80.82%	83.26%	82.41%	79.71%	82.32%	76.17%	78.92%	85.96%
Accommodation and food service activities	94.59%	89.74%	92.31%	85.71%	71.43%	90.24%	80.00%	73.81%	74.36%	88.57%
Information and communication	86.03%	83.86%	85.32%	83.74%	84.42%	88.38%	90.45%	80.53%	80.10%	80.56%
Financial and insurance activities	89.76%	87.32%	86.47%	83.53%	88.02%	87.65%	93.53%	85.91%	85.04%	88.84%
Real estate activities	94.55%	89.09%	90.38%	86.27%	96.00%	91.30%	90.38%	82.98%	72.73%	82.98%
Professional, scientific, and technical activities	90.51%	89.58%	89.73%	87.67%	88.30%	88.38%	89.06%	81.75%	84.19%	91.39%
Administrative and support service activities	82.85%	79.32%	84.28%	81.90%	78.50%	84.26%	85.00%	78.82%	79.49%	85.23%
Public administration and defence; compulsory social security	92.86%	84.62%	91.67%	85.71%	87.50%	86.67%	92.31%	92.31%	92.31%	81.82%
Education	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Human health and social work activities	88.10%	90.00%	90.48%	88.64%	81.40%	86.11%	88.57%	90.63%	96.55%	62.50%
Arts, entertainment, and recreation	85.71%	83.33%	92.86%	76.92%	76.00%	80.95%	77.27%	83.33%	63.64%	71.43%
Other service activities	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Activities of households as employers; undifferentiated goods— and services—producing activities of households for own use	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Activities of extraterritorial organizations and bodies	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Some industries have too much missing data and we exclude those firms

Source: Authors' elaboration

6 CONCLUSIONS

This empirical analysis, which uses a sample of large European companies, highlighted the high volatility of the DSCR indicator. The analysis also showed that a significant percentage of companies have DSCRs below the unit threshold (and therefore below the threshold defined by the ECB).

The theoretical analysis (in particular, the stochastic approach to determining the forecasted DSCR) confirmed how relevant the degree of uncertainty relative to the drivers determining EBITDA is in defining a sufficiently reliable target DSCR (e.g., with 95% confidence). Furthermore, it is evident that given the specific business and/or sector features of the analysed companies, it is substantially arbitrary and nondiscriminatory to identify a single and predefined reference for the DSCR.

From a regulatory point of view, it seems important from the perspective of a concrete and efficient use of the DCSR indicator as a proxy for debt sustainability (and for the quality of the use of the lending banks) to go beyond an approach characterized by the DSCR levels and to identify (preferably in a stochastic contest) a sufficient DSCR that is specifically calibrated with reference to the fundamental drivers of the firm (like the DOL, turnover volatility, and firm growth rate).

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Credit Risk Disclosure Practices in the Annual Financial Reporting of Large Italian Banks

Enzo Scannella and Salvatore Polizzi

I INTRODUCTION

Lending represents the most important business of a commercial bank, and the credit risk of a loan portfolio has a strong impact on bank financial statements in terms of economic performance, liquidity, funding, capital requirements, and the overall solvency and stability (Mottura 2011, 2014a, 2016; Onado 2004; Rutigliano 2011, 2016; Sironi and Resti 2008; Tutino 2013, 2015). It has become increasingly important to

Although this chapter has been written jointly by the two authors, it is possible to identify the contribution of each one as follows. Abstract and Sects. 1, 2, 5, and 6 have been written by Enzo Scannella. Sections 3 and 4 have been written jointly by Enzo Scannella and Salvatore Polizzi. The data were analyzed jointly by the two authors. All the figures and tables were prepared jointly by the two authors.

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measure, manage, assess, and disclose the impact of credit risk in the economics and management of banking institutions (Bessis 2015; Hull 2018; Masera 2005, 2009; Onado 2017).

Credit risk is one of the most relevant kinds of risk in banking. It is one of the main risks in commercial banks, and the ability to manage it affects meaningfully banks' stability and profitability. "Credit risk is the risk of loss resulting from an obligor's inability to meet its obligations" (Bessis 2015). It arises from the possibility that borrowers, bond issuers, and counterparties in derivative transactions may default.

The topic of this chapter is the assessment of credit risk disclosure practices in the annual financial reporting of large Italian banks. The authors carry out an empirical study on a sample of the ten largest Italian banks. In this research, the authors employ content analysis as a "research technique for making replicable and valid inferences from texts to the contexts of their use" (Krippendorff 2004), and as "a research technique for the objective, systematic and quantitative description of the manifest content of communication" (Berelson 1952).

The structure of this chapter is as follows. Section 2 introduces credit risk disclosure in banking. It aims to frame the specific nature of credit risk and provides a regulatory and accounting perspective on credit risk in banking. Section 3 provides an innovative metric based on the analytical grids of key credit risk disclosure parameters to evaluate credit risk disclosure in banking. Section 4 analyses the main results of the empirical research on credit risk disclosure in banking and discusses the research findings. Section 5 provides a brief overview of the research findings. Section 6 concludes.

2 CREDIT RISK DISCLOSURE IN BANKING: DEFINITION AND REGULATORY FRAMEWORK

The main purpose of this research is to evaluate credit risk disclosure practices in banking, with reference to credit risk on loan portfolio. It refers to the risk that a borrower (either retail, corporate, or institutional) defaults on payment obligations in terms of principal and/or interest. This risk stems from the possibility to make losses on loans if the debtors are not able to repay the credits.

The risk factors or components of credit risk can be distinguished into transaction and portfolio levels. At the transaction level, such credit risk

components are the following: default risk, exposure risk, recovery risk, and migration risk. The first three risk components characterize the current credit state of a borrower and are mandatory with the capital adequacy regulation (Basel Committee on Banking Supervision 2006). The migration risk refers to the potential deterioration of the creditworthiness of a borrower. At the portfolio level, the credit risk components are the following: concentration and correlation risk.

A bank's exposure to credit risk through a loan implies that only the lending bank faces the risk of loss. The assessment of credit risk on loans has to take into account the repayment of both principal and interest.

In 1988, the Basel Committee on Banking Supervision (1988) issued the first regulatory framework directed toward assessing capital in relation to credit risk (the risk of counterparty failure). This framework takes into account the credit risk on on- and off-balance sheet exposures by applying credit conversion factors to different types of off-balance sheet transactions.

The New Bank Capital Accord (Basel Committee on Banking Supervision 2006) defines "credit risk components" as the factors that have an incidence on the potential loss from credit risk. Within the New Bank Capital Accord, banks may rely on their own internal estimates of credit risk components in determining the minimum capital requirement for credit exposures. Risk components include probability of default (PD), loss given default (LGD), and exposure at default (EAD). Such credit risk components are significant information inputs of risk-weighted functions that have been developed to determine bank capital requirements and to discriminate among different credit asset classes.

Credit risk disclosure provides market participants and other stakeholders the information they need to make meaningful assessments of a bank's credit risk profile and investment decisions. Overall, the disclosure of reliable, understandable, accurate, and updated qualitative and quantitative information on banking risk, and credit risk particularly, is the prerequisite to trigger the sequence of conditions that allows financial markets to fulfill their role of effective discipline, in the sense that market prices banking risks more efficiently (Scannella 2018). In a wider perspective, credit risk disclosure strengthens confidence in a banking system by reducing uncertainty in bank assessment and bank performance (Acharya and Richardson 2009; Acharya and Ryan 2016; Crockett 2002; Financial Stability Board 2012; Kissing 2016; Morgan 2002; Nier and Baumann 2006; Onado 2000, 2016). In addition, well-informed creditors and other bank counterparties may provide a bank with strong incentives to maintain sound

risk management systems and practices and to conduct a prudent banking business (Basel Committee on Banking Supervision 2000; Maffei 2017; Malinconico 2007). Hence, the Basel Committee considers the disclosure of banks' activities and risks inherent in those activities to be a key element of an effectively supervised, safe and sound banking system.

Credit risk disclosure reduces asymmetric information in financial markets and contributes to financial stability and to remove obstacles that prevent market discipline by providing investors and other market participants a better understanding of banks' risk exposures and risk management practices. On the other hand, banks cannot disclose all the information about their risk exposure and management, because they may want to hide strategic information their competitors might be interested in.¹ Thus, there is essentially a trade-off problem between transparency and opacity in banking. This is one of the main reasons that support the introduction and imposition of some minimum disclosure standards and transparency constraints in an attempt to balance such trade-off. The regulatory framework concerning credit risk disclosure in banking can be identified as follows: International Accounting Standards/International Financial Reporting Standards (IAS/IFRS), bank capital requirements regulation, and national regulation of annual financial statements of banking institutions.

The adoption of IAS/IFRS aims to enhance the comparability across space and over time of banks' financial statements. Accounting standards for loans are mainly covered by IFRS 7 (financial instruments: disclosures) and IAS 39 (financial instruments: recognition and measurement). The latter has been largely amended by IFRS 9 (financial instruments) in January 2018. At initial recognition, loans are evaluated at fair value. Subsequently, loans are measured at amortized cost using the effective interest method. IAS 39 permits banks to designate, at the time of acquisition, any loan as available for sale, in which case it is measured at fair value with changes in fair value recognized in equity. In addition, loans are impaired, and impairment losses are recognized, only if there is objective evidence as a result of one or more events that occurred after the initial recognition. IFRS 7 requires disclosure of information about the significance of financial instruments to a bank, and the nature and extent of risks arising from those financial instruments, both in qualitative and quantitative

¹For further information see Beattie and Liao (2014), Freixas and Laux (2012), Gaetano (1996), Polizzi (2017), and Scannella (2018).

terms. Specific disclosures are required in relation to transferred financial assets and a number of other matters. In particular, IFRS 7 adds new disclosure requirements about financial instruments to those previously required by IAS 32 and replaces the disclosures previously required by IAS 30.

The Basel Capital Adequacy regulation provides a set of requirements for banks.² Its main goal is making the event of a bank bankruptcy less likely. In order to achieve this aim, the Basel Committee for Banking Supervision (2006) has created a three-pillar regulatory framework. Pillar 3 represents a crucial regulatory requirement for risk reporting. This pillar requires banks to prepare a Pillar 3 disclosure report, which gives banks the possibility to disclose a wide range of information on risk exposures and capital adequacy, both from a quantitative and a qualitative point of view. The Basel Committee on Banking Supervision has recently expanded risk disclosure requirements in order to enhance the consistency of reporting and comparability across banks and enhance market discipline (Basel Committee on Banking Supervision 2015, 2017).

At the national level, with particular reference to Italy, the regulatory framework regards the Legislative Decree n. 38/2005 and the Circular n. 262/2005 of the Bank of Italy, that provide detailed rules that must be followed by Italian banks in order to prepare their financial statements.³ These rules are consistent with the IAS/IFRS (international accounting principles). Banks disclose several measurements of risk and useful pieces of information about credit risk in their financial statements, and particularly in the Notes, that integrate and complete a bank's statement of financial position and profit and loss statement. The most valuable pieces of information on credit risk are disclosed in the following parts: part "A" (accounting policy),

² A brief overview of the recent history of the bank capital requirements regulation, that has an impact on risk disclosure, follows: Basel Committee on Banking Supervision (2006, 2011, 2015, 2017); Capital Requirements Directives (Directive 2006/48/EC relating to the taking up and pursuit of the business of credit institution; Directive 2006/49/EC on the capital adequacy of investment firms and credit institutions); Regulation n. 575/2013 of the European Parliament and of the Council on prudential requirements for credit institutions and investment firms; Directive 2013/36 of the European Parliament and of the Council on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms. For more detailed information at the national level, see: Bank of Italy (2006, 2013).

³ For more details see Bastianini et al. (2005); Bioni (1988); Bioni et al. (2012); De Laurentis (2004); Dell'Atti (2009); Mazzeo et al. (2005); Nadotti (1995, 2004); Ossola (2005); Paolucci and Menicucci (2008); Rutigliano (2011, 2012, 2016); Tutino (2009, 2015).

part “B” (information on balance sheet), part “C” (information on income statement), and part “E” (information on banking risks). In particular, part “E” provides information concerning different risk categories, methodologies, and models used to measure banks’ risk exposures, hedging practices, and so on.

Briefly, even in light of such recent changes, the legal framework governing risk reporting in banking is extremely fragmented. In the next section we describe the research design of the empirical study.

3 METHODOLOGY AND RESEARCH DESIGN

The purpose of this section is to analyze the methodology we employ to investigate credit risk disclosure practices in banking. The *sample* of this research consists of the ten largest Italian banks based on the book value of total assets, and the *time horizon* runs from 2012 to 2017 (Table 10.1).⁴

Data collection derives from the analysis and evaluation of the three aforementioned most important risk disclosure reports: the Notes and the

Table 10.1 Sample description

<i>Bank</i>	<i>Total assets (2017) (in million euro)</i>
Unicredit	836.790
Intesa Sanpaolo	796.861
Monte dei Paschi di Siena	139.154
Banco Popolare ^a	117.411 (<i>year 2016</i>)
	161.207 (<i>BPM: year 2017</i>)
UBI Banca	127.376
Banca Nazionale del Lavoro	78.934
Mediobanca ^c	70.446
BPER Banca	71.339
Banca Popolare di Milano ^a	51.131 (<i>year 2016</i>)
Banca Popolare di Vicenza ^b	34.424 (<i>year 2016</i>)

^aOn 1 January 2017, the two former banks Banco Popolare and Banca Popolare di Milano merged to become Banco BPM

^bIn June 2017, Banca Popolare di Vicenza was wound up under insolvency procedure (*compulsory liquidation*)

^cThe financial statements of Mediobanca as on 30 June 2017

⁴The same sample has been used by Scannella (2018) with reference to market risk reporting.

Management Commentary of the Annual Report and the Basel Capital Accord's Pillar 3 report. We downloaded them from the banks' official websites. As a whole, we read and analyzed 31,780 pages of disclosure reports from 2012 to 2017 (Table 10.2).

Data were collected through the application of *content analysis* on the annual balance sheets and Pillar 3 reports of the banks in the sample. A scoring model based on analytical grids was used.⁵ The scoring model is divided into two parts. The first part is based on 30 credit risk disclosure indicators that are evaluated through the application of the following rule: score "1" if a bank discloses the information and score "0" if a bank does not disclose the information (Table 10.3). We identified the most relevant pieces of information that banks should include in their financial reports for credit risk disclosure purposes and we constructed the first part of the metric accordingly. In order to detect this kind of information, we adopted the following approach. First, we reviewed the scientific literature on banks' risk reporting to identify all the crucial pieces of information that banks should disclose in their financial reports from a theoretical point of view. Second, we reviewed the risk reporting practices of the banks of the sample and chose the most useful pieces of information to be represented by a credit risk disclosure indicator. Furthermore, we carefully checked the regulatory requirements in terms of mandatory disclosure in order to be sure to not include any piece of mandatory information as a disclosure indicator in the first part of the metric. After this process, we identified 30 disclosure indicators for the first part of the scoring rule. These disclosure indicators are indexes that show the presence or the absence of the information described by the name/description of the indicator itself.

The second part of the scoring model is based on a judgment approach that takes into account 47 key disclosure parameters (Table 10.4). As shown in Table 10.4, these parameters are grouped into the following 11 subcategories: key aspects of credit risk management in banking, credit risk management decision disclosure, credit risk components, information on credit risk exposures, loan losses and measurement models, credit risk mitigation/transfer instruments, other key elements of bank credit risk, bank loan portfolio disclosure, credit rating disclosure issues, bank credit risk capital requirements disclosure, and general credit risk disclosure issues.

⁵ See Scannella and Polizzi (2018) and Scannella (2018) for other scoring models based on analytical grids. See Holsti (1969) and Weber (1990) for further information on content analysis.

Table 10.2 Number of pages per disclosure report

	NT	MC	3P	NT	MC	3P	NT	MC	3P	NT	MC	3P	NT	MC	3P	NT	MC	3P	
	2012	2012	2012	2013	2013	2013	2014	2014	2014	2014	2015	2015	2015	2016	2016	2016	2017	2017	2017
Unicredit	327	35	329	371	32	287	419	35	375	465	31	385	445	37	361	445	37	349	
Intesa	255	127	220	265	132	236	267	140	254	268	118	254	271	132	256	317	134	253	
MPS	335	81	187	334	109	188	387	111	174	375	91	193	367	91	204	367	123	228	
Banco Pop.	215	127	174	233	131	178	237	139	187	229	121	212	233	113	237	297	113	277	
Ubi Banca	165	153	157	176	143	171	181	147	211	173	146	149	183	139	147	207	129	163	
BNL	263	79	8	274	80	18	271	86	31	186	86	27	178	87	28	175	91	33	
Mediobanca	163	45	88	155	47	85	152	45	89	187	45	105	185	45	119	195	53	121	
BPER	257	110	146	281	111	142	275	125	159	273	146	193	271	160	224	283	144	229	
B. Pop. Mil.	305	74	110	305	65	132	311	77	134	319	79	132	314	81	137	N/A	N/A	N/A	
B. Pop. Vic.	232	140	137	240	139	143	264	151	179	246	139	159	244	149	186	N/A	N/A	N/A	

NT/Notes, MC Management Commentary, 3P Pillar 3 disclosure report

Table 10.3 First part of the scoring model: the analytical grid of credit risk disclosure indicators

Section 1: Definitions

Credit risk definition
 Expected loan loss definition
 Unexpected loan loss definition
 Credit risk components definition (PD, LGD, EAD)
 Credit risk-weighted assets definition
 Back-testing definition
 Nonperforming loans definition

Section 2: Calculations and limitations

Amount of expected loan loss
 Amount of unexpected loan loss
 Amount of credit risk-weighted assets
 Limitations of expected loan loss calculation
 Limitations of unexpected loan loss calculation
 Limitations of the internal credit rating system
 Limitations of loan loss provisioning methodologies
 Potential credit risk exposures (*on-balance sheet*)
 Potential credit risk exposures (*off-balance sheet*)

Section 3: Explanations

Explanation of expected loan loss models used
 Explanation of unexpected loan loss models used
 Explanation of provisioning for loan losses
 Explanation of credit risk-weighted assets calculation
 Explanation of back-testing models used
 Qualitative disclosure on nonperforming loans portfolio
 Explanation of credit risk mitigation/transfer instruments

Section 4: Other key disclosure parameters

Presence of graphs about expected and unexpected loan loss
 Stress test explanations
 Stress test results^a
 Credit risk aggregation reported^b
 Risk-adjusted performance indicators
 Credit risk exposure limits and tolerance
 Scenario analysis

^aIt is mandatory for credit internal stress test models only^bThis indicator will return a score "1" if at least three of the following credit risk levels of aggregation will be reported: aggregation for the type of loan; aggregation at the portfolio level; aggregation at the country level; aggregation for the type of credit borrower; aggregation for the companies of the bank group

Table 10.4 Second part of the scoring model: the analytical grid of credit risk disclosure indicators (score 0–5)*Section A: Key aspects of credit risk management in banking*

Explanation of credit risk management strategies
 Explanation of credit risk management goals, procedures, processes, and policies
 Explanation of credit risk measurements
 Explanation of credit risk control systems

Section B: Credit risk management decision disclosure

Information on credit risk assumption and retention
 Information on credit risk prevention and protection
 Information on credit risk transfer
 Information on credit risk elimination and avoidance

Section C: Credit risk components

Insolvency risk
 Migration risk
 Recovery risk

Section D: Information on credit risk exposures

Current credit risk exposures (*on-balance sheet*)
 Potential credit risk exposures (*on-balance sheet*)
 Current credit risk exposures (*off-balance sheet*)
 Potential credit risk exposures (*off-balance sheet*)
 Accuracy of potential credit risk exposures assessment

Section E: Loan losses and measurement models

Credit risk: expected loss
 Credit risk: unexpected loss
 Measurement models for expected loss
 Measurement models for unexpected loss
 Model risk

Section F: Credit risk mitigation/transfer instruments

Information on collateral
 Information on personal guarantees
 Information on insurance contracts
 Information on credit derivatives
 Information on loan securitization

Section G: Other key elements of bank credit risk

Provisioning for loan losses
 Analysis of nonperforming loans
 Information on specialized lending
 Credit risk: balance sheet ratios

Section H: Bank loan portfolio disclosure

Loan portfolio composition
 Loan portfolio correlation
 Loan portfolio concentration
 Credit risk aggregation and methodologies

(continued)

Table 10.4 (continued)

<i>Section I: Credit rating disclosure issues</i>
Information on internal/external credit rating
Rating assignment
Rating quantification
Rating validation
Information on the accuracy of internal/external credit rating models
Implications of internal/external credit rating for bank management
<i>Section L: Bank credit risk capital requirements disclosure</i>
Credit risk-weighted assets (<i>on- and off-balance sheet</i>)
Measurement models for credit risk capital requirements
Capital adequacy for credit risk (<i>regulatory perspective</i>)
Economic capital for credit risk (<i>internal and managerial perspective</i>)
<i>Section M: General credit risk disclosure issues</i>
Backward-looking information on bank credit risk
Forward-looking information on bank credit risk
Provision of an integrated perspective on bank credit risk

We assign a score from “0” to “5” after taking into account the following qualitative features of the disclosure: understandability, relevance, comparability, and reliability. These qualitative characteristics are outlined in the Conceptual Framework for IAS/IFRS by the International Accounting Standard Board (2010). Score “0” means that we find a severe lack of information disclosure; score “5” means that we find an excellent information disclosure. We assume that these qualitative features are extremely important for credit risk reporting purposes.

The process we adopted to identify these key disclosure parameters is similar to the one adopted for the first section of our metric. Thus, both the disclosure parameters and the subcategories were identified looking at the scientific literature, the risk reporting practices of the banks of the sample, and the regulatory requirements. As a result, we identified the information that banks should disclose from a theoretical and practical viewpoint. The decision of splitting each subcategory into different disclosure parameters relies on the willingness of making our evaluation as verifiable and as objective as possible, even though it is impossible to eliminate totally the subjectivity. After this process, we identified 11 subcategories/sections that include 3 to 6 key disclosure parameters.

With reference to the first part of the scoring model, the maximum score a bank can obtain is 30. As for the second part of the scoring model, the maximum score is 235. We assigned equal weight to each section of

the first and second part of the scoring model because we assume that each section is equally important in determining the quality of banks' risk disclosure. Lastly, we rescaled the summed scores in order to express the final score (disclosure quality index) on a 0–100-point scale. These normalized scores equate raw scoring gathered through different measurement techniques. A more detailed discussion of the research findings is provided in the section which follows.

4 RESEARCH FINDINGS: DISCUSSION

The following subsections focus on the results of this empirical study. As stated previously, the overall objective of this work was to connect qualitative and quantitative data through a scoring model in order to assess credit risk disclosure in banking institutions, add new academic insights, and provide practical implications. Details of the research findings from each bank in the sample will be presented in the subsections that follow.

4.1 *Unicredit*⁶

Unicredit risk reporting shows a significant information overlap between Notes to the account and Pillar 3 disclosure report. The Management Commentary of the annual report does not contain any additional information on credit risk, and it attenuates the provision of an integrated perspective on bank credit risk. There is also a better balance between backward-looking and forward-looking information on credit risk in comparison to market risk (Scannella 2018; Scannella and Polizzi 2018).

In particular, in 2012, Unicredit provided a useful glossary and explanation of credit risk determinants. The qualitative description of credit risk mitigation techniques is informative enough, as well as the distinction between expected and actual credit losses. A detailed description of stress tests is provided in both Notes to the account and Pillar 3 report. The Notes to the account also provide a measure of Rarorac (risk-adjusted return on risk-adjusted capital) and the Management Commentary shows two balance sheet ratios with reference to credit risk without providing any comments. Moreover, there are few pieces of information on internal credit rating in comparison to 2016 risk reporting.

⁶Sources: Unicredit (2012–2017) Relazioni e bilancio. Unicredit (2012–2017) Terzo pilastro di Basilea 2. Informativa al Pubblico.

The disclosure on insolvency risk is better than other risk components. There are useful comparisons between internal and external credit ratings. The disclosure on personal guarantees and insurance contracts is not informative enough and mainly description-based. In contrast, the disclosure on credit derivatives is better from the quantitative instead of the qualitative point of view. In a wider perspective, the disclosure on unexpected losses is better than the disclosure on expected losses.

There are no explanations of methodologies that are used for loan loss provisioning. The rating assignment and rating validation (both internal and external) disclosures are quite informative and mainly descriptive. Both the Notes and the Pillar 3 report provide a high level of detail on measurement models for credit risk capital requirement and capital adequacy for credit risk (regulatory perspective). The disclosure on the economic capital is less informative than the regulatory capital. However, the methodologies that are used to evaluate the economic capital and its role in credit risk management are described appropriately.

In 2013, Unicredit's credit risk disclosure did not show relevant improvements in comparison to the previous year. In brief, there is just a higher level of details with reference to EAD and recovery risk, mainly in the Pillar 3 report. The disclosure on model risk is much better, but still not satisfactory. The information on nonperforming loans improved in the Notes due to the implementation of the EBA's Technical Standards in October 2013.

In 2014, credit risk disclosure was similar to the previous year. The disclosure on recovery risk and credit risk expected loss improved slightly, mainly in the Pillar 3 report. It is curious to mention that in the glossary the definition of "risk-weighted assets" is omitted.

In 2015, credit risk disclosure was almost identical to that of the previous year. There were just more details on nonperforming exposures, and the definition of "risk-weighted assets" is included in the glossary.

Credit risk disclosure in 2016 was characterized by some improvements in comparison to the previous year, particularly with reference to loan securitization, management of nonperforming loans, governance structure of the credit risk management, regulatory capital requirements, assignment and validation of bank credit rating systems, and complementarity and coherence of the Annual report and Pillar 3 report. In brief, the glossary provides comprehensible definitions of the most important aspects/terms of credit risk. Information on stress test is provided both in the Notes and the Pillar 3 report: mainly qualitative and descriptive in the

Notes and analytical and quantitative in the Pillar 3 report. The results of the stress test are reported without an adequate level of details. In the Pillar 3 report the distinction between expected and actual credit losses is quite informative.

The disclosure on current and potential on-balance sheet exposures is better than the one related to off-balance sheet exposures. At the same time, the disclosure on unexpected credit losses is more informative than the one related to expected credit losses. In addition, the disclosure on model risk is not satisfactory and only qualitative and descriptive.

With reference to recovery risk, the disclosure is not satisfactory. The information on personal guarantees is scarce, as well as the information on insurance contracts on credit risk and credit derivatives. Unicredit provides useful information on internal economic capital (in 2016 Unicredit introduced the migration risk as a component of the economic capital), although it contains fewer details in comparison to the disclosure on regulatory capital. In the Pillar 3 report there are some pieces of information on specialized lending and it provides more details on regulatory capital in comparison to the Notes.

In brief, in 2016, there was still an information overlap between the Notes and the Pillar 3 report (e.g. expected credit risk losses, credit risk provisioning, etc.) and a good balance between backward and forward-looking information on credit risk (e.g. lifetime expected losses techniques, calculation of probabilities of default, use of migration matrixes, etc.). This balance is much better than Unicredit market risk disclosure (Scannella 2018). In addition, the Management Commentary does not provide any relevant information on credit risk in banking.

In 2017, credit risk reporting improved in various aspects, mainly in the Pillar 3 report, with the introduction of new tables and the provision of new pieces of information. In detail, the Pillar 3 report provides more information on back-testing PD for exposure classes and recovery risk, which increases the disclosure on the accuracy of potential credit risk exposures assessment, the accuracy of internal credit rating models, and the explanation of credit risk measurements. In addition, disclosure improvements have been made with reference to the analysis of nonperforming loans, credit risk-weighted assets (on- and off-balance sheet), and credit derivatives (with the introduction of the section “EU CR7: IRB method. Effects on RWA of credit derivatives that are used to hedge credit risk”). Lastly, some useful tables on current credit risk exposures (on- and off-balance sheet) are missing in the Pillar 3 report; the Management

Commentary does not provide any relevant information on credit risk in banking. The information overlap between Notes to the account and Pillar 3 report attenuates the provision of an integrated view on bank credit risk.

4.2 *Intesa Sanpaolo*⁷

Intesa Sanpaolo's credit risk reporting shows higher forward-looking information and an integrated perspective in comparison to Unicredit credit risk reporting. Pillar 3 disclosure report provides information that is not disclosed in the Notes; the Management Commentary sheds some light on bank risk and provides cross-references to the Pillar 3 disclosure report and the Notes.

In particular, in 2012 Intesa Sanpaolo provided a useful glossary in the Pillar 3 report to easily understand key terms in credit risk reporting. The disclosure on stress test is mainly qualitative; it does not provide any details on future scenarios or their impacts on the economics and management of the bank. There are just few and low informative pieces of information on scenario analysis only in the Pillar 3 report.

The Management Commentary focuses mainly on the macroeconomic context and provides an integrated perspective on some critical aspects of bank risk, with particular reference to credit risk in banking, such as qualitative and quantitative analyses of loan portfolios, information on sovereign credit risk exposures and regulatory capital, and so on. Even though on this aspect the Management Commentary is better than Unicredit, the section "the expected development of the bank management" could be improved.

Disclosure on rating assignment and validation is slightly better than Unicredit. It is useful the table that compares internal rating classes and external agency rating classes as well as are the paragraph that analyses credit risk migration techniques and the description of the limitations of unexpected loan loss calculation. The methods of credit risk rating assessment are explained appropriately.

Credit risk disclosure provides useful information on potential exposures, with reference to categories of exposures and their maturities.

⁷Sources: Intesa Sanpaolo (2012–2017) *Relazione e bilancio*. Intesa Sanpaolo (2012–2017) *Terzo pilastro di Basilea 2. Informativa al pubblico*.

The disclosure on bank loan portfolio concentration provides some useful details, mainly qualitative, but ultimately it is not satisfactory enough.

Loan securitization operations are well analyzed and reported. The disclosure provides information on the most important aspects of loan securitization operations that are performed by Intesa Sanpaolo. It provides an integrated and comprehensible view of bank loan securitization, although Unicredit seeks to delve deeper into the topic. It is probably related to the fact that Unicredit manages more loan securitization operations than Intesa Sanpaolo does.

In credit risk disclosure, the composition of the regulatory capital is well described and detailed. It also provides a good analysis of nonperforming exposures and credit risk provisioning methodologies. In addition, it provides information on specialized lending and its rating assessment methods, although some key details on the current credit risk of specialized exposures are not disclosed.

The information on off-balance sheet exposures seems slightly better than Unicredit. For example, the off-balance sheet exposure rating is well explained, and there are tables that support qualitative and descriptive analyses. In addition, the information gap between current and potential credit risk exposures is less evident than the one of Unicredit.

The disclosure on credit derivatives is strictly compliant with the Circular n. 262 of Bank of Italy (2005). An additional piece of information is provided in the Pillar 3 report which discloses the creditworthiness of credit derivative counterparties. With reference to personal guarantees, the disclosure is better than the one of Unicredit, mainly in the Pillar 3 report (e.g. types of guarantors, types of guarantor rating classes, etc.). In addition, the disclosure on collaterals and model risks seems more detailed than the one of Unicredit.

The disclosure on the bank economic capital for credit risk, within a managerial perspective, is slightly less detailed than the one of Unicredit, but it is quite effective and easy to understand.

Generally speaking, Intesa Sanpaolo risk disclosure does not provide enough tables and graphs that could primarily summarize descriptive information on credit risk. Consequently, it affects the comprehensibility of risk disclosure documents. However, a forward-looking perspective reflects an important focus on future credit risk exposures.

In 2013, there were no significant improvements in credit risk disclosure. It seems the same as the previous year. In particular, in the Notes and the Pillar 3 report, the risk appetite framework and the credit risk

management strategies and policies are described better than in the ones of the previous year. The information on the economic capital in the Notes is slightly improved (e.g. economic capital absorption for types of business units). The content of the Management Commentary is similar to that of the previous year.

In 2014, credit risk disclosure was also similar to the one of the previous year. There were no relevant improvements. With reference to stress test results, they added a new paragraph “Comprehensive Assessment of the European Central Bank” in the Management Commentary. The lack of a summary table does not help the reader to obtain a quick view of it. In addition, it is curious to mention that credit risk reporting discloses the key term “unexpected loss” inside inverted commas, and it is used only twice in the Notes and seven times in the Pillar 3 report (it does not provide any definition of unexpected loss).

In 2015, Intesa Sanpaolo did not provide a higher level of credit risk disclosure in comparison to the previous year. It is important to notice a slight improvement in the description of nonperforming exposures, as well as expected credit risk losses. Even though in 2015 the forward-looking information is slightly improved, the lack of stress test results affects the final score of section M of the scoring model.

In 2016, Intesa Sanpaolo credit risk disclosure showed some improvements, particularly with reference to economic capital (e.g. the use of internal stress tests to evaluate the adequateness of economic capital), current off-balance sheet credit risk exposures, credit risk provisioning, and nonperforming loans. In addition, in the Pillar 3 report, there was a useful comparison between internal approach-based probabilities of default and actual default rates by types of economic sectors. Forward-looking information improved with reference to IFRS 9 and its future impacts on the bank balance sheet (e.g. lifetime probability of default and underlying methodologies). In 2016, there were more pieces of information on stress test results in comparison to the previous year. The Notes also provide a glossary. The same credit risk ratios are disclosed in the Pillar 3 report and Management Commentary. Finally, it is curious to mention that the information on specialized lending has diminished both in the Pillar 3 report and Notes.

In 2017, Intesa Sanpaolo credit risk disclosure showed almost the same improvements we noticed in Unicredit mainly because of the recently expanded risk disclosure requirements of the Pillar 3 report (Basel Committee on Banking Supervision 2017). In addition, Intesa Sanpaolo

improved the disclosure on the expected qualitative and quantitative effects of the new IFRS 9 on the bank balance sheet. They provide more details on expected credit losses that help to better understand measurement models for expected losses and loan loss provisioning. We also found more information on credit risk-weighted assets (on- and off-balance sheet), credit risk aggregation and methodologies, and credit derivatives, with positive effects on the accuracy of both internal credit rating models and potential credit risk exposures assessment. Lastly, it slightly improved the disclosure on the explanation of credit risk management goals, procedures, processes, and policies, as well as the disclosure on nonperforming loan securitization.

4.3 *Monte dei Paschi di Siena*⁸

In 2012, Monte dei Paschi risk disclosure showed a prominent backward-looking perspective instead of a forward-looking one on credit risk, primarily because of the low level of information on potential credit risk exposures, stress tests, scenario analysis, sensitivity analysis, and so on. With reference to the provision of an integrated perspective on bank credit risk, we noticed that Pillar 3 report provides some additional information than the Notes do, and the Management Commentary is a useful document for the bank risk reporting, providing a unified view on some crucial aspects of credit risk in banking (with useful tables and graphs).

In comparison to Unicredit, Monte dei Paschi discloses less information on capital adequacy for credit risk (regulatory perspective), measurement models for credit risk capital requirements, credit risk-weighted assets (on- and off-balance sheet), implications of internal credit rating for the bank management, and accuracy of internal credit rating models. In particular, for the rating assignment, they do not disclose properly the models adopted, and for the rating quantification, there are no comparisons among internal rating classes. In contrast, they provide more details on internal and external rating validation. There is not enough information on the comparison between internal and external credit ratings, as well as on credit risk aggregation and methodologies.

With reference to the analysis of the loan portfolio, we noticed that there is no information on loan portfolio correlation; the degree of loan

⁸ Sources: Monte dei Paschi di Siena (2012–2017) Relazione e bilancio. Monte dei Paschi di Siena (2012–2017) Informativa al pubblico. Pillar 3.

portfolio concentration is explained better than Unicredit, and there is less information on loan portfolio composition in comparison to Unicredit. The useful table with the loan portfolio composition in terms of residual maturity is not disclosed because they perform a sensitivity interest rate risk analysis on the basis of internal models. However, this sensitivity analysis is not informative enough for credit risk. In general, there are fewer details and comments than Unicredit.

The disclosure on loan losses provisioning is affected by the low information level on accounting policies. In addition, the Pillar 3 report is not helpful on this topic. In contrast, the analysis of nonperforming loans is better than the one of Unicredit. The disclosure on nonperforming loans has a good level of details (e.g. balance sheet ratios, coverage ratios of nonperforming exposures, etc.). There are different tables and comments on the topic in all risk reporting documents.

With reference to loan securitization and its impacts on the economics and management of the bank, there are fewer details than Unicredit risk reporting. There is no information on special purpose vehicles and synthetic loan securitization. On this topic, the contribution of the Pillar 3 report is really important.

The information on measurement models for expected and unexpected credit losses is quite good. The disclosure on expected credit losses is detailed, comprehensible, and supported by a certain number of useful graphs and tables. The disclosure on unexpected credit losses is strictly connected to the disclosure on the bank economic capital. There are no details on model risk. It is worthwhile to notice that although they disclose some useful details on expected credit losses, they do not provide their total amount.

Monte dei Paschi does not provide a satisfactory disclosure on potential credit risk exposures (both on- and off-balance sheet), the accuracy of potential credit risk exposures assessment, recovery risk, credit risk elimination and avoidance, migration risk, credit risk mitigation techniques, and back-testing. The information on credit risk assumption, retention, and prevention is worse than Unicredit. The information on credit risk protection is slightly better (in particular in the Pillar 3 report).

With reference to the key aspects of credit risk management in banking, we noticed that Monte dei Paschi provides more information on the organizational aspects of credit risk management instead of credit risk strategies and policies.

The disclosure on risk tolerance is almost identical in the Notes and the Pillar 3 report. Nevertheless, in general, the information overlap between those risk reporting documents seems less significant than Unicredit.

Some internal scenario analyses are disclosed, mainly in the Pillar 3 report, with their implications in terms of credit risk, derivatives, and bank performances. Monte dei Paschi mentions the use of risk-adjusted performance indicators for internal risk management purposes, but it does not disclose any measure or type of such indicators.

The disclosure on stress test is scarce and mainly descriptive. There are just few details on stress test results and comments. The Pillar 3 report provides further information, but it is not relevant. In general, the forward-looking perspective suffers from a low level of detail, which does not help the reader to obtain a clear and adequate view on credit risk in banking.

It is important to highlight that, on the one hand, the disclosure on internal economic capital and unexpected credit loss is better than Unicredit and the comprehensibility is very good. On the other hand, the disclosure on regulatory capital and credit risk-weighted assets is less informative than Unicredit.

Generally speaking, we noticed that the distribution of information among risk reporting documents is different in comparison to Unicredit and Intesa Sanpaolo. Some aspects are well disclosed, while others are not disclosed at all. It is worthwhile to mention that in many parts of the annual report there are a lot of references to section “E” of the Notes, even though in this case the Pillar 3 report is an important document for credit risk disclosure. It also provides a useful glossary.

In 2013, Monte dei Paschi risk disclosure showed some improvements, with particular reference to the explanation of credit risk management goals, procedures, processes, and policies; credit risk assumption and retention; credit risk elimination and avoidance; accuracy of potential credit risk exposures assessment (because of more details on the back-testing mainly); personal guarantees; and accuracy of internal credit rating models. In the Management Commentary they introduced a new table “risk weighted assets—RWA” that shows also credit risk-weighted assets. With reference to the amount of unexpected loan loss, there are fewer details on the bank economic capital than the previous year. The disclosure on stress tests improved, but their results are missing.

In 2014, Monte dei Paschi credit risk disclosure showed some improvements. Briefly, we mention the following: in the Pillar 3 report, there are more pieces of information on expected and actual credit losses, rating

back-testing, and a comparison between internal estimates of probabilities of default and actual defaults for rating classes; new sections of the Pillar 3 report on credit risk management policies and goals, the use of internal ratings for credit risk, and credit risk-weighted assets. It slightly improved the disclosure on stress tests in the Management Commentary and on bank capital adequacy for credit risk, mainly because of the introduction of a new section on bank regulatory capital in the Pillar 3 report. The geographical distribution of both on- and off-balance sheet exposures, that provided details on nonperforming exposures, is not disclosed anymore. In conclusion, the forward-looking information is slightly improved in comparison to the previous year, mainly because of a higher level of information on recovery risk and stress test.

In 2015, we noticed that the quality of credit risk disclosure was slightly reduced, mainly in the Notes. They provided fewer tables and graphs on internal economic capital and expected credit loss, as well as less information on current credit risk exposures (on-balance sheet), regulatory capital, and stress tests. In contrast, other parts of the risk disclosure showed some improvements, such as more pieces of information on measurement models for credit risk capital requirements, credit risk-weighted assets (on- and off-balance sheet), rating validation, recovery risk, and specialized lending. The disclosure on internal/external credit rating and credit derivatives showed slight improvements in the Pillar 3 report in comparison to the previous year.

In 2016, Monte dei Paschi improved the quality of its credit risk disclosure. It provided more details on credit risk prevention and protection, insolvency risk, collaterals (mainly in the Management Commentary), and personal guarantees (mainly in the Pillar 3 report, with the introduction of two new paragraphs on this topic). The disclosure on loan loss provisioning and insolvency risk was positively affected by the presence of some references to the new IFRS 9 and its impacts on migration risk, potential credit risk exposures, and potential bank risks. The disclosure on stress tests improved, as well as on credit risk balance sheet ratios, with the introduction of new ratios on the quality of bank loans.

In 2017, Monte dei Paschi credit risk disclosure showed almost the same improvements we noticed in Unicredit and Intesa Sanpaolo, mainly because of the recently expanded risk disclosure requirements of Pillar 3 report (Basel Committee on Banking Supervision 2017). In addition, we noticed some other disclosure improvements with reference to implications of internal credit rating for bank management, analysis of nonperforming

loans, loan securitization, provisioning for loan losses, credit risk prevention and protection (it is worthwhile to mention the creation of a new “chief lending officer” that should improve the early detection of bank credit risk), accuracy of internal credit rating models, and potential credit risk exposures assessment. In 2017, the disclosure on stress test and potential credit risk exposures has been slightly reduced (on-balance sheet). Lastly, Monte dei Paschi partially adopted the new IFRS 9 in 2017 financial statement.

4.4 *Banco Popolare and Banco BPM*⁹

Banco Popolare credit risk reporting shows a higher backward-looking than a forward-looking disclosure and an acceptable integrated perspective. The Pillar 3 disclosure report and the Notes are complementary documents, and the Management Commentary is useful for credit risk reporting purposes. In a wider perspective, credit risk reporting adopts a more narrative and qualitative approach instead of a quantitative one.

On closer inspection, in 2012, the explanation of credit risk management goals, procedures, processes, and policies is quite informative, although it contains fewer details than Unicredit. The Pillar 3 disclosure report provides a useful glossary to support the comprehension of some key credit risk dimensions. In addition, the definition of credit risk in the Pillar 3 disclosure report is quite precise and detailed.

With reference to credit rating disclosure issues, we noticed that the disclosure on internal rating, the comparison between internal and external rating, and the implications of internal credit rating for bank management is quite good, but there are not so many pieces of information on the accuracy of internal credit rating models. However, the existence of a good comparison between expected credit losses and actual credit losses supports the same score we assigned to Unicredit.

The disclosure on capital adequacy for credit risk (regulatory perspective), credit risk-weighted assets (on- and off-balance sheet), and measurement models for credit risk capital requirements is less informative than Unicredit. It also provides few tables and summaries. Although there are pieces of information on potential exposures, they are mainly related to the trading portfolio. Banco Popolare pays more attention to the regulatory

⁹Banco Popolare (2012–2017) Relazione finanziaria annuale. Banco Popolare (2012–2017) Informativa al pubblico.

perspective of capital requirements disclosure than internal and managerial perspective. Stress test results are provided only with reference to regulatory capital. The disclosure on sovereign risk is quite informative.

The Management Commentary provides two useful sections for credit risk reporting: analysis of results in a perspective view and risk management. They also provide a good synthesis of some important credit risk aspects. Other sections of the Management Commentary do not shed additional light on credit risk.

Different sections of credit risk reporting show a less informative disclosure in comparison to Unicredit: insolvency risk, current credit risk exposures (off-balance sheet), measurement models for unexpected loss, loan loss provisioning, analysis of nonperforming loans, and rating assignment. Although the information on loan securitization is less detailed than Unicredit, the Notes provide informative sections on risks and securitization (e.g. rating downgrading paragraph). The disclosure on loan portfolio correlation is not adequate, but Banco Popolare shows more information than other banks. The disclosure on loan portfolio concentration is characterized by the presence of a table and a narrative structure of the analysis of large risk exposures. The disclosure on credit risk aggregation and methodologies is quite qualitative, and the overview is not clear.

In 2013, Banco Popolare credit risk disclosure showed some improvements, with particular reference to rating validation; capital adequacy for credit risk (regulatory perspective); explanation of credit risk measurements; information on credit risk assumption and retention; and recovery risk. The information on stress test results is not provided. The increased volume of the risk disclosure in 2013 is mainly related to the merger by the incorporation of “Credito Bergamasco S.p.A.” into Banco Popolare.

In 2014, we noticed some improvements in Banco Popolare credit risk disclosure, with reference to explanation of credit risk management strategies, goals, procedures, processes, and policies; capital adequacy for credit risk (regulatory perspective); economic capital for credit risk (internal and managerial perspective); information on specialized lending; information on internal/external credit rating; and balance sheet ratios for credit risk. In 2014, the Management Commentary provided stress test results and more information on loan loss provisioning and nonperforming loans.

In 2015, Banco Popolare credit risk disclosure was almost the same as the previous year. We noticed some improvements with reference to accuracy of internal credit rating models (there are some details on back-testing, mainly for market risk rather than credit risk); credit risk elimination

and avoidance (mainly in the accounting policy section); recovery risk and credit risk expected loss (with the introduction of new tables and qualitative information); and loan securitization. In contrast, the disclosure is slightly worse with reference to stress test results.

In 2016, better disclosure of the accounting policy (with reference to the introduction and implementation of the new IFRS 9) and stress test results (Pillar 3 disclosure report and Management Commentary) increased a forward-looking perspective on bank credit risk. We also noticed some disclosure improvements with reference to credit risk transfer (more information on nonperforming loan transferring in the Notes), insolvency risk (more information on the probability of default and loss given default), loan loss provisioning, and potential credit risk exposures (on-balance sheet).

On 1 January 2017, Banco Popolare and Banca Popolare di Milano merged to become Banco BPM Group. Thus, for 2017 we take into account Banco BPM credit risk reporting. In 2017, the quality of credit risk disclosure improved quite a lot with reference to disclosure reports. The structure of Banco BPM credit risk disclosure is similar to the previous Banco Popolare credit risk disclosure. Some disclosure improvements could be affected by the merger of the previous two banks into the new group.

Briefly, we mention the following disclosure improvements: loan loss provisioning and expected credit loss (mainly in the Notes); accuracy of internal credit rating models (more information on back-testing of rating systems in the Notes); credit risk-weighted assets, both on- and off-balance sheet (it is worthwhile to notice the introduction in the Notes of two useful tables: EU CR8—risk-weighted assets variations, and EU CR4—standardized method—credit risk exposures); capital adequacy for credit risk (regulatory perspective); current credit risk exposures (off-balance sheet); insolvency risk (to notice the introduction of a new table EU CR6—IRB method); measurement models for expected loss; model risk; unexpected loan loss; and economic capital for credit risk (the Pillar 3 disclosure report provides information on the risk appetite framework). The Management Commentary provides some information on nonperforming loans. Stress test results are not disclosed. Information on scenario analysis is provided only in the Notes. In short, backward-looking information on bank credit risk improved with reference to all credit risk reports.

4.5 *UBI Banca*¹⁰

In 2012, UBI Banca credit risk reporting was characterized by a much more backward-looking perspective instead of a forward-looking one. With reference to the provision of an integrated perspective on bank credit risk, there are some information overlaps between the Notes and the Pillar 3 disclosure report. The Management Commentary provides useful information on credit risk, mainly qualitative, and supports the provision of an integrated view.

With reference to key aspects of credit risk management in banking (explanation of risk management goals, procedures, processes, policies; credit risk measurements; credit risk control systems), we observed a good level of disclosure. In comparison to Unicredit, it seems that the information in the Notes is much more qualitative than quantitative. A glossary is not provided.

In all credit risk reports, the disclosure on credit risk expected loss and unexpected loss is not adequate. It is not clear how the bank calculates them and their meaning. There is no explanation on credit risk components and risk-weighted assets. It affects negatively the understandability of credit risk disclosure. The information on value at risk and back-testing is mainly on market risk instead of credit risk. The analysis of nonperforming loans is quite good: in the Notes there are more details than Unicredit.

UBI Banca risk reporting provides some useful balance sheet ratios on credit risk with reference to each bank in the group. In contrast, an insufficient level of information is provided with reference to credit risk potential exposures, explanation of unexpected loan loss models used, explanation of credit risk-weighted assets calculation, credit risk aggregation and methodologies, internal/external credit rating, implications of internal credit rating for bank management, credit risk-weighted assets (on- and off-balance sheet), measurement models for credit risk capital requirements, and capital adequacy for credit risk (regulatory perspective). Information on stress test results on trading and banking book and scenario analysis is also provided. With reference to bank credit risk capital requirements disclosure, we noticed an evident gap between the regulatory and the internal/managerial perspective.

The disclosure on loan portfolio concentration and credit risk elimination/avoidance is slightly better than Unicredit; the Notes provide details

¹⁰Sources: UBI Banca (2012–2017) Relazioni e bilanci. UBI Banca (2012–2017) Informativa al pubblico. Pillar 3.

on large credit risk exposures. In contrast, the disclosure on insolvency risk, migration risk, and recovery risk is worse than the one provided by Unicredit. In general, the disclosure on the current credit risk exposures (on-balance sheet) is better than the disclosure on potential credit risk exposures (on- and off-balance sheet), both qualitative and quantitative.

Credit risk disclosure does not provide an adequate level of information to evaluate the accuracy of potential credit risk exposures assessment and measurement models for unexpected losses. The disclosure on measurement models for expected losses, collateral, and personal guarantees is slightly worse than Unicredit. The disclosure on loan securitization is adequate and almost similar to Banco Popolare in 2012.

Even though in 2013 the volume of all credit risk reports increased, there was no significant improvement in credit risk disclosure. It seems the same as the previous year. We noticed slight improvements with reference to credit risk prevention and protection, credit risk assumption and retention, measurement models for expected loss, internal/external credit rating, implications of internal credit rating for bank management, recovery risk, analysis of nonperforming loans, and credit risk-weighted assets (on- and off-balance sheet).

The volume of credit risk reporting increased also in 2014. The structure of the Pillar 3 disclosure report changed in comparison to that of the previous year and it attenuates the comparability over time. In the Pillar 3 report, the disclosure on credit risk concentration slightly improved: it provides a distinction between sector concentration risk and single name concentration risk. The information is only qualitative and not sufficient to increase the score.

We noticed a better disclosure in comparison to the previous year with reference to the following aspects: measurement models for credit risk capital requirements (in the Pillar 3 report there are more details on risk-weighted assets); insolvency risk (disaggregation of credit exposures with reference to their creditworthiness); and explanation of credit risk management goals, procedures, processes, and policies (both in the Notes and Pillar 3 report). In addition, the Pillar 3 disclosure report provides more information on credit risk prevention and protection, credit risk expected loss, collateral, loan securitization, and credit risk-weighted assets (on- and off-balance sheet).

In 2015, credit risk disclosure did not improve significantly. Credit risk reporting provided more details on capital adequacy for credit risk (regulatory perspective); explanation of credit risk measurements (mainly with

reference to the future introduction of the new IFRS 9); model risk; migration risk; and current credit risk exposures (off-balance sheet).

In 2016, UBI Banca risk disclosure showed some improvements, with particular reference to current credit risk exposures (on-balance sheet), mainly in the Management Commentary; measurement models for credit risk capital requirements (it is worthwhile to notice the introduction of a new paragraph “EBA Transparency Exercise 2016” and “SREP 2016”, as well as more details on capital conservation buffer); loan loss provisioning (mainly with reference to nonperforming loans); credit risk expected loss; and internal/external credit rating (the implementation of the new IFRS 9 affects both aspects).

In 2017, UBI Banca credit risk disclosure showed several improvements, mainly because of the recently expanded risk disclosure requirements of the Pillar 3 report (Basel Committee on Banking Supervision 2017) and the implementation of the new IFRS 9. On closer inspection, we noticed a better disclosure with reference to the following aspects: measurement models for expected loss (that incorporate forward-looking scenarios); credit risk transfer; loan securitization; credit risk mitigation; credit derivatives (mainly Over-the-counter (OTC) derivatives); credit risk elimination and avoidance (mainly with reference to the derecognition of credits from the balance sheet); explanation of credit risk management strategies; rating assignment; implications of internal credit rating for bank management; migration risk; potential credit risk exposures (on-balance sheet), mainly because of the introduction of a new section (sensitivity analysis BCE) in the Management Commentary; explanation of credit risk control systems; credit risk prevention and protection; potential credit risk exposures (off-balance sheet); and specialized lending. In short, the forward-looking information on credit risk increased in 2017 because of the implementation of the new IFRS 9 that affects many aspects of credit risk disclosure.

4.6 *Banca Nazionale del Lavoro*¹¹

Banca Nazionale del Lavoro is under the control of BNP Paribas. For this reason, its Pillar 3 disclosure report consists of just few pages. More detailed Pillar 3 reports are published by the holding bank (BNP Paribas). In order to take into account the necessary information, we have also analyzed the

¹¹ Sources: Banca Nazionale del Lavoro (2012–2013) Bilancio d’esercizio. Banca Nazionale del Lavoro (2014–2017) Relazione finanziaria. Banca Nazionale del Lavoro (2012–2017) Pillar 3 report.

BNP Paribas Pillar 3 disclosure report with particular reference to Banca Nazionale del Lavoro, but unfortunately, it was not always possible to isolate such pieces of information. In addition, BNP Paribas Pillar 3 disclosure report does not provide appreciable information with reference to our scoring model. This aspect has a relevant impact on the disclosure quality index of the scoring model. Overall, we noticed that the volume of all Banca Nazionale del Lavoro credit risk reports is less than the one of other banks in the sample. It could be an example of a strategic under-reporting of bank risk (Begley et al. 2017; Core 2001; Lev 1992).

In 2012, Banca Nazionale del Lavoro provided much more backward-looking information on bank credit risk than forward-looking information. It is characterized by fewer details, a lack of useful narrative explanations and qualitative information, a concise analysis of stress test results, scarce use of tables and graphs, a lack of a glossary, and use of value at risk measures almost exclusively for market risk instead of credit risk. Information on bank credit risk is mainly provided by the Notes. This may affect the provision of an integrated perspective on bank credit risk.

Credit risk reporting provides a vague disclosure on insolvency risk, accuracy of internal credit rating models (back-testing is mainly used for market risk), explanation of credit risk management strategies, explanation of credit risk measurements, credit risk assumption and retention, credit risk transfer, credit risk elimination and avoidance, migration risk, and credit risk prevention and protection. Disclosure on rating validation and credit risk control systems is quite good, as well as the description of risk management functions in banking.

Information on credit risk exposures is vague and not adequate to fully comprehend credit risk expected and unexpected losses, and measurement models for expected and unexpected losses. An inadequate level of information is evident with reference to off-balance sheet credit exposures.

With reference to credit risk mitigation/transfer instruments, the disclosure on personal guarantees and credit derivatives is not informative enough; it is satisfactory for collateral and adequate for loan securitization, although it offers less information than Unicredit.

Furthermore, the bank loan portfolio disclosure is not adequate to comprehend the bank loan portfolio correlation, concentration, and credit risk aggregation and methodologies. Just few details are mentioned on the analysis of nonperforming loans and provisioning for loan losses. Credit risk balance sheet ratios are disclosed only with reference to regulatory capital.

The disclosure on credit rating issues is also scarce, particularly with reference to the implications of internal credit rating for bank manage-

ment, internal/external credit rating, and rating quantification. The disclosure on rating assignment is slightly better.

The bank credit risk capital requirements disclosure is better with reference to the regulatory perspective than the internal/managerial perspective. The information on measurement models for credit risk capital requirements is scarce, as well as the use of economic capital for internal purposes. The disclosure on credit risk-weighted assets (on- and off-balance sheet) is slightly better.

In 2013, we noticed some improvements. In comparison to the previous year, the volume of bank risk disclosure increased; however, it had no significant impact on the comprehension of credit risk. The Pillar 3 disclosure report contains the same tables as the previous year, but with more details and explanations on credit risk-weighted assets, capital adequacy for credit risk (regulatory perspective), and measurement models for credit risk capital requirements. The Notes provide more information on OTC credit derivatives and clearing houses (it positively affects the disclosure on credit risk transfer), provisioning for loan losses (with the introduction of the shortfall and a better explanation of expected credit loss), internal/external credit rating, accuracy of internal credit rating models (with reference to the back-testing procedures for the internal rating system), explanation of credit risk management strategies, and credit risk measurements. In 2013, there was no information on the economic capital for credit risk (internal and managerial perspective).

Since 2014, Banca Nazionale del Lavoro has started to publish one report which is called “Relazione finanziaria” that includes the Notes, the Management Commentary, and the Pillar 3 disclosure report. We noticed that the Pillar 3 disclosure report contains more qualitative and quantitative information than the previous year, particularly with reference to credit risk expected loss, rating validation, implications of internal credit rating for bank management, credit risk-weighted assets (on- and off-balance sheet), measurement models for credit risk capital requirements, and credit risk prevention and protection.

The disclosures on collateral, loan securitization, credit risk balance sheet ratios (in the Management Commentary we noticed a higher number of credit risk ratios), economic capital for credit risk (internal and managerial perspective), and loan portfolio concentration (with reference to large exposures) also slightly improved.

In 2015, we noticed a significant reduction in the risk reporting volume. However, the credit risk disclosure is almost the same as the previous

year. The reduction of the number of pages of risk disclosure affects the provision of an integrated perspective on bank credit risk. They started providing information on the new IFRS 9; consequently, it improved the disclosure on loan loss provisioning.

In 2016, Banca Nazionale del Lavoro improved the quality of its credit risk disclosure. It provides more details on credit risk expected loss (in the Management Commentary there are more pieces of information on expected loss at maturity for performing loans), accuracy of internal credit rating models (in the Notes we have some references to back-testing on PD, LGD, and EAD), explanation of credit risk management strategies, credit risk elimination and avoidance, insolvency risk, and loan portfolio concentration. It slightly improved the forward-looking information on bank credit risk, mainly with reference to the Management Commentary and the implementation process of IFRS 9.

In 2017, we noticed a lot of improvements in all credit risk reports. The backward-looking information on bank credit risk improved, as well as the forward-looking information. In particular, we noticed a better disclosure with reference to the following aspects: analysis of nonperforming loans; impacts of the first-time adoption of the IFRS 9; capital adequacy for credit risk (regulatory perspective); current credit risk exposures (the Notes contain new tables that provide different disaggregation of credit risk exposures); insolvency risk (with more details on the default credit exposures); credit risk aggregation and methodologies; current credit risk exposures (off-balance sheet); recovery risk; measurement models for expected loss; explanation of expected loan loss models used; explanation of credit risk management goals, procedures, processes, and policies (the Pillar 3 disclosure report introduces a new paragraph on risk management); and explanation of credit risk measurements and rating quantification. In particular, in 2017, more balance sheet ratios on credit risk were disclosed and compared to average ratios of the banking system. A glossary is still missing.

4.7 *Mediobanca*¹²

Mediobanca obtains the lowest credit risk disclosure score of the whole sample, even though it is characterized by the highest increase over the evaluation period. There is no glossary, the Pillar 3 disclosure report is

¹² Sources: Mediobanca (2012–2017) Bilanci. Mediobanca (2012–2017) Terzo pilastro di Basilea 2. Informativa al pubblico.

only in English (the Italian version is not available on the website), and the Management Commentary is almost useless for credit risk disclosure. In 2012, Mediobanca had not adopted the internal rating models for regulatory purposes yet. Consequently, it affected the credit risk disclosure in many aspects (rating assignment, quantification, validation, and internal/external credit rating models).

The information on credit risk determinants is inadequate. The Pillar 3 disclosure report provides some brief useful pieces of information on credit risk concentrations in connection with credit risk mitigation techniques, capital adequacy, analysis of nonperforming loans, provisioning for loan losses, and explanation of credit risk mitigation/transfer instruments. The back-testing is applied only to value at risk for market risk and to hedging operations. The disclosure on credit risk management strategies, goals, procedures, processes, policies, credit risk measurements, and credit risk control systems is less informative than other banks in the sample. There are just few pieces of information with reference to credit risk assumption and retention, credit risk prevention and protection, credit risk elimination and avoidance, insolvency risk, migration risk, and recovery risk.

Mediobanca disclosure on credit risk exposures is almost similar to Banca Nazionale del Lavoro. The disclosure on loan losses and measurement models is affected by a low level of information, with the exception of measurement models for unexpected losses. The level of details on collateral, personal guarantees, credit derivatives, and loan portfolio concentration is similar to the credit risk reporting of Unicredit. The Pillar 3 disclosure report contains useful information on banking book securitization.

A low level of qualitative and quantitative information characterizes the loan portfolio composition, credit risk aggregation and methodologies, credit risk-weighted assets (on- and off-balance sheet), measurement models for credit risk capital requirements, and capital adequacy for credit risk (regulatory perspective). There are just few balance sheet ratios on credit risk. There is no information on economic capital for credit risk. Notwithstanding the low quality of disclosure, credit risk reporting is quite easy to read (but there are neither tables nor graphs). Consequently, it affects the provision of an integrated perspective on bank credit risk.

In 2013, credit risk disclosure was the same as in the previous year. We just noticed a slight reduction in the number of pages and a slight improvement with reference to the explanation of credit risk management strategies (in the Management Commentary) and loan securitization.

In 2014, credit risk disclosure in the Pillar 3 report and Notes improved mainly with reference to explanation of credit risk measurements, credit risk expected loss, credit risk-weighted assets (on- and off-balance sheet), analysis of nonperforming loans, information on internal/external credit rating, rating assignment, and measurement models for credit risk capital requirements.

In 2015, Mediobanca improved significantly the quality of its credit risk disclosure. It provides more details on provisioning for loan losses, insolvency risk, recovery risk, credit risk measurements, credit risk assumption and retention, credit risk transfer and securitization, current credit risk exposures (on- and off-balance sheet), rating validation, and capital adequacy for credit risk (mainly in the Pillar 3 report). The volume of credit risk reporting increased a great deal.

In 2016, we noticed better forward-looking information on bank credit risk mainly because of the disclosure on stress test results and new accounting principle of the IFRS 9. The disclosure on IFRS 9 affects many improvements of credit risk reporting, such as provisioning for loan losses, measurement models for expected loss, potential credit risk exposures (on- and off-balance sheet), insolvency risk, and migration risk. We also noticed some other improvements with reference to the analysis of nonperforming loans; implications of internal credit rating for bank management; explanation of credit risk management goals, procedures, processes, and policies; and the use of risk-adjusted performance indicators (only for the management compensation policy). It is strange to notice that the definition of credit risk is missing in the Pillar 3 disclosure report. Similar to other banks in the sample, the denomination of “large risks” changed into “large exposures”.

In 2017, Mediobanca credit risk disclosure improved undoubtedly, both from the qualitative (with the introduction of a useful and well-structured glossary) and quantitative points of view (mainly backward-looking information on bank credit risk). In detail, we found better description and more data with reference to nonperforming loans; rating validation; accuracy of internal credit rating models; credit risk-weighted assets (on- and off-balance sheet); explanation of credit risk management strategies; explanation of credit risk management goals, procedures, processes, and policies; credit risk: expected loss; recovery risk; loan securitization; rating quantification; and capital adequacy for credit risk (regulatory perspective).

4.8 *BPER Banca*¹³

BPER Banca credit risk reporting is characterized by a significant information overlap between the Pillar 3 disclosure report and the Notes. The Pillar 3 report provides few pieces of information in addition to the information provided by the Notes.

In 2012, credit risk disclosure is not adequate in all risk reports. It is worthwhile to notice that the Management Commentary provides a brief synthesis on banking risks and exposures that helps to provide an integrated perspective on bank credit risk. Like all other banks in the sample, backward-looking information on bank credit risk is better than forward-looking information.

We found a low level of qualitative and quantitative information with reference to the following credit risk aspects: explanation of expected loan loss models used, credit risk exposures, credit risk management decisions, credit risk components; loan losses and measurement models; credit risk mitigation/transfer instruments (with the exception of loan securitization); bank loan portfolio; model risk; collaterals; scenario analysis; and credit risk assumption, retention, prevention and protection. BPER Banca employs external rating systems, which affects the disclosure on credit rating. There is no information on stress tests, back-testing, and economic capital (internal and managerial perspective). A glossary is not provided and it negatively affects the first part of the disclosure scoring model.

In comparison to the previous year, in 2013, we noticed some slight improvements in credit risk disclosure. We found more qualitative and quantitative information with reference to analysis of nonperforming loans; explanation of credit risk control systems; credit risk assumption and retention; rating validation; balance sheet ratios on credit risk; and loan securitization (mainly in the Management Commentary).

In 2014, BPER Banca provided a better credit risk disclosure, particularly with reference to explanation of credit risk measurements; personal guarantees and collaterals; accuracy of potential credit risk exposures assessment; explanation of credit risk management strategies; current and potential credit risk exposures (on-balance sheet); credit risk assumption, retention, prevention, and protection; credit risk expected loss; specialized lending; insolvency risk; stress test results; and capital adequacy for credit risk (regulatory perspective). In addition, it is worthwhile to notice that

¹³Sources: BPER Banca (2012–2017) Bilancio dell'esercizio. BPER Banca, Informativa al pubblico. Basilea 2 Pillar 3.

the denomination of “large risks” changed into “large exposures”, and many sections of the Notes and Pillar 3 disclosure report are exactly the same.

In 2015, we noticed some improvements of backward-looking information on bank credit risk with reference to rating quantification, rating validation, rating assignment, recovery risk, loan portfolio concentration, measurement models for credit risk capital requirements, explanation of credit risk control systems, and balance sheet ratios on credit risk (they introduced two new risk ratios). The information on specialized lending is missing, and stress test results are moved to the Notes.

In 2016, the volume of the Pillar 3 disclosure report increased significantly. In this report, we found a better disclosure on the following aspects: credit risk management goals, procedures, processes, and policies; specialized lending; explanation of organizational issues related to the bank lending activity; implications of internal credit rating for bank management; internal/external credit rating; accuracy of internal credit rating models; measurement models for expected loss; explanation of credit risk measurements; credit risk elimination and avoidance; loan portfolio concentration. The analysis of potential impacts of the IFRS 9 in banking improved the disclosure on the following aspects: rating quantification; migration risk; insolvency risk; recovery risk; provisioning for loan losses. It contributes to enhancing a forward-looking perspective on bank credit risk. Some balance sheet ratios on credit risk are provided. In addition, in 2016, BPER Banca started employing the IRB methodology to calculate credit risk. It affected many aspects of credit risk disclosure.

Like the previous year, in 2017, we observed some important improvements in credit risk disclosure. The volume and complexity of credit risk reporting increased; however, it does not provide enough tables and graphs. It affects the integrated view on bank credit risk. In particular, we noticed disclosure improvements with reference to credit risk-weighted assets (on- and off-balance sheet); implications of internal credit rating for bank management; credit risk transfer and loan securitization; credit risk elimination and avoidance; and credit risk management goals, procedures, processes, and policies. In the Management Commentary, the information on economic capital for credit risk (internal and managerial perspective) is missing. In conclusion, the implementation process and a forward-looking approach of the IFRS 9 contributed to improving the disclosure of the aforementioned credit risk aspects. Although the quantitative disclosure on credit risk measurements needs to be improved, the qualitative disclosure on key aspects of credit risk management in banking is adequate and, in some aspects, better than other banks in the sample.

4.9 *Banca Popolare di Milano*¹⁴

Banca Popolare di Milano credit risk reporting is characterized by a good balance between qualitative and quantitative information. In some aspects, it is better than other banks of similar dimensions in the sample. Credit risk disclosure is much more backward-looking than forward-looking. They put much more emphasis on forward-looking information on market risk instead of credit risk. We also noticed an information overlap between the Notes and the Pillar 3 disclosure report that affects the provision of an integrated perspective on bank credit risk. They provide a well-structured Management Commentary, but they need to exploit better its communication potentialities. The glossary in the Notes provides useful definitions that enhance the comprehensibility of credit risk reporting.

In 2012, it is worthwhile to highlight an adequate disclosure on the following credit risk aspects: explanation of credit risk management goals, procedures, processes, and policies; explanation of credit risk control systems; credit risk transfer and loan securitization; organizational structure of bank risk management; measurement models for credit risk capital requirements; capital adequacy for credit risk (regulatory perspective); personal guarantees and collateral, and recovery risk; and analysis of non-performing loans.

Banca Popolare di Milano does not show a well-detailed disclosure with reference to credit risk-weighted assets (on- and off-balance sheet); back-testing (mainly on market risk); internal/external credit rating; scenario analysis and sensitivity analysis (mainly for market risk); credit risk assumption, retention, prevention, and protection; credit risk elimination and avoidance (it focuses on accounting issues); insolvency and migration risk; credit risk expected and unexpected loss; measurement models for expected and unexpected loss; credit derivatives; rating validation; implications of internal credit rating for bank management; and accuracy of internal credit rating models. Disclosure on credit risk exposures is better for current exposures than potential ones; it is also better for on-balance rather than off-balance sheet exposures. Loan portfolio concentration and provisioning for loan losses have a better disclosure in the Pillar 3 report than in the Notes.

¹⁴Sources: Banca Popolare di Milano (2012–2016) Relazione e Bilancio. Banca Popolare di Milano (2012–2016) Informativa al pubblico. Pillar 3.

In 2013, we noticed a significant increase in the number of pages of the bank's risk reporting; however, many parts of credit risk reporting are exactly the same as the previous year. In 2013, slight improvements are related to the following aspects: explanation of credit risk measurements; credit risk prevention and protection; explanation of credit risk management strategies; accuracy of potential credit risk exposures assessment; description of model risk; risk-adjusted performance indicators (they provide the definition and value of the "risk-adjusted return on risk-adjusted capital", which is known as Rarorac).

In 2014, the glossary is missing, which negatively affects the final score of the disclosure scoring model, even though other sections of credit risk disclosure show some enhancements. In comparison to the previous years, we noticed more qualitative and quantitative information on the following aspects: insolvency risk, recovery risk, and migration risk; credit risk expected loss; provisioning for loan losses; analysis of nonperforming loans; explanation of credit risk management goals, procedures, processes, and policies; credit risk assumption and retention; measurement models for expected loss; credit risk mitigation policy; loan securitization; and rating validation. It is curious to notice that the risk-adjusted performance indicator is missing and the denomination of "large risks" changed into "large exposures", while its disclosure remains the same as the previous year.

In 2015, the volume of the annual reporting increased a lot, but not with reference to credit risk disclosure. In 2015, credit risk disclosure showed some improvements mainly in the Pillar 3 report and Notes with reference to rating assignment; internal/external credit rating; explanation of credit risk control systems; capital adequacy for credit risk (regulatory perspective) and credit risk-weighted assets (on- and off-balance sheet); recovery risk; analysis of nonperforming loans; and specialized lending.

In 2016, credit risk disclosure improved in both its backward-looking and forward-looking perspectives because of qualitative and quantitative improvements in different sections of credit risk reporting, the implementation process of IFRS 9, the description of stress test results, and the sensitivity analysis. Notwithstanding the lack of a glossary, the wide use of tables and summary diagrams helps to provide a good level of understandability of credit risk reporting. The information on the IFRS 9 implementation process positively affects the disclosure on measurement models for expected loss, potential credit risk exposures (on- and off-balance sheet), rating quantification, and explanation of credit risk measurements. Other disclosure improvements are related to the explanation of credit risk management

strategies, stress test, credit risk elimination and avoidance, model risk, and external and internal rating validation. The Notes show vague information on economic capital for credit risk (internal and managerial perspective). Information on specialized lending is missing.

On 1 January 2017, Banco Popolare and Banca Popolare di Milano merged to become Banco BPM, as already mentioned. Hence, in 2017 we took into account Banco BPM credit risk disclosure (see Sect. 4.4).

4.10 *Banca Popolare di Vicenza*¹⁵

In 2012, Banca Popolare di Vicenza credit risk reporting is much more backward-looking than forward-looking. It provides a good disclosure on stress test, sensitivity analysis, loan securitization, and rating. The information overlap between the Notes and Pillar 3 report is less evident than Unicredit risk reporting. Although the Management Commentary provides a meaningful paragraph on credit risk and a brief glossary, it needs some improvements in terms of credit risk disclosure. The explanation of credit risk control systems and the information on internal/external credit rating, rating assignment, and validation is quite informative. In contrast, the disclosure on credit risk prevention and protection, credit risk management strategies, goals, procedures, process, policies, credit risk measurements, and credit risk transfer is insufficient, mainly qualitative, and less informative than the one of Unicredit.

The disclosure on the credit risk components is mainly focused on PD instead of LGD and EAD. In addition, the disclosure on insolvency risk is much better than migration risk. A definition of credit risk-weighted assets is not provided. Unexpectedly, the Notes provide more information on credit risk-weighted assets (on- and off-balance sheet) than the Pillar 3 disclosure report. There is no definition of nonperforming loans, but the disclosure is quite satisfactory from a qualitative and a quantitative point of view.

There are no risk-adjusted performance indicators. The Management Commentary shows some balance sheet ratios on credit risk. The disclosure on credit risk exposures needs some improvements, mainly in terms of accuracy. The disclosure on measurement models for expected loss, collateral, and guarantees is similar to the average level of other banks in the sample.

¹⁵Sources: Banca Popolare di Vicenza (2012–2016) Relazioni e Bilancio. Banca Popolare di Vicenza (2012–2016) Terzo Pilastro di Basilea 2. Informativa al pubblico.

The Pillar 3 report and the Notes provide a satisfactory level of information with reference to credit risk aggregation and methodologies, as well as accuracy of internal credit rating models. The low use of internal rating models affects the disclosure on the implications of internal credit rating for bank management, measurement models for credit risk capital requirements, and capital adequacy for credit risk (regulatory perspective). There is no information on economic capital for credit risk (internal and managerial perspective). It is also important to notice the inadequate use of tables and graphs. Oddly, some of them are almost unreadable.

In 2013, Banca Popolare di Vicenza was still involved in the implementation process of advanced internal rating-based methodologies. Credit risk disclosure is similar to the previous year but shows some improvements. First, the Pillar 3 report provides a glossary and some abbreviations. Second, tables and graphs are more readable than those in 2012. Third, the disclosure on the explanation of credit risk management strategies and internal/external credit rating has slightly improved. Fourth, with reference to the measurement models for unexpected losses, VaR models are mainly used for market risk and some methodological issues are clarified. The disclosure on measurement models for credit risk capital requirements, sensitivity analysis, and loan portfolio concentration has also slightly improved.

In 2014, Banca Popolare di Vicenza enhanced credit risk disclosure with particular reference to insolvency risk, internal rating system, credit risk control system, measurement models for expected loss, rating quantification and validation, capital adequacy for credit risk, provisioning for loan losses, credit risk-weighted assets (on- and off-balance sheet), credit risk assumption and retention, migration risk, and balance sheet ratios. The credit risk disclosure delivers more information on credit risk management goals, procedures, processes, and policies. For the first time, the term “exposure at default, EAD” is used in the annual credit risk reporting.

In 2015, credit risk disclosure is almost the same as the previous year. We noticed a slight enhancement with reference to the implementation of an advanced rating-based system. In terms of disclosure it has a positive effect on the explanation of credit risk management strategies; explanation of credit risk management goals, procedures, processes, and policies; and credit risk transfer. In some cases (e.g. collateral and off-balance sheet exposures), the quantity of information was reduced mainly with reference to insignificant information on credit risk. Consequently, an improvement in the quality of credit risk disclosure was observed.

In 2016, the backward-looking information on bank credit risk improved with reference to the internal rating system, measurement models for capital adequacy, the accuracy of internal credit rating models, recovery risk, credit risk prevention, and protection. The expected implementation of the new IFRS 9 improved the disclosure on credit risk prevention, protection, elimination and avoidance; credit risk expected and unexpected loss (with some information on VaR models for credit risk). Both the Notes and the Pillar 3 report provide more details on loan securitization, nonperforming loans, and balance sheet ratios. The new pieces of information on stress tests have no impact on credit risk disclosure.

In June 2017, Banca Popolare di Vicenza was wound up under insolvency procedure¹⁶ (compulsory liquidation). Thus, we took into account its credit risk disclosure until 2016.

5 RESEARCH FINDINGS: AN OVERVIEW

The research findings show that credit risk disclosure improved from 2012 to 2017 for all banks of the sample (Fig. 10.1 and Table 10.5). Moreover, the volume and complexity of credit risk disclosure also increased (Figs. 10.2 and 10.3). Furthermore, the research findings show that there is room to improve several aspects of credit risk disclosure.

Banks in the sample use graphs and tables in different ways in their credit risk reporting. An appropriate balance between narrative and graphic description, in addition to charts and cross-references, would enhance the understandability of credit risk reporting and help banks to provide an integrated perspective on credit risk.

Disclosure on risk-adjusted performance is provided in the management compensation policy and incentive programs sections of the bank annual report. Banks do not usually employ any risk-adjusted performance indicators as important tools in credit risk disclosure. Banks could pay more attention to risk-adjusted performance indicators and assign them an important role in credit risk reporting.

The research findings of the empirical research indicate that all banks in the sample enhanced the quality and quantity of credit risk management disclosure. In general, the disclosure on credit risk prevention and protection is slightly better than the disclosure on credit risk assumption,

¹⁶ Bank of Italy appointed the liquidators who sold a part of Banca Popolare di Vicenza to Banca Intesa Sanpaolo.

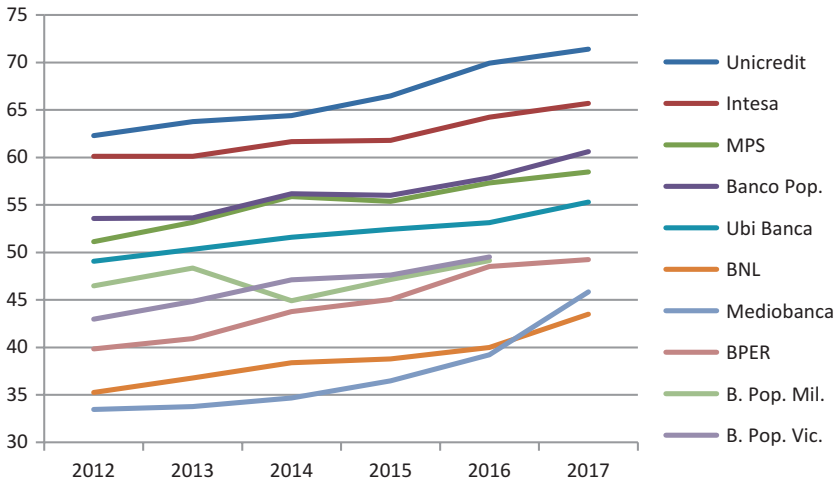


Fig. 10.1 An overview of the credit risk disclosure quality indexes

Table 10.5 An overview of the credit risk disclosure quality indexes

	2012	2013	2014	2015	2016	2017	Difference 2017-2012
Unicredit	62.29	63.76	64.41	66.48	69.93	71.40	9.11
Intesa Sanpaolo	60.12	60.12	61.67	61.79	64.23	65.69	5.57
Monte dei Paschi di Siena	51.13	53.17	55.86	55.36	57.30	58.47	7.34
Banco Popolare	53.57	53.62	56.18	55.99	57.86	60.61	7.04
UBI Banca	49.06	50.31	51.60	52.42	53.13	55.30	6.23
Banca Nazionale del Lavoro	35.25	36.77	38.39	38.78	39.97	43.49	8.24
Mediobanca	33.46	33.76	34.67	36.46	39.20	45.84	12.38
BPER Banca	39.83	40.91	43.75	45.03	48.50	49.24	9.41
Banca Popolare di Milano	46.49	48.34	44.91	47.14	49.14	N/A	2.65
Banca Popolare di Vicenza	42.97	44.83	47.10	47.60	49.52	N/A	6.55

retention, and credit risk transfer. In contrast, the disclosure on credit risk elimination and avoidance is mainly related to accounting principles and rules of recognition and derecognition of assets in a bank balance sheet. The disclosure on current on-balance sheet credit risk exposures is better than off-balance sheet credit risk exposures, while the disclosure on current credit risk exposures is better than potential credit risk exposures. In addition, disclosure on potential on-balance sheet credit risk exposures is better than potential off-balance sheet credit risk exposures.

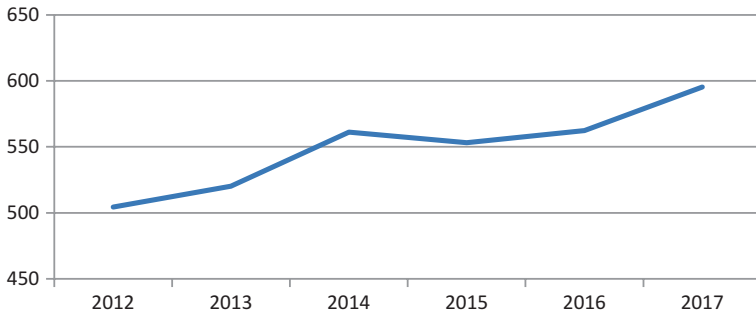


Fig. 10.2 Average number of pages of disclosure reports per year

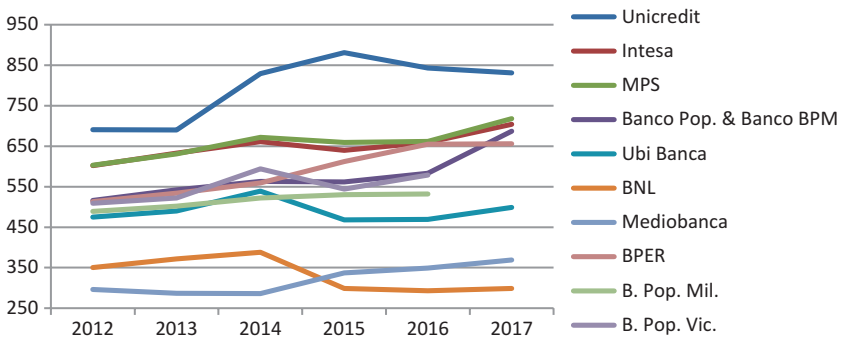


Fig. 10.3 Total number of pages of disclosure reports per year

Moreover, risk disclosure adopts mainly a building-block approach. It means that the interconnectedness and interactions with other different risk types (market risk, liquidity risk, and operational risk) are not well disclosed. Consequently, risk disclosure does not provide an adequately integrated and unified point of view on banking risks, and particularly on credit risk.

It is worthwhile to notice that the adoption of a unified view on risk disclosure might offer the opportunity to integrate accounting-based and management-based information on banking risks. In addition, it is highly recommended to avoid moving pieces of information from one report to another over time continuously. For example, with reference to some banks in the sample, we noticed that stress test results are moved from the Pillar 3 report to the Notes or Management Commentary, and vice versa, over time continuously.

The Management Commentary has mainly a narrative nature, as it explains current and future management strategies and prospects, main trends and factors underlying the development, performance, and competitive position of a bank during the financial year, which are likely to affect future banks' performance and development. It provides financial and nonfinancial information, outlook information, and insights into a bank's performance that financial statements cannot provide, mainly because of their different nature and purposes in bank reporting system. In brief, the Management Commentary offers an opportunity for bank management to provide a narrative explanation that accompanies financial statements to enhance annual disclosure (Bryan 1997; Calandrini et al. 1993). The information that is provided by the Management Commentary is relevant to understand the long-term development of financial statements. The research findings of this empirical study provide evidence that banks do not exploit all relevant disclosure potentialities of the Management Commentary. Banks do not use it in an appropriate way.

While accurate credit risk reporting is crucial for the stability of the banking system as a whole, there is essentially a fundamental trade-off problem between transparency and opacity in banking. In this empirical research, we show that it may create incentives to adopt under-reporting behaviors in banking, with important consequences in terms of usefulness of credit risk information and measurements. In this perspective, the trade-off problem and the under-reporting behavior have relevant regulatory and policy implications (Ryan 2012).

It is well argued that risk disclosure is crucial to drive investment decisions. By disclosing reliable and accurate forward-looking information, stakeholders would be able to assess potential credit risk exposures, potential credit losses, and bank capital adequacy to absorb not only current losses but also future expected and unexpected losses on credit risk. Overall, we show that forward-looking disclosure on credit risk could be improved for assessing the soundness of banking institutions.

6 CONCLUSION

The ongoing financial crisis, the first established part of the EU banking union (the Single Supervisory Mechanism), and the recent adoption of a bail-in regime in the European bank resolution regulation have enhanced the importance of credit risk disclosure in banking. Banks have to face increased supervisory pressure and market scrutiny (Masera 2016; Mottura

2014b; Tutino 2014; Tutino et al. 2011) that affect the growing importance of risk disclosure for assessing the soundness and stability of a banking institution and, in a broader view, of a banking system.

This research focuses on Italian banks and provides empirical evidence on the significant differences that characterize their credit risk reporting, even though banks are subject to similar regulatory and accounting frameworks. While it is important to understand credit risk reporting practices for a given bank over time, it is also important to compare such practices and identify the fundamental differences that characterize banks' credit risk disclosure. In order to perform this analysis, we propose a hybrid scoring rule to evaluate banks' credit risk disclosure practices. Through this metric, we conducted a content analysis to investigate credit risk reporting qualitative and quantitative profiles on a sample of large Italian banks. Although both an entirely objective approach and a judgmental one are affected by some limitations, we argue that their combination in the same metric can make this analysis reliable and really useful. The empirical results of this research show that banks report their credit risk differently.

Nevertheless, it is important to mention that this empirical research may suffer from some limitations. The subjectivity of the content analysis might be a potential limitation of this empirical research, as well as the difficulties in combining the qualitative features (comprehensibility, relevance, comparability, and reliability) to evaluate credit risk disclosure. However, the methodology we propose in this research mitigates any concern about the subjective evaluation that affects the content analysis. Additionally, subjectivity is a necessary feature of any judgment-based scoring model and cannot be removed entirely.

In conclusion, this empirical study sheds light on how the largest Italian banks deal with credit risk disclosure in their annual financial reporting. In this perspective, the implementation of the new IFRS 9 in banking and the recently expanded risk disclosure requirements under the Pillar 3 of the Basel Capital Adequacy regulation (Basel Committee on Banking Supervision 2015, 2017) will stimulate further research in this field.

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The Impact of Recent Regulatory Reforms on Cross-Border Banking: A Study of the Nordic Markets

Viktor Elliot, Ted Lindblom, and Magnus Willeson

I INTRODUCTION

In their capacity as financial service providers, banks constitute an integral link in both domestic and international supply chains. Banks play an important role by offering efficient ways to monitor, reduce, and redistribute risk in financial settlements between trading parties. Their role in risk mitigation is particularly accentuated in international supply chains. In many cases, banks are vital for access to goods produced in other countries because they connect households and real-sector firms to supply chains (IFC 2017). In addition to settling cross-border payments, banks facilitate

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global trade by providing traditional trade finance arrangements, such as letters of credit (L/Cs), as well as newer supply chain finance schemes, such as reverse factoring. In general, banks are in a position to provide cross-border banking services because they have and/or belong to a network of correspondent banking relationships (CBRs).

In an international setting, correspondent banking can be described as a bilateral commitment or arrangement between banks located in different countries that make it possible for them to offer and efficiently execute cross-border payments and trade finance services. In the arrangement, the so-called correspondent bank holds deposits on the account of the so-called respondent bank(s), allowing the respondent bank to accomplish its customers' financial cross-border transactions through the correspondent bank.¹ As the arrangement is generally a reciprocal CBR, each participating bank can be either a correspondent or a respondent bank, depending on the underlying business transaction. Inspired by the development and the work of the Wolfsberg Group,² Grolleman and Jutra (2017:6) adopt the following general definition of a traditional CBR arrangement: "the provision of a current account (called a *nostro* account) by a bank to another bank, which uses this *nostro* account to facilitate cross-border payments and trade finance transactions of its customers (e.g., individuals, legal entities, or even other banks)."

There are three main CBR arrangements for providing cross-border banking services (see, e.g., Erbenová et al. 2016). In the first and most common traditional arrangement, the respondent bank utilizes the *nostro* account(s) at the correspondent bank to carry out cross-border payments or trade finance transactions on its own behalf or on behalf of its bank customers. In the second arrangement, the respondent bank uses its CBR to provide cross-border banking services on behalf of its financial intermediary customers (such as other banks or financial institutions). This type of arrangement is referred to as "nested" CBR. Finally, in the third arrangement, the nested form of CBR is further accentuated. The respondent bank has here entered into an agreement with its intermediate customers to access directly the bank's *nostro* accounts at the correspondent bank,

¹ See, for example, the Bank of International Settlements (BIS)-sponsored Committee on Payment and Market Infrastructures (CPMI 2016).

² The Wolfsberg Group is an association founded by 13 multinational banks with the aim of developing "frameworks and guidance for the management of financial crime risks, particularly with respect to Know Your Customer, Anti-Money Laundering and Counter Terrorist Financing policies" (Grolleman and Jutra 2017:6).

allowing these financial intermediaries to execute cross-border payments on behalf of their own customers. This form of CBR arrangement is referred to as a “pass-through” or “pass-by” agreement.

For many years, the number of CBRs and the extent of their use have increased to the benefit of international trade. However, in connection to the post-crisis regulatory framework, the number of CBRs has started to decrease significantly (see BAFT 2014; Arnold and Fleming 2014; ECB 2015; World Bank 2015; IIF and Ernst & Young 2016; Artingstall et al. 2016; IFC 2017). These reports highlight that the reduction of CBRs is a global phenomenon that could have large negative effects on global trade. The Financial Stability Board (FSB 2016:3) specifically notes that “a decline in the number of correspondent banking relationships is a source of concern for the international community because it may affect the ability to send and receive international payments, or drive some payment flows underground, with potential consequences on growth, financial inclusion, as well as the stability and integrity of the financial system.” On the basis of recent data, the BIS (2018) suggests that inter-firm trade credit and non-bank-intermediated trade finance arrangements are increasing and that the business models of banks are becoming more homogeneous. To what extent this may be explained by the emerging regulatory environment remains to be documented. Empirical research is still limited. Recent analyses of cross-border banking are generally anecdotal and tend to focus on dyadic buyer/supplier relationships (see, e.g., Andersson et al. 2014; Gelsomino et al. 2016). There are few studies on how the use of inter-firm trade credit and intermediated trade finance in international supply chains has been affected by the new regulations, let alone on the impact of the recently imposed anti-money laundering (AML) and combating the financing of terrorism (CFT) regulations.

The BIS has stated that “market participants generally describe the emerging regulatory environment as much less burdensome than initially anticipated, while highlighting that some uncertainties remain about the possibly divergent treatment across jurisdictions and the potential impact of aspects of the liquidity coverage ratio” (2014:2). However, Demir et al. (2017) have observed changes in the use of L/Cs due to the altered capital adequacy requirements and the pillars introduced in Basel II. Moreover, in a questionnaire-based study on the impact of Basel III on firms’ use of trade finance, Broens (2014) found that a majority of the company treasuries and credit analysts who responded, raised concerns about the impact of the regulation on corporate trade finance, albeit their concerns varied with

company size. This leads us to formulate the following empirical research question: What impact, if any, do the new regulatory capital requirements and AML/CFT reforms have on banks' networks of CBRs in general, and on the execution of trade financing activities in particular? Although single regulatory measures may have specific effects on banking activities, our chapter is concerned with the broader regulatory change process and the analysis of the combined effects of regulation on banks' CBRs.

The aim of this study is to explore and analyze whether and how the new regulatory reforms have affected the CBR networks and trade finance products of Nordic banks. All the Nordic countries are open economies with small domestic markets, which means that international trade is of great importance for economic welfare. Hence, the Nordic countries are highly dependent on a well-functioning banking system and on strong international relationships to execute trade. A recent report from the Nordic Council of Ministers (2016) shows that in 2015 the sum of exports and imports as a share of gross domestic product (GDP) ranged between 69 percent (in Norway) and 101 percent (in Denmark). The report further notes that the importance of small and medium-sized enterprises (SMEs) for service exports increased in Denmark and Finland between 2010 and 2014. Thus, the Nordic region is a useful example to illustrate the impact of recent regulatory change on banks' CBRs and the implications for international trade. While we make no claim on generalizability, the Nordic banks operate (partly through their CBRs) in a wide range of countries, which indicates that our results are likely to represent a more general trend across the EU and the world within and beyond the Organisation for Economic Co-operation and Development (OECD). Our results are based on personal interviews with bank managers responsible for cross-border banking services provided by the major banks operating mainly in the Swedish, Danish, and Norwegian markets. We find that regulation has had a substantial impact on the banks' CBR networks and on how they are organized around trade finance activities. However, the banks have responded differently to the changes, in terms of both how they comply with regulation and how they organize internally. Our findings contribute to the regulatory response literature by providing insights into (1) how financial institutions address regulatory challenges, (2) how the balancing act between compliance and profitability in banks' regulatory responses can vary, and (3) the reasons for banks choosing to organize their network of CBRs in the ways they do.

The chapter is organized as follows. Section 2 briefly reviews the relevant empirical literature on trade finance and correspondent banking, and is followed by a discussion of regulatory responses in Sect. 3. Section 4 addresses the method we have adopted and presents the respondents we interviewed. Section 5 gives the results from the interviews and the main findings of our study. Section 6 draws conclusions from these results and suggests questions for future research.

2 BRIEF REVIEW OF TRADE FINANCE STUDIES IN RELATION TO CORRESPONDENT BANKING

It appears that the academic literature on trade finance takes banks' CBR networks more or less for granted. CBRs are to a large extent implicitly described in the context of bank-intermediated trade finance to buyers and/or sellers, bank credit extensions, and/or how banks (re)organize their cross-border banking activities (Niepmann and Schmidt-Eisenlohr 2017).³ Panza and Merrett (2018) conclude that the existence of CBRs is a cheaper way for a bank to organize trade finance in support of international trade than having a network of its own branches and subsidiaries abroad as part of an international organization. They observe strong evidence that a country's distribution of CBRs is tied to its bilateral trade flow volumes, GDP, and the location of its financial centers.

The relative benefit of using banks is driven by economies of scale, factors of scope, and, not least, information asymmetries between buyers and sellers that banks can overcome themselves or via their CBR networks. Nevertheless, a large stream of literature in the trade finance area has argued in line with Fisman and Love (2003) that banks are a second-best alternative to inter-firm trade credit in reducing transaction costs. In this vein, Schmidt-Eisenlohr (2013) concludes that the timing of a trade plays an essential part in the estimation of the costs and benefits of alternative forms of payment (pre-payment, post-payment, and L/Cs) for funding a specific transaction. Atanasova (2007) observes that the choice between inter-firm trade credit and intermediate trade finance by banks can be

³A body of literature has identified and analyzed CBRs related to platforms in which banks are integrated. A discussion of interchange fees between actors in card payment systems is one example (Rochet and Tirole 2002; James and Weiman 2010). There is also a body of literature discussing the role of the Federal Reserve banks as an intermediary in CBRs within the US banking system (McAndrews and Strahan 2002; Stavins 2004).

based on transactions and financing motives. A major determinant of trade finance is access to capital, which suggests that smaller and/or riskier firms benefit more from trade finance than larger, well-capitalized firms. For instance, Ahn (2011) points out that the use of L/Cs reduces the importance of information asymmetries between the parties. Kouvelis and Zhao (2012) admit that banks can reduce cost or risk in the international financial supply chain, but argue that company wealth is a determinant of which supply chains are suitable. Different economic conditions further our understanding of the use of trade credit (Broens 2014; Lin and Chou 2015; Carbó-Valverde et al. 2016).

The view that trading firms choose between different financing alternatives is not exclusive to the buyer and seller perspective. In their analysis of why banks restrict credit on the basis of client risk, Jin and Luo (2016) cite risk aversion on the part of the bank to explain the supply of trade finance in international trade. Demirgüç-Kunt and Maksimovic (2001) divide the determinants of the use of intermediate trade finance of banks rather than inter-firm trade credit into two categories: substitutes and complements. According to the *substitution hypothesis*, trade credit can be a low-cost alternative to trade finance. This explains why trade credit solutions are more common in countries that exhibit financial market imperfections, such as capital constraints or less efficient financial markets. The *complementary hypothesis* is based on the comparative monitoring advantage of the buyer and sellers, in addition to generally good access to a strong and efficient financial system. With respect to the latter hypothesis, there is a general consensus in the literature that banks add value to economic growth through efficient intermediation of trade finance services. Countries with better developed financial markets and higher use of formal trade credit arrangements show higher economic growth (Fisman and Love 2003). This implies that banks provide a useful service in redistributing resources.

3 IMPACT OF REGULATIONS ON TRADE FINANCE AND CORRESPONDENT BANKING

Because the literature on CBR is sparse and the regulatory impact on trade finance has only very recently become an area of concern, we depart from studies that analyze regulatory impact more broadly in order to discuss how banks may respond. Capital regulation impacts the use of trade credit

(Elliot and Lindblom 2018) and influences short-term business credit in relation to shadow banking alternatives (Duca 2016). In essence, regulation can change the relative benefit of using banks in two ways. On the one hand, regulation can lead to improved internal processes for monitoring and managing risk and capital. The need for compliance with a regulatory policy can even help a firm's management to reduce organizational resistance when undertaking necessary organizational development in the risk management area. On the other hand, there may be a number of issues related to compliance risk. In particular, when there is a discrepancy between the regulator's view of risk and the bank's view of risk and result, unintended and inefficient regulatory outcomes such as the following are likely:

- direct or indirect costs of compliance that are higher than the benefit of risk, have no effect on risk, or even increase risk when reaching for yield to increase revenue to cover regulatory costs;
- business opportunities that are missed on compliance grounds rather than on grounds of risk and return (which may lead to financial exclusion and spill-over into market segments in need of financing);
- decreased profitability in market segments due to regulatory costs in markets where non-bank actors are less heavily regulated or trade credit is more appealing; regulatory restrictions or higher regulatory costs may consequently spill over to encourage a growing shadow banking sector.

The purpose of regulation is to reduce risk in the banking sector (Leaven and Levine 2009), but as VanHoose (2007) notes, banks vary in their responses to regulation. The variations may result in risk being directly, or indirectly, transferred from banks to other parties who are less equipped to manage the risk effectively. Regulatory response theories may be helpful in analyzing institutional incentives and motives behind how banks act and react when regulatory change is anticipated or implemented. In addition to Oliver's (1991) categorization of responses to institutional processes (acquiescence, compromise, avoidance, defiance, and manipulation), the recent literature has focused on responses related to regulatory arbitrage, de-risking, and legitimacy.

Regulatory arbitrage is a response in which regulatory inconsistencies are utilized to reduce the effect of regulation. For instance, positions in less regulated foreign markets can be used to cover for more restrictive

regulation in the home market (Ongena et al. 2013), and similarly between regulated and non-regulated sectors or products (Acharya et al. 2011). Banks benefit from using regulatory arbitrage when there is a gap between regulatory and market requirements (Calomiris and Mason 2004) or between accounting risk and real risk (Blaško and Sinkey 2006).

De-risking is a term used within the financial industry to denote a regulatory response of withdrawal from high-risk assets or markets for regulatory purposes.⁴ Similar responses have been discussed in the context of regulatory arbitrage, illustrated by shifts in business strategies between high and low capital requirements (Calem and Follain 2007). However, we distinguish de-risking as an avoidance strategy for reducing risk in order to comply with regulatory requirements and avoid regulatory penalties. The academic literature does not explicitly emphasize de-risking, but implicit coverage includes retrenchment strategies due to regulation (Classens 2016). Adriano (2017) raises concerns that de-risking in the banking sector can spill over into other parts of the economy as an indirect consequence of less efficient payments and credit markets in international contexts. This can encourage non-bank transactions and credits and loss of prestige and authorization compared to having correspondent relationships in an international context.

Legitimacy can be a driver of regulatory responses. Legitimacy is related to reputational risk when the actions undertaken by the regulated party depart from what is expected of them. The primary goal of the regulatory response is to please the regulator, that is, to obtain a kind of regulatory certification (Berg et al. 2011), which may deviate from the necessary management and responsibilities of risk (Power 2009).

Trade finance instruments, such as short-term L/Cs, are considered relatively low risk (especially from the perspective of credit risk) and have traditionally been treated so from a regulatory perspective (Auboin and Blengini 2018; Elliot and Lindblom 2018). Unfortunately, the preferred capital treatment in earlier versions of the Basel accords remains in the revised Basel III framework. As noted by Elliot and Lindblom (2018), this has a number of implications.

⁴This definition is close to the definition used by the FATF (Financial Action Task Force), which identifies de-risking as a situation “where financial institutions terminate or restrict business relationships with entire countries or classes of customer in order to avoid, rather than manage, risk in line with the FATF’s risk-based approach” (FATF 2016).

- Self-liquidating trade finance instruments, including L/Cs, are exempt from the one-year maturity floor and the sovereign floor.
- Under the standardized approach, the credit conversion factor (used to capture the likelihood of this off-balance sheet position becoming an on-balance sheet exposure) is only 20 percent for L/Cs.
- The leverage ratio includes a 20 percent credit conversion factor to short-term contingent trade finance assets.
- The revised liquidity regulations are based on a low outflow rate (0 to 5 percent) on contingent trade finance exposures (see BIS 2014 for an extended discussion).

In their reform proposal released in March 2016 (informally known as Basel IV), the Basel Committee on Banking Supervision proposed a series of measures with significant potential implications for the capital required for trade finance products (see Resti 2016 for an overview). The proposal was formalized in December 2017 (BIS 2017). Although in the standardized approach the credit conversion factor is kept the same for L/Cs, many banks may no longer be allowed to use their internal models to calculate the capital requirements for specific trade finance products (BIS 2017). We expect that the original Basel III requirements, as well as the revised version, will have an impact on the role played by banks in trade finance arrangements. However, a more direct impact on the structure and status of CBRs is expected from the regulations relating to AML and CFT.

Magnusson (2009:102) traces the concept of money laundering to 1920s America, where “organized crime gangs invested the proceeds of crime in laundries and car wash companies.” The gradual legislative efforts to prevent money laundering can also be referred back to the US, but the concept has since broadened substantially (Larsson 2008). Today, according to Magnusson (2009:103), the main interest is not the crime in itself, but rather “the legal regulation against money laundering and the financing of terrorism.” Following the legitimacy motives, Larsson (2008) concludes that the regulation system has become a goal in itself.

In 1988, with the signing of its 1988 Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, the United Nations was the first international organization to adopt formal regulations aimed at combating money laundering (Al-Qadi et al. 2012). More than 130 countries ratified the Convention, which includes legally binding provisions against money laundering. In 1989, the Group of Seven (G7) formed the Financial Action Task Force (FATF) to implement and monitor effective

programs to combat money laundering at an international level. The FATF developed a basic framework of 40 principles against money laundering, which were modified and implemented in major financial centers in 1996. Following the events of September 11, 2001, an additional eight principles focusing on the financing of terrorism were added to the framework (Al-Qadi et al. 2012). In February 2012, the FATF published another revision of their recommendations, intended to strengthen global safeguards and the integrity of the financial system by providing governments with stronger tools to take action against financial crime.⁵ The principles had been expanded to deal with new threats, such as the financing of proliferation of weapons of mass destruction, and to be more specific on transparency and tougher on corruption. The nine recommendations on terrorist financing have been fully integrated with the measures against money laundering. For the purposes of this study, recommendations 10–13 are particularly important. These recommendations encompass the customer and CBR due diligence requirements or what is commonly referred to as “know your customer” (KYC).⁶

Moreover, the FATF also conducts country-specific mutual evaluations (MEs) of measures to combat money laundering and terrorist financing on a continuous basis. The results of the MEs for Denmark, Norway, and Sweden are listed here.

- Denmark was evaluated during an onsite visit in 2016. The report concludes that “overall, Denmark has a moderate level of understanding of its money laundering and terrorist financing (ML/TF) risks; with TF risks being better understood by authorities. [...] [T]here is an inadequate understanding of risk and weak implementation of AML/CFT measures in almost all segments of the financial sector.”
- Norway was evaluated during an onsite visit in 2014. The report concludes that “information on and analysis of, money laundering (ML) risks in Norway is incomplete and further work is needed to identify and understand the risks, including with respect to relevant predicate offences.”

⁵On June 26, 2015, the 4th Anti-Money Laundering Directive (EU) No. 2015/849 (4th AMLD), which takes account of the FATF 2012 recommendations, entered into force. EU Member States were required to implement the 4th AMLD into national law by June 26, 2017 (<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32015L0849>, accessed 2018-06-26).

⁶<http://www.fatf-gafi.org/about/historyofthefatf/>, accessed 2018-06-26.

- Sweden was evaluated during an onsite visit in 2016. The report concludes that Sweden has a reasonable understanding of its ML/TF risks but that “significant improvements are needed in understanding ML/TF threats, domestic coordination, using financial intelligence and other information, the supervision of financial institutions and non-financial businesses and professions, the application of targeted financial sanctions for TF, and measures to prevent the misuse of legal persons and arrangements. It is not consistent across authorities and lacks sufficient coordination mechanisms.”

All three countries were criticized for having insufficient understanding of ML/TF risks as well as weak supervision and supervisory powers in that area. As with the similar findings of Agarwal et al. (2014) for the US and Barth et al. (2013) at a more global level, an explanation for the shortcomings appears to reside in the lack of coordination between the various authorities.

4 METHOD

Fundamental to our analysis is Auboin’s (2007:1) notion that “an efficient financial system is one indispensable infrastructure to allow trade to happen.” Based on a series of recent reports that have found a significant decrease in CBRs over recent years (see BAFT 2014; Arnold and Fleming 2014; ECB 2015; World Bank 2015; IIF and Ernst & Young 2016; Artingstall et al. 2016; IFC 2017), we argue that the efficiency of the financial system for trade facilitation is in jeopardy.

As alluded to in the Introduction, academic analyses of the regulatory implications on banks’ role in trade finance are scarce at best. To address this gap, we aim to explore how regulatory reform is affecting the way in which banks support international supply chains. Because this is an area where previous research has been rare and where access to data is very limited, we have chosen an exploratory and qualitative approach. In accordance with Kvale (1996), the exploratory purpose of the study motivates a search for emergent generalizations rather than the testing of established patterns. Thus, our findings lay a foundation for formalizing a set of hypotheses that can be tested in future work. The key data source for our analysis is semi-structured interviews conducted with representatives of the six largest Nordic banks. Together, these banks account for most of the cross-border CBR activities of the Nordic banks. Three out of the six

banks in our sample have recently been sanctioned by the financial supervisory authorities for deficiencies in respect of AML. In order to maintain anonymity, we cannot relate the sanctions to specific banks, but it is worth noticing that this may influence the type of regulatory response they have initiated.

The majority of interviews were conducted in Swedish. None of the interviews was recorded, but diligent notes were taken. A transcript was written up directly after each interview and then circulated back to the respondents for comments. Because many of the bank representatives continuously referred throughout the interviews to the Exportkreditnämnden (EKN), the Swedish export credit agency, a complementary interview was carried out with two EKN representatives. By interviewing the key players in the field, we were partly able to avoid issues of idiosyncrasy and facilitate a broader theoretical elaboration of the research question (see Eisenhardt and Graebner 2007 for further discussion of the advantages of comparative studies).

Taking into account the aim of the study, the empirical research question was broken down into the following four sub-questions:

1. What has been the impact of recent regulatory change on the bank's CBR network?
2. What are the criteria for terminating and/or initiating CBRs, and have these criteria changed in recent years?
3. What trade finance alternatives are available for firms outside the bank's CBR network?
4. What is the nature of competition in this field, and has it changed in recent years?

During the interviews, these questions formed themes that we discussed with the respondents, and the responses encompassed a wide range of areas, including whether this is a specifically Nordic phenomenon, which specific regulations were most important to the reduction in CBRs, the impact of the new regulatory reforms on the trade finance products of Nordic banks (whether or not caused by the decline of CBR networks), and the incentives and motives behind how banks act and react when regulatory change is anticipated or implemented (primarily in relation to cost-based motives and the regulatory response strategies of regulatory arbitrage, de-risking, and legitimacy). The questions were also useful in structuring the empirical discussion in the following section.

5 EMPIRICAL FINDINGS

In this section, we present the results of our interviews with representatives of the six banks and the EKN. For reasons of anonymity, the banks are referred to as Banks A to F. The presentation of our findings is organized according to the four questions presented in the previous section.⁷

5.1 *What Has Been the Impact of Recent Regulatory Change on the Bank's CBR Network?*

The CBR networks of the banks differ in size, but the respondents in most of the banks acknowledged that their network of CBRs had been significantly reduced during the last five to ten years. The magnitude of the decrease varied among the banks, ranging from a reduction of around one-fifth to a reduction as great as two-thirds. The respondent at Bank A declared a decrease in CBRs from a peak of about 3000 a decade ago to barely 1000 CBRs at present: “Of the up to 2000 CBRs that we have terminated, about 1000 were inactive and the other 1000 active with too low a business volume to cover their costs.” These types of CBR are also reported to have been terminated by the other banks. As one of the respondents at Bank C clarified, “previously the mantra was ‘good to have,’ whereas now it is ‘need to have.’” Neither he nor any of the other respondents reported finding that the bank had noticeably lost business volume because of its trimmed network of CBRs. The respondent at Bank B pointed out that “it is now important to get more out of the CBRs that the bank has left.”

Nevertheless, several respondents gave examples of cases where the bank had refused to offer any trade finance to a customer on the grounds that the bank of the customer’s counterparty was not included in its current CBR network. The respondent at Bank A estimated that the bank’s volume of trade transactions had declined by about 15 percent overall. The decline primarily concerned the more vulnerable (risk-exposed) markets and the bank’s smaller customers: “It is not a good trend, which I believe will continue.” The belief that the number of CBRs will further decline was shared by the two respondents at Bank C. In the words of one

⁷Because the interviews could not be recorded and have, in most cases, been translated from Swedish, the results are based not on direct quotes but rather on a representation of what was said during the interviews.

of them, “occasionally, the bank recommends the customer to consider another ‘solution,’ which in principle means that the customer should try to find another bank.” However, the respondents at Bank F maintained that finding another bank may not be that easy: “If another bank does not trust the customer, why should we? Does it mean that we think they [the other bank] have a poor KYC process? Most likely we will refuse the customer too.”

In this context, the respondents at Bank E expressed some concerns. They thought that other Nordic banks had been stricter in reducing their CBRs. The bank had recently made a strategic shift toward “taking social responsibility” by paying more attention to the trade finance conditions for SMEs. As one respondent put it, “large firms can always take their business elsewhere, but for SMEs we might be the only option.” At the same time, one of the respondents in the bank emphasized the importance of bearing in mind that the bank cannot and should not always decide what correspondent bank its customer’s counterparty uses. He provided the following vivid example: “Consider a large firm that imports spices from all over the world. The firm walks around the market in Delhi and finds an exporter that it wants to use. The exporter requires collection, and we look at the exporter’s bank and approve the CBR. Later on, the large firm wants to switch to another supplier, whose house bank we are reluctant to approve. Should we tell our customers that they cannot switch to the suppliers they find best for their businesses? It is a mess!” The respondents at Bank F offered an alternative view: “We continuously advise our customers to ensure that their trading partners utilize banks with whom we have a relationship.” They insisted that the bank’s customers had taken this well: “During the last two years, we have seen tremendous change in the behavior of our customers. Today, they ask us what CBRs we have in a specific market before the trade is initiated.”

According to the respondents interviewed, the major reason for the downsizing of the banks’ CBR networks is not that a CBR is regarded as costly for the bank to maintain from a strict business point of view. Under regular conditions, the annual operational costs incurred by having a CBR have only a marginal effect on the bank’s profit. Instead, the major reason is the substantial increase in compliance risk over the past few years. As the respondent at Bank B put it, “Comply or die!” This respondent went on to explain: “In the case where a trade finance deal fails, the credit loss is most likely negligible for the bank as a whole, although it might be painful for the trade finance department. However, if the failure is attributed to an

inadequate KYC analysis, it can lead to huge fines that will be very noticeable at the highest levels of the bank.” One of the respondents at Bank C verified that the regulator can now impose fines of several hundreds of million euros or a maximum of 10 percent of the bank’s turnover. In the past, the corresponding maximum fines were only around €5 million. The respondent also emphasized the reputational risk: “It is important that international correspondent banks in the network do not perceive the bank as a ‘bad’ bank with insufficient controls.”

5.2 What Are the Criteria for Terminating and/or Initiating CBRs, and Have These Criteria Changed in Recent Years?

The respondents emphasized primarily the following three parameters: the benefit to the bank and its customers of having CBRs, compliance risk, and reputational risk. Before the implementation of the AML/CFT regulations (currently the Fourth Money Laundering Directive), the focus was on the first of these parameters and, to a lesser extent, the third one. Under the new regulatory framework, the emphasis is on the second parameter: compliance risk. This was emphasized by most of the respondents, who reported that their bank’s compliance unit with specific responsibility for KYC for CBRs had been reorganized and increased from very few staff to a powerful department with more than ten staff. For instance, the respondent at Bank D reported that “the new regulatory framework means that the establishment of CBRs must always be sanctioned by the bank’s compliance (‘on-boarding’) committee.” Two respondents at Bank E acknowledged that nowadays they are “drowning in compliance.” One of them estimated that more than 50 percent of their time is spent on compliance-related issues: “Sometimes the only option for actually helping a customer is to open a new CBR, and then it needs to be carefully motivated.” Similarly, the respondents at Bank F estimated that at least 25 percent of their time is spent on compliance-related issues: “We no longer do promotions where we try to increase our CBR network. Just five years ago, there were clear targets for increasing the number of CBRs, but these targets are gone, and now we focus on the CBRs we already have.”

The altered conditions for extending the bank’s network of CBRs were clearly illustrated and summarized by the respondent at Bank B: “I used to travel around and connect new correspondent banks to the bank’s CBR network in order to facilitate trade for the bank’s customers. The initiation of a new CBR connected to SWIFT was relatively simple to accomplish at

a low cost.” However, he continued, “Today the initiation of a new CBR is challenging. The bank has to conduct thorough examinations and analyses in order to comply with KYC requirements. One must clarify how the potential correspondent bank is operating, as well as its portfolio of businesses, customers, etc. This requires a personal visit to the bank in question.”

When it comes to determining whether a new CBR should be initiated, all the respondents reasoned in a similar way. Some type of internal rating is conducted on each new CBR; 30 to 70 percent of the rating is said to be based on the country risk and the remaining 70 to 30 percent on bank-specific variables such as size, whether the bank is public, the type of accounting firm involved, and credit rating (the actual rating being less important than the fact of the bank being rated by one of the large rating agencies). To decide on the bank-specific rating, the respondents use external utilities, but in many cases they also make site visits (see further below).

Most of the respondents emphasized the importance of a Nordic connection with respect to the customer, the trade, or both. Moreover, they were very reluctant to utilize CBRs in “risky” countries, such as Iran and North Korea. Some of the banks claim that it is unthinkable today to be involved in any trade related to these countries. This is illustrated by the following statement by a respondent at Bank E: “We had to close down Iran, despite there being some really profitable trade with good firms. In addition, both Swedish and Danish authorities are in Tehran to promote Nordic firms and increase trade, but, at the same time, no banks can offer their services there anymore. This is very problematic.” The respondents at Bank F agreed, but only partially: “Several Iranian banks have subsidiaries that are on the European Central Bank’s TARGET2⁸ list, which means that we cannot stop any transactions from that subsidiary. This is an obvious hole in the regulations.”

There are also differences between the banks. This is particularly evident when comparing their calculations of costs and benefits. The respondent at Bank A did not find it necessary to make site visits to a potential new correspondent bank. Instead, he referred to pre-set standard cost estimates for

⁸TARGET2 is the real-time gross settlement (RTGS) system owned and operated by the Eurosystem. Central banks and commercial banks can submit payment orders in euro to TARGET2, where they are processed and settled in central bank money, that is, money held in an account with a central bank.

determining whether a particular CBR is justified. An ordinary CBR is estimated to cost the bank approximately €2500; such a relationship is estimated to cost ten times as much if the correspondent bank is located in a risky region or a country listed by the FATF. In principle, the expected revenue for the bank of having the CBR must exceed the pre-set standard cost in its location. However, if the CBR is deemed valuable for a core customer to the bank, the CBR may be kept or initiated in any case. In light of the latter addendum, Bank A's decision criteria resemble those described by the respondents from the other banks. Banks F and D were also said to rely, at least to some extent, on pre-set standard costs. The other banks were said to make their decisions on a case-by-case basis; this was asserted explicitly by the respondents at Banks B, C, and E.

The respondent at Bank B reported that the bank makes a risk classification in which 1 is very high risk and 6 is very low risk. The bank prefers CBRs that are classified as 5 or 6. Although it accepts lower grades, this will be reflected in a higher price to the customer. Having clarified this, the respondent stated that "the bank does not apply any pre-set standards to determine how 'expensive' a CBR is. This is determined case by case. There are a lot of differences between regions/countries, as well as between the customers concerned. In some regions, the bank needs to have many CBRs, whereas just one CBR may be enough to cover the whole market in others."

One of the respondents at Bank C registered agreement: "There is a threshold cost to initiate a CBR, but the bank does not apply pre-set standards. We make our decision based on an overall assessment." Even if the respondent found it possible to open a CBR centrally from the bank office on the home market, the solution would be temporary. The respondent emphasized that, as at Bank B, an adequate KYC procedure must be carried out locally at the correspondent bank. If this bank is located in a risky country/region, it is regarded as particularly important to meet its representatives. It might also be necessary to pay a visit to the central bank, which can occasionally act as a correspondent bank. Bank F has redefined its policy, and now, when the respondents decide to visit a specific country, they make sure to visit all the correspondent banks in that country, as well as the central bank and other supervisory authorities (and, in many cases, the embassy). One respondent at Bank F stated that "it is the joint analysis of all of these parties that creates the best understanding of the financial market in a specific country."

The importance of specific cases was further emphasized by the respondents at Bank E. They argued that the big banks are not necessarily any longer the best CBRs: “In fact, in several countries, new lean banks, based on similar governance structures and processes to Western banks, stealing the best employees and working with the best clients, may be better as CBRs than the traditional large state-owned banks.” Nevertheless, the respondents were careful to point out that there was extensive internal politicking regarding CBRs and that it is always necessary to “motivate to senior management” why a specific CBR should be maintained or initiated; “before motivating it to senior management, it must be approved by compliance, but in certain ‘very high-profile cases’ there may be a slight amount of wiggle-room.” One of the respondents advocated the adoption of a portfolio approach: “The marginal cost of having an additional CBR in a country where you already have 10 CBRs is very low.”

The respondent at Bank D acknowledged that the bank uses pre-estimated standard costs associated with different CBRs, but that these standards are not disclosed. Instead, the respondent emphasized the risk aspect. She declared that the bank aimed not to “de-risk” but to evaluate each CBR carefully against the following criterion: “If you cannot manage the risk, you cannot keep it.” It was important for the business unit to be able to motivate the CBR adequately, but poor motivations were not uncommon, such as “it will make it possible for the bank to earn a lot of money.” In the case of larger correspondent banks, there may also be an incomplete picture regarding ownership, subsidiaries, or why the bank operates a branch in, for example, New Jersey or the Cayman Islands: “This will give rise to a dialogue leading to continuous learning for business unit managers and, usually, improved motivations and explanations.”

5.3 *What Trade Finance Alternatives Are Available for Firms Outside the Bank’s CBR Network?*

The respondents differed in their views on what trade finance alternatives there are outside their own CBRs. The respondents at Bank E gave the opinion that, in many cases, there are no alternatives, and “banks need to make sure that they know what they are doing.” In some cases, they advocate “multiple bank solutions” in which the bank provides trade finance arrangements to specific customers together with other banks. The respondents at Bank C acknowledged that the bank had on occasion entered into “third-party bank” agreements that allowed it to utilize the CBRs of larger

international banks. One of the respondents stated that it may be especially useful to cooperate with other big banks in the case of large trade finance arrangements: “Large infrastructure projects in a risky country, such as Bangladesh, may be too risky for a single bank.” Moreover, the banks’ limits on their correspondent banks depend on the size of those banks. The respondent emphasized that cooperation is a sensitive matter: “At the end of the day, it is a question of competition.” This may explain why the bank seeks first of all to cooperate with larger international banks. However, the bank also acts as a third-party bank itself by opening up its CBR network, particularly for smaller banks in Sweden and Norway, since these banks do not have their own CBRs or a CBR in the region/country of their customers’ trading counterpart.

The respondent at Bank B confirmed that the bank may also act as a third-party bank, thus allowing another financial institution to utilize its CBR network. However, it is crucial for there to be a Nordic connection. The respondent illustrated this with the following hypothetical example: “Assume that an Italian bank wishes to utilize the bank’s CBRs to manage a trade finance transaction with a counterpart in Spain—the Italian bank’s limit at its ‘own’ correspondent bank in Spain might, for example, be fully utilized. Even if this is a good deal on paper, the bank would be reluctant to approve it. However, the bank might agree if the customer to the Italian bank was, for instance, Zanussi, as it is a subsidiary of Electrolux [in Sweden].” The respondent added that it was likely that the bank would then issue a guarantee through which it assumed the credit risk and some form of KYC responsibility, but the main part of the reputational risk would be assumed by the Italian bank. Where a large transaction is concerned, the bank would probably issue the guarantee together with the EKN (the Swedish export credit agency) or enter into some form of insurance agreement (e.g., with Lloyd’s of London).

The respondent at Bank A also referred to the EKN in Sweden as an important player for accomplishing larger trade finance transactions, particularly for those involving parties in regions/countries that are considered riskier: “The Swedish EKN is very good, fast, straightforward, and fair. We split the risk 50/50.” The EKN’s counterparts in Finland and Denmark were considered inferior.

The respondents at the EKN explained that the agency functions more or less as an insurance company in that it provides insurance in the form of guarantees. The EKN offers three main products: a credit-loss guarantee related to customer (accounts) receivables, a working capital credit

guarantee, and a contract/counterpart guarantee. The first product is directed to export companies, which for a fee can ensure payment from a foreign counterpart on which they have a claim in terms of accounts receivable. The EKN guarantees up to 95 percent of the payment risk; the remaining 5 percent is considered an excess fee and is borne by the customer. This product is mainly offered in connection with exports to countries outside the EU and the OECD. Within the EU and the OECD, the guarantee is mostly long term (two years or more): “Here, there is fierce competition and a lot of private trade finance alternatives offering short-term solutions based on portfolio thinking.” The other products are directed toward banks and other financial institutions, such as Almi (a government-owned agency offering SME funding in the form of business loans and investments), which may be involved in smaller transactions concerning SMEs. Both respondents emphasized the importance of increasing awareness and general knowledge of the EKN and its products among business firms and banks. They arrange seminars for business firms and pay many visits to banks. In addition to the attractiveness for the bank of sharing the credit risk with the EKN in large trade finance transactions, the respondents pointed out the advantage for the bank of having the EKN as a partner in more ordinary transactions: “The bank may not need to provide any collateral.” The EKN may issue a counterpart guarantee for up to 75 percent of the total trade finance credit, and the respondents reported growing interest from banks in the past four years: “An important explanation for this is the booming economy, which at present makes banks prepared to take on more risk.” The respondents were careful to explain that the EKN issues guarantees to Swedish firms only and conducts its own credit risk assessments independently of the bank: “It has happened, albeit not very often, that the EKN has said no, despite the fact that the bank had said yes.”

Another alternative to using CBRs in trade finance was mentioned by the respondents at Banks B and C. As with the other banks, both have or have had their own banking operations abroad. However, this is only of interest for customers with trade in the relevant countries.

5.4 What Is the Nature of the Competition in This Field, and Has It Changed in Recent Years?

All the respondents gave assurances that they were well informed about the actions taken by other Nordic banks. The respondent at Bank A, for

instance, gave examples of strategic decisions on the part of each of the bank's major competitors and described how they had positioned themselves on the Nordic market. The respondent at Bank B stated that the bank's greatest competitor changes over time: "Occasionally, a bank may want to 'buy' itself into the market through aggressive pricing." The respondent emphasized the importance of bearing in mind that SMEs typically have a house bank, whereas larger firms often bank with several banks and other financial institutions. The respondents at Bank C explained their view that it is increasingly important for SMEs, too, to have more than one bank if they are trading across borders. This is a way to benefit from competition and to have alternatives when "their" bank is unable or unwilling to assist them with trade finance. However, the respondents at Bank E raised a warning flag about increasing standardization and the resulting concentration of the market: "Too much standardization is dangerous, because if we all offer the same products, what is left to compete with?" They advocated a more nuanced view, according to which simpler CBR transactions should not be treated in the same way as more complex CBR transactions. The respondent at Bank D was convinced that increasing digitalization will lead to more and more automatization of processes, even if many trade finance processes do not particularly lend themselves to automation.

6 CONCLUDING DISCUSSION

This study aims to explore and analyze the impact of the new regulatory reforms on the CBR networks and trade finance products of the Nordic banks. On the basis of our interviews with respondents from the six dominant Nordic banks, we suggest that recent regulatory reforms have had an impact on how these banks assess risk and supply trade finance solutions across international supply chains. A striking feature of the results is how, from an aggregate outside position, the regulatory responses of all six banks seem rather similar (e.g., cutting down on CBRs, formalizing compliance procedures, and focusing on less risky markets and customers). However, on digging deeper, it becomes clear that the banks differ in how they manage regulatory compliance and risk, as well as the spill-over from regulation. While some of the banks focus on standardization and de-risking, others emphasize their social responsibility as an important element of the infrastructure that allows trade to function. These views have implications for how the banks assess current and new CBRs; some banks

rely primarily on external information and focus on the dominant banks in specific countries, whereas others diligently examine each relationship. Why the banks differ in their responses to the new regulations remains to be explored and calls for further research.

Consistent with what has been reported elsewhere (e.g., Arnold and Fleming 2014; Artingstall et al. 2016), the Nordic banks have downsized CBRs significantly. Our respondents posited costs as a primary motive, reinforced by the higher costs of compliance and engagement for improved KYC processes. These costs stem both from increasing numbers of staff dedicated to ensuring that the banks are compliant with the AML/CFT regulations and from existing staff spending a lot more of their time on KYC procedures. Compliance motives were suggested by some of the respondents. Consideration of these regulatory responses and the regulatory spill-over brings the perspective of regulatory cost to the trade finance literature, which has focused so far on the banks' engagement in trade finance in terms of risk. From a more practical perspective, such costs may decrease over time, especially with technological innovations, such as the Legal Entity Identifiers suggested by the FSB.

In addition to insights into how banks address regulatory challenges, the findings of this study have implications for theories of regulatory responses (e.g., Oliver 1991; VanHoose 2007; Acharya et al. 2011; Ongena et al. 2013) that require further attention with respect both to research on the efficiency of financial systems and to theories of regulatory responses.

From the financial system perspective, we observe that concurrent outcomes related to reduced CBRs and to regulatory responses can be motivated by different strategies toward costs and risk. These results indicate a risk of error or low determination in drawing conclusions about systemic risk on an aggregated basis without taking into account institutional differences in attitudes to risk and cost management. AML and CFT regulations are special in that there is no direct conflict of incentive between regulators and banks; they all want to prevent criminal activity. The conflict arises in how to address the problem. Regulators appear to have a strong belief in screening as a tool for identifying "bad apples." Banks, on the other hand, have expressed the concern that screening imposes additional costs on the good apples, leaving the bad ones to continue their operations outside the regulatory system. Our findings indicate that trade finance costs have certainly gone up, and it remains for future research to confirm whether this has had the intended effects.

From the regulatory response perspective, we observe strong support on the part of the banks for de-risking strategies. However, de-risking is not limited to avoiding risky markets but involves efforts to reduce costs related to regulatory sanctions and fines. A decision to retain CBRs in certain markets because of high volumes of trade finance and/or supporting important clients is based on motives that go beyond risk. Moreover, our findings lend support for theories related to legitimacy (Power 2009; Berg et al. 2011) with respect to how the banks focus increasingly on reputational risk, engage in compliance issues on a regular basis, and, to some extent, suffer from managerial anxiety. Regulatory arbitrage is not viewed as a response theory at this stage. However, concerns over competition from non-bank actors can be raised. This would mean regulatory arbitrage being undertaken not by banks but by their clients.

Finally, trade is currently under pressure from many directions: a gradual dismantling of free-trade agreements, regulatory pressure on financial service providers, and increasing conflict between the major players in the world (e.g., in the form of wide-ranging sanctions). For small, open economies, such as the Nordic countries, these are serious problems, but the problems are perhaps even more serious for exposed developing economies, where the informational disadvantage is bound to be substantial. The latter actors are typically the least able to pay higher costs; at the same time, it is perhaps most critical that they be integrated into the world trade community in order to tackle poverty and associated problems.

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The Effectiveness of the ‘Belt and Road’ Initiative in Tackling China’s Economic Slowdown and Its Financial Implications Within a Policy Trilemma Context

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I INTRODUCTION

The global financial crisis (GFC) about a decade ago disrupted international capital flows, but China was able to offset the adverse effects of this situation. The country boosted domestic demand through a massive stimulus package at the end of 2008 aimed largely in funding the infrastructure and loosening monetary policies to increase bank lending. The Chinese government cleverly used its state-owned enterprises (SOEs) as an instrument to

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implement its aggressive stimulus package. In early 2010, China's economy seemed to be back on track again with double-digit annual gross domestic product (GDP) growth rates. However, it temporarily boosted GDP and export growth, but it left a legacy of debt and many 'ghost' cities and bad assets doing nothing to sustain that first injection of growth. Despite the fact that China's GDP growth usually exceeds the target, the rate of GDP has slowed since then, declining from 10.6% in 2010 to around 6.8% in 2018 (Morrison 2018).

Though the stimulus program implemented in China was effective in general, one of its lasting side effects was the creation of massive excess capacity in many industrial sectors, ranging from steel to cement. Combined with the slowing economy and the sluggish international demands, it is anticipated that the overcapacity will squeeze corporate profits, increase debt levels, and make the country's financial system more vulnerable. Many SOEs in sectors with spare capacity borrowed heavily during the financial crisis. Most of the Chinese debt is held by SOEs, which account for just one-third of the industrial output, yet receive more than half of the credit dispensed by the Chinese largest 'Big Five' banks.¹ The rising non-performing loans to SOEs have put the Chinese banking system under a great deal of stress. The biggest weakness of the system is that it lacks the ability to allocate credit according to market-conform risk assessment principles. The regulated banks feel safe lending to SOEs, no matter how indebted they are, because the government implicitly guarantees their debt. As a result, the SOEs have developed a habit of debt-financed growth.² This credit overhang may not have been a problem when China's economy was growing, but it represents a serious economic risk in times of economic slowdown. In order to restrain borrowing by local governments and SOEs, the government declared curbing SOE leverage as 'the priority of priorities' and warned local officials to be held accountable for building up regional debt. The implementation of the policy of 'deleveraging' can be considered as one of its major tasks for the coming years (Cai 2017).

¹Traditionally China has a bank-based financial system whereby most businesses are funded by traditional bank loans mainly coming from the 'Big Five' regulated banks, namely the Agricultural Bank of China, China Construction Bank, Industrial and Commercial Bank of China, Bank of China, and the Bank of Communications.

²A phenomenon from the former planned economy referred to as 'financial dependency triangle' between the state council, state-owned banks, and SOEs, whereby the state banks were instructed mainly to lend to SOEs (Linden 2008).

China's economic slowdown, stock crashes, and currency realignments are highlighting the downturn of the world's second-largest economy and the main driver of global growth. The attention of global markets was focused on China's exchange rate in August 2015 when the People's Bank of China (PBC) announced a nearly 2.0% devaluation of the renminbi (RMB) against the US dollar (USD). Since then China has devalued the RMB multiple times while making a transition from its 12th to its 13th Five Year Plan (FYP), in which the Chinese authorities have laid out a clear and concise list of objectives as to how they want to develop their 'new normal' economy and avoid a 'middle-income trap' in the near future. The main characteristics of this 'new normal' growth model consist of a slower growth level with a higher quality and more emphasis on efficiency and social security with a strong role of the government; the ability to adjust in accordance to the current market circumstances; and opening up of the financial markets and services sector as the current economy's primary driver of growth to offset contractions in China's traditional powerhouses of heavy industry and manufacturing. The aim is to keep a strict balance in restructuring China's economy, that is making sure growth in one sector offsets slowdowns in another in order to guarantee enough employment. One of the most crucial objectives as part of this plan is to induce an economic shift that will steer the country away from a reliance on exports and investments toward growth driven by domestic consumption and innovation. This is part of China's narrative to decrease its reliance on its global partners, a lesson learned from the GFC when China became dangerously dependent on debt-fueled investments in infrastructure, housing, and heavy industries with a significant overcapacity as a result.

President Xi Jinping, largely motivated by China's pressing economic concerns and China's attempt to gain political leverage over its neighbors, launched in 2013 the 'One Belt, One Road' (OBOR) or 'Belt and Road' initiative (BRI).³ This infrastructure 'project of the century' is currently covering more than 80 countries from Asia to Europe and Africa. With a network of pipelines, ports, railways, highways, and road infrastructure, the BRI aims to 'break the bottleneck of Asian connectivity'. The entire OBOR project includes a land-based 'Belt' from China to Europe, evoking

³ President Xi initially introduced the term '*One Belt, One Road*' initiative in 2013, but after some criticism about the naming and when it became apparent that this transport network encompasses several land and sea routes, the term BRI was increasingly used. In this chapter, the terms OBOR and BRI are used interchangeably.

'Old' Silk Road trade paths and a 'Road' referring to ancient maritime routes and the scale is ambitiously large. The geopolitical context of the BRI is different from the US-led Marshall plan in the post-World War II era, and the BRI is much more ambitious in terms of the number of countries involved and the scale of financing that could be available (Citi GPS 2018). However, to a certain extent the aims of the BRI are quite similar to the strategic aims of the Marshall plan, namely boosting export, currency internationalization, countering a rival, fostering strategic divisions, and obtaining diplomatic support. Globally, the BRI positions China as the leader of a new form of 'globalization 2.0' as a response to Trump's new protectionism. It is likely that economic steps of the OBOR implementation come first as has usually been the case with the rise of China as a major economic power. As long as political stability is guaranteed, possible political and institutional adjustments can be expected if necessary. So it is expected that at least in the short run the BRI does not emphasize ideological factors as heavily as was the case in the Marshall plan which was fully funded by the US government (Shen and Chan 2018).

A vital part of implementing the BRI would be to enhance financial integration between countries. There are plans to build a currency stability system, investment and financing system, and credit information system in Asia. There will also be other financial initiatives in the pipeline for the deepening of multilateral financial cooperation. Despite resistance from Western countries due to their overlapping purposes with their international financial institutions, among others, three important financial institutions have been established to fund the OBOR infrastructure projects, namely the Silk Road Infrastructure Fund, the Asian Infrastructure Investment Bank (AIIB), and the New Development Bank (NDB), the former Development Bank of BRICS (BDO 2015). Also, recapitalizations in USDs of the China Development Bank and China Export-Import Bank play an important role in OBOR projects. Although there is no agreed-upon definition for what qualifies as an OBOR project, so far it is clear that the funding mainly comes from China's huge, but shrinking, financial resources. Such a logical deduction was probably well taken in times when China was flooded with capital inflows and foreign exchange reserves had nearly reached US \$4 trillion in June 2014. However, China's economy has slowed down, its shadow banking system has become more significant, and the regular banks' balance sheets are saddled with doubtful loans, which keep on being refinanced and do not leave much room for the massive lending needed to finance the BRI. This is particularly important as Chinese banks have been the largest

lenders so far and although multilateral development organizations (MDOs) geared toward this objective certainly they do not have the necessary financial means. Even the AIIB has so far only approved investments of US \$1.7 billion in 2016 and US \$2.5 billion in 2017 on OBOR projects and China's reserves lost nearly US \$1 trillion due to massive capital outflows. Since the RMB is not a fully functioning global currency, the BRI largely requires dollar-denominated financial resources to fulfill its objectives. Although US \$3.10 trillion of reserves (as of March 2019) still look ample, the Chinese authorities seem to have set that level as a floor under which reserves should not fall so that financial stability is restored. This 'dollar-constraint' obviously reduces the leeway for OBOR projects to be financed by China, at least in hard currency (García-Herrero 2017). Against this background, this chapter will review different financing options for Xi's grand plan and the financial implications within a policy trilemma context.

After the GFC, China seemed to have circumvented the impossible trinity or policy trilemma. This theory states that it is impossible for a country to have control of all three of the following main aims at the same time: free capital mobility, a stable exchange rate management, and monetary autonomy. A country that attempts to get all three policy aims at once will be broken by the international markets as they force a run on the currency. Although China never abandoned all its capital controls, there were numerous ways to move money into and out of China. At the same time, the RMB has started to float more against the USD. China was also able to increase or lower interest rates without too much impact on the exchange rate. Thus, policymakers made the argument that China negotiated between the three choices and in essence circumvented the logic of the impossible trinity. With the rise of shadow banking and the desire for more RMB internationalization since the late 2000s, the increasing financial liberalization is at odds with the striving for more financial stability. The question then arises to what extent the authorities can circumvent or bend not only a policy trilemma but also fine-tune a quadrilemma as described in Sect. 2.4 (Aizenman 2011). Also, the impact of the OBOR project in the policy trilemma or quadrilemma will be examined.

Despite the fact that the BRI was supposed to be a plan to tackle the problems of funding, debt, and overcapacity, it might not work after all. With an experience of five years in the execution of all kinds of projects in different Euro-Asian and African countries, several drawbacks of the OBOR plan have now become more visible and will be dealt with in this chapter. The following research questions will be addressed:

- What is the effectiveness of the BRI to help China bounce back from its economic slowdown?
- To what extent the BRI is a ‘win-win’ cooperation between China and the recipient countries?
- What are the financial implications of the BRI within a policy trilemma context?
- What are alternative ways to finance the BRI in the near future, besides the huge contribution of China’s banking system and several multilateral development organizations?
- What will be the impact of the BRI on China’s financial markets?

The aim of this conceptual and descriptive chapter is to provide a systematic discussion of the contribution of the BRI in tackling China’s economic slowdown and its financial implications. The novelty of this chapter is the investigation of both the rationale of the OBOR project and its pitfalls with a focus on different options on how to finance this project within a policy trilemma context. The Mundell & Fleming model of the impossible trinity theory is applied to the current financial economic situation in China. Moreover, this chapter describes the impact of the BRI on this theory including possible policy options to cope with China’s policy trilemma or even quadrilemma in a ‘new normal’ economic settlement. An important contribution of the chapter lays in an analysis of financial stability issues concerning liberalization policies in China. A lot of the secondary sources are anecdotal and come from press releases, magazines, journals, and occasional studies and reports by banks, multilateral development organizations, and research and consultancy agencies.

This chapter is structured as follows. China’s inevitable economic downturn, credit binge, debt and trade problems, its policy trilemma, and the ‘new normal’ growth model aiming at financial stability will be explained in Sect. 2. The rationale for the BRI including its aims, drawbacks, and possible ‘win-win’ cooperation are further elaborated on in Sect. 3. The financial pitfalls of ‘Belt and Road’ and some policy options will be dealt with in Sect. 4, including the financial means and problems with financing the BRI, the consequences of the liberalization of China’s financial markets, links to its shadow banking system, and possible policy options to cope with China’s inconsistent trinity. Finally, the chapter highlights some concluding remarks and recommendations in Sect. 5.

2 TO A MORE SUSTAINABLE AND MARKET-ORIENTED POLICY APPROACH OF CHINA'S ECONOMY AND ITS FINANCIAL SYSTEM

2.1 *China's Inevitable Economic Downturn*

After four decades of unprecedented growth since China started its economic reforms and more than five years since it launched its BRI, its current economy is exposed to several dangers which can undermine further development. Besides the slow progress of the deepening of China's financial reforms, other possible threats for China's future economic development are the following: an inevitable economic downturn and related credit binge and debt problem; the international trade conflicts and a possible new role for the World Trade Organization (WTO) with the BRI in the background; the unbalanced inward and outward investments patterns; and the aging problem and excessive industrial overcapacity. In 2018, the Chinese stock market fell by no less than 25%, and the RMB has been falling since 2017. Although the current trade dispute with the US is not the cause of these problems, it does not help to the fight against China's economic downturn. China's hardest challenge as planned in its latest 13th FYP is to enter into the next stage of a high-income advanced economy, whereby the GDP share of the services sector overtakes the agricultural and manufacturing production sector with sustainable lower growth rates with more focus on quality than quantity. China is still suffering from a 'middle-income trap' whereby it is difficult to sustain high levels of productivity gains due to structural inefficiencies in its economy. Currently China is the world's second-largest economy, and the bigger an economy gets, the harder it is to keep growing at a fast pace, so a single-digit growth has become an inevitable reality. China's economy has long been built on its manufacturing sector. Being the factory of the world is easy when you have a huge and growing population, but becomes harder when your 'one-child' and currently 'two-child' policy slows growth, ages your population, and creates a generation unwilling to accept the low-paid jobs of their ancestors. China's government is trying to move from a manufacturing and export-driven economy to a services and consumption-driven one, so exports are declining after decades of double-digit annual growth (Morrison 2018).

2.2 *China's Credit Binge and Debt Problem*

China's economic recovery after the GFC was supported by a rapid credit growth which could be considered as a natural consequence of strong underlying growth and a reflection of deeper financial reforms. Since 2011 more credit has been allocated to the services than the manufacturing sector, but the credit is less efficiently used due to a continued allocation to less productive SOEs in mainly Northeast provinces with heavy exposure to mining sectors. Although the privately owned enterprises (POEs) in the services sector create more value added, overall the credit intensity has risen since more credit is needed to create value added in the manufacturing sector. The development of this 'credit binge' partly explains China's inevitable economic downturn, which could undermine future growth and financial stability by sharply boosting debt levels. In the short term, China's high savings ratio, current account surplus, and small external debt can help mitigate the immediate risks of necessary disruptive adjustments. However, in the long term, further financial deepening, a more efficient credit allocation, and a deleveraging policy are needed to break the negative spiral effect between slowing growth, excessive credit provision, and worsening debt service capacity (Chen and Kang 2018).

While credit growth has moderated to come in line with economic growth, the rapid increase and composition of China's total debt to GDP is certainly worrying. According to Bloomberg (Bloomberg Database 2018), China's debt buildup has been more than quadrupled since 2004 with a total debt to GDP (including corporate, household, government and banking sector) surpassing the 266% at the end of 2017 (see Fig. 12.1). Although the advent of the obscure high-yielding shadow banking and real estate driven debt has boosted the Chinese economy through the GFC, it has also saddled it with a heavy repayment burden reflected in a high level of debt servicing ratio, which made its banking system more vulnerable (Shih 2017). Therefore, several trends have become potential ticking time bombs and cannot sustain such a high pace of leveraging before another crisis occurs. First, half of all loans are linked to China's overheated real estate market; second, unregulated shadow banking accounts for nearly half of new lending (55% to GDP in 2017); and third, the debt of many local governments is probably unsustainable. Also, the credit overhang has caused overcapacity in many unprofitable government-supported industries. Much of the credit flowed to property developers creating an excess of unsold homes often displayed as 'ghost towns'. As a result many local

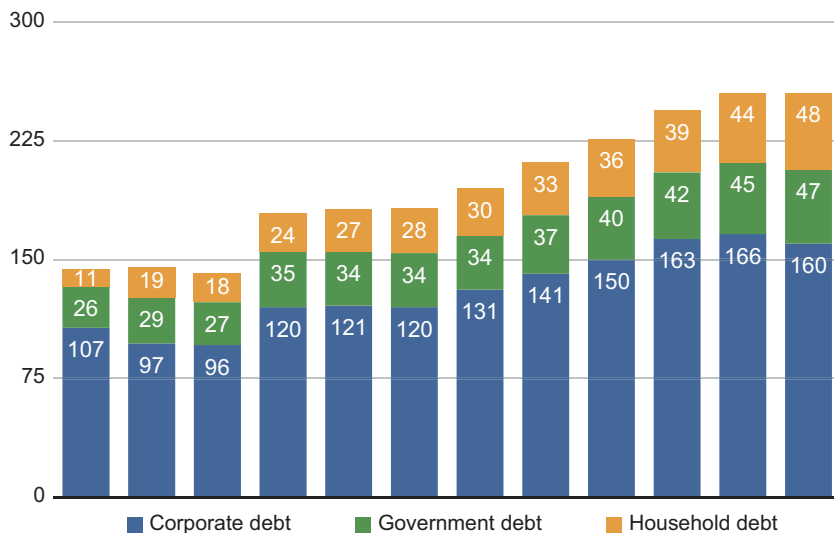


Fig. 12.1 Debt to GDP in China in the period of 2006–2017. Source: Own elaboration on ChinaPower.csis.org (accessed: 27.02.2019)

governments are now finding it hard to cope with debts and tax receipts, especially when land sales suffer from the slowing economy. In particular the rising corporate debt with unaffordable property prices creates the risk of a bubble that might burst. Since around two-thirds of the corporate debt is owed by SOEs who are quite often indirectly involved in the construction industry, the turbulence in the real estate market will have a huge impact on the banking sector. This explains why the Chinese government is looking for a transition of a policy shift away from an economy fueled by non-financial sector debt, such as corporate debt and government stimulus, toward a more sustainable consumer-driven economy (Morrison 2018).

2.3 The International Trade Conflicts and China's Inward and Outward Investments

Over the past four decades, trade ties between China and the US have expanded drastically, in particular since China's accession to the World Trade Organization (WTO) in 2001. Currently China is the largest trading partner of the US, while the US is China's second-largest trading partner

after the EU. The prominent role in the international trade not only exerted a great impact on the development of the Chinese economy but impacted the whole global economy as well. Being a net exporter China has a high rate of gross savings measured at 46.4% in December 2017, which is declining since 2010 (CEIC Data 1952–2017). This helped to build huge trade surpluses in the country which negatively affected the deficit parts of the world and led to global trade imbalances. One of the biggest victims is the US where industries were adversely influenced by the Chinese trade and related manufacturing production.

The recent trade conflict between China and the US has drawn growing attention and concern over its possible impact on the global economy, given that both countries are the world's two largest economies, accounting for about 40% of the global economy and over 22% of the world's export of goods. Chinese goods exported to the US were mainly consumer and manufactured goods (e.g. computer equipment, toys, games, and apparel), while US goods exported to China were mainly capital and intermediate goods (e.g. aerospace products, oil seeds, and soybeans). The existence of a trade deficit with China in goods has over the years been the concern of the US. An argument from the US government to restrict trade with China is that the surge in Chinese imports had led to more unemployment in declining industries in the manufacturing sector such as the US steel, car and ship industry. However, a counter-argument is that increased trade ties with China had also brought a number of benefits to the US economy, for instance by enabling US companies to tap into the Chinese market with a lucrative customer base and to offer lower prices of consumer goods through low-cost production. Despite trade negotiations between China and the US since the beginning of 2017, the US has nevertheless initiated announcements on all kinds of trade-restricting measures in 2018 that affect China and other trading partners such as Canada, Mexico, and the EU as well. The US has taken actions against China on the following three fronts, namely tariff increases on major goods imported from China including those related to the 'Made in China 2025' program⁴; WTO dispute settlements with respect to certain measures pertaining to the protection of intellectual property rights; and specific investment restrictions and enhanced export controls for Chinese

⁴'Made in China 2025' is a high-level strategic action plan rolled out by the government in 2015 with an aim to become the world's leading manufacturer of telecommunication, railway, and electrical power equipment by 2025.

persons and entities related to the acquisition of industrially significant technology to protect national security. Obviously this led to the announcement of several counter trade measures imposed by China. This trade war has been escalated since the US and China introduced new import duties on October 1, 2018, at \$200 billion in Chinese goods and \$60 billion in US products, including threats of an increase in tariffs of 10–25%. Amid the trade conflict with China, the US has also imposed punitive tariffs on products imported from other major trading partners, including Canada, Mexico, and EU. These countries/regions have responded by imposing retaliation tariffs on US goods. These 'tit-for-tat' actions have aroused concerns of some stakeholders in the US, worrying that on the one hand US consumers and businesses will have to pay more for commonly used imported products and materials, while on the other hand US exported goods will become more expensive, resulting in sales loss and unemployment (Tiffany and Kent 2018). The US and China have agreed to a temporary truce to de-escalate trade tensions at the G20 Summit in Buenos Aires on December 1, 2018. According to the agreement, both the US and China will refrain from increasing tariffs or imposing new tariffs for 90 days (until March 1, 2019), as the two sides work toward a larger trade deal (Wong and Koty 2018).

The growth of Chinese trade has a huge impact on its investment trend in the country. China's global foreign direct investment (FDI) inflows grew rapidly after it began to liberalize its trade regime since the launch of the 'open door' policy in 1979 and the accession to the WTO in 2001. Although China's inbound or inward FDIs are still rising and are not becoming less attractive to multinationals after the GFC, the outbound or outward FDIs have increased even more substantially over the past decade since Chinese firms are increasingly going abroad looking for brands, talent, and technology to bring back to the Chinese market. In 2015, China's outbound has surpassed its inbound investment flows changing the role of the Chinese companies from global manufacturers to global investors. In line with the ongoing liberalization strategy, the focus of China's outward FDI is shifting from natural resources to high tech- and consumption-driven sectors. Since Chinese POEs currently account for half of China's outward FDIs, the number and size of POEs are also growing and an increasing number of them are also joining hands with SOEs to expand globally (Ernst & Young 2015).

There are several factors which have largely driven the sharp increase in China's outward investments since the late 2000s. First, the Chinese gov-

ernment's 'Going Out' strategy and initiatives to encourage firms to 'Go Global' is mainly driven by China's massive accumulation of foreign reserves from which a significant level has been invested in relatively safe, but low-yielding assets, such as US Treasury securities. The government wants to use FDI to gain access to intellectual property rights (IPR), technology, know-how, famous brands, and so on in order to move Chinese firms up along the value chain in manufacturing and services, boost domestic innovation and development of Chinese brands, and to help Chinese firms (especially SOEs) to become major global competitors. Investing in foreign firms, or acquiring them, is viewed as a method for Chinese firms to obtain technology, management skills, and often, internationally recognized brands, needed to help Chinese firms become more globally competitive. Thus, Western countries with advanced technologies, stable economies, and healthy investment environments continue to be the most popular investment destinations. Second, China's slowing economy and rising labor costs have also encouraged greater Chinese overseas FDI in order to help firms diversify risk and expand business opportunities beyond the domestic market, and, in some cases, to relocate less competitive firms from China to low-cost countries. Third, to obtain natural resources, such as oil and minerals, it was deemed by the government as necessary to sustain China's rapid economic growth. Fourth, increased FDI outflows may be the result of the Chinese government attempting to diversify its foreign exchange reserve holdings. Until recently, it appears that a large share of China's foreign reserves has gone to portfolio investments, especially US Treasury securities, which are relatively safe and liquid but earn relatively small returns (Morrison 2018).

Since the launch of BRI in 2013, China's outbound investments in recipient BRI countries have been mainly focused on construction and greenfield investments, while in non-BRI countries the emphasis is more on mergers and acquisitions (Chen and Kang 2018). It is likely that the BRI will enable businesses to access more diversified and emerging markets, which will provide the impetus for the economic development of BRI countries. Chinese outbound capital restrictions appear to be more likely to be approved for OBOR-related transactions at the expense of non-OBOR outbound deals for foreign real estate for instance. The OBOR's emphasis on infrastructure has helped boost Chinese exports of construction-related goods and services. To what extent BRI-boosted outbound investments and the associated transportation corridors mature into economic corridors depends on the effectiveness of its implementa-

tion. Chinese capital controls, while favoring outbound investment for OBOR-related projects, are still inefficient and overly restrictive for inbound investments. In addition to the financial economic motives, the BRI aims for more exchange of ideas and knowledge are at odds with the current increase in nationalism and censorship in China. These current trends in China all contradict the BRI's expressed goal of improving global connectivity. In order to reduce the gap between the slowdown in inbound and significant increase in outbound investments, the government has already taken measures at the end of 2017 to ease restrictions on inbound FDIs and to regulate outbound FDIs. In the end Beijing's dilemma is that greater connectivity fueled by BRI requires giving up some control (Hillman 2018). The Chinese authorities will always have to balance between, on the one hand, market liberalization stimulated by BRI and, on the other hand, social stability through government control. Since the start of economic reforms under Deng Xiaoping in 1979, in practice this usually meant that sometimes the reins are tightened and at other times they are released again or, in another metaphor, sometimes the oyster opens and at other times it closes again.

2.4 *China's Challenge of the Impossible Trinity*

The impossible trinity or triangle, also known as inconsistent or 'unholy' trinity or trilemma, is a policy-choice problem based on the traditional Mundell-Fleming paradigm developed in the 1960s. This hypothesis in international economics states one of the three aims is a trade-off with the other two aims and no one could reach all three aims simultaneously. Robert Mundell (1963) concluded that a country with free capital mobility or convertibility would be better off by adopting fixed exchange rates to avoid the dependency on interest rates to balance a very large deficit or surplus on the balance of payments of a certain country.

For decades after 1979 the PBC can manage its exchange rate without releasing its independent monetary policy, but only by maintaining controls on capital flows (so for many years the authorities pick side C of the triangle in Fig. 12.2). However, the last two decades when capital became substantially more mobile, China has experienced significant capital inflows mostly due to huge amounts of inward or inbound FDIs combined with huge outward or outbound FDIs since the last decade. Especially the speculative short-term capital movements can easily evade the capital restrictions. Although China has liberalized its capital flows

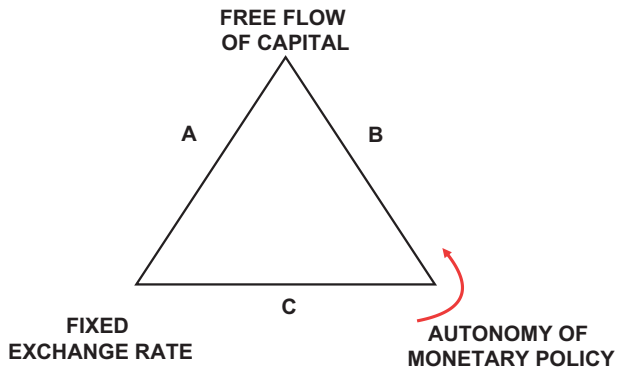


Fig. 12.2 China's gradual change from side C to side B of the impossible triangle since the start of the millennium. Source: Own elaboration based on literature

over time, still the authorities prefer to have some control over the capital flows and its effects on domestic industries. It can be assumed that further progress of the BRI will exert a higher pressure on further financial market liberalization and result in higher openness for the free flow of capital. At the same time China's exchange rate is becoming more managed floating than fixed since the rising capital mobility has made the RMB more vulnerable to speculation, so the authorities gradually change from side C to side B of the triangle (see Fig. 12.2), which will ultimately stimulate more globalization and financial integration. The PBC tries to keep the exchange rate low and stable to remain competitive in the global markets, but as a matter of fact the RMB has been rather undervalued for many years and the financial market forces continuously have given pressure for RMB revaluation. That is why the PBC let the currency float to the extent where it does not harm certain vulnerable domestic industries. The monetary sovereignty is also acquired to some extent since the PBC mainly uses it for the maintenance of the exchange rate. It may be presumed that fast growth of debt will necessitate some adjustments of monetary policy as well. It motivates the Chinese government to treat monetary policy as an important tool to provide stabilization to the economy. The last two decades, especially in the years before the GFC, Chinese authorities have tried several times to reach all the 'corners' of the triangle and it actually has at least some features of every policy. However, since the start of the

GFC the focus is again more on currency stability combined with more capital mobility as a response on a rising RMB in the years before the GFC (a gradual move from side B to C in the triangle). On the other hand, from 2014 onward, the policy will change again to a combination of monetary autonomy with free movement of capital (a gradual move from side C to B in the triangle). Since the Mundell-Fleming model fails to consider monetary sterilization policy, for example, using open market operations, the government was able to bend or circumvent the policy trilemma and in this way disprove the theory that the trinity is completely impossible. Although the authorities cannot defy the Mundell-Fleming model completely, since 2015 they have tried to bend this trilemma because the RMB was formally listed on IMF's reserve currencies in 2016. Since the IMF requires China to free its capital flows as the precondition of the listing, this has huge implications for its economy and financial system.

Aizenman (2011) has transformed the policy trilemma into a quadrilemma by including financial stability as an additional policy aim (see Fig. 12.3). This theory allows China to have a fixed (or in practice more managed) exchange rate, independent monetary policy, and free capital flows at least to some extent, but now it has to sacrifice financial stability mainly because of problems caused by volatile short-run capital inflows or 'hot money'. The tendency of the authorities to challenge the trilemma as much as possible will make it harder to keep the financial system stable and might lead to even bigger market distortions. The main problems of the Chinese economy could be related to the policy quadrilemma, so China could be better off if it would sacrifice one of the trinity aims and keep financial stability (Aizenman 2011; Aizenman and Sengupta 2012; Aizenman et al. 2013).

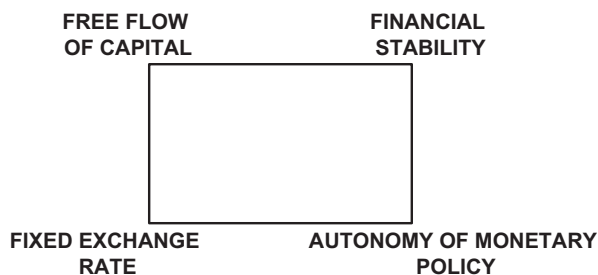


Fig. 12.3 The policy quadrilemma. Source: Aizenman, J. (2011)

2.5 *China's 'New Normal' Growth Model in Response to Its Policy Trilemma Aiming at Financial Stability*

As indicated in the 13th FYP, China is undergoing a difficult but necessary transition from a growth model that emphasizes heavy industry, construction, and exports to a new development model that focuses more on services, innovation, entrepreneurship, and domestic consumption as a means of raising productivity and climbing up the global value chain. The large internal imbalances of savings, fixed investment, and consumption are caused by China's banking policies and the lack of an adequate social safety net. The Chinese government places restrictions on the export of capital. As a result, Chinese households put a large share of their savings in domestic banks. The Chinese government sets the interest rate on deposits as well, and often this rate is below the rate of inflation, which lowers household income. In addition, China's lack of an adequate social safety net such as pensions, health care, unemployment insurance, and education induces households to save a large portion of their income (Morrison 2018).

The 'new normal' economy embodies a focus on structural changes that can achieve still strong but lower economic growth of much better quality in terms of its social distribution and impact on the natural environment. The structural reforms in many areas of the economy will address the 'middle-income trap'. In its 13th FYP, China sets a middle-high average annual of 6.5% growth target despite slowing global and domestic demand, overcapacity, and rising debt. Moreover, the 13th FYP not only focuses more on supply-side structural reforms but also enhances individual well-being through social welfare and health care reforms in order to reduce its relatively high savings ratio in favor of more consumption (Reeves and Hu 2015). The new development model also places a strong emphasis on reducing inequalities, especially urban-rural and regional inequalities, and environmental sustainability with a focus on reductions in air pollution and other forms of local environmental damage, as well as in greenhouse gas emissions (Green and Stern 2015).

This structural shift will likely be accompanied by further economic slowdown because the economy has become more mature and will be less predictable since markets and entrepreneurs, rather than directions from the center, are expected to play a larger role in the decision-making. Since the government's legitimacy is closely tied to the creation of more employment and incomes, it has become more important that the economic slowdown remains within its target range. Also, the difficult process of transferring

resources from declining manufacturing to growing services sectors of the economy would be easier if the overall growth is strong. To support economic growth during its difficult transition, China has eased monetary policy in various ways while continuing a process of reforming and opening up its capital markets. Given the enormous amount of debt, Chinese debtors need low rates so as to help service interest payments and avoid bankruptcy. However, if Chinese households and corporate investors are offered lower rates in China and rising rates in the US, they become increasingly attracted to overseas investment, which brings about capital flight and currency instability. If the PBC forgoes monetary independence and drives rates higher, Chinese debtors will face financial difficulties, thereby slowing economic growth. But if the PBC lowers rates too much, there may be a sizable capital flight that could quickly diminish China's foreign exchange reserves, ultimately forcing China to float its currency. An economy that is growing more slowly, and in which monetary easing by repeatedly injecting liquidity and using sterilization tools to offset capital outflows and economic slowdown, is not an economy that offers high returns to domestic savers. Consequently, Chinese households and firms are looking abroad for higher returns than the RMB-denominated investments. However, increased private capital outflows also constitute a flight from the RMB toward the USD and other currencies which puts downward pressure on China's exchange rate.

In the short run, the PBC can offset this pressure by selling some of its enormous stocks of dollar-denominated securities and by buying RMB. Although China should be able to defend its exchange rate for some time, if this trend should continue, eventually it will run low on reserves and will no longer be willing or able to buy up RMB in the foreign exchange market with the risk that the RMB will fall too sharply. Moreover, the risk that the RMB might be significantly devalued in the future could accelerate the decline in reserves by leading households and firms to sell RMB now to avoid capital losses from a possible future devaluation. This is the essence of the trilemma in the current Chinese economy: if China wants to use monetary policy to manage domestic demand and to simultaneously free up international capital flows, it may not be able to manage the exchange rate at current levels (Bernanke 2016). Given the desire for an ongoing financial, that is capital and interest rate, liberalization, and the need for more currency flexibility for the purpose of RMB internationalization, the three policy aims of the trinity are themselves more at odds with each other and will make it harder to maintain financial stability. However, in December 2016, the PBC focused more on

a policy of currency stability as an important tool to achieve the policy goals of the BRI, namely trade and investments. Facing higher US rates, the PBC effectively gave up monetary autonomy by implementing a more tight monetary policy. In a world of a relatively strong USD, the PBC may well need to maintain high rates for a prolonged period of time or face intensified outflow pressure. At the same time, the PBC is also breaking the promises it had made to the IMF on RMB convertibility, erecting new barriers to the conversion of RMB in order to staunch capital outflows. Rather than circumventing the impossible trinity, China for now has sacrificed both free capital flows and monetary autonomy in order to preserve currency stability (Shih 2017).

3 THE RATIONALE FOR THE ‘BELT AND ROAD’ INITIATIVE

3.1 *The Aims and Logic Behind the ‘Belt and Road’ Initiative*

The framework of the BRI promotes common interests in all fields, including development toward prosperity with political trust, economic integration, and cultural inclusiveness. The following five key goals, originally from the National Development and Reform Commission, are meant to ‘break the bottleneck of connectivity’:

- Policy Coordination: planning and supporting large-scale development infrastructural projects.
- Facilities Connectivity: building facilities to enable connectivity along the ‘Belt and Road’.
- Trade Facilitation: facilitating cross-border investments and supply chain cooperation.
- Financial Integration: enhancing monetary policy coordination and bilateral financial cooperation.
- People-To-People Exchange: promoting culture, science, health, and education (Northern Trust 2017).

China has developed an impressive reputation as the ‘world’s factory’ over the last three decades. In recent years, however, its comparative advantages in manufacturing, such as low labor costs, have begun to disappear. For this reason, the Chinese leadership wants to capture the higher end of the global value chain and the BRI can play an important role in this. The primary goals are to make the country’s manufacturing industry

more innovation-driven, emphasize quality over quantity, and restructure China's low-cost manufacturing industry. The BRI can facilitate the export of higher-end Chinese manufactured goods and encourage the acceptance of Chinese technological standards. Apart from the high-speed rail sector, the Chinese government is also using the BRI to push for Chinese standards in other sectors such as energy and telecommunications.

With significant investments under the BRI, China also intends to compensate for the overcapacity that characterizes many sectors of its industry (steel, aluminum, cement, machinery, turbines, heavy goods vehicles, and basic chemicals) by transferring part of the production overcapacity of mainly SOEs to countries that are along the 'New' Silk Road. OBOR projects are currently too small to absorb China's vast glut of steel and other products. Instead, Chinese authorities want companies to move this excess production capacity through direct foreign investment to Asian countries who need to build their infrastructure. China exports high-quality production capacity, equipment, technical know-how, and developmental experience and in this way retains control over the import of raw materials needed to fuel its economy.

The BRI will enable Chinese companies to successfully carry out the Chinese government's 'Going Out' strategy by helping them to establish foreign trade strongholds or production bases along the routes covered by the initiative. It will also have a significant domestic focus since the authorities will also use the BRI as an addition, revival, and incentive for China's 'Going West' campaign since the 2000s to close the development gaps between coastal and inland China. Despite Beijing's preferential policies, large-scale fiscal injections and state-directed investments, the Western provinces' share of China's total GDP increased only marginally. A drawback of China's 'great western development' is the fact that there is little emphasis in the 'Go West' campaign on measures to alleviate poverty, while the government is obsessed with gigantic, and correspondingly expensive, infrastructure projects. In order to implement the OBOR projects more effectively, the authorities have to take into account that heavy state subsidies in these Western provinces have led to a high concentration of SOEs and low penetration of POEs (Cai 2017).

At least in theory it is the intention that the BRI will lead to a win-win situation for both China and the recipient countries. China has the financial means and the technical infrastructure expertise, while many of the BRI countries are fiscally constrained and lack infrastructure funding. For China, the BRI helps address its economic rebalancing priorities by exporting its

own manufacturing overcapacity, while better infrastructure in recipient countries will enable local industrialization and business creation. Geopolitically, it supports a rise in China's foreign policy 'soft power'. For the smaller, recipient economies, this platform expedites a move toward a higher stage of economic development (Nomura 2018). China's ultimate aim is to make Eurasia dominated by China an economic and trading area to rival the transatlantic one dominated by America. If the BRI increases China's 'soft power', it might give the authorities more 'leverage' in future negotiations about military conflicts (The Economist 2017a).

3.2 *The Drawbacks of the 'Belt and Road' Initiative*

Despite many benefits for the recipient countries of the BRI, it is important to realize that there is a clear economic dominance of China in mutual cooperation with the other BRI countries. It remains to be seen whether it is attractive for the BRI participants to simply accept China's unwanted industrial capacity. The project does not solve the deteriorating domestic demand in China but is instead focusing on finding new yet still 'unstable' export regions. More concerns are on the fact that there are no real customers that actually come to the newly developed infrastructures in the silk road, such as the shopping malls developed in a desert that has almost no buyers and just several shops that all sell the same product.

Another concern is that China wants to build and export the industrial overcapacity built during years of stimulus spending and have them rebuild abroad with all the connected adverse environmental consequences (The Economist 2018). This industrial surplus will not only be in China but will be a contagion spread across the economic 'belt'. Many BRI recipient countries are not enthusiastic about accepting China's excess capacity because in several industrial sectors they are competing directly with China.

Most of the financial Chinese funds will come from loans, not from grants, which might create a heavy debt burden for some countries. It means that if the receiving country will not be able to pay them back in the future, China can acquire the infrastructure built with the funds. Some of the Chinese loans are not transparent, which makes it more risky comparing to loans from different sources. Additionally, the Chinese inexpensive import might displace local firms and thus hurt employment in small enterprises. It is still unclear how the cooperation will impact living standards and there are some concerns that the BRI will be beneficial only to

the upper- and middle-class and will not have a positive impact on ordinary people (Hurley et al. 2018).

Another complaint is that BRI has mainly benefited China's SOEs. Although the BRI's initial focus was on energy and infrastructure with a huge involvement of SOEs, it is now widening in trade, manufacturing, internet, and tourism as part of the BRI's key goals with more possibilities of participation of POEs and multinational corporations in the BRI as well (Deloitte 2018).

Also, the forecasted debt growth is considered as a shortcoming of the BRI. It is predicted that BRI will not be plagued with wide-scale debt sustainability problems for its participants, stemmed especially from over-investing in some infrastructural projects. On the other hand, it is unlikely to avoid any instances of debt problems among some participating countries. Current research from the Center for Global Development (2018) shows that the problem might involve especially eight countries: Djibouti, the Maldives, Laos, Montenegro, Mongolia, Tajikistan, Kyrgyzstan, and Pakistan. BRI countries risk piling up dangerous amounts of debt, which some fear is designed to give China a strategic hold over them (Pakistan as a vassal state is seen as an example of China's 'debt trap diplomacy'). In response to the negative debt scenario, China is providing some debt relieves in an ad hoc manner and is trying to implement a greater coherence and discipline in order to avoid unsustainable debt among the BRI countries (e.g. implementing risk controls for overseas banking activity) (Hurley et al. 2018).

Another challenge for developing economies is that they must take advantage of this opportunity and climb up the global value chains, building their own comparative advantages. It means that with time some developing countries must shift their orientation from energy carriers to the production of goods and services of higher added value, some others must plug its production systems and own business into the international trade system. If they fail to do so, they could be marginalized in the whole project and will serve always as suppliers of raw materials for China (Královičová and Žatko 2017). It might be difficult to develop a strong industry, separately for the core BRI, as the Chinese projects sometimes have some strings attached, like special concessions for Chinese entrepreneurs, some requirements to use Chinese contractors, labor and machinery, and what is limiting the contribution of these projects to local economies. The other risk is that some investments might become unsustainable or generate low returns in the future, which will impact the par-

ticipants. Some projects regulations shift the accompanying risk to the state where the project is being implemented (Szcudlik 2017).

A general problem of the entire BRI is that some ambitions may contradict others and different motivations might lead to conflicting interests which ultimately might have a delaying effect on the implementation. There is infighting between the most important Chinese institutions involved, including the ministry of commerce, the foreign ministry, the planning commission, and China's provinces.

Furthermore, China is finding it hard to identify profitable projects in many BRI countries and is facing a backlash against some of its plans, with elected governments in Sri Lanka and Myanmar repudiating or seeking to renegotiate projects approved by their authoritarian predecessors (The Economist 2017a). Several failed projects are being canceled, renegotiated, or delayed due to disputes about costs or complaints host countries get too little out of projects built by Chinese companies and financed by Chinese loans that must be repaid (e.g. a \$15 billion high-speed railway in Thailand was suspended in 2016 following complaints that too little business went to Thai companies). This will downgrade China's credit rating; however, authorities are renegotiating to give local contractors a bigger role.

Basically the BRI has the potential to promote connectivity and free flow of economic factors, highly efficient allocation of resources, and deep integration of markets. It is difficult, however, to predict the exact result of the BRI as it requires deep collaboration between member countries. There are many uncertainties, such as political, financial, technical, environmental, and social. There is a fear that the BRI will end up producing a scattering of large, abandoned 'white elephant' projects along the belt and road routes. What is essential is that the project must prove profitable for all partner countries, not only for China. However, up to now there is no blueprint to measure BRI's performance⁵ (The Economist 2018).

It must be clarified that all the Chinese joint investments with its partners are related to the policy trilemma in three dimensions (see Fig. 12.4). First, financial market liberalization and RMB-denominated lending will support the BRI and hence free movement of capital. Capital flows accompanying

⁵ Following the inaugural Forum in May 2017, President Xi Jinping announced that the Second Belt and Road Forum for International Cooperation will be held in April 2019. The following topics will be addressed: a more concrete roadmap for Belt and Road's development; an evaluation of Belt and Road five years on; focus on implications for business; the direction of globalization; and a direct response to criticisms around BRI (see the drawbacks of the BRI).

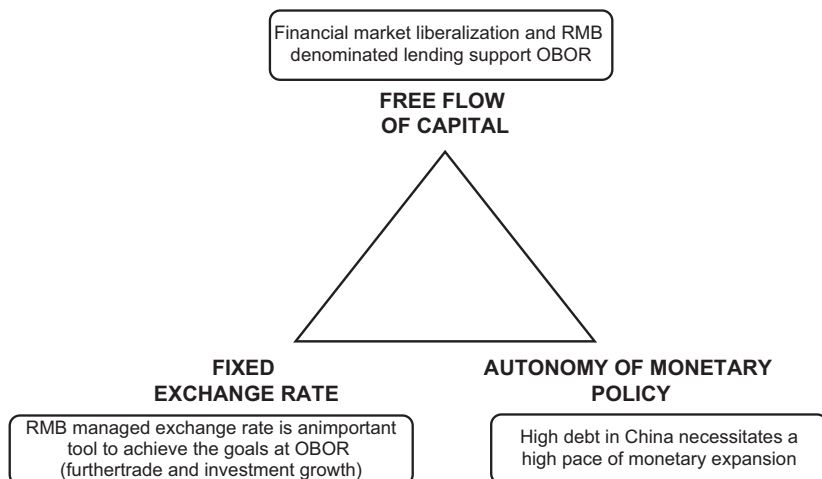


Fig. 12.4 The impact of the 'Belt and Road' project on China's policy trilemma.
Source: Own elaboration based on literature

the pursuing investments impact on greater financial openness. The different sources of financing the investments are an important contributor to the free flow of capital. Second, implementation of the BRI will expand the debt burden which requires a high pace of credit lending. A rise of shadow banking will push financial liberalization at the expense of monetary autonomy. Third, being open to cross-border capital flows may result in the loss of control over national credit conditions which might be harmful for the domestic consumption. Fourth, RMB managed floating exchange rate is an important tool of the BRI to promote trade and investment growth.

Five years ago the OBOR project was launched with great enthusiasm as the 'new Marshall plan without a war'. However, taking into account all the delaying factors that the OBOR implementation entails, the Chinese proverb 'loud thunder, small raindrops' might well apply or more ironically expressed as OBOR is sometimes called 'one road, one trap'. With the arrival of the OBOR initiative, the aim of RMB internationalization has become even more necessary, if in the future the AIIB or Silk Road Fund would like to implement the RMB-denominated lending against the investment of infrastructure. However, assuming the OBOR project will be accompanied by the necessary delays and that the drastically reduced foreign reserves will be used even more to finance the OBOR projects,

aggressive foreign investment of infrastructure, RMB internationalization, and implementation of a more flexible market-oriented financial policy are the three goals which could not be realized anymore. Even though the authorities have been able to circumvent or bend the impossible trinity with many policy adjustments during the last decade, eventually out of these three goals only two could be realized simultaneously.

4 THE FINANCIAL PITFALLS OF ‘BELT AND ROAD’ AND SOME POLICY OPTIONS

4.1 *The Financial Means and Options for the ‘Belt and Road’ Project*

One of the most important issues related to the OBOR initiative is to find ways of financing the project. The way the BRI is financed could be the most important factor in terms of the sustainability of the entire initiative. It is estimated that the total investment needed to cover the transport and infrastructure (excluding power, water, and other infrastructure) for the coming five years is estimated between \$1 and \$8 trillion⁶ (Hillman 2018). Collecting such an amount of money involves joining many different sources. The transcontinental development projects related to the OBOR, which have been already announced, are estimated at over \$900 billion (Chatterjee and Kumar 2017). The most important question related to the plans is to how to provide a sustainable financing for such a large project. Despite resistance from Western countries due to their overlapping purpose with IMF, three financial institutions have been built in order to fund this project, namely Silk Road Infrastructure Fund, Asian Infrastructure Investment Bank (AIIB), and New Development Bank (NDB).

There are three ways how the different options to finance OBOR will affect the policy trilemma. Firstly, initiated by China approach of diversified ways of financing OBOR will have an impact on the free flow of capital in the country. Financing the BRI from private sources will strengthen the financial market liberalization in China. Secondly, it must be expected that the OBOR project will be financed in a large part from other than Chinese sources. Otherwise a further escalation of the Chinese debt would

⁶The origin of the figure of \$8 trillion was first mentioned in reports by the Asian Development Bank in 2009 as an estimation of Asia’s infrastructure needs in the coming decade.

lead to severe capital outflow from the economy. Such a situation might have a very negative impact on many aspects: devaluation of RMB, asset depreciation, interest rates growth, foreign exchange reserves decline, and inflationary pressure. Here is visible a kind of substitution between the free flow of capital (inflow of foreign capital to the OBOR investments) and monetary autonomy (the need to actively use the monetary policy as a stimulus for the economy). Thirdly, it is expected that some external factors will have an impact on the BRI. The world financial market is at the moment on the brink of tightening monetary policy. Since the economy started to recover from the credit crisis, US official interest rates have risen step by step from 0.25% to 2.50% in December 2018. It will result in the overall growth of interest rates on international markets and worsening the credit conditions for OBOR investments. The overall interest rates growth will lift the financing conditions in China as well as downgrade the growth prospects and trigger the capital outflow from the country and its investment projects. The same effect must be extended to other financial markets. The policy applied by Federal Reserve System (FED) in the medium and long term might cause massive outflows of capital from emerging markets which will impact negatively on the joint financial initiatives between China and other emerging markets. Here is visible a threat of free flow of capital and lack of monetary autonomy.

4.2 The Impact of the Chinese Financial Market's Liberalization on the Policy Trilemma

An important condition for the success of the BRI is financial opening and liberalization of financial flows in China. It is one of the main goals defined in China's Financial Roadmap from the CPC Central Committee. Among the main areas related to the financial liberalization are (Hsu 2015):

- Further open up the financial sector by allowing small, privately owned banks to participate in the market;
- Liberalize cross-border financial transactions;
- Promote the Chinese bond market development and foster the development of bond markets in other Asian countries;
- Promote equity market development and support equity finance in China;
- Encourage financial innovation through diversified financial products.

It can be stated with a high certainty that the further development of the real economy in China depends to a large extent on the reforms of the financial market in the country. These reforms will especially support the development of SMEs and be favorable to individual borrowers and investors. The BRI itself might act as a drain on China's financial resources with negative consequences for the domestic market and economy, whereas the financial liberalization will lead to the increase of financial resources and to stabilize the internal development processes. The downside of the situation is that the liberalization of the financial market, together with more managed floating than fixed exchange rates, excludes the PBC's monetary autonomy.

The financial liberalization will encourage not only the domestic economy but also the OBOR project. In order to facilitate different sources of financing (public and private, domestic, and foreign), China must foster its financial cooperation with other states participating in the project. For this reason it is necessary to create the institutional structure capable of combining funds from different sources. The Chinese financial market especially must be able to service the financial instruments from developed countries. To be able to fulfill this requirement, the market must have necessary breadth, depth, and liquidity. China is the initiator and leading country for the BRI and for performing this role it is necessary to have the abilities to manage the cross-border capital flows. It is necessary for the country to improve the institutional infrastructure facilitating the cooperation, including entities from different countries.

Financial market liberalization in China might impact the BRI especially in three ways:

- The process will facilitate economic growth;
- It will favor the development of the financial infrastructure, will broaden the scope and size of the financial market, and in this way will enable participation of investors from different countries;
- Financial opening is important for Chinese participation in global economic governance.

Taking into account the great importance of the BRI, it is necessary to reduce the interest rate regulations in China and to create market mechanisms that allow financial institutions to set the interest rates according to the supply and demand of funds. Only the market mechanism of interest rates settling will provide that intermediaries of funds are efficient. In parallel

to the interest rates liberalization, scoring institutions and credit rating institutions must be created that independently will be able to rate the credit-worthiness of not only the 'Big Five' regulated banks but also the growing shadow banking sector.

In the past the financial market in China was mainly based on banks. It is necessary to develop other sectors of the market, especially the capital market with the capability to issue public, corporate, and project bonds. The qualified Chinese financial institutions and companies must be able to issue bonds not only in RMB but in foreign currencies outside China as well. There is a need to collect funds in countries along the BRI project.

For encouraging FDI inflow to the BRI countries, it is necessary to adjust Chinese law. The country must encourage private investment funds to participate in the key projects of the BRI and it requires application of common international standards. On the other hand, it is necessary to develop some technical solutions, for example the ability to create public-private partnerships (PPPs). Many of the projects related to the BRI will generate lower returns. Financing them by commercial banks or other private investors is not appropriate. The PPPs are the most suitable way of funding such projects, which means that there should be a way to create a sufficient legal and institutional environment for such possibilities.

The BRI requires a high level of connectivity. Open capital flows are one of the crucial dimensions which enable to intertwine different economies. For this reason China must invest in infrastructure with the aim to support capital flows. It is necessary to create a credit information system and cross-border payment system, which will enhance private business engagement. Greater transparency, higher interconnectedness, and a more mature capital market will expand investment opportunities and enable acquisitions of stable and long-term funds.

It is evident that the financial market liberalization will increase the free flow of capital in China. Such a process seems to be deepening and accelerating within the next years. Regarding the process of financial liberalization, very significant contribution might have the financial regulations oriented on the Chinese financial sector development. If the PBC and China Banking Regulatory Commission (CBRC) will continue the regulatory policy implemented in 2017 and 2018, aimed at reining the highly leveraged financial sector, it might have a dampening effect on further investments within the next several years.

Another very important aspect of financial liberalization is RMB internationalization. It can be treated as a separate political goal, but the OBOR

project strictly impacts the Chinese currency internationalization and helps to achieve, by using the RMB, the status of a global reserve currency (Djankov and Miner 2016). There are three dimensions of such a process:

- The BRI will boost the export of goods and services to the member countries. As a consequence there will be an increased demand for RMB trade settlements.
- The Chinese investments occupying the OBOR project will entail capital flows denominated in RMB. As more and more infrastructure projects are undertaken, there will be a proportional outflow of the Chinese currency, which will strengthen its internationalization.
- The Chinese currency might be treated as a reserve asset. It is likely that it will increase the demand for RMB-denominated products in offshore markets. The status of the currency as the reserve asset was bolstered by its inclusion to the SDR (a unit of account used by the IMF) basket on October 1, 2016.

The RMB internationalization will be very beneficial for the OBOR project in other ways as well. It will reduce exchange risk and costs of related investments, promote the development of the financial market, and assist overseas expansion. The international status of the currency will be helpful for reducing China's reliance on the USD. All these aspects are very important for Chinese investment purposes (Zhang and Tao 2014).

Regarding the policy trilemma, it should be highlighted that a transition from a fixed to a more managed floating exchange rate system has an uncertain impact on the BRI (China's participation in the globalization processes including further trade and investment growth) and on the monetary autonomy at the same time (stimulus for the domestic economy). The model with free movement of capital, more managed floating exchange rates, and monetary autonomy, that is a gradual change from side C to side B of the triangle in Fig. 12.2, originally gives the idea that during the period of prosperity, the more flexible exchange rate will conform to the flows of capital and provide the expected monetary autonomy. However, this model might be harmful because RMB internationalization (attached to the free-float exchange rate) might impact the currency stability and will adversely affect other economic conditions. For instance, a depreciation of RMB will cause an outflow of capital from the country and will impact negatively on the financial means for the OBOR project. Such a situation should result in some actions undertaken with the intention to

limit the RMB fluctuations. Ultimately it depends on the extent to which the PBC allows the currency to float freely or prefers to impose a return to a more managed exchange rate approach. By contrast to the presented model, it is worth considering a different one, which seems to suit better the BRI (allows China to integrate with the globalized world) but does not exert such harmful impact on the domestic economy taking its economic slowdown and debt problems into consideration. Such an approach assumes that the fully liberalized capital flows are associated with a lack of monetary policy autonomy and a more pegged exchange rate regime (i.e. a gradual shift toward side A of the triangle). According to the proposal, in the contemporary Chinese economic condition, the most important need is to adjust and consolidate financial and economic systems and fully liberalize interest rates (step one), then allow more mobility of capital (step two, with some time delay to the step one), and finally the pegged exchange rate must be kept but there might be allowed a greater float. Such an approach not only is more beneficial to the BRI (gives necessary free flows of capital) but also enables the economic transition in China and eliminates some shortcomings of the free-floating exchange rate (e.g. a harmful effect of RMB appreciation in the long term) (Sun and Payette 2016).

4.3 *China's Shadow Banking and the 'Belt and Road' Project*

Apart from the traditional financial market, which is still underdeveloped, an important feature of the Chinese financial market is its large unregulated shadow banking. The shadow banking system is at the moment the most rapidly growing part of the financial market in China and OBOR might strengthen this process through demand for further investment financing. There are three important dimensions, which exert a great impact on the links between shadow banking and the BRI:

- China's bank-based nature of the financial system and its level of development (and the consequences such as limited supply of loans, important role of off-balance sheet instruments, and interconnectedness between banks and unregulated institutions);
- the financial liberalization process and accompanying growth of financial innovations;
- the core position of China in the OBOR project and its shrinking financial resources for his purpose.

The Chinese banking system is still in the phase of dynamic development, measured as an annual growth (FSB 2018) and an outstanding value of unregulated banking products. In the past it used to be monolithic and the government started to open it up in the 1980s. Nowadays it is still state-dominated which impacts the pattern of investments and limits the size and scope of credit supply. It also impacts the efficiency of the loans (loan-and-build model)⁷ and undermines the financial feasibility and profitability of the investments. As a consequence there is a large field for the development of private financing. This kind of financing, although economically more justified, allows to circumvent financial regulations and contributes to the development of the shadow banking system. Many entities with restricted access to state-owned bank's loans are willing to pay higher interest rates for the shadow bank intermediaries, which is an important factor spurring the growth of shadow banks in China (Sheng and Soon 2016).

The liberalization of the Chinese financial market, which enables financial innovation development, is closely related to shadow banking. Innovation can help contribute to financial deepening, which will increase the amount of capital financing for OBOR. On the other hand, innovation generates shadow banking related to Fintech (mobile payment, online lending, and online investment), which might have an impact on the BRI in many aspects, especially enhancing the process of investments financing and broadening the international trade relations. While the traditional banking sector is relatively heavily regulated, the new technology is one of the most important channels for unregulated financial development (The Economist 2017c). The financial digital systems are very closely interconnected and at the same time they constitute a bridge between mainland China and other OBOR countries (Sabine 2016). On the other hand, the BRI will be a catalyst for financial innovative investments (e.g. syndicated loans and infrastructure bonds, or SWIFT, a global financial messaging service provider).

A very important driver of the shadow banking is China's borrowing options. Due to the BRI, China has become a major international lender, and for some countries it has become their most important source of long-term investment funds. The state-regulated Chinese financial system is over-extended by debt and the 'loan-and-build' model will deepen the

⁷This model relates to the feature that borrowers do not think like investors and the commercial logic (rate of return) is secondary to political motivations.

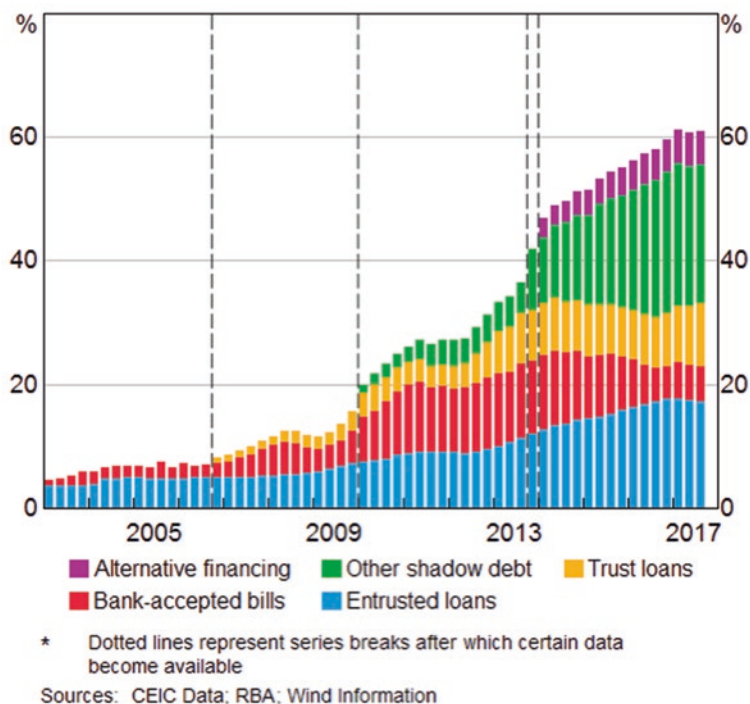


Fig. 12.5 China—shadow financing. Source: Bowman, Hack, and Waring, 2018

debt and its costs. The shadow banking system will become an alternative for the traditional sources of credit. Currently, China's traditional banks are big drivers of shadow banking. The data related to the structure of the shadow banking in China shows, that among the largest part of the system, which developed during the last few years are *entrusted loans* and *other shadow debts* (see Fig. 12.5). Entrusted loans are inter-company loans facilitated by financial institutions (very often there are banks involved), whereas other shadow debt are debt assets (very often bank-originated loans), letters of credit, and other non-standard types of debt assets (Bowman et al. 2018).

The BRI can deepen the cooperation between different financial institutions on the Chinese market. It increases the banking activity not only

for the domestic market but also for foreign markets. On the other hand, it poses a great risk on the whole BRI. Some instruments (like Wealth Management Products (WMPs), trust products, or Fintech products) are unguaranteed and opaque. They are interconnected with other instruments and link different sectors of the Chinese financial market and the markets of other OBOR member countries. For example banks use trust companies as intermediaries for many of their activities. Usually they are financed by banks and then they lend money to other entities like SMEs, local governments, and so on. The growing imbalance between the investment needs and safe credit growth makes the BRI financing unsustainable. Binding different markets, the Chinese shadow banking system is able to trigger international financing crisis and affect the real economies in China and many other countries.

The growth of shadow banking in China is an important contributor of two processes: development of debt market (together with the erosion of monetary policy autonomy) and encouragement of financial liberalization in the country. The development of unregulated banking activities in China (e.g. off-balance sheet banking operations, and trust companies activities) enables to erode the controlled deposit ceiling rate, offers a much higher rate of return than traditional deposit rates, and develops the debt market in this way. Further pressure on the market is put by internet-based financial products. They not only have an impact on the debt market but enable credit intermediation outside the regulated banking sector (channeling large amounts of deposits to other financial institutions) and in this way encourage the financial liberalization (intermediating private funds among different enterprises).

As a result of the above-mentioned processes, the shadow banking development might be an important contributor to the BRI's success. The rapid growth of the system makes the whole Chinese financial system more competitive on the international level and increases the probability to find funds for the BRI investments. It means that when considering the policy trilemma model, one side of the desired option is the free flow of capital (equated with the shadow banking growth). The other feature of the model is the lack of monetary autonomy. It stems from the fact that the important condition for the further development of the traditional banking sector in China (which is an essential counterbalance for the shadow banking system) is the lack of interest rates restrictions (lower government impact of the monetary authority). The monetary autonomy, as it used to be in the past, might lead to the situation that government-regulated interest rates are cre-

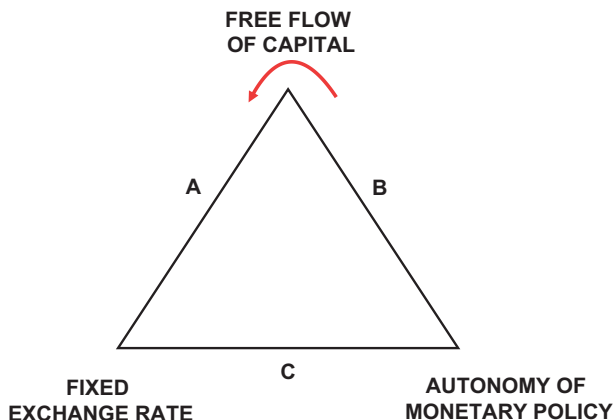


Fig. 12.6 Recommended policy approach: A gradual shift toward side A of the impossible trinity. Source: Own elaboration based on literature

ating ‘financial repression regime’, which is penalizing some of the financial market participants. Full liberalization of the interest rates is a better option. This rationale leads to the managed exchange rate as well, which should be the second side of the desired model. The possibility of interventions in the exchange rate regime (managed exchange rate) makes the debt market more secure and creates higher stability for the Foreign currency denominated debt. The desired options mean that the best solution for supporting the BRI is to pick side A of the triangle in Fig. 12.6.

Taking into account the idea of policy quadrilemma, the conclusion is similar to the trilemma—the Chinese authorities should sacrifice the monetary autonomy. It means that they should try to provide the free capital flows, together with the focus on financial stability and fixed exchange rate regime. As regard to the financial stability in relation to the shadow banking sector development, it is evident at the moment that the shadow banking sector together with the government debt in China is still manageable. They will be challenged in the future, but there is a possibility that proper regulations (embracing the shadow part of the financial market) together with the proper monetary policy will provide further sustainability for the system. On the one hand, it will be a costly process, but on the other hand, the lack of monetary autonomy means that the liberalized interest rates will create opportunities for some entities, for example the SMEs, to have access to loans from traditional banks and be less dependent on the shadow banking sector.

4.4 *Possible Policy Options to Cope with China's Policy Trilemma in a 'New Normal' Economy*

The ongoing capital liberalization combined with a more managed floating currency and market-oriented interest rates means that China needs to bend the impossible trinity in order to maintain a 'new normal' sustainable growth model. However, the costs of sterilization as a form of monetary action in which the PBC seeks to limit the effects of capital flows on the money supply and tries to stabilize the value of the currency is often used to fine-tune the conflicting aims of the policy trilemma. This cannot go on forever and might become unbearably high over time. These costs come mainly from interest payments to banks' required and excess reserves, PBC's bills, and selling reverse repurchase agreements or open market operations. If these costs in relation to GDP growth will become unsustainable, retaining both monetary autonomy and currency control will become unsustainable too. From a macro-economic perspective, sterilization intervention (and the BRI export boost) also leads to serious misallocation of resources by subsidizing the export sector at the expense of the rest of the economy. Especially the SMEs that mainly produce non-tradable goods are still denied much-needed funds and rely more on finance from shadow banks (Lo 2015).

China has for years been pursuing the policy trilemma, but it is likely that the country can bend the trinity which will come with costs in the form of lower official reserves and will lead to a policy quadrilemma. For decades China has been hoarding reserves, which have been increasingly used to bend the trinity in order to remain financially stable at the expense of declining reserves, which have fallen with around US \$1 trillion since June 2014 (SAFE 2016). Policymakers can keep going for a while but at a high price and with the knowledge that ultimately its efforts will be doomed to fail. Consequently the authorities are looking for possible policy options to escape from an economic downturn via a quadrilemma in light of a 'new normal' economy. The following policy options can be considered to reduce a possible further decline of monetary reserves or to fight the quadrilemma:

- effective implementation of the BRI project
- capital controls and monetary policy tightening
- more controlled freely floating currency
- targeted fiscal policy
- supply-side structural reforms 'with Chinese characteristics'

An effective implementation of the BRI project will depend on to what extent the return of the BRI project will exceed incurred costs in terms of capital assigned to the OBOR investments; the implementation of the BRI project will not further increase Chinese credit overhang and debt problems; and finally, the planned investments will be viable from an economic and political point of view. The effectiveness of the BRI requires a simultaneous occurrence of the following preconditions: First, a more flexible market-oriented financial policy and hence a monetary policy better adjusted to market conditions with market-conform interest rates which implies less monetary sovereignty; Second, more free movement of capital since the scope of BRI projects forces to open the financial markets; Third, the achievement of a high level of financial stability; Fourth, RMB internationalization and a more free-floating exchange rate system needed for this. However, taking into account the possible adverse effects of too much currency flexibility and the growing impact of China's shadow banking on its financial system, it is advisable to keep the capital flows free and to give up some monetary autonomy combined with more managed floating exchange rates. The free flow of capital is necessary both for the BRI and for further institutional development of the Chinese financial markets, which is necessary for the PBC and the CBRC to be able to regulate the process of the financial intermediaries' development (especially the Fintech side which is developing rapidly and in an uncontrolled way). The monetary autonomy will become less important in the context of the huge debt and the rapid growth of the shadow banking system. The question is what is the best policy option regarding the exchange rate system. On the one hand, it must be further internationalized, but on the other hand, it is possible to keep the more managed floating rate in order to avoid the threats of the unfavorable appreciation in the long run, which would be harmful for the further development of the economy and might surpass the positive effects of the BRI. As indicated earlier, this ultimately means a gradual shift toward side A of the triangle (see Fig. 12.6).

In addition to an effective implementation of the BRI, another possible option is to impose tighter and broader capital controls which received some support from the IMF and the Bank of Japan. For instance, by slowing capital outflows via reintroduction of restrictions on outbound FDIs, the pressure on China's reserves and on the exchange rate will mitigate. Although this will allow China to operate safely with fewer reserves, it will also put a halt to China's intention to integrate its currency more into the global markets, not only as a payments and trading currency but

also as a reserve currency. Also, as long as China maintains its openness to trade and inward investment, there are potentially many ways for households and firms to evade capital restrictions. Also, a more restrictive monetary policy could be implemented. For instance, China could raise interest rates, which might encourage capital inflows and discourage outflows, but this would hurt growth in an already declining economy. Almost for two decades the opening of the capital movement in China has been accompanied with a monetary policy which sometimes loosens and sometimes tightens its reins, so it is likely that small steps forward or backward will be implemented in the near future as well. At the same time, it is also likely that the IMF reserve currency inclusion and the OBOR-initiated pursuit of more globalization will have to make capital flows more freely. From a theoretical point of view, the scenario with capital controls and monetary policy tightening leads to a shift back toward side C of the triangle (see Fig. 12.7). It means a return to a policy of fixed exchange rate implemented together with stricter monetary stimulus.

Another option is to allow the RMB to gradually float more freely, that is allow a more managed floating exchange rate, which would give back control of monetary policy to the central bank and eliminate the need to run down reserves to support the currency (the gradual shift toward side B of the triangle in Fig. 12.8). The price that China is paying for maintaining currency stability is that the central bank has not been able to ease

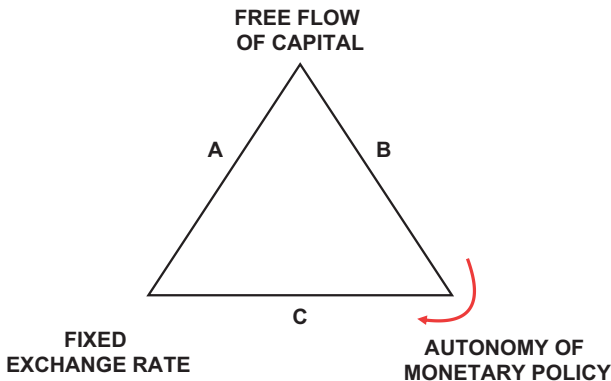


Fig. 12.7 The scenario with capital controls and monetary policy tightening: A gradual shift toward side A of the impossible trinity. Source: Own elaboration based on literature

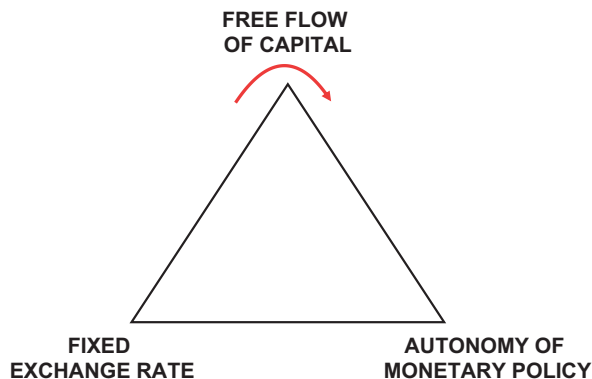


Fig. 12.8 The scenario with controlled freely floating currency and monetary policy tightening: A gradual shift toward side B of the impossible trinity. Source: Own elaboration based on literature

monetary policy more strongly, so it is likely the PBC will have to make the RMB a more controlled free-floating currency. However, that option exposes China to the risk that the RMB will plunge, thereby hurting confidence in the currency and creating a death spiral. It could also create more speculation in the global financial markets with a growing number of risky investment funds that bet against the RMB (Steil and Smith 2016). Such scenario would be less favorable for the BRI comparing to the option with free flow and fixed exchange rate, when taking into account the export oriented policy and the possibility of exchange rate stimulus. On the other hand, more free-float exchange rate is better for the RMB internationalization, which is also essential for further OBOR investments.

An alternative option is to target fiscal policy, that is government spending and tax measures aimed specifically at supporting the transition into the 'new normal' economy. For example, the lack of a strong social safety net combined with an aging society implies that Chinese citizens are mostly on their own when it comes to covering costs of health care, education, and retirement and is an important motivation to use China's relatively high household savings rate. Also, the recent reversal of the 'one-child' policy and transition to a 'two-child' policy might partly address this problem. Fiscal policies aimed at increasing income security, such as strengthening the pension system, would help to promote consumer confidence and consumer spending. Likewise, tax cuts or credits

could be used to enhance households' disposable income, and government-financed training and relocation programs could stimulate the labor transition from slowing to expanding production sectors. To what extent it is effective to subsidize the services sector should be further explored, but the reduction of existing subsidies to heavy industries and SOEs combined with efforts to promote entrepreneurship would certainly be useful (Bernanke 2016). The impact of such scenarios on the BRI may be different depending on the strength of the change, but finally it should lead to a 'new normal' growth model based more on the domestic market than on the foreign investments. On the other hand, building an efficient model based on the domestic market is time consuming, so it should be accompanied by the continued development of the BRI projects.

Another alternative policy option is to focus on supply-side structural policy reforms to support the transition in China's 'new normal' growth model as a logical response to the failure of existing reforms and restructuring after the GFC. The Chinese government insisted during the 12th FYP period on an economic development strategy of enlarging domestic demand. To some extent this move inhibited the economic slowdown, but economic growth nevertheless dramatically declined. The ineffective demand-side stimulus gave rise to the introduction of supply-side structural reforms as a main feature of the 13th FYP. Since November 2015, the Chinese government has been implementing supply-side structural reforms to improve the Chinese companies' productivity, to win the competition in a global market, to further release the reforms, to offset downward economic pressure, to better meet the needs of the society, and to promote sustained and sound economic and social development. These structural reform policies are executed in many areas, including price formation, tax regulation, financial and investment regulation, and demonopolization, with the final aim to further embrace a more competitive market mechanism (Reeves and Hu 2015).

The China-specific supply-side structural reforms include the following elements: elimination of excess capacity; reduction of the housing surplus or inventory; deleveraging or restructuring debt; cost reductions; and restoring weak growth areas. As the Chinese economy has slowed, heavy industrial capacity has continued to grow, and the result has been massive overcapacity in many industries such as coal and steel. Firstly, to tackle overcapacity, the focus is on increasing mergers and decreasing bankruptcy and liquidation. Secondly, the reduction of the housing surplus is mainly focused on fulfilling the housing demand of new urban residents. In prac-

tice this means reducing the inventory of unsold housing in second and third-tier cities. While housing markets in top-tier cities like Beijing and Shanghai are relatively healthy, smaller cities still have an enormous excess of unsalable housing. The supply-side policy will include efforts to make them affordable to rural-urban migrants.

Thirdly, the restructuring of China's debt will involve preventing systemic and regional risks and will be a complicated task since its debt burden is not only huge but also difficult to trace and locate in the economy. The banking system is certainly at the center of the debt problem, but other parts of the financial system are also involved. Closing down loss-making SOEs means writing-off their debts, including debts to banks, local governments, and other obligations in the capital markets (Naughton 2016).

Another way to address the corporate debt problem is the introduction of debt-for-equity swaps for state-owned banks with many non-performing loans. These banks would obtain equity stakes in corporations that have borrowed and cannot service their loans. This could lead to a 'win-win' situation for the banks in the form of lower bad debts, and for the firms the interest payments could be reduced. However, making credit decisions for companies in which banks have a stake might lead to a conflict of interest (Kalish 2016).

A consideration of the pressure from the non-banking financing in China lead the authorities to implement some regulatory reforms on the sector. Among the most important goals is to expand the sector to SMEs, rural businesses, and households and increase the systemic safety for the system. It is important not to reverse the increasing consumer access to financial services during the process of regulating the non-bank part of the Chinese financial market. The consumer safety should be improved and non-bank financial institutions more carefully and comprehensively regulated, but at the same time encouraged for further support for the real economy (Elliot and Qiao 2015). Together with the above mentioned, the Chinese regulator must limit the corporate debt. This category of debt accounts for over two-thirds of the total debt in the country, and compared to other markets, Chinese companies are among the most indebted in the world (Duceux 2018).

The reduction of redundant capacity and restructuring the debt would allow firms to reduce their costs. This additional element refers to further policy measures that would help firms to reduce costs and increase competitiveness. To lower costs, comprehensive measures are put in place, including systemic transaction costs, cutting tax burdens for enterprises,

reductions in burdensome regulation, and reductions in social security contributions, although this latter will conflict with the targeted fiscal policy aimed at increasing income security. The final element to improve weak growth areas implies that effective supply will be enhanced through poverty alleviation, cultivating newly emerging industries, and so on. It is important that all the key tasks of the supply-side structural reforms be carried out together in a coherent way (Naughton 2016).

Although there are some similarities between Chinese and Western supply-side structural reforms with regard to lowering tax rates, for the rest they have little in common. The ‘Chinese characteristics’ of supply-side structural reforms emphasize on cutting overcapacity, a specific aim of the BRI as well, and increasing effective supply to a large extent guided by heavy government intervention, while Western supply-side proponents prefer to avoid too heavy involvement of demand-side policies. As a matter of fact China’s supply-side reforms could be considered as an umbrella term for the pragmatic approach to solving its structural problems. The above-mentioned elements make it clear that it could mean different things at different times, and the temptation to rely on demand-side management remains overwhelming. As long as the current authorities are bounded by the existing political institutions, their approach to solving economic problems has not fundamentally changed. Step-by-step further institutional reforms are required to effectively push through the structural reforms that China urgently needs and to carefully balance the trade-off between financial liberalization and financial stability (DBS 2016).

Implementation of financial stability to the main policy aims in China means that there is a change from the policy trilemma to the policy quadrilemma (see Fig. 12.9). At the present times, in the context of BRI it means that the free capital flows and financial stability is given. The authorities have a choice between fixed exchange rate and independent monetary policy. This choice leads to the conclusion that the main dilemma is if the policy is aimed more on supporting the BRI or more on supporting the supply-side structural reforms in China.

It must be highlighted that even having defined the possible scenarios, it might be very difficult to implement them in the current circumstances. Lo Chi (2015) argues that it will be a great challenge to find an equilibrium between the necessary monetary autonomy and exchange rate control when the capital account is fully opened. There are few reasons. The main problem is that the PBC has multiple policy goals but is short of policy instruments. The second challenge is the great instability of the

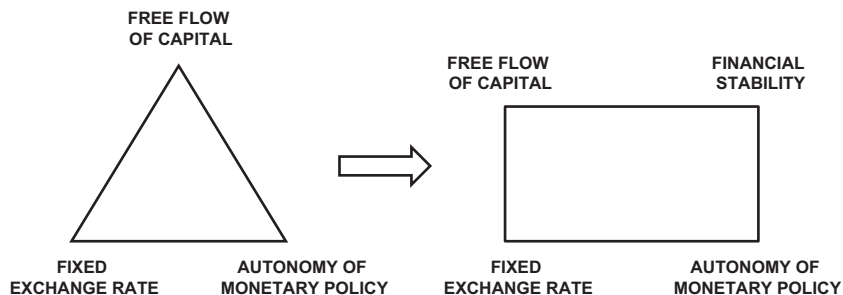


Fig. 12.9 The change from the impossible trinity to the policy quadrilemma

economy and is still unanswered if the PBC will be able to cope with the mounting debt problems. And the third, and probably the most important one, the PBC treats the secrecy of its policy as the power to move markets and influence economic behavior. Many other central banks abandoned such policy during the last three decades. They argue that in the age of systemic risk, policy transparency and communication with the markets is the best approach (Lo 2015). It poses a new challenge for the Chinese policy.

5 CONCLUDING REMARKS AND RECOMMENDATIONS

Since 2010 China's GDP growth rates are gradually declining to inevitable lower 'new normal' rates below 7.0% in 2018 combined with a huge credit binge and resulting debt problem in the non-financial corporate sector in particular. China's final stimulus came in August 2015, when China abandoned its currency peg with the USD and reduced the RMB's exchange rate three times in just one week. This was done to make the country more competitive, but it also caused shockwaves in markets worldwide and prompted cries of manipulation. Besides these factors, the global slowdown, China's own falling local demands, its shady banking, the real estate sector, and its corrupt political system have also contributed to the exhaustion of its growth potential. As a result, the government policy will now focus more on containing financial risks, entering a policy focused on deleveraging, and tackling quality-of-life issues.

This decade the Chinese policy makers have challenged the sustainability of the impossible trinity by adding financial stability as a fourth element into this theory. By extensively using their foreign reserves, China basically bowed to the trilemma under its recent 'new normal' growth model and

the ongoing liberalization strategy. The Chinese economy has accumulated such high levels of reserves that the authorities have tried to achieve a 'possible trinity' through a certain level of currency control and financial openness while maintaining monetary autonomy. For more than a decade China has tried to maintain these three aims and at the same time making use of the fact that the Mundell-Fleming model failed to consider the role of sterilization policy such as the sale of central bank bills. China has been able to circumvent the Mundell-Fleming model only when the RMB is subject to upward pressure. However, more recently China has faced an increasing trilemma attempting to pursue monetary autonomy and limiting exchange rate flexibility, while at the same time facing large and growing international capital in- and outflows. Since the turn of the millennium the authorities have mainly focused on the aim of a stable exchange rate combined with monetary autonomy (side C of the triangle). An increasingly open capital account, declining foreign reserves, and rising sterilization costs have made it impossible for the authorities to defy the 'unholy' trinity theory forever since they are forced to choose between monetary sovereignty and currency control. In contrast with a small and open economy like Singapore, China is a large economy with a high degree of internal orientation and is heavily indebted, which will make monetary autonomy likely to be more effective in counteracting the effects of external shocks on its domestic economy. This will make it more appropriate to relinquish currency control in favor of control on interest rates as a tool for domestic economic management. The RMB's internationalization has already deployed for many years and China's decision to join the IMF's reserves currency basket list could be considered as a test case to loosen the currency control and to bend the impossible trinity theory. Liberalizing a currency regime from a fixed to a fully floating exchange rate needs to be managed amid volatility in global capital flows. Therefore, China's policy makers will have to reform their exchange rate system at a slow and steady pace since currency risks need to be managed when pursuing China's aim to fully participate in a globalized economy.

The pressure on the 'horns' of the trilemma or the three 'corners' of the triangle becomes even more magnified as there is also a desire for more financial liberalization including the interest rates which might threaten the monetary sovereignty and financial stability. This explains why the authorities prefer to balance 'several dishes at the same time' to move from an export- and investment-led economy to a consumption-led model without a 'hard landing' to rein in speculation in property and equity markets with-

out damaging vulnerable industries, to engage with free markets without being hit by volatility, and to expand its financial sector without suffering from the 'hot money' flows that destabilized South East Asia in the late 1990s. Based on the experiences of these countries there is a tendency to violate the trilemma in times of financial crisis and economic downturn. It is likely that China's capital account liberalization will need to go with loosening the grip on its currency. This also suggests that a possible solution for China's trilemma is to loosen capital controls in order to shift the RMB toward being a major trading and reserve currency and eventually a floating exchange rate combined with monetary autonomy so that the government can stimulate the economy. Since the GFC the authorities have gradually moved from side C to side B of the triangle. However, in the case of the Chinese economy, there is still the possibility for many years to violate the trinity rule by using their huge accumulated stock of foreign reserves to stabilize the financial system, which transforms the economy from trilemma into quadrilemma measured in terms of its official reserves. Since mid-2014 until present, when the RMB faced accelerating depreciation with a reverse movement in 2017, the PBC intervened to prevent a plunge, an effort that depleted China's foreign reserves by a massive \$1 trillion and left the PBC with little choice but to tighten capital controls substantially.

The main benefits for China to bend the trinity rule is being listed in the IMF's reserve currency and being able to open its capital account without having too much currency fluctuation and losing its sovereignty in controlling interest rates. However, this actually comes with huge costs in terms of intensive use of monetary sterilization tools and especially the monetary reserves. Given the current state of the economy, it will be difficult to completely release the relatively stable exchange rate and sovereign monetary policy, which are needed as the tools to stimulate the economy. The authorities have made it clear that China will shift its economy from a focus on exports to a more consumption-based reliance. The recent RMB devaluations conflict with this policy aim as it will boost export activity and be counter-productive in China's attempts to increase its reliance on domestic consumption. Thus, to fulfill the aims of the 'new normal' economy, China needs to bend the rule and implement all three policy aims of the trinity in its own way.

There are several policy options to make the impossible trinity possible with their pros and cons. Based on the experiences of the gradual economic reforms of the last decades, it is likely that in the near future the monetary and exchange rate policy including the use of capital controls

will be implemented in a similar way whereby authorities sometimes tighten or loosen the reins depending on the degree of financial stability, which has become even more important for an effective implementation of the BRI. The inconsistency of the Chinese approach to reform the currency regime reflects the delicate balancing act being attempted by the policy makers. On the one hand, they are pushing for reforms and liberalization in the currency markets and elsewhere in the economy. To some extent it is unavoidable in the increasingly open Chinese economy, growing shadow banking system, and the interconnectedness between traditional banking and non-bank financial institutions. On the other hand, they are mindful of the need to maintain stability on which its own political legitimacy is based. In other words, not only China's 'new normal' economy matters but even more importantly its social stability is at stake. Since the demand-side policy stimulus with monetary means turned out to be rather ineffective after the GFC, the 13th FYP explicitly stresses another policy direction to address the 'new normal' economy, with a focus on a targeted fiscal policy and supply-side structural reforms. The big question remains whether the authorities will be able to control their economy and continue to compensate for its slowdown to protect the social stability given its dependency on global demand.

Unlike China's monetary easing policy since 2012, a targeted fiscal policy can support aggregate demand and growth without creating an incentive for capital outflow. At the same time a targeted fiscal approach would also serve the aims to reform and rebalance the economy in the long term by making the social safety net stronger and promoting domestic consumption and services. Thus, in this way China could effectively pursue both its short-term and its long-term objectives without placing downward pressure on the currency and without new restrictions on capital flows. In an interrelated combination with the targeted fiscal policy, an additional policy option is to implement supply-side structural reforms to pursue its 'new normal' direction and further unlock China's economic potential. The supply-side structural reforms consist of several elements, namely the key tasks to reduce overcapacity and inventories, to deleverage and lower costs, and to shore up weak growth areas. These tasks are interconnected and mutually reinforcing and are aiming at a more sustainable development strategy to bypass the 'middle-income trap'. Furthermore, the supply-side structural reforms with 'Chinese characteristics' are also meant to contribute to a stable recovery of the global economy in the post-crisis era.

With the abolition of the term-limits to remain in power, President Xi Jinping has all the time to implement his grand OBOR project five years after launching its initiative. In a way the BRI could be seen as Xi's answer to Donald Trump's #MAGA: 'Let's Make China Great Again'. In the short term it will become a balancing act to meet all the aims of the policy trilemma or quadrilemma. In case RMB internationalization and OBOR-driven investments and export take more time than expected, a gradual adjustment toward more monetary independence is likely. If RMB internationalization is more combined with excessive capital in- and outflow, it is likely that the authorities reinsert the reins via more capital controls. If the BRI export boost fails and at the same time the RMB's inclusion in IMF's reserves requires more capital mobility, it is probably more desirable to stabilize exchange rates more which will ultimately stimulate more trade and investment growth. This implies in the near future a gradual shift toward side A of the triangle.

In the short term it is advisable to restructure the Chinese 'new normal' economy first to a sustainable growth rate rather than ambitiously going to the next step without a strong foundation. There is not one single policy option, but only a choice among several painful measures which reflect the underlying structural problems in the Chinese economy, one that will take many years to rebalance. In the short term China will have to use its monetary reserves in an attempt to support its currency and guarantee financial stability without decreasing them too strongly. It is a dangerous gamble but one that is worth pursuing. If China succeeds, at least for a while, it can buy itself time to rebalance its domestic economy from slowing manufacturing to growing services and domestic consumption and claim to be the first country to solve a trilemma that has haunted economics for decades. The limited monetary autonomy, strongly managed exchange rate, and partial capital liberalization as a mixture of central controls and market freedoms satisfy the conditions of a variation of the impossible trinity theory. However, deeper institutional financial reforms are required to increase the role of markets, the private sector, competition, and domestic consumption for driving productivity-led and greener growth in the future. This could make China's 'new normal' economy more stable, and as soon as the sustainability has been embedded in the new development stage, it would be the right time to fully liberalize the capital flows, the interest rates, and thereafter the exchange rate system.

Since the turn of the millennium, China has used its monetary policy and exchange rate as useful tools for its economic development. The

authorities managed the RMB exchange rate and applied an independent monetary policy at the same time. However, after the GFC the government has implemented more managed floating than fixed exchange rates, but still focused their attention on monetary autonomy. At the same time they enforced more openness and liberalized approach to the capital flows. The BRI and its investments enhanced this approach by intensifying the flow of capital (especially the FDI investments). The active fiscal stimulus and the excessive debt burden have led to a situation when further expansionary monetary policy will no longer be as efficient as it used to be. Taking into account the growing impact of China's shadow banking on its financial system, it is likely that the authorities have to give up the monetary autonomy for further strengthening financial stability. As a result the PBC might be focused more on currency stability than the monetary autonomy in the near future. Regarding the triangle representing the impossible trinity, it means that the policy goals will move from side B to side A of the triangle. Additionally the accompanying further liberalization of the free flow of capital will cause the necessity to focus more on financial stability.

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