



# Insolvency regimes and cross-border investment decisions<sup>☆</sup>

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## ABSTRACT

This paper investigates the effect of insolvency regulation reforms on cross-border debt and equity investments at aggregate and sectoral levels. Using disaggregated data from the ECB's Securities Holdings Statistics by Sector (SHSS) database and the OECD indicators on efficiency of insolvency regulations, we find that investors increase their debt and equity holdings in the countries that undertook reforms of insolvency regulations and whose insolvency framework improved thereafter. The effect differs across sectors, with investments of institutional investors in equity and investments of banks in debt being particularly sensitive. In addition, shareholders are mostly responsive to prevention and streamlining tools, while debt holders respond more to availability of restructuring tools. Finally, we show that reforms of insolvency regulations are particularly effective in increasing cross-border debt and equity investments when the quality of insolvency regulations in holder and issuer countries is relatively similar, arguing for potential benefits of harmonizing insolvency regulations.

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## 1. Introduction

The European Union (EU) financial system remains national and cross-border financial integration is rather limited (European Commission, 2015b). In particular, differences in financial services regulations and institutional quality, together with the resulting heterogeneity in the efficiencies of insolvency procedures, are among the most important impediments on the way to a common EU capital market (European Commission, 2015a; European Banking Authority, 2020). In order to deepen capital market integration, it is an important first step to set minimum standards in insolvency processes and systematically monitor each countries' bureaucratic progresses over time (European Commission, 2015a; Bhatia et al., 2019). On 20 June 2019, the European Parliament and Council signed a new directive 2019/1023<sup>3</sup> that established minimum standards for

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preventive restructuring procedures which should be adopted at national level. The directive sets early restructuring procedures that are beneficial for enterprises as it allows them to continue operating while in distress in cases where this maximizes their value. In addition, it introduces some targeted measures to improve the efficiency of insolvency, restructuring, and discharge procedures, especially in shortening their lengths and thereby increasing recovery rates. Further harmonization of insolvency regulations and convergence to minimum standards remain a work in progress.

While the literature claims that reforms of insolvency regulations positively affect costs and supply of bank lending, to the best of our knowledge, there are no in-depth studies that explore the effect of insolvency regulations on international debt and equity markets.<sup>4</sup> Therefore, it is not clear how insolvency regulations affect cross-border debt and equity markets. To which degree do international investors take insolvency regulations into account when they make their investment decisions? Do different types of investors (households, non-financial corporations, banks, and institutional investors) respond differently to a legal change? Answering these questions is a first step on the way to evaluating the effect of reforms in insolvency regulations on capital markets and capital market integration, particularly in Europe.

In this paper, we assess how improvements in the quality of insolvency regulations (that occur after the reforms of insolvency regulations take place) affect cross-border investments in debt and equity markets. To this end, we investigate reforms of insolvency regulations conducted by the OECD economies between 2010 and 2016 (McGowan and Andrews, 2018). The idea is that once the reforms are accomplished, the quality of insolvency regulations improves and investors start investing more in countries with more efficient regulations. For example, better insolvency regulations might increase recovery rates and therefore make investments in debt securities more attractive. At the same time, introducing pre-insolvency regimes might help restore the value of a distressed enterprise and thus attract more investment in its shares.

In the first part of the paper, we use the insolvency regulations index by McGowan and Andrews (2018) that quantifies the state of insolvency regulations in the years 2010 and 2016. We updated the OECD index on insolvency regulations by collecting data on reforms of insolvency regimes in the OECD economies for the years 2011–15. The collected data allows us to see when the reform was conducted, and which aspects of insolvency regulations were affected by the reform. The data thus allows us to look at changes in insolvency regulations in detail, differentiating between treatment of failed entrepreneurs, prevention and streamlining, as well as availability of restructuring tools.

In the second step, we use data on reforms of insolvency regulation and their quality in a difference-in-differences setup. We assess how legal change affects cross-border debt and equity investments at the aggregate and sectoral levels by comparing cross-border holdings of debt and equity issued by non-financial corporations in countries that implemented insolvency reforms (treatment group) versus countries that did not implement insolvency reforms (control group). We exploit the staggered nature of the reforms, i.e. that the reforms are conducted by countries at different points in time and, therefore, some countries serve as a control group prior to the reform and as a treatment group after the reform. For this analysis, we use the ECB Securities Holdings Statistics by Sector (SHSS) database, which provides information on nominal and market values of debt and equity securities at a granular level. In particular, we have information by issuer country, holder country, as well as holder and issuer sector. The data allows us to partition debt and equity issued by non-financial corporations, i.e. those firms affected by the reforms of insolvency regulations.<sup>5</sup> The structure of the data allows us to examine whether investors from different sectors such as households, non-financial corporations, banks, and institutional investors, have a different sensitivity to the legal change. Further, we can explore what types of reforms (i.e. treatment of failed entrepreneurs, prevention and streamlining, and availability of restructuring tools) matter the most for cross-border investment decisions.

Our findings suggest that indeed investors take insolvency regulations into account when making their cross-border investment decisions. The results are in line with the literature that explores the effect of institutional quality on cross-border debt and equity holdings, such as Okawa and van Wincoop (2012), Giofre (2013), and Bremus and Kliatskova (2020). More specifically, investors prefer to invest more in debt and equity of a country that improves its insolvency regulations after the reform takes place. The effect, however, varies significantly across investor sectors. The aggregate results are driven by institutional investors' investment in equity and by banks' investment in debt. In addition, our results show that insolvency regulation reforms have a particularly pronounced effect on investments when the quality of insolvency regulations in holder and issuer countries is relatively similar. These findings provide an appealing case for the creation of an EU Capital Markets Union, suggesting that improvements in the quality of regulations impact equity and debt investments only if the quality of insolvency regulations between countries is relatively similar.

Further, our estimation results suggest that reforms of different aspects of insolvency regulations are not equally important for cross-border investment decisions. Availability of pre-insolvency regimes is crucial for shareholders as a timely identification of bankrupt enterprises and early unofficial interventions should increase survival rates and the value of enterprises, thereby making investment more attractive. At the same time, availability of debt restructuring tools is important for debt holders as those help enterprises to continue their operations and, therefore, increase possible debt recovery rates. Finally, we provide some initial evidence suggesting that issuer countries with developed financial markets and an

<sup>4</sup> There are a number of studies that explore the effect of institutional quality on the development of international capital markets (two examples are Okawa and van Wincoop (2012) and Bremus and Kliatskova (2020)).

<sup>5</sup> Monetary financial institutions usually fall under a separate insolvency regime (IMF, 2005). For example, in the EU, apart from the national insolvency regulations for liquidation of a bank, there is an EU-wide resolution regime as set out in the Bank Recovery and Resolution Directive (BRRD) and Single Resolution Mechanism Regulation (SRMR) for cases when a failing bank cannot go through normal insolvency proceedings without harming the public interest or causing financial instability.

effective government are the ones that benefit (in terms of higher debt and equity inflows) from reforms the most. All in all, our findings are positive about the potential of reforming insolvency regulations and their harmonization across different countries to improve capital market integration, even though the benefits might spread out differently across sectors and countries.

Our study is mainly related to two strands of the literature. First, multiple cross-country and country-specific studies show that (changes in) insolvency procedures affect the banking sector, its structure and depth. Haselmann et al. (2009) show that banks increase the supply of credit subsequent to a change in insolvency regulations. Changes in collateral laws which ensure that individual creditors can realize their claims against a debtor are especially important. Haselmann and Wachtel (2010) show that the legal environment can affect the composition of bank portfolios; i.e., in countries with efficient insolvency regulations, banks lend more to small and medium enterprises (SMEs) and provide more mortgages. At the same time, banks tend to lend to large enterprises and to the public sector in a legal environment that is less well-functioning. Single country studies that examine bankruptcy reforms in Italy (Rodano et al., 2016) and Brazil (Araujo et al., 2012) show that improvements in creditor rights reduce the cost of debt and spur lending, leading to higher investment volumes. In contrast to the existing literature, Vig (2013) shows that the securitization reform in India led to a reduction in firms' secured debt, total debt, debt maturity, and asset growth, as well as to an increase in liquidity hoarding by firms by imposing an extra cost on borrowers and, therefore, reducing the willingness of firms to obtain secured debt. Our paper contributes to the existing literature by assessing how insolvency regulations affect cross-border debt and equity investment, instead of focusing on bank lending.

Second, the paper is related to gravity literature that analyzes drivers of international investment positions at the sectoral level, distinguishing between sophisticated (e.g., banks, institutional investors) and less sophisticated (e.g., households) investors. Roque and Cortez (2014), Giofre (2017), Galstyan et al. (2016), Boermans and Vermeulen (2020) and Bremus and Kliatskova (2020) look at the determinants of cross-border debt and equity holdings at the sectoral level. The literature suggests that, on the one hand, sophisticated investors usually have more diversified portfolios and make their investment decision based on a wide range of information, including compliance costs of regulations (Boermans and Vermeulen, 2020; Carvalho, 2022; Sun et al., 2020). On the other hand, less sophisticated investors have a higher home bias in their investment decisions, are more affected by information costs and familiarity (Christelis and Georgarakos, 2013; Roque and Cortez, 2014), and prefer investing in countries that are more transparent and have better-developed equity markets (Roque and Cortez, 2014). In addition, banks usually hold larger bond portfolios due to stricter capital and liquidity requirements (Boermans and Vermeulen, 2020; Buch et al., 2016), while institutional investors hold larger equity portfolios due to lower risk aversion and search for yield effects. The above-mentioned studies mostly concentrate on the effect of standard gravity controls (such as distance, language, etc.) on cross-border investment. Our study contributes to the literature by focusing on the sectoral effects of insolvency regulations, distinguishing between investment in debt and equity and between sophisticated (e.g., banks, institutional investors) and less sophisticated (e.g., households, non-financial corporations) investors.

The remainder of the paper is structured as follows. Section 2 presents the empirical model together with tested hypotheses and data. Section 3 discusses our main estimation results. Section 4 provides robustness tests and extensions of the analysis. Section 5 concludes.

## 2. Empirical analysis

The goal of this paper is to investigate how improvements in the quality of insolvency regimes occurring after the reforms take place affect cross-border portfolio investments at the aggregate and sectoral levels. In the following, we present hypotheses, data, and the empirical strategy.

According to McGowan and Andrews (2018), a number of reforms that impact the timely initiation and resolution of personal and corporate insolvency proceedings were undertaken by different OECD countries between 2010 and 2016. We use these reforms in order to identify the effect of improvements in insolvency regulations on cross-border portfolio investments. More specifically, we test the following hypotheses.

**Hypothesis 1:** *Investors in country  $i$  invest more in debt and equity issued in country  $j$  if country  $j$  improves the efficiency of insolvency regulations after the reform of insolvency regulations takes place.* We use legal change, i.e. reforms of insolvency regulations, for the identification. We assume here that after the reform the quality of insolvency regulations improves and, therefore, international investors are inclined to invest more in debt and equity issued in the country that undertook the reform. The magnitude of the effect is expected to vary. Reforms that increase the protection of creditor rights should attract foreign lenders to a greater extent (La Porta et al., 1997). However, reforms that increase debtor protection may also have a positive impact by virtue of eliminating legal uncertainty and hence reducing risk when the indebted firm is distressed (Haselmann et al., 2009). Differentiating between the interests of debtors and creditors is not always trivial. For example, reforms of restructuring tools are debtor-friendly as they allow an insolvent firm to continue to operate and give it a chance for a successful recovery. At the same time, these reforms, to a lesser degree, are also creditor-friendly as creditors might get the opportunity to achieve higher recovery rates after debt restructuring as compared to following the immediate suspension of a firm's operations.

**Hypothesis 2:** *The impact of reforms of insolvency regulations on cross-border investments differs across investor types and insolvency reform instruments.* We hypothesize that investors respond more to prevention and streamlining reforms as well

as to reforms of available restructuring tools than to the treatment of failed entrepreneurs. While exploring the exact mechanism is not part of this paper, we suggest that insolvency laws affect cross-border investments through the reduction in compliance costs as well as better quality of information on enterprises' financial situation. We assume that investors take into account the availability of pre-insolvency regimes as a timely identification of bankrupt enterprises and early unofficial interventions should increase survival rates and the value of enterprises, thereby making investment more attractive. This should be especially important for equity investments as shareholders are the least interested in a firm's bankruptcy. In addition, the availability of debt restructuring tools is important as those help enterprises continue their operations and, therefore, increase possible debt recovery rates. In particular, it should be taken into account by debt investors as in case of a bankruptcy, debt holders are generally paid before equity holders. Further, reforms of the treatment of failed enterprises mostly affect entrepreneurs, i.e. owners of the business, and, therefore, are less important for debt holders or minor shareholders (McGowan and Andrews, 2018).

Finally, while we do not have a well-defined prior on which sectors are more affected by insolvency regulations, we assume that more sophisticated investors, such as banks and institutional investors, are more responsive to legal changes. Professional investors have more diversified portfolios (Boermans and Vermeulen, 2020; Carvalho, 2022) and, therefore, are more exposed to cross-country differences in the legal framework. In addition, professional investors have more capacity to monitor and analyze the legal environment (Roque and Cortez, 2014; Bremus and Kliatskova, 2020). Nevertheless, it might also be the case that investment decisions of the other categories of investors, such as households and non-financial corporations, are affected by insolvency regimes, especially as transaction costs that arise in the event of a default might be a very high burden for small investors (Christelis and Georgarakos, 2013).

## 2.1. Data

In our study, the sample covers 19 holder countries and 33 issuer countries. The coverage is limited to countries that report their securities holdings in the ECB's Securities Holdings Statistics by Sector (SHSS) database. *Holder countries* are Austria, Belgium, Cyprus, Germany, Estonia, Spain, Finland, France, Greece, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, the Netherlands, Portugal, Slovenia, and Slovakia. *Issuer countries* are Australia, Austria, Belgium, Canada, Chile, Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. The choice of issuer countries is limited to the countries for which data on insolvency regulations from the OECD is available. Data sources for all variables are presented in Table A1.

### 2.1.1. Data on insolvency law reforms

McGowan and Andrews (2018) developed an aggregate index on the design of insolvency regimes (hereinafter *insolvency index*) based on questionnaires answered by all OECD member countries (except Iceland), plus China, Lithuania (which became a member in 2018), Malaysia, and Russia.<sup>6</sup> Data is available for a total of 38 countries. The questions initially spanned the 1995–2016 period in 5-year intervals, but the response rates only allowed for an analysis of the years 2010 and 2016. The insolvency indicator covers detailed aspects of insolvency reforms and their changes, including efficiency of the procedures, differentiated treatment according to the firm's size, and entrepreneur's probity. We scaled the aggregate index to take values between minus one and zero, with higher values indicating a higher quality of insolvency regulations.<sup>7</sup> The aggregate index is decomposed into three (plus one) subcomponents, each divided into two to five features that are explained below.

#### 1. Treatment of failed entrepreneurs:

- Availability and time to discharge, i.e. the number of years a bankrupt enterprise must wait until it is discharged from pre-bankruptcy indebtedness;
- Extent of exemptions of the debtor's assets that are not directly linked to the business (e.g. house, spouse's assets);

A lenient treatment of debtors improves the entrepreneurship environment by giving failing entrepreneurs a second chance to start a new business. At the same time, if personal costs for failed entrepreneurs are too small, it may create a moral hazard problem as entrepreneurs would get involved more in risky business. This, in turn, may increase investors' risk aversion and thereby increase the costs of credit as well as collateral requirements.

#### 2. Prevention and streamlining:

- Early warning mechanisms, such as training on one's financial situation and counsel in the event of difficulties;

<sup>6</sup> A more in-depth analysis of insolvency regulations in EU Member States is presented by Steffek (2019). The country sample, however, does not cover countries outside of the EU.

<sup>7</sup> The original index by McGowan and Andrews (2018) was scaled between zero and one, with higher values indicating lower quality of insolvency regulations. For the ease of interpretation in this paper, we rescaled the index as described in the text.

- Pre-insolvency regimes, which include the assessment of risks and early interventions for informal solutions before official proceedings;
- Special insolvency procedures for SMEs, which may be treated more leniently due to their limited resources.

These tools allow creditors and debtors to intervene earlier before the start of formal insolvency proceedings. In addition, the measures help to distinguish temporary difficulties from inevitable bankruptcy, and, in case of the latter, speed up and smooth the process so that resources can be re-allocated faster to productive economic agents.

### 3. Restructuring tools:

- Ability to initiate restructuring of both debtors and creditors;
- Availability and length of stay on assets, which enables the firm to continue operations and, therefore, increases the probability of a successful restructuring;
- Possibility and priority of new financing. While priority rules of debt repayment make the system more predictable, priority for new financing might give the firm an opportunity to restructure successfully and, therefore, increase its final recovery rate;
- Possibility to “cram-down”, i.e. approve restructuring based on a requisite majority rule rather than unanimity, may allow timely restructuring of a firm;
- Treatment of management during restructuring, whose dismissal is assumed to have adverse effects on the timely initiation of the restructuring.

Facilitating timely restructuring can help to avoid plunging a viable firm into insolvency and, therefore, minimizes the costs and risks involved in the process. Furthermore, it can free up capital for reinvestment.

### 4 Other factors:

- Degree of court involvement, i.e. go to court only if necessary;
- Distinction between honest and fraudulent bankruptcies, which can fine-tune the lenience of entrepreneurs' treatment;
- Rights of employees, which if too rigid, are thought to hamper the process.

All in all, the abovementioned measures are supposed to have a positive effect on capital markets by facilitating a timely restructuring of viable businesses or bankruptcy of failed enterprises when appropriate, thereby lowering transaction costs and increasing recovery rates for creditors.

The design of insolvency regimes varies significantly across countries and over time. While some countries have quite efficient frameworks to prevent as well as resolve insolvency (such as France and the United Kingdom), others are lagging behind (Fig. 1). A comparison of values for the years 2010 and 2016 (Fig. 2) suggests that efficiency of insolvency rules improved or remained the same in all countries, with the exception of Poland, due to the recently conducted reforms.

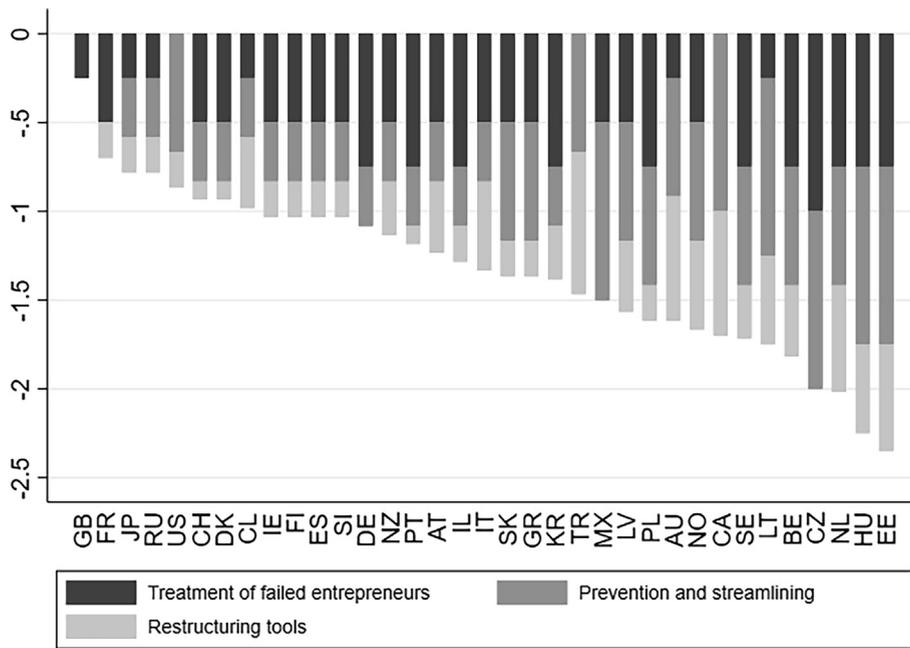
In our sample period, 19 countries undertook reforms of their insolvency regulations to varying degrees. We collected information on the year and affected regulations based on McGowan and Andrews (2018) and national sources. A detailed account per year and country is provided in Table A2. The observed changes were substantial, with the average insolvency indicator improving from  $-0.5$  in 2010 to  $-0.4$  in 2016. The average improvement after a reform took place was equal to 0.13, with a range between 0.08 and 0.31. The reforms mostly involved changes in pre-insolvency regimes, the possibility of new financing, and SME-specific procedures. For example, the German Financial Stability Act of 2010 allows overindebted but potentially viable companies not to file for immediate insolvency. In addition, in-court restructuring and creditor participation were improved in 2012. In Italy, debt restructuring and reorganization procedures have been alternatives to formal bankruptcy proceedings since 2012 and creditor rights have increased, too. Finally, while Slovenia did not jump on the bandwagon of reforms in the 1990s, it introduced various provisions in 2013 and 2015, notably simplifying processes for small enterprises and introducing preventive procedures.

#### 2.1.2. Data on portfolio debt and equity holdings by sectors

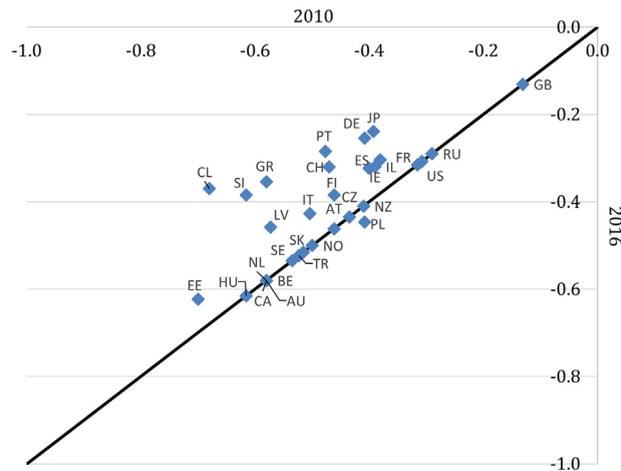
We use confidential bilateral sectoral cross-border portfolio equity and debt holdings at an annual frequency as dependent variables.<sup>8</sup> These variables capture security holdings by a sector  $s$  of country  $i$  that are issued by non-financial corporations in country  $j$ . The data comes from the ECB's SHSS database and is available on a systematic basis starting in the fourth quarter of 2013.<sup>9</sup>

<sup>8</sup> Debt holdings include long-term and short-term debt securities. Equity holdings include listed shares but exclude investment fund shares (ECB, 2015).

<sup>9</sup> Prior to this date, the data was provided to central banks on a voluntary and experimental basis. Therefore, the coverage was incomplete for a number of countries (e.g. for Greece and Spain). Third-party holdings and holdings by non-euro area countries showed a very low coverage over this period. Furthermore, only limited quality checks were performed on the data for these periods.



**Fig. 1.** Barriers in insolvency regimes in 2016. *Note:* The figure depicts three components of insolvency regimes: treatment of failed entrepreneurs, prevention and streamlining, and restructuring tools. The sub-indexes are not scaled. Higher index values indicate higher quality of insolvency regulations. For example, the UK and France have the highest quality of insolvency regulations. *Source:* Authors' illustration based on McGowan and Andrews (2018).



**Fig. 2.** Efficiency of insolvency regulations. *Note:* OECD insolvency index (high values = high efficiency), developments between 2010 and 2016 (above the diagonal = improvement, on the diagonal = remained the same). AT = Austria, AU = Australia, BE = Belgium, CA = Canada, CH = Switzerland, CL = Chile, CZ = Czech Republic, DE = Germany, EE = Estonia, ES = Spain, FI = Finland, FR = France, GB = United Kingdom, GR = Greece, HU = Hungary, IE = Ireland, IL = Israel, IT = Italy, JP = Japan, LV = Latvia, NL = Netherlands, NO = Norway, NZ = New Zealand, PL = Poland, PT = Portugal, RU = Russian Federation, SE = Sweden, SI = Slovenia, SK = Slovakia, TR = Turkey, US = United States. *Source:* Authors' illustration based on McGowan and Andrews (2018).

For our analysis, we only consider debt and equity securities issued by non-financial corporations (code S 11 in the SHSS dataset) as insolvency regulations and their changes affect only the insolvency proceedings of corporates, including SMEs. Further, we divide holder sectors  $s$  into the following investor groups<sup>10</sup>:

- non-financial corporations (code 11);
- banks (code 122), including own holdings of monetary financial institutions (MFIs), excluding foreign banks' holdings;
- institutional investors (codes 123–129), including holdings of money market funds, investment companies, insurance corporations, pension funds, and other financial intermediaries;
- households (codes 14–15).

Holdings of debt and equity by central banks and general government are excluded from the analysis, as we concentrate on the behavior of private investors. When deciding whether to use nominal or market values of equity and debt,<sup>11</sup> one has to keep in mind the pros and cons of both strategies. Nominal values help avoid the influence of possible valuation changes that might come from movements in exchange rates or prices. However, when considering portfolio adjustments, investors look at the market values and the corresponding portfolio weight of different assets. In line with Buch et al. (2016) and Timmer (2018), we therefore concentrate on the results generated with market values of equity and debt.

Fig. 3 compares market and nominal values for debt and equity, further distinguishing between countries that are part of the sample and all countries reporting SHSS data to the ECB. Our sample captures more than 80 % of the total assets. When comparing nominal and market values, we observe that valuation changes mostly affect equity investment. Debt investments in market and nominal values are similar, with nominal values being slightly higher than market values before the year 2012, and slightly lower thereafter. For debt, the total value increases from 2013 onwards. It is worth noting, however, that this might come from a better data coverage due to the change in the SHSS methodology (i.e. reporting to the ECB became compulsory at the fourth quarter of 2013).

Further, we compare debt and equity investments separately for each sector of the holder country  $i$ . In the process, we look at the aggregate debt and equity volume issued by all sectors in country  $j$  (Fig. 4). Institutional investors and banks are the major holders of debt, while institutional investors hold most of the equity. The difference between holder sector trends is significant: only institutional investors have increased their holdings in both debt and equity. Banks decreased their debt holdings, potentially linked to the progressive introduction of Basel III. Debt and equity holdings of households and non-financial corporations (NFC) remained almost constant throughout the observed period. Fig. 5 depicts holdings of debt and equity issued by the NFC sector only, as these assets are the ones that are mainly affected by insolvency reforms and will be used in our regression framework. The trends are similar to the ones observed for the entire sample.

### 2.1.3. Control variables

In addition to our main variables of interest, we include a set of control variables in the regression equations. We use standard bilateral gravity controls, such as common legal origin (British, French, German, Scandinavian, or Socialist), logarithm of imports and logarithm of distance (Okawa and van Wincoop, 2012; Galstyan et al., 2016). We assume that countries with lower distance between each other, common legal origin, or that trade more with each other face lower communication costs as well as less information asymmetries and therefore tend to have higher cross-border investment. Following Houston et al. (2012), we include country-specific control variables for issuer economies such as logarithm of real GDP and a financial development index. We expect investors to keep holdings in high-income countries with well-developed financial markets. Summary statistics for dependent and explanatory variables are in Table 1.

## 2.2. Regression specification

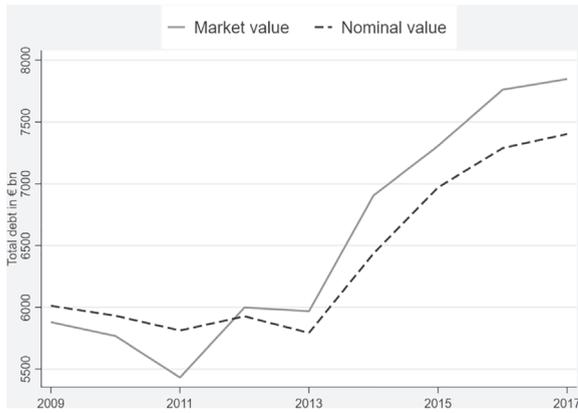
To assess the effect of insolvency law reforms in an issuer country on the investment behavior of different sectors in a holder country, we apply a difference-in-differences approach. The idea is that after the reform takes place in the issuer country, the quality of insolvency regulation is improved and economic agents prefer to invest more in this country. We estimate the following specification of the model (Houston et al., 2012; Haselmann et al., 2009):

$$\log(A_{isjt}) = \alpha_j + \alpha_{it} + \gamma_1 \text{Treatment}_{jt-1} + \beta_1 X_{ijt} + \beta_2 X_{jt} + \varepsilon_{isjt}, \quad (1)$$

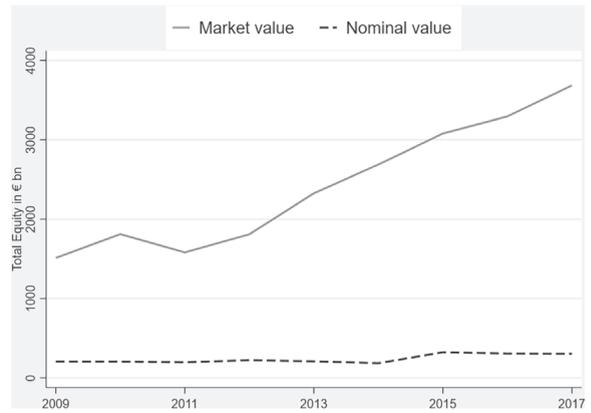
where  $i$  indexes holder country,  $j$  indexes issuer country, and  $t$  indexes years. The holder sector, i.e. banks, institutional investors, non-financial corporations, and households, are denoted as  $s$ . Regressions are also estimated with the aggregate level of debt and equity holdings defined as the sum of debt (or equity) across all sectors. The logarithm of the market value of debt and equity issued by non-financial corporations is denoted by  $A_{isjt}$ . The issuer fixed effects correspond to  $\alpha_j$ . All time-varying

<sup>10</sup> The classification by investor group is available at [https://sdw.ecb.europa.eu/datastructure.do?%20conceptMnemonic=HOLDER\\_SECTOR&datasetinstan ceid=351#cl](https://sdw.ecb.europa.eu/datastructure.do?%20conceptMnemonic=HOLDER_SECTOR&datasetinstan ceid=351#cl)

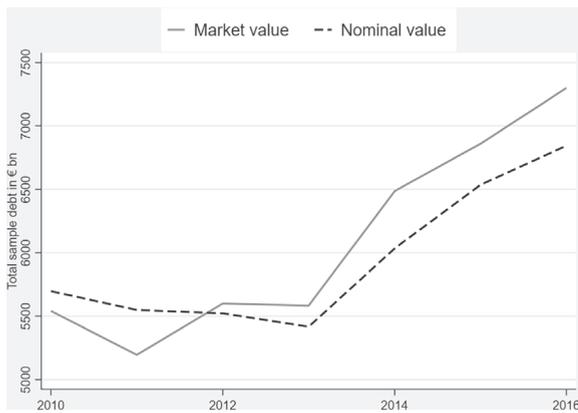
<sup>11</sup> Nominal change in holdings reflects the nominal transaction plus the other nominal volume-driven adjustment (for example, due to reclassifications). Market changes in holdings, in addition, include price changes and exchange rate adjustments as well as the compound effects (a residual resulting from the simultaneous occurrence of adjustments in market prices and exchange rates and which cannot clearly be ascribed to one of the two causes of adjustment) (Deutsche Bundesbank, 2015).



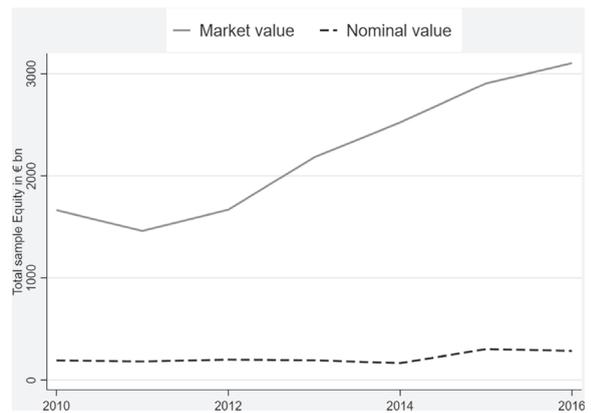
(a) Market vs. nominal value of debt, all countries



(b) Market vs. nominal value of equity, all countries

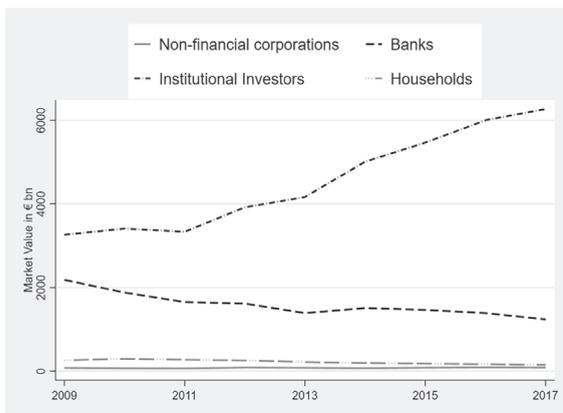


(c) Market vs. nominal value of debt, sample countries

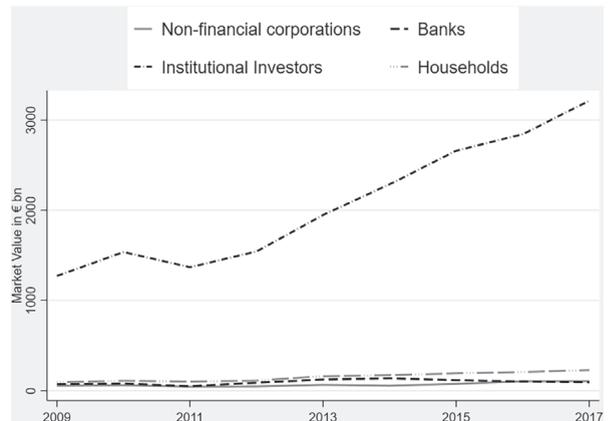


(d) Market vs. nominal value of equity, sample countries

**Fig. 3.** Nominal vs market value of investments. *Note:* Sample countries are those presented in Table A3. Equity and debt holdings are cross-border holdings, i.e. holdings of country  $i$  of securities issued by same country  $i$  are excluded from the analysis. *Source:* SHSS, authors' calculations. (a) Market vs. nominal value of debt, all countries; (b) Market vs. nominal value of equity, all countries; (c) Market vs. nominal value of debt, sample countries (d) Market vs. nominal value of equity, sample countries.

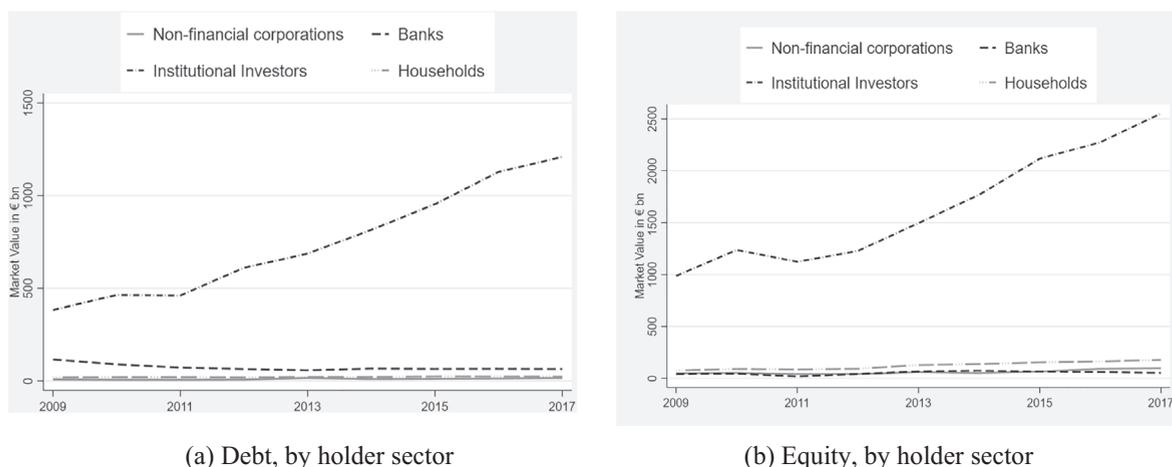


(a) Debt, by holder sector



(b) Equity, by holder sector

**Fig. 4.** Cross-border debt and equity investment in assets issued by all sectors, by holder sector. *Source:* SHSS, authors' calculations. (a) Debt, by holder sector; (b) Equity, by holder sector.



**Fig. 5.** Cross-border debt and equity investments in assets issued by non-financial corporations, by holder sector. *Source:* SHSS, authors' calculations. (a) Debt, by holder sector; (b) Equity, by holder sector.

**Table 1**  
Descriptive Statistics.

	Obs.	Mean	Std. Dev.	Min	Max
<b>Dependent Variables</b>					
<b>In nominal value</b>					
Log(E), Agg	3159	15.06	4.03	—	—
Log(E), NFC	2054	12.14	3.80	—	—
Log(E), Banks	1404	12.59	3.69	—	—
Log(E), II	2857	14.76	3.93	—	—
Log(E), HH	2792	12.93	3.80	—	—
Log(D), Agg	2817	17.69	3.16	—	—
Log(D), NFC	1442	14.60	2.69	—	—
Log(D), Banks	1752	16.72	2.51	—	—
Log(D), II	2601	17.62	3.13	—	—
Log(D), HH	2044	14.60	2.84	—	—
<b>At market value</b>					
Log(E), Agg	3158	17.55	3.94	—	—
Log(E), NFC	2058	14.58	3.52	—	—
Log(E), Banks	1383	15.18	3.71	—	—
Log(E), II	2856	17.62	3.72	—	—
Log(E), HH	2792	15.14	3.49	—	—
Log(D), Agg	2819	17.73	3.17	—	—
Log(D), NFC	1442	14.60	2.71	—	—
Log(D), Banks	1752	16.77	2.54	—	—
Log(D), II	2605	17.66	3.15	—	—
Log(D), HH	2044	14.58	2.86	—	—
<b>Independent Variables</b>					
Treatment dummy (lag), issuer	3158	0.21	0.40	0	1
Insolvency indicator (lag), issuer	3158	-0.45	0.13	-0.7	-0.13
Log(Real GDP), issuer	3158	27.93	2.29	23.49	33.91
Fin. development index, issuer	3158	0.65	0.18	0.26	0.95
Log(Distance)	3158	7.54	1.08	4.09	9.87
Log(Imports)	3158	20.49	2.37	12.87	25.87
Common legal origin	3158	0.23	0.42	0	1

*Note:* Descriptive statistics for independent variables are based on the sample of the baseline regression with market values of aggregate equity holdings as the dependent variable (Table 3 column (1)). For confidentiality reasons, we do not display individual values of investments, such as minima and maxima. Agg = Aggregate, E = Equity, D = Debt, NFC = Non-Financial Corporations, II = Institutional Investors, HH = Households.

and time-invariant holder country characteristics are captured by holder time fixed effects  $\alpha_{it}$ . The set of control variables includes issuer-specific variables  $X_{jt}$ , namely the logarithm of real GDP and the financial development index (Sviryzdenka, 2016), as well as bilateral variables  $X_{ijt}$ , specifically the logarithm of distance between countries  $i$  and  $j$ , logarithm of imports, and common legal origin (Okawa and van Wincoop, 2012).  $Treatment_{jt-1}$  takes a value of 1 in the year that a reform takes place and thereafter, and 0 otherwise. We expect  $\gamma_1$  to have a positive sign as after the reform of insolvency regulations investors should be willing to invest more in debt and equity of the issuer country.

Further, we account for the intensity of a regulatory change, i.e. which aspects of the law were changed and by how much. For that, we use the insolvency index by [McGowan and Andrews \(2018\)](#) and estimate the following specification of the model ([Houston et al., 2012](#); [Haselmann et al., 2009](#)):

$$\log(A_{isjt}) = \alpha_j + \alpha_{it} + \gamma_2 \text{InsIndex}_{jt-1} + \beta_1 X_{ijt} + \beta_2 X_{jt} + \varepsilon_{isjt}, \quad (2)$$

where  $\text{InsIndex}_{jt-1}$  represents the insolvency index, where higher values indicate a higher quality of regulations. We estimate regressions for the composite index of insolvency laws that is based on 13 aspects of insolvency procedures as well as for sub-indexes of insolvency laws, namely treatment of failed entrepreneurs, prevention and streamlining, and restructuring tools ([McGowan and Andrews, 2018](#)). Our coefficient of interest is  $\gamma_2$ . It captures the sensitivity of the dependent variable to the change in insolvency procedures. We expect it to have a positive sign as improvement in the quality of insolvency procedures should incentivize economic agents to invest more in the foreign country's assets. In each regression, standard errors are clustered at the issuer country level (i.e. on the assigned treatment dimension) as suggested by [Abadie et al. \(2017\)](#).

Our baseline sample covers 19 euro area holder countries and 33 issuer countries for the 2010–17 period. The difference-in-differences methodology described above allows countries to undergo treatment, i.e. implement a reform of insolvency procedures, at different points in time. As highlighted by [Haselmann et al. \(2009\)](#), multiple pre-intervention and post-intervention time periods take care of many threats concerning validity. Suppose a country *A* implements a reform in 2012 and is hence part of the treatment group. However, since other countries undergo reforms (i.e. treatment) before it does, it serves as a control group up until its reform year, and as a treatment group thereafter. If country *B* implements a reform prior to 2010 or does not implement reforms at all during the observed period, it serves as a control group. The list of countries is provided in the Appendix [Table A3](#).

The difference-in-differences approach is meaningful if treatment and control groups share similar characteristics. Our sample consists of the OECD and EU countries that are similar in a number of dimensions, such as being open market economies with highly developed financial markets and strong institutions. Further, the reforms of insolvency laws should be exogenous to identify a causal link between reforms and cross-border asset holdings. In many of the EU countries, legal change was induced by external pressures from the EU. In addition, endogeneity of legal reforms is less of a concern in our setup as insolvency regulations are usually changed due to high non-performing loans or a high number of zombie firms and bankruptcies of the non-financial corporations ([McGowan and Andrews, 2018](#)) rather than pressure from the side of international investors. It is worth noting, however, that while the results produced by equation 1 are better identified, the results of equation 2 might suffer from reverse causality even when the lagged index is used as an explanatory variable. Therefore, we interpret the results produced by equation 2 in terms of correlation rather than causality.

### 3. Regression results

In this section, we present the results of our empirical analysis. First, we report the effect of legal changes on cross-border investments in debt and equity for different holder country sectors. Second, we look at a more granular picture and investigate which aspects of insolvency regulation reforms matter the most. Finally, we present a number of robustness checks and model extensions.

#### 3.1. Baseline specification

We begin our analysis with estimating equation 1 for different holder country sectors and at the aggregate level, with the variable of interest taking the value of 1 in the year of the reform and thereafter, and 0 otherwise. [Table 2](#) and [Fig. 6](#) present the estimation results. The coefficients on the treatment dummy show whether undertaking reforms triggered an increase in investments from foreign holder countries.

The coefficients on the treatment dummy have the expected positive sign, suggesting that countries that have undertaken reforms of insolvency regulation attract significantly more cross-border investment at the aggregate level (in particular, for equity; the results for debt are less robust as described in [Section 4](#)). However, the differentiation by sector matters. The observed aggregate results are driven mostly by institutional investors' investment in equity and by banks' investment in debt. The economic impact of a legal change on cross-border investment is considerable; for example, a reform of insolvency regulation implies an increase in cross-border equity holdings by institutional investors by 27.1 % and in cross-border debt holding by banks by 40.5 %, other things being equal.<sup>12</sup> These results are comparable to the findings of [Haselmann et al. \(2009\)](#) on the effect of insolvency reforms on banking credit.

A more fine-grained picture is provided by our second specification, where we use the insolvency index that measures the quality of insolvency regulations. The higher the index, the higher the quality of regulations; after the reform of insolvency regulations the index increases. [Table 3](#) and [Fig. 7](#) report the estimation results. The coefficients show the expected positive sign, suggesting that an improvement in the quality of insolvency regulations is associated with a significant increase in equity investments by institutional investors and an increase in debt investments by banks and to a lesser extent by house-

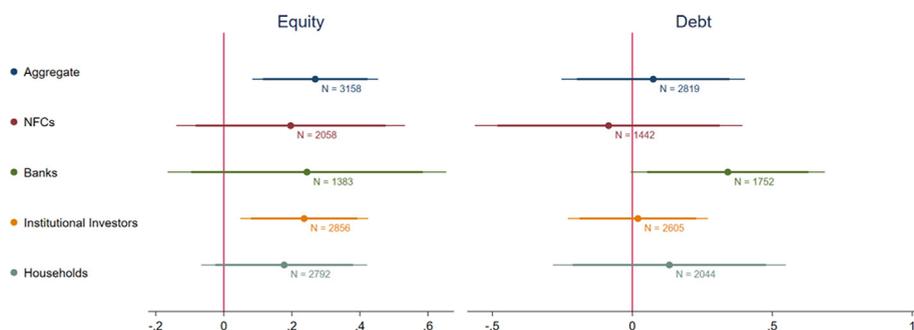
<sup>12</sup> The effect of dummy variables in a semilogarithmic equation is  $\exp(\gamma_1) - 1$ .

**Table 2**  
Baseline regression in a dummy form.

Log(Mark. Val.)	Equity					Debt				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH
$TreatDum_{t-1}^i$	0.27*** (0.09)	0.20 (0.16)	0.24 (0.20)	0.24** (0.09)	0.18 (0.12)	0.07 (0.16)	-0.08 (0.23)	0.34* (0.17)	0.02 (0.12)	0.13 (0.20)
$\text{Log}(GDP)_t^i$	-0.59 (1.15)	0.52 (2.48)	1.98 (1.72)	0.46 (1.00)	0.97 (1.59)	5.65** (2.61)	3.65** (1.67)	7.14*** (1.08)	4.05** (1.68)	2.69 (3.88)
$\text{Fin.Dvlp.index}_t^i$	1.85 (1.13)	4.93* (2.71)	0.36 (2.82)	3.12*** (1.09)	1.94 (1.38)	8.93*** (2.16)	5.76 (3.73)	1.58 (3.11)	8.03*** (1.55)	5.64* (2.84)
$\text{Log}(Distance)_{t-1}^{ij}$	-0.13 (0.16)	0.10 (0.33)	-0.55* (0.28)	-0.21 (0.15)	-0.73*** (0.18)	-0.49*** (0.15)	-0.70*** (0.22)	-0.78*** (0.17)	-0.40*** (0.13)	-0.77*** (0.18)
$\text{Log}(Imports)_t^{ij}$	0.74*** (0.16)	0.85*** (0.17)	0.98*** (0.26)	0.54*** (0.19)	0.54*** (0.13)	0.25** (0.11)	0.09 (0.15)	0.03 (0.09)	0.31*** (0.11)	0.19 (0.17)
$\text{Com.leg.origin}^{ij}$	0.96*** (0.29)	0.86*** (0.31)	0.68** (0.32)	1.00*** (0.34)	1.04*** (0.24)	0.80*** (0.22)	1.04*** (0.27)	0.83*** (0.26)	0.86*** (0.25)	1.11*** (0.30)
R-squared	0.85	0.67	0.70	0.86	0.85	0.82	0.64	0.62	0.82	0.74
Obs.	3158	2058	1383	2856	2792	2819	1442	1752	2605	2044

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors in brackets.

Note: The table presents estimation results for log bilateral portfolio debt and equity securities at market values based on equation 1. Holder-year and issuer fixed effects are included in all regressions. Standard errors are clustered at the issuer country level. E = Equity, D = Debt, Agg = Aggregate, NFC = Non-Financial Corporations, II = Institutional Investors, HH = Households.



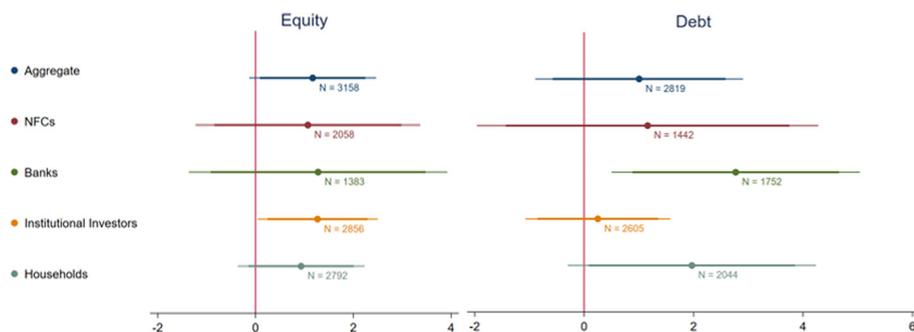
**Fig. 6.** Coefficients on treatment dummy by sector and instrument. Note: The figure presents coefficients on the treatment dummy based on the estimation of equation 1, with logarithm of market value of debt and equity holdings as dependent variables. Full estimation results are presented in Table 2.  $TreatDum_{t-1}^i$  takes the value of 1 in the year when the insolvency reform takes place and thereafter, and 0 otherwise. Confidence intervals are at the 90 % (thin line) and 95 % (thick line) levels.

**Table 3**  
Baseline regression in an index form.

Log(Mark. Val.)	Equity					Debt				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH
$\text{Insol.index}_{t-1}^i$	1.17* (0.64)	1.07 (1.13)	1.28 (1.30)	1.27** (0.60)	0.93 (0.64)	1.01 (0.93)	1.16 (1.53)	2.77** (1.11)	0.25 (0.65)	1.97* (1.11)
$\text{Log}(GDP)_t^i$	-0.51 (1.36)	0.66 (2.62)	2.08 (1.86)	0.59 (1.14)	1.07 (1.73)	5.79** (2.66)	3.95** (1.81)	7.35*** (1.12)	4.08** (1.68)	3.01 (3.95)
$\text{Fin.Dvlp.index}_t^i$	2.18* (1.08)	5.22* (2.62)	0.73 (2.94)	3.48*** (1.13)	2.19* (1.26)	9.28*** (2.16)	5.92 (3.91)	2.27 (3.25)	8.11*** (1.52)	6.22** (2.72)
$\text{Log}(Distance)_{t-1}^{ij}$	-0.13 (0.16)	0.10 (0.33)	-0.55* (0.28)	-0.20 (0.15)	-0.73*** (0.18)	-0.49*** (0.15)	-0.69*** (0.22)	-0.78*** (0.17)	-0.40*** (0.13)	-0.77*** (0.17)
$\text{Log}(Imports)_t^{ij}$	0.75*** (0.16)	0.85*** (0.17)	0.98*** (0.26)	0.54*** (0.19)	0.54*** (0.13)	0.25** (0.11)	0.09 (0.15)	0.03 (0.09)	0.31*** (0.11)	0.20 (0.17)
$\text{Com.leg.origin}^{ij}$	0.96*** (0.29)	0.86*** (0.31)	0.68** (0.32)	0.99*** (0.34)	1.04*** (0.24)	0.80*** (0.22)	1.04*** (0.27)	0.83*** (0.26)	0.86*** (0.25)	1.11*** (0.30)
R-squared	0.85	0.67	0.70	0.86	0.85	0.82	0.64	0.62	0.82	0.74
Obs.	3158	2058	1383	2856	2792	2819	1442	1752	2605	2044

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors in brackets.

Note: The table presents estimation results for log bilateral portfolio debt and equity securities at market values based on equation 2. Holder-year and issuer fixed effects are included in all regressions. Standard errors are clustered at the issuer country level. E = Equity, D = Debt, Agg = Aggregate, NFC = Non-Financial Corporations, II = Institutional Investors, HH = Households.



**Fig. 7.** Coefficient on insolvency index by sector and instrument. *Note:* The figure presents coefficients on the insolvency index based on the estimation of equation 2. Full estimation results are presented in Table 3, with the logarithm of market values of debt and equity holdings as dependent variables. The insolvency index is an index based on 13 aspects of insolvency procedures, grouped as treatment of failed entrepreneurs, prevention and streamlining, and restructuring tools (McGowan and Andrews, 2018). Confidence intervals are at the 90% (thin line) and 95% (thick line) levels.

holds. These findings are consistent with the results reported in Table 2. The economic significance of the results is challenging to interpret as our explanatory variable is an index in a range between minus one and zero. An improvement in insolvency regulations in the issuer country by one standard deviation is associated with a 16.5 % increase in cross-border equity holdings by institutional investors, other things being equal. For cross-border debt holdings, the increase is by 36 % and 25.6 % for banks and households, respectively.

The baseline results stress that while overall benefits of the insolvency reforms are non-negligible, the responses they trigger vary greatly by sector. Propensity to invest in equity increases significantly for institutional investors, which have in recent years formed the largest sector in equity holdings. Institutional investors are also professional market players, and we expect them to be more sensitive to the reforms. Less significant coefficients for cross-border debt investment might signal that aspects of insolvency regulations, namely the early identification of insolvency and the ability of NFC to continue their operations while in distress, might be more important for shareholders as compared to debt holders.

Apart from looking at the quality of insolvency regulations of the issuer country, we also explore whether the difference in the quality of insolvency regulations between holder and issuer country affects cross-border investment in debt and equity. We re-estimate equation 2 using the difference in insolvency indices between holder and issuer country as an explanatory variable. Estimation results are reported in Table 4. As expected, investors prefer to invest more in debt and/or equity of countries with better-quality insolvency regulations compared to their home country. The results are mostly driven by institutional investors and households for equity investment and by banks and households for debt investment.

**Table 4**

Regression in an index form, difference between holder and issuer country.

Log(Mark. Val.)	Equity					Debt				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH
$Dif\ InsolvIndx_{i,t}^j$	-1.16*	-1.08	-0.78	-1.27*	-1.04**	-1.49	-1.29	-3.20***	-0.58	-2.11*
	(0.64)	(1.21)	(1.36)	(0.64)	(0.50)	(0.89)	(1.29)	(1.16)	(0.61)	(1.09)
$Log(GDP)_t^i$	0.13	1.00	1.19	0.57	1.41	5.95*	2.49	7.22***	3.99**	3.27
	(1.23)	(2.70)	(2.25)	(0.88)	(1.30)	(3.00)	(2.24)	(1.12)	(1.90)	(4.14)
$Fin.Dvlp.index_t^i$	2.19*	4.18	1.75	3.20**	1.24	8.88***	4.65	1.10	7.59***	5.83*
	(1.19)	(2.51)	(2.95)	(1.43)	(1.18)	(2.26)	(4.01)	(2.61)	(1.70)	(2.90)
$Log(Distance)_{i,t}^j$	-0.39***	-0.37*	-0.35	-0.19	-0.82***	-0.30**	-0.76***	-0.81***	-0.23	-0.68***
	(0.11)	(0.20)	(0.30)	(0.18)	(0.15)	(0.13)	(0.23)	(0.22)	(0.14)	(0.18)
$Log(Imports)_t^i$	0.64***	0.69***	1.06***	0.52**	0.53***	0.40***	0.19	0.05	0.43***	0.25
	(0.17)	(0.16)	(0.31)	(0.22)	(0.15)	(0.13)	(0.19)	(0.16)	(0.15)	(0.19)
$Com.leg.origin_{i,t}^j$	1.17***	1.18***	0.73**	1.14***	1.14***	0.93***	1.20***	0.95***	0.94***	1.34***
	(0.29)	(0.32)	(0.32)	(0.31)	(0.23)	(0.23)	(0.30)	(0.29)	(0.27)	(0.30)
R-squared	0.88	0.74	0.73	0.87	0.87	0.84	0.70	0.64	0.83	0.76
Obs.	2651	1777	1223	2401	2397	2343	1215	1450	2194	1757

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors in brackets.

*Note:* The table presents estimation results for log bilateral portfolio debt and equity assets at market values. The difference is constructed by subtracting the insolvency index of the issuer country from the insolvency index of the holder country, i.e. it is positive when the quality of the holder country's insolvency regulation is better than that of the issuer country (NB: a lower index corresponds to a lower quality of insolvency regulation). Holder-year and issuer fixed effects are included in all regressions. Standard errors are clustered at the issuer country level. E = Equity, D = Debt, Agg = Aggregate, NFC = Non-Financial Corporations, II = Institutional Investors, HH = Households.

### 3.2. Different types of insolvency regulations

Further, we distinguish between different types of insolvency regulations, i.e. treatment of failed entrepreneurs, prevention and streamlining, and restructuring tools. As discussed above, we assume that the effects of reforming different aspects of insolvency regulations might be heterogeneous. For example, well-functioning pre-insolvency regimes might be especially important for shareholders as they increase survival rates and the value of enterprises. At the same time, availability of restructuring tools might be mostly taken into account by debt holders as this aspect of insolvency regime has the potential to increase debt recovery rates.

For cross-border equity holdings, the results are presented in Table A4. Indeed, as suggested by our second hypothesis, prevention and streamlining represent the most significant component affecting equity holdings of institutional investors. Thereby, availability of early warning mechanisms and pre-insolvency regimes (i.e. early informal interventions before formal proceedings) seem to be the most important aspects. At the same time, special insolvency procedures for SMEs do not appear to have been taken into account. This is not surprising as SMEs usually do not issue shares and therefore are not the subject of interest to equity investors. Finally, the other aspects of insolvency regulations, such as restructuring tools and treatment of failed entrepreneurs, appear to be less important for equity holders.

Table A5 presents the results for cross-border debt holdings. Availability of restructuring tools as well as prevention and streamlining tools seem to be the most important aspects that affect banks' investment decisions. Thereby, the two subcomponents – availability of length of stay as well as possibility and priority of new financing – appear to be the crucial ones. Availability of length of stay, that is, continuation of operations by firms in distress, increases the probability of a subsequent successful restructuring. Furthermore, priority for new financing allows distressed firms to attract additional financing on good terms and therefore increases the probability of recovery.

## 4. Robustness checks and extensions of the model

### 4.1. Robustness checks

We explore the sensitivity of our results to sample composition, potential outliers and alternative clustering of standard errors. The regression outputs are not reported but are available upon request. First, we check whether the results remain intact when we change the sample composition. For that, we exclude issuer countries, holder countries, and years one-by-one. This way, we want to ensure that our results are not driven by individual countries or a particular sample period. The results are mostly unaffected by this alternative specification, with one notable exception (Fig. A1). If Ireland as an issuer of debt is excluded from the sample, the coefficient on treatment dummy in the regression with aggregate debt becomes positive and statistically significant at the 1 % level (this is driven by households; other results remain similar). This suggests that Ireland is an outlier that drives insignificant results we observe for regressions with aggregate debt as a dependent variable.

Further, we consider different approaches for estimating the standard errors in our panel data regressions. Clustering standard errors by holder country and issuer holder country levels changes the significance of the results at the margin, by decreasing standard errors and increasing the coefficients' significance levels.

### 4.2. Difference and similarity of laws

First, we investigate whether the impact of reforms on cross-border investment decisions is conditional on the difference in quality of insolvency regulations between the holder and the issuer country. The difference is constructed by subtracting the insolvency index of the issuer country from the insolvency index of the holder country, i.e. it is positive if the quality of the holder country's insolvency regulation is better than that of the issuer country. We assume that the treatment might have a bigger effect if the issuer country has better regulations than that of the holder country. To test this, we estimate the following equation:

$$\log(A_{isjt}) = \alpha_j + \alpha_{it} + \gamma_1 Treatment_{jt-1} + \gamma_2 Treatment_{jt-1} * Diff_{i-j,t-2} + \gamma_3 Diff_{i-j,t-2} + \beta_1 X_{ijt} + \beta_2 X_{jt} + \varepsilon_{isjt}, \quad (3)$$

where  $Diff_{i-j,t-2}$  is defined as the difference between issuer and holder country indices of insolvency regulations. The estimation results are presented in Tables A6 and Figs. A2 and A3.<sup>13</sup> The results are not statistically significant and, as suggested by the margin plots, the impact of reforms is rather similar at different points of difference in insolvency indexes, with confidence intervals becoming particularly wide at the upper and lower bounds of the difference in insolvency index distribution.

In addition, we explored whether the impact of insolvency regulation reforms on capital markets depend on how similar the regulations between two countries are. To this end, we estimated the following equation:

$$\log(A_{isjt}) = \alpha_j + \alpha_{it} + \gamma_1 Treatment_{jt-1} + \gamma_2 Treatment_{jt-1} * AbsDiff_{i-j,t-2} + \gamma_3 AbsDiff_{i-j,t-2} + \beta_1 X_{ijt} + \beta_2 X_{jt} + \varepsilon_{isjt}, \quad (3)$$

<sup>13</sup> The authors also used different estimation strategies, including (i) interacting treatment dummy with dummies that mark thresholds in the difference in the insolvency regulations' quality between holder and issuer country (i.e. top 25%, bottom 25%, median, etc.); and (ii) using these thresholds in order to identify subsamples on which regressions were estimated separately. The results produced by alternative estimation strategies are not different.

where  $AbsDiff_{i,j,t-2}$  is defined as the absolute value of the difference between issuer and holder country indices of insolvency regulations. The smaller the absolute difference is, the more similar regulations between two countries are in terms of their quality. The estimation results are presented in Tables A7 and Figs. A2 and A3. The results suggest that it is the similarity of a holder country's insolvency regime with that of the issuer country that drives the effect. The impact of treatment decreases as the dissimilarity of the quality of insolvency regulations increases, with the results being particularly pronounced for equity investment. If the quality of regulations is more similar, the impact of the treatment is positive and statistically significant. At the same time, if the quality of the regulations remains different – i.e. either the quality of the holder country's insolvency regulations is much worse than that of the issuer country, or *vice versa* – the impact of the treatment becomes negligible and not statistically different from zero. These findings provide an appealing case for an EU Capital Markets Union, suggesting that improvements in the quality of regulations have an impact on equity and debt investments only if the quality of insolvency regulations is comparable between countries.

#### 4.3. Heterogeneity of holders

We test whether the observed effect of insolvency regulations on cross-border debt and equity holdings varies with holder country characteristics, like the development of financial markets (Sviryzdenka, 2016) or quality of governance (Kaufmann et al., 2010).<sup>14</sup> We assume that investors that come from countries with well-developed financial markets would be more sensitive to the quality of insolvency regulations in a counterparty country as these investors are, in general, more open to international investments (Desbordes and Wei, 2017; Hyun and Kim, 2010). In addition, investors that reside in countries with an effective government might have higher quality standards and higher expectations of an issuer country's regulatory environment. To test this hypothesis, we interact the insolvency index with a dummy variable that is equal to 1 when the financial market development (or government effectiveness) is above the sample median in the year 2009 and 0 otherwise. The results reported in Table A8, however, provided no consistent evidence that either financial market development or government effectiveness in the holder country matter for cross-border investment.

#### 4.4. Heterogeneity of issuers

Further, we check whether the quality of insolvency regulations affects cross-border investments differently depending on the characteristics of the country<sup>15</sup> that conducted insolvency reforms. In this case, we look at the financial development and government effectiveness of issuer countries. Countries with a high level of financial development have more liquid markets with plenty of investment opportunities. Therefore, removal of some impediments, such as ineffective insolvency regulations, might have a stronger effect. In addition, countries that have an effective government, i.e. one that implements policies with a high degree of commitment and credibility, might achieve better results after implementing reforms, as an effective government signals a high degree of law enforcement. Indeed, when reforms of insolvency regulations are implemented by countries that are financially more developed and have a more effective government, the effect of such reforms becomes more pronounced (Table A9). The effect is observed for some sectors and is most consistently found for institutional investors. All in all, the results suggest that the development of financial markets and an effective government in an issuer country are important for the success of insolvency reforms.

## 5. Conclusion

Should a company be on the verge of bankruptcy or simply face financial distress, a well-defined insolvency regime goes a long way toward removing uncertainty for both investors and management, as was also evidenced during the COVID-19 crisis (Menezes and Muro, 2020; Martinez, 2022). The literature has widely documented the effects of insolvency reforms on banking. Efficient insolvency procedures are associated with an increase in credit supply (Haselmann et al., 2009), notably to SMEs, portfolio diversification (Haselmann and Wachtel, 2010), and lower risk-taking (Fang et al., 2014). Going a step further, our study provides insights on two grounds: we analyze the effects of insolvency reforms on foreign players, and from an investment point of view separately for debt and equity securities. Further, we decompose this effect by holder sectors.

Relying on the OECD data on insolvency regimes and ECB SHSS data on cross-border investments, we identify a causal effect at an aggregate level and within sectors through a difference-in-differences approach. Our results suggest that foreign investors are more likely to invest in a country if its insolvency regime is efficient. Investors are particularly sensitive to an improvement in prevention, streamlining, and restructuring tools. However, the marginal effects are not homogeneous across sectors. The aggregate results are mostly driven by institutional investors' investment in equity and banks' investment in debt. Further, we find evidence that, for equity investments, investors are more sensitive to measures related to prevention and streamlining, while debt holders mostly take into account restructuring tools. Exploring the underlying mechanism

<sup>14</sup> The financial development index by Sviryzdenka (2016) assesses the depth, accessibility and efficiency of financial markets. The index on quality of governance by Kaufmann et al. (2010), which is part of the World Bank Worldwide Governance Indicators, assesses the perceptions of government performance (public services, civil service, policy formulation and implementation, credibility of commitment) from household and firm surveys. The index ranges from approximately -2.5 to 2.5, with higher values indicating a better quality of governance.

<sup>15</sup> Eidenmüller et al. (2015) did not find support for creditor protection rules in bankruptcy to matter for issuers of the securities.

through which the heterogenous effect occurs across types of investors and types of insolvency instruments is not part of this paper and is left for future research.

Overall, while the effect varies with sectors and instruments, insolvency reforms do exert a positive effect on cross-border investments, thereby deepening capital market integration. Moreover, the reforms seem to be more efficient when two countries become closer in terms of the quality of their insolvency regimes, providing an appealing case for the creation of an EU Capital Markets Union. Still, our results remain agnostic in terms of the optimal insolvency regime and, hence, leave headroom for decision-makers to choose the design of the reform. Indeed, there does not necessarily exist an academic consensus on the content of the reforms, notably in terms of creditor- versus debtor-friendliness (Kliatskova and Savatier, 2019). Therefore, an optimal design of insolvency regulations is another interesting question that we leave for future research.

**Data availability**

The data that has been used is confidential.

**Declaration of Competing Interest**

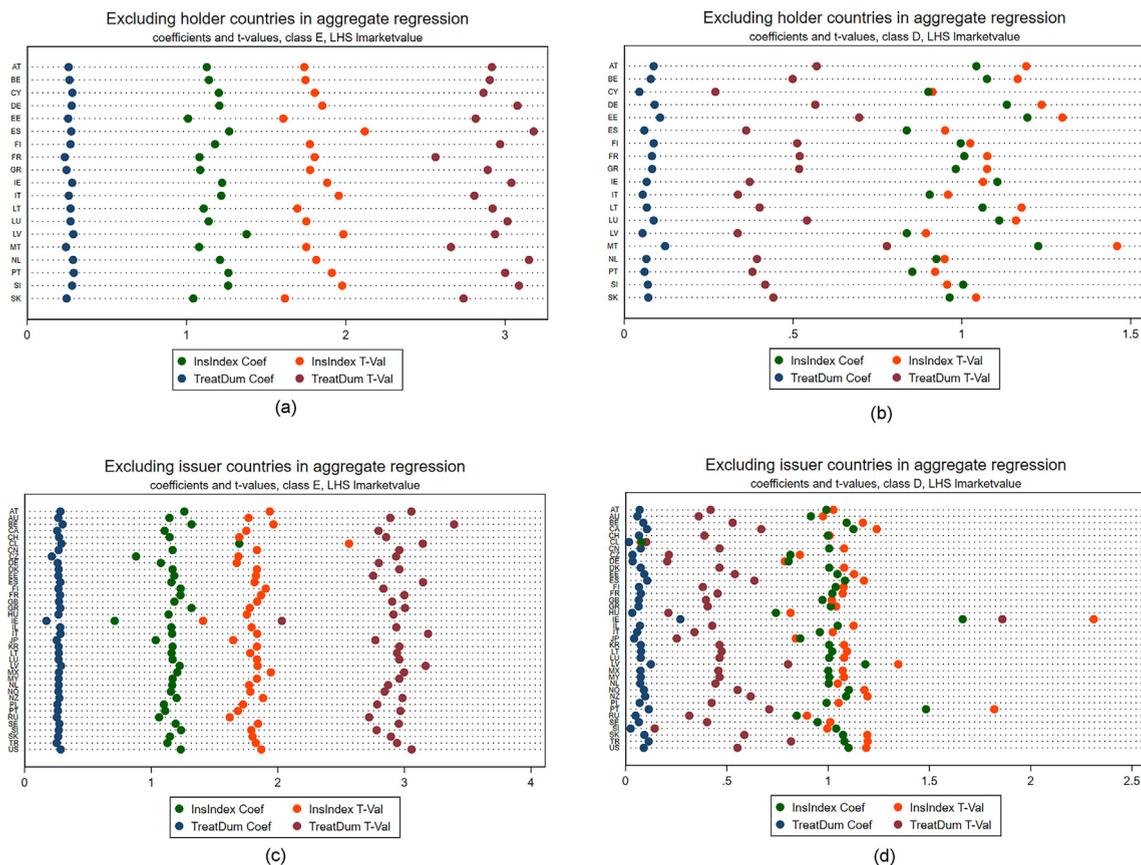
The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

**Acknowledgement**

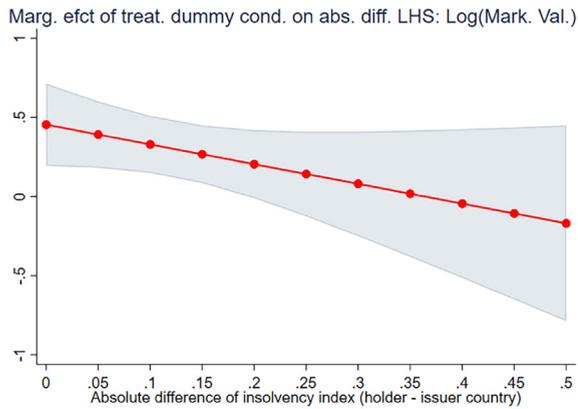
None.

**Appendix A**

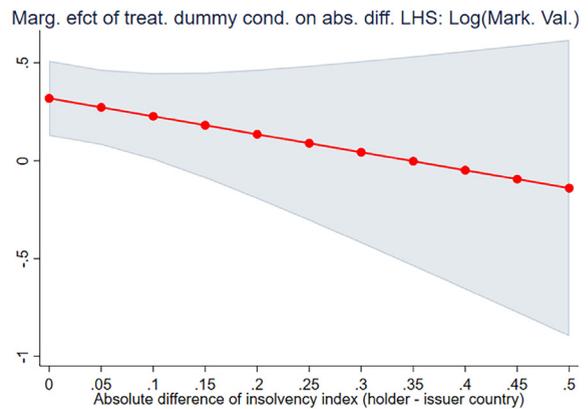
See Tables Figs. A1-A3 And Tables A1-A9.



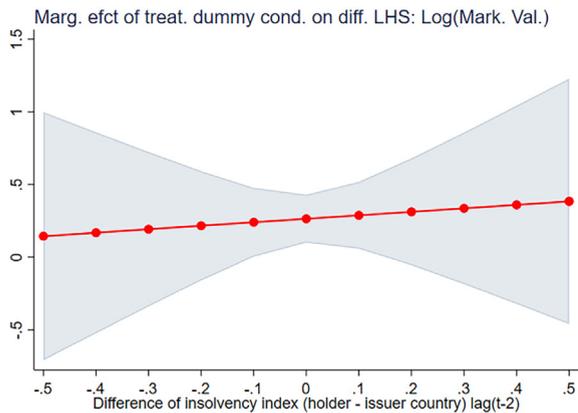
**Fig. A1.** Robustness check: excluding issuer and holder countries one-by-one. Note: The figures show coefficients and *t*-values (clustered by issuer country) for treatment dummy and insolvency index as estimated in Tables 2 and 3.



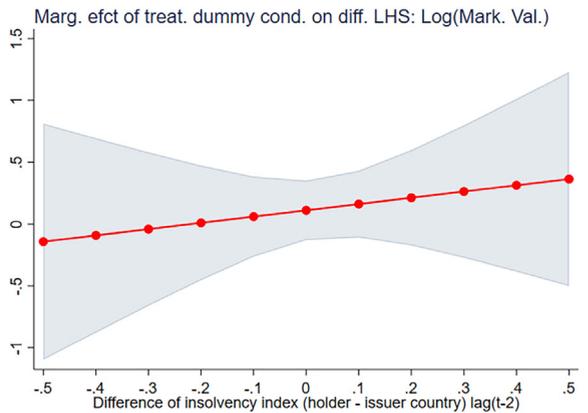
(a) Equity



(b) Debt

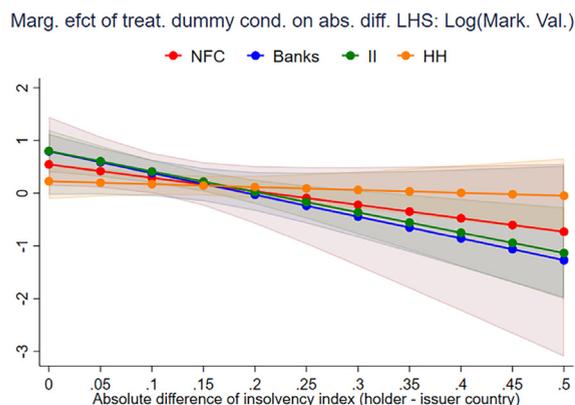


(c) Equity

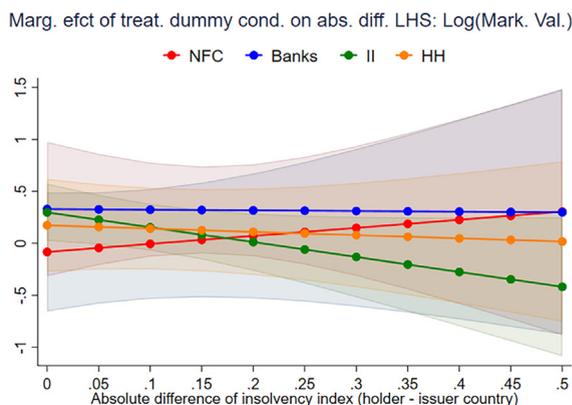


(d) Debt

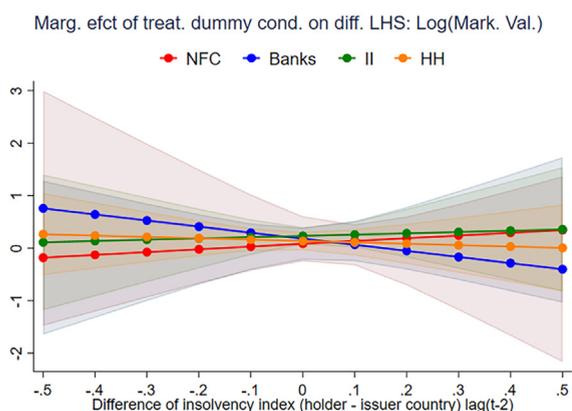
**Fig. A2.** Marginal effects: absolute difference vs difference. *Note:* The figures show marginal effects (with 95% confidence intervals, clustered by issuer country) of treatment on log bilateral portfolio debt and equity assets at market values at the aggregate level, conditioning on absolute difference (top figures) and difference in insolvency indexes (bottom figures) between holder and issuer countries as estimated in [Tables A6 and A7](#).



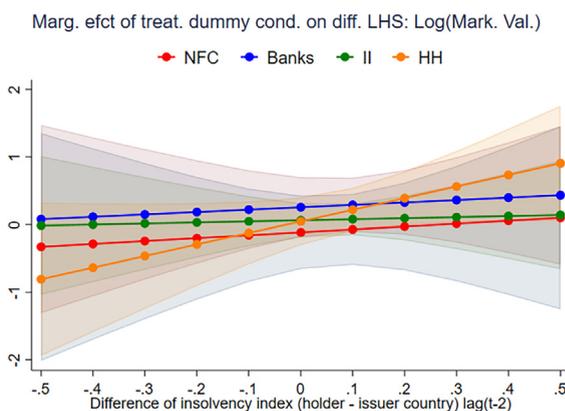
(a) Equity



(b) Debt



(c) Equity



(d) Debt

**Fig. A3.** Marginal effects: absolute difference vs difference, by sector. *Note:* The figures show marginal effects (with 95% confidence intervals clustered by issuer country) of treatment on log bilateral portfolio debt and equity assets at market values at the sectoral level, conditioning on absolute difference (top figures) and difference in insolvency indexes (bottom figures) between holder and issuer countries as estimated in Tables A6 and A7. (a) Equity (b) Debt (c) Equity (d) Debt.

**Table A1**  
Data description and sources.

Variable	Unit	Description	Source
Debt and equity holdings	EUR	Nominal and market value of debt and equity issued by non-financial corporations in country $j$ and held by sectors $s$ in country $i$ at time $t$ . Holdings with a value below 50€ were dropped (2.6 % of non-missing values)	SHSS, ECB
Insolvency index, issuer	[-1,0]	Index measuring the quality of laws governing insolvency (and pre-insolvency) procedures. The original index is re-scaled to take values between minus one and zero, thus, higher values indicate a higher quality of insolvency regulations.	McGowan and Andrews (2018)
Real GDP, issuer	constant 2010 local currency unit	Real GDP, base year: 2010	World Development Indicators, WB
Financial development (FD) index, issuer	[0,1]	The index summarizes how developed financial institutions and markets are in terms of their depth (size and liquidity), access (ability of individuals and companies to access them), and efficiency (ability to provide financial services at low cost, with sustainable revenues and the level of activity of markets).	Svirydzenka (2016)
Distance	km	Distance between issuer and holder countries' most populated cities	CEPII
Bilateral trade	USD million	Sum of the values of imports and exports, fob	DOTS, IMF
Common legal origin	0 or 1	Dummy that equals 1 when the two countries share the same legal origin (British, French, German, Scandinavian, Socialist)	La Porta et al. (1999)

**Table A2**

Insolvency reforms in the selected economies.

Country	Year	Law	Notes
Chile (CL)	2014	No 20.720: Law for Reorganization and Liquidation of Assets for Companies and Individuals	Pre-insolvency, SME-specific procedures, possibility of new financing, rights of employees
Germany (DE)	2012	BGBI. I S. 2854: Insolvency Statute	Pre-insolvency provisions, possibility of new financing
Denmark (DK)	2014	LBK nr 11 of 06/01/2014: Bankruptcy Act	Initiation of restructuring by creditor
Estonia (EE)	2014	RT I 09.05.2014, 2: Reorganization Act	Possibility of new financing, "cram-down", distinction between honest and fraudulent bankruptcies
Finland (FI)	2015	25.1.1993/47: Laki yrityksen saneerauksesta (Company Restructuring Act)	SME-specific procedures
Greece (GR)	2014	4307/2014: Amendment to Bankruptcy Code	Time to discharge, pre-insolvency provisions, new financing, "cram-down"
Ireland (IE)	2013	Personal Insolvency Act 2012	SME-specific procedures
Israel (IL)	2015	Amendment 47 of 1967 Execution Law	"cram-down"
Italy (IT)	2012	Decree 83 of 22/06/2012, transformed into law 134 of 03/08/2012	SME-specific procedures
Japan (JP)	2014	Law 94: Revision of Companies Act	Early warnings, pre-insolvency provisions
South Korea (KR)	2015	Consolidation of Debtor Rehabilitation and Bankruptcy Act	SME-specific procedures
Latvia (LV)	2015	Amendments to Insolvency Law	"cram-down", distinction between honest and fraudulent bankruptcies
Lithuania (LT)	2011	XI-1486: Law on Corporate Bankruptcy	Distinction between honest and fraudulent bankruptcies
	2013	XII-237: Law on Bankruptcy of Enterprises	Time to discharge
Mexico (MX)	2014	Amendment of the LCM, Commercial Insolvency Law	Possibility of new financing
Poland (PL)	2016	Bankruptcy and Reorganization Law, restructuring Law	Time to discharge
Portugal (PT)	2012	Law No. 16/2012: Insolvency and Recovery Code	Early warnings, pre-insolvency provisions and possibility of new financing
Slovenia (SI)	2013	Insolvency Act	Pre-insolvency provisions, initiation of re-structuring by creditor
	2015	Insolvency Act	SME-specific procedures
Spain (ES)	2013	14/2013: Spanish Insolvency Law, reform and amendments	Time to discharge
	2014	Royal Decree Law 4/2014	Possibility of new financing
Switzerland (CH)	2014	AS 2013 4111; BBI 2010 6455: Reform of the Debt Enforcement and Bankruptcy Law	Pre-insolvency provisions, possibility of new financing, rights of employees

Note: The table reports a timeline of reforms across countries between the years 2010 and 2016.

**Table A3**

List of countries, treatment vs control groups.

Country	Control/Treatment (year of reform)	Country	Control/Treatment (year of reform)
Austria	C	Italy	T (2012)
Australia	C	Japan	T (2014)
Belgium	C	South Korea	T (2015)
Canada	C	Latvia	T (2015)
Switzerland	T (2014)	Lithuania	T (2011, 2013)
Chile	T (2014)	Luxembourg	C
China	C	Malaysia	C
Czech Rep.	C	Mexico	T (2014)
Germany	T (2012)	Netherlands	C
Denmark	T (2014)	New Zealand	C
Estonia	T (2014)	Norway	C
Spain	T (2013, 2014)	Poland	T (2016)
Finland	T (2015)	Portugal	T (2012)
France	C	Russian Federation	C
United Kingdom	C	Slovakia	C
Greece	T (2014)	Slovenia	T (2013, 2015)
Hungary	C	Sweden	C
Ireland	T (2013)	Turkey	C
Israel	T (2015)	United States	C

Note: Countries reported as a treatment group (T) are part of the control group (C) prior to the year they adopted the reform. Countries, such as Spain, Lithuania, and Slovenia, conducted reforms step-wise, i.e. different aspects of insolvency regulations (treatment of failed entrepreneurs, prevention and streamlining, restructuring tools) were reformed in different years.

**Table A4**  
Equity holdings, by reform component.

Log(Mark. Val.)	A. Regressions in a dummy form.														
	Treatment of failed entrepreneurs					Prevention and streamlining					Restructuring tools				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Agg	NFC	Banks	II	HH	Agg	NFC	Banks	II	HH	Agg	NFC	Banks	II	HH	
<i>Trt.Fail.Entrp</i> <sub>t-1</sub>	0.00 (0.09)	-0.07 (0.20)	0.36 (0.25)	0.07 (0.09)	-0.03 (0.11)										
<i>Prvnt.Strml</i> <sub>t-1</sub>						0.30** (0.12)	0.22 (0.19)	0.10 (0.22)	0.25** (0.11)	0.22 (0.16)					
<i>Restruct.Tools</i> <sub>t-1</sub>											-0.04 (0.16)	0.08 (0.15)	0.36** (0.18)	0.05 (0.12)	-0.01 (0.10)
R-squared	0.85	0.68	0.70	0.86	0.85	0.85	0.67	0.70	0.86	0.85	0.84	0.67	0.70	0.86	0.85
Obs.	3460	2240	1481	3139	3050	3582	2315	1549	3233	3165	3508	2260	1516	3162	3099

Log(Mark. Val.)	B. Regressions in an index form.														
	Treatment of failed entrepreneurs					Prevention and streamlining					Restructuring tools				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Agg	NFC	Banks	II	HH	Agg	NFC	Banks	II	HH	Agg	NFC	Banks	II	HH	
<i>Trt.Fail.Entrp</i> <sub>t-1</sub>	-0.04 (0.13)	-0.33 (0.47)	0.45 (0.52)	0.04 (0.15)	-0.00 (0.17)										
<i>Prvnt.Strml</i> <sub>t-1</sub>						0.18** (0.09)	0.12 (0.15)	-0.01 (0.16)	0.17** (0.07)	0.13 (0.11)					
<i>Restruct.Tools</i> <sub>t-1</sub>											-0.02 (0.18)	0.11 (0.15)	0.60*** (0.21)	0.07 (0.16)	-0.07 (0.12)
R-squared	0.85	0.68	0.70	0.86	0.85	0.85	0.67	0.70	0.86	0.85	0.84	0.67	0.70	0.86	0.85
Obs.	3460	2240	1481	3139	3050	3582	2315	1549	3233	3165	3508	2260	1516	3162	3099

\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01. Standard errors in brackets.

Note: The table presents estimation results for log bilateral portfolio equity assets at market values based on equations 1 (top tables) and 2 (bottom tables). Holder-year and issuer fixed effects as well as control variables are included in all regressions. Standard errors are clustered at the issuer country level. E = Equity, D = Debt, Agg = Aggregate, NFC = Non-Financial Corporations, II = Institutional Investors, HH = Households.

**Table A5**  
Debt holdings, by reform component.

Log(Mark. Val.)	A. Regressions in a dummy form														
	Treatment of failed entrepreneurs					Prevention and streamlining					Restructuring tools				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH	(11) Agg	(12) NFC	(13) Banks	(14) II	(15) HH
<i>Trt.Fail.Entrp</i> <sub>t-1</sub>	0.20 (0.27)	-0.29 (0.70)	0.30 (0.53)	-0.13 (0.22)	-0.18 (0.49)										
<i>Prvnt.Strml</i> <sub>t-1</sub>						0.09 (0.16)	0.23 (0.20)	0.39** (0.19)	0.08 (0.12)	0.17 (0.20)					
<i>Restruct.Tools</i> <sub>t-1</sub>											0.18 (0.16)	-0.14 (0.35)	0.35 (0.21)	0.05 (0.13)	0.39 (0.24)
R-squared	0.82	0.65	0.59	0.82	0.73	0.81	0.65	0.59	0.82	0.74	0.81	0.65	0.59	0.82	0.74
Obs.	3099	1547	1924	2854	2204	3146	1581	1964	2901	2248	3074	1541	1910	2833	2192
Log(Mark. Val.)	B. Regressions in an index form.														
	Treatment of failed entrepreneurs					Prevention and streamlining					Restructuring tools				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH	(11) Agg	(12) NFC	(13) Banks	(14) II	(15) HH
<i>Trt.Fail.Entrp</i> <sub>t-1</sub>	0.47* (0.27)	0.08 (1.06)	0.63 (0.50)	-0.00 (0.28)	0.18 (0.72)										
<i>Prvnt.Strml</i> <sub>t-1</sub>						0.06 (0.12)	0.24 (0.18)	0.28* (0.16)	0.05 (0.08)	0.21 (0.13)					
<i>Restruct.Tools</i> <sub>t-1</sub>											0.30* (0.17)	0.18 (0.31)	0.61** (0.24)	0.06 (0.19)	0.36 (0.27)
R-squared	0.82	0.65	0.59	0.82	0.73	0.81	0.65	0.59	0.82	0.74	0.81	0.65	0.59	0.82	0.74
Obs.	3099	1547	1924	2854	2204	3146	1581	1964	2901	2248	3074	1541	1910	2833	2192

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors in brackets.

Note: The table presents estimation results for log bilateral portfolio debt assets at market values based on equations 1 (top tables) and 2 (bottom tables). Holder-year and issuer fixed effects as well as control variables are included in all regressions. Standard errors are clustered at the issuer country level. E = Equity, D = Debt, Agg = Aggregate, NFC = Non-Financial Corporations, II = Institutional Investors, HH = Households.

**Table A6**

The impact of difference of insolvency regulations: Interaction with difference of insolvency indexes.

Log(Mark. Val.)	Equity					Debt				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH
$TreatDum_{t-1}^i$	0.26*** (0.08)	0.08 (0.15)	0.18 (0.22)	0.23*** (0.08)	0.14 (0.09)	0.11 (0.12)	-0.11 (0.28)	0.26 (0.23)	0.07 (0.13)	0.05 (0.18)
$Dif\ InsolvIndx_{t-2}^{i,j}$	-0.15 (0.77)	-2.73** (1.28)	-0.71 (2.32)	0.12 (1.07)	0.07 (0.95)	-1.31 (0.93)	-2.38 (1.43)	-0.99 (1.78)	-0.48 (0.72)	-2.13* (1.20)
$TreatDum_{t-1}^i \times Dif\ InsolvIndx_{t-2}^{i,j}$	0.24 (0.85)	0.53 (1.42)	-1.16 (2.01)	0.25 (1.25)	-0.26 (0.80)	0.51 (0.90)	0.43 (1.46)	0.35 (1.16)	0.16 (0.90)	1.71* (0.96)
$\log(GDP)_t^i$	0.44 (1.25)	2.25 (2.45)	1.99 (1.87)	0.90 (0.89)	2.23* (1.10)	3.57* (1.98)	3.98** (1.93)	4.18** (1.61)	2.76* (1.53)	3.19 (4.23)
$Fin.Dvlp.index_t^i$	1.99 (1.53)	5.89** (2.71)	1.30 (2.70)	3.27* (1.78)	1.64 (1.45)	7.19*** (2.61)	7.87* (4.37)	-1.58 (3.90)	6.73*** (2.16)	6.12* (3.16)
$\log(Distance)^{i,j}$	-0.38*** (0.11)	-0.37* (0.20)	-0.27 (0.34)	-0.20 (0.18)	-0.81*** (0.15)	-0.30** (0.13)	-0.71*** (0.22)	-0.83*** (0.20)	-0.24* (0.14)	-0.60*** (0.19)
$\log(Imports)_t^{i,j}$	0.61*** (0.17)	0.67*** (0.17)	1.11*** (0.33)	0.51** (0.23)	0.51*** (0.14)	0.43*** (0.13)	0.26 (0.19)	0.06 (0.15)	0.44*** (0.16)	0.28 (0.21)
$Com.leg.origin^{i,j}$	1.16*** (0.29)	1.14*** (0.33)	0.62* (0.32)	1.13*** (0.31)	1.13*** (0.22)	0.88*** (0.24)	1.08*** (0.32)	0.88*** (0.32)	0.91*** (0.27)	1.30*** (0.32)
R-squared	0.88	0.74	0.74	0.87	0.87	0.84	0.72	0.64	0.84	0.76
Obs.	2187	1509	1027	1977	2012	1954	1057	1208	1834	1484

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors in brackets.

Note: The table presents estimation results for log bilateral portfolio debt and equity assets at market values. The difference is constructed by subtracting the insolvency index of the issuer country from the insolvency index of the holder country, i.e. it is positive if the holder country's insolvency regulation is better than that of the issuer country (NB: a lower index corresponds to a worse quality of insolvency regulation). Holder-year and issuer fixed effects are included in all regressions. Standard errors are clustered at the issuer country level. E = Equity, D = Debt, Agg = Aggregate, NFC = Non-Financial Corporations, II = Institutional Investors, HH = Households.

**Table A7**

The impact of similarity of insolvency regulations: Interaction with absolute difference of insolvency indexes.

Log(Mark. Val.)	Equity					Debt				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH
$TreatDum_{t-1}^i$	0.45*** (0.13)	0.55* (0.29)	0.80** (0.33)	0.80*** (0.20)	0.23 (0.17)	0.32*** (0.10)	-0.08 (0.29)	0.33 (0.33)	0.30** (0.14)	0.17 (0.23)
$AbsDif\ InsolvIndx_{t-2}^{i,j}$	-0.42 (0.67)	0.03 (0.93)	0.10 (1.08)	-1.16 (0.97)	-0.50 (0.51)	-1.10 (0.70)	-1.72** (0.73)	-1.29 (1.00)	-0.75 (0.72)	-1.91*** (0.51)
$TreatDum_{t-1}^i \times AbsDif\ InsolvIndx_{t-2}^{i,j}$	-1.25 (0.80)	-2.55 (1.73)	-4.13* (2.37)	-3.87*** (1.23)	-0.55 (0.99)	-0.92 (0.79)	0.78 (1.31)	-0.06 (1.63)	-1.43* (0.80)	-0.31 (0.90)
$\log(GDP)_t^i$	0.45 (1.21)	1.95 (2.60)	2.13 (1.84)	1.07 (0.77)	2.34** (1.08)	3.38* (1.92)	3.84** (1.85)	4.15** (1.59)	2.71* (1.45)	2.57 (4.21)
$Fin.Dvlp.index_t^i$	2.10 (1.27)	6.01** (2.42)	2.24 (2.45)	3.86*** (1.35)	2.02 (1.72)	6.93** (2.53)	7.57 (4.88)	-1.50 (3.77)	6.79*** (1.76)	4.85 (3.29)
$\log(Distance)^{i,j}$	-0.38*** (0.11)	-0.38* (0.20)	-0.31 (0.33)	-0.20 (0.17)	-0.81*** (0.15)	-0.29** (0.13)	-0.71*** (0.22)	-0.82*** (0.20)	-0.24* (0.14)	-0.59*** (0.19)
$\log(Imports)_t^{i,j}$	0.60*** (0.17)	0.65*** (0.16)	1.04*** (0.31)	0.46** (0.21)	0.50*** (0.14)	0.42*** (0.13)	0.25 (0.18)	0.04 (0.15)	0.42*** (0.15)	0.28 (0.20)
$Com.leg.origin^{i,j}$	1.17*** (0.29)	1.15*** (0.33)	0.68** (0.31)	1.14*** (0.30)	1.13*** (0.22)	0.87*** (0.24)	1.07*** (0.31)	0.90*** (0.31)	0.91*** (0.27)	1.27*** (0.31)
R-squared	0.88	0.74	0.74	0.87	0.87	0.85	0.72	0.65	0.84	0.76
Obs.	2187	1509	1027	1977	2012	1954	1057	1208	1834	1484

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors in brackets.

Note: The table presents estimation results for log bilateral portfolio debt and equity assets at market values. The absolute difference is constructed by subtracting the insolvency index of the issuer country from that of the holder country and taking the absolute value. Holder-year and issuer fixed effects are included in all regressions. Standard errors are clustered at the issuer country level. E = Equity, D = Debt, Agg = Aggregate, NFC = Non-Financial Corporations, II = Institutional Investors, HH = Households.

**Table A8**  
Financial markets and governance indicators of the holder country.

<b>Level of financial markets development</b>	<b>Equity</b>					<b>Debt</b>				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH
$TreatDum_{t-1}^i$	0.18 (0.18)	0.06 (0.26)	0.38 (0.37)	0.22 (0.21)	0.08 (0.14)	0.01 (0.18)	-0.13 (0.29)	0.33 (0.25)	-0.05 (0.21)	0.06 (0.25)
$TreatDum_{t-1}^i \times FinDev$	0.16 (0.35)	0.49 (0.33)	-0.31 (0.56)	0.04 (0.39)	0.11 (0.27)	0.18 (0.26)	0.45 (0.35)	0.10 (0.29)	0.14 (0.30)	0.34 (0.27)
R-squared	0.85	0.67	0.69	0.86	0.86	0.83	0.65	0.63	0.84	0.74
Obs.	2716	1719	1150	2435	2375	2483	1257	1560	2314	1804
<b>Government effectiveness</b>										
	<b>Equity</b>					<b>Debt</b>				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH
$TreatDum_{t-1}^i$	0.31* (0.16)	0.47 (0.30)	0.27 (0.40)	0.41* (0.20)	0.07 (0.17)	0.26 (0.18)	0.41 (0.32)	0.87** (0.35)	0.18 (0.19)	0.27 (0.26)
$TreatDum_{t-1}^i \times GovEff$	-0.09 (0.23)	-0.40 (0.42)	-0.12 (0.41)	-0.29 (0.28)	0.10 (0.27)	-0.26 (0.21)	-0.55 (0.32)	-0.76* (0.44)	-0.25 (0.26)	-0.07 (0.33)
R-squared	0.85	0.67	0.69	0.86	0.86	0.83	0.66	0.64	0.84	0.74
Obs.	2716	1719	1150	2435	2375	2483	1257	1560	2314	1804
<b>Level of financial markets development</b>										
	<b>Equity</b>					<b>Debt</b>				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH
$Insol.indx_{t-1}^i$	-0.44 (0.85)	-0.23 (1.75)	-2.47 (1.82)	-0.63 (0.91)	-0.06 (0.89)	-0.96 (1.19)	0.46 (1.63)	1.11 (1.23)	-1.95* (1.11)	0.62 (1.31)
$Insol.indx_{t-1}^i \times FinDev$	2.64** (1.04)	2.67** (1.12)	4.59** (1.90)	3.15*** (1.02)	1.26 (0.99)	2.95*** (1.06)	2.81*** (0.97)	3.11*** (0.83)	2.98*** (1.00)	2.68*** (0.71)
R-squared	0.85	0.67	0.70	0.86	0.86	0.83	0.66	0.64	0.84	0.74
Obs.	2716	1719	1150	2435	2375	2483	1257	1560	2314	1804
<b>Government effectiveness</b>										
	<b>Equity</b>					<b>Debt</b>				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH
$Insol.indx_{t-1}^i$	0.73 (0.91)	1.23 (1.85)	-1.87 (2.10)	0.42 (0.85)	0.64 (0.91)	0.81 (1.13)	2.07 (1.66)	2.91** (1.28)	-0.58 (0.92)	1.84 (1.18)
$Insol.indx_{t-1}^i \times GovEff$	0.50 (0.77)	-0.30 (1.50)	3.25*** (1.14)	1.28 (0.84)	-0.10 (0.88)	0.61 (0.69)	-0.05 (0.90)	-0.02 (1.14)	1.30* (0.72)	1.00 (0.90)
R-squared	0.85	0.67	0.69	0.86	0.86	0.83	0.65	0.63	0.84	0.74
Obs.	2716	1719	1150	2435	2375	2483	1257	1560	2314	1804

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors in brackets. Note: The table presents estimation results for log bilateral portfolio equity and debt assets at market values. Financial markets and government effectiveness indices are dummies which take the value of 1 if, in 2009, their value was above the sample median, hence, suggesting relatively well-developed financial markets and government effectiveness, respectively. As these values are constant in time, their constitutive terms are dropped from the equations. Holder-year and issuer fixed effects as well as control variables are included in all regressions. Standard errors are clustered at the issuer country level. E = Equity, D = Debt, Agg = Aggregate, NFC = Non-Financial Corporations, II = Institutional Investors, HH = Households.

**Table A9**  
Financial markets and governance indicators of the issuer country.

<b>Level of financial markets development</b>	<b>Equity</b>					<b>Debt</b>				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH
$TreatDum_{t-1}^i$	0.11 (0.13)	-0.22 (0.23)	-0.17 (0.33)	0.07 (0.08)	-0.06 (0.17)	-0.03 (0.20)	-0.03 (0.32)	0.54** (0.26)	-0.22 (0.19)	0.23 (0.26)
$TreatDum_{t-1}^i \times FinDev$	0.25* (0.15)	0.76*** (0.27)	0.49 (0.43)	0.29** (0.12)	0.32 (0.21)	0.24 (0.25)	0.19 (0.45)	-0.24 (0.32)	0.45** (0.22)	-0.01 (0.36)
R-squared	0.85	0.67	0.69	0.86	0.86	0.83	0.65	0.63	0.84	0.74
Obs.	2716	1719	1150	2435	2375	2483	1257	1560	2314	1804
<b>Government effectiveness</b>										
	<b>Equity</b>					<b>Debt</b>				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH
$TreatDum_{t-1}^i$	0.20* (0.12)	0.19 (0.24)	0.34 (0.23)	0.18 (0.12)	0.11 (0.15)	0.00 (0.18)	-0.21 (0.28)	0.33* (0.19)	-0.04 (0.14)	0.16 (0.25)
$TreatDum_{t-1}^i \times GovEff$	0.22*** (0.08)	0.18 (0.26)	-0.44 (0.53)	0.22** (0.09)	0.08 (0.17)	0.43*** (0.15)	0.85** (0.39)	0.15 (0.28)	0.32** (0.12)	0.22 (0.27)

Table A9 (continued)

Level of financial markets development	Equity					Debt				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH
R-squared	0.85	0.67	0.69	0.86	0.86	0.83	0.66	0.63	0.84	0.74
Obs.	2716	1719	1150	2435	2375	2483	1257	1560	2314	1804
<b>Level of financial markets development</b>	<b>Equity</b>					<b>Debt</b>				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH
$Insol.indx_{t-1}$	-0.03 (0.48)	-2.33 (1.38)	-0.61 (1.18)	0.06 (0.37)	-0.26 (0.71)	-0.05 (1.38)	1.42 (1.52)	3.64*** (0.92)	-1.39 (1.34)	1.29 (1.70)
$Insol.indx_{t-1} \times FinDev$	2.60*** (0.72)	6.35*** (1.67)	1.84 (2.62)	2.71*** (0.60)	1.85* (1.07)	1.93 (1.91)	0.80 (2.99)	-1.65 (2.03)	3.39** (1.51)	2.11 (2.36)
R-squared	0.85	0.67	0.69	0.86	0.86	0.83	0.65	0.63	0.84	0.74
Obs.	2716	1719	1150	2435	2375	2483	1257	1560	2314	1804
<b>Government effectiveness</b>	<b>Equity</b>					<b>Debt</b>				
	(1) Agg	(2) NFC	(3) Banks	(4) II	(5) HH	(6) Agg	(7) NFC	(8) Banks	(9) II	(10) HH
$Insol.indx_{t-1}$	0.64 (0.67)	0.51 (1.74)	0.84 (1.31)	0.80 (0.62)	0.48 (0.76)	0.69 (1.26)	0.78 (1.91)	2.55* (1.30)	-0.14 (0.87)	2.19 (1.40)
$Insol.indx_{t-1} \times GovEff$	1.94*** (0.64)	1.93 (1.97)	-0.97 (3.82)	1.94*** (0.57)	0.43 (1.10)	2.55** (1.19)	4.39 (3.02)	1.42 (2.11)	2.09** (0.86)	1.09 (1.58)
R-squared	0.85	0.67	0.69	0.86	0.86	0.83	0.66	0.63	0.84	0.74
Obs.	2716	1719	1150	2435	2375	2483	1257	1560	2314	1804

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors in brackets. Note: The table presents estimation results for log bilateral portfolio equity and debt assets at market values. Financial markets and government effectiveness indices are dummies which take the value of 1 if, in 2009, their value was above the sample median, hence, suggesting relatively well-developed financial markets and government effectiveness, respectively. As these values are constant in time, their constitutive terms are dropped from the equations. Holder-year and issuer fixed effects as well as control variables are included in all regressions. Standard errors are clustered at the issuer country level. E = Equity, D = Debt, Agg = Aggregate, NFC = Non-Financial Corporations, II = Institutional Investors, HH = Households.

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