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Irrational exuberance and deception — Why markets spin out of control

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ABSTRACT

This article reports on a field study of 457 US participants that identifies the intimate link between three constructs: disconnection (dis-anchoring) from the bundle of needs, goals, and preferences (NGPs), irrationality, and indebtedness. We combine these three mental states that together influence deceitful borrowing behaviors to define irrational exuberance. When using linear regressions and path analyses, we find that together they form a self-reinforcing wheel of misfortune that may spin out of control and generate market frictions, as suggested by US market data. A predatory dynamic drives this loop whereby market agents position themselves at various levels of financial predation (as either predators, prey, or a mix thereof). The theoretical implications of our findings are that we integrate this loop into the literature on debt, something that has not been done before in financial or economic theory. Thus, we enrich the understanding of why market agents – lenders and borrowers alike, either individuals or organizations – mislead each other and why markets consequently tend to deviate from normalcy. The managerial implication is that a better psychological appraisal of borrowers' mental states and behaviors would likely improve lending risk assessment, may reduce default outcomes, and, on a macroeconomic level, could alleviate the symptoms of impending financial crises.

1. Introduction

Lenders, whether in conventional banking settings, on the increasingly popular peer-to-peer lending platforms, or in the black market, must assess whether the loan they grant borrowers will likely be reimbursed, and reimbursed within the allocated timeframe (Fatemi and Fooladi, 2006). Lenders rely on a number of hard data tools, such as credit history checks, which have proven to be fairly reliable. However, lenders do not delve into the psychological underpinnings of possible or actual indebtedness (Castagnolo and Ferro, 2014). One reason is that these factors require a set of skills that is not expected of lenders — notably, some degree of psychological appraisal. Second, the latter involves subjective assessments: unless lenders use advanced psychometrics, generally out of their reach, they have to rely on their impressions and feelings. Third, borrowers may take offense at being investigated psychologically. However, the rise of behavioral finance, with its understanding of risk aversion, bias and heuristics, to list only these concepts, has outlined the importance of taking into account the psychology of market agents in financial decision making (Saliya, 2019). In short, people are not purely rational and do not systematically aim for utility maximization; instead, they sometimes use mental short cuts, rely on their most recent past experience, and/or blindly follow what others are doing, discounting risk. While, from a pragmatic point of view, lenders are rarely trained to perform psychological assessments of potential borrowers in addition to relying on hard data, this does not prevent researchers from seeking to understand better the psychology of indebtedness. Most particularly, it is not so much the level of indebtedness that represents a psychological phenomenon but the fear of it: as fear of debt becomes unsustainable, people will stress and panic.

When looking at market data, taking as an example the US Global Financial Crisis (GFC) that developed out of predatory/subprime mortgages, one observes that the market did not evolve rationally, but rather experienced a quick boom and a sudden, sharp decline. Using proxies and for the sole purpose of supporting and illustrating our argument, Fig. 1 plots in an informal, stylized fashion US households' over-indebtedness, disconnection, irrationality, and an underlying predatory paradigm. Over-indebtedness was calculated by subtracting the value of debt for the considered year from the average household debt for the ten years preceding the GFC boom. To measure the level of disconnection from the bundle of needs, goals, and preferences

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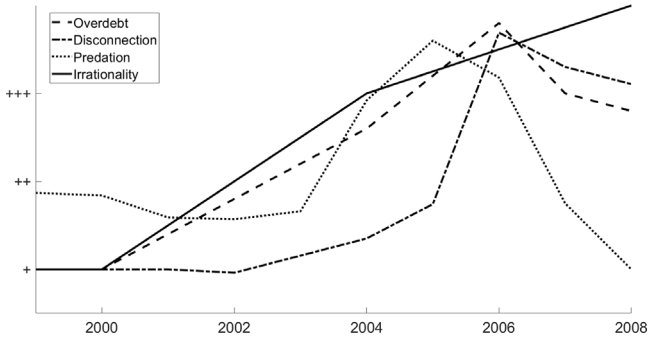

Fig. 1. Stylized Trends in the US for Proxies of Psychological Constructs. *Note:* This stylized graph displays NGP disconnection irrational prices, over-indebtedness and toxic products (predatory paradigm).

(NGPs, a concept we explain further in this article), we employ excess delinquencies (again, based on the past average) because they signify that borrowers are no longer able or willing, at least temporarily, to attend to their original needs, goals, and preferences (they do not have the money to meet their financial obligations, which are to cover their needs, goals, and preferences). Indeed, once in the foreclosure stage (once their level of delinquencies is so high that they for sure can no longer can meet their obligations), they give up once and for all the need they had for the home they owned (e.g., near a school for their children) and the goals that motivated their purchase of that home (e.g., to secure a retirement location), and may end up abandoning some cherished attributes when they settle for an affordable dwelling (e.g., an extra bedroom). The same approach was used to measure excessive house prices as a proxy for irrationality. Finally, a hypothetical underlying predatory paradigm (presence of toxic financial products) was also measured using the same approach, by considering subprime mortgages that often targeted vulnerable individuals. (Appendix A presents other market indicators that point to the departure from market rationality as expected under conventional financial and economic theory.)

As can be observed in Fig. 1, the trends of these proxies evolved together, except for irrationality (excess house prices compared to expected historical average), which kept going up (and still is, above the inflation rate), showing that it alone cannot explain the financial downfall of 2008. While Fig. 1 points in the direction of some variables that came into play during the crisis, it cannot explain their intricate links, if only because the crisis was short term (yet with long-lasting consequences), thus providing insufficient data for this particular analysis. Because the subprime phenomenon was a particularity of the US economic system, it is also difficult to compare it efficiently with what happened in other countries, where this type of mortgage did not exist. Finally, note that we used proxies for assumed underlying mental states, such as disconnection. The bottom line is that there were obviously some psychological forces at play in the crisis, and that the hard data cannot explain how the possible explanatory variables interacted with each other.

Given these observations, our research question is: "What is the relationship between the mental states of irrational exuberance (disconnection from the bundle of needs, goals, and preferences – NGPs – , irrationality, and indebtedness) and the behavior of deception in a predatory paradigm?" Another way to express this is to ask if people who dream of an easy path to financial wealth (as was the case during the boom leading to the crisis) tend to accumulate more debt by resorting to lies; or if people who disengage (dis-anchor) from their NGPs spend without counting while misleading their lenders; or if people who feel and act like prey (for example, vulnerable people) are compelled to make morally hazardous choices that augment their debt levels. We do not contend that we cover all the possible variables that may influence or even cause market turmoil; we rather limit our search to these core dimensions because they offer a new way of looking at the phenomenon under investigation. Indeed, and to take only this example, at the present time no research delves into the construct of disconnection from the bundle of NGPs in relation to irrationality, indebtedness, predatory paradigm, and deception.

There are many advantages to enhancing our understanding of the relationships between these variables. First, it adds to the theory of behavioral finance and identifies how some of its core concepts, or proxies thereof (e.g. dis-anchoring), relate to indebtedness, something that has not been systematically done in the literature, despite its very practical value. For example, instead of simply stating that people rely on anchoring when making financial choices, without even being able to measure and quantify this assumption, it may be more instructive to show through research that people who dis-anchor (disconnect from their NGPs) tend to accumulate an unreasonable amount of debt. Second, our approach feeds into the domain of psychology by showing how a core dimension of human life – managing debt – is linked to particular mental and behavioral dynamics. After all, excessive debt is associated with stress, higher crime levels, and hardship (Boccio and Beaver, 2021). Third, our approach opens the door to enhancing the questionnaire we borrowed from the academic literature to find ways to adapt it to the needs and realm of lenders.

In the next section, we examine the literature on the five variables of interest. We acknowledge the fact that our review is transdisciplinary, covering behavioral finance, economics, and psychology in particular, adopting in the process Haldane and Turrell (2019)'s claim that such an effort is beneficial from scholarly and managerial points of view. We then present our field study and analyze our results. We conclude by examining the limits and potential of our research effort.

2. Literature review

2.1. Disconnection (Dis-anchoring)

Finance theory stipulates that investors anchor their beliefs of satisfactory returns on an estimated weighted average of the past returns of assets (Barberis, 2018). Research aimed at measuring the beliefs of real-world investors leans towards confirming this mechanism (Amromin and Sharpe, 2014), which explains in part why volatility occurs: investors do not focus on the present reality, but rely on the past. The concept of (dis)connection from NGPs, which is introduced here, is similar to the long-established concept of dis(anchoring), except for the following differences. Firstly, disconnection focuses solely on the bundle of NGPs, not on recent past events, under the assumption that NGPs are enduring and are active in the recent past as well as in the present. Secondly, disconnection is understood within a predatory paradigm (Mesly and Huck, 2022), whereby market agents abuse each other, notably by resorting to asymmetry of information, to gain an undue advantage and maximize personal profits. In contrast, (dis)anchoring is a general concept that has never been specifically adjusted to market conditions. In short, disconnection is the tendency of market agents to forego their initial needs, goals, and preferences for reasons such as market pressures (excitement over wealth anticipations or misleading advertisements) and lack of financial knowledge: when disconnecting, they may borrow carelessly, and they eventually end up in debt because they make bad, unrealistic (disconnected) financial decisions (e.g., they buy on credit products they do not need but that increase their debt

load). When stakes represent a substantial share of the household budget (e.g., a house represents on average 30 to 50% of total average household expenses; a car, 20 to 30%), market agents (house owners) consider not only their needs, but also their financial objectives and preferences.

2.2. Irrationality

Simon (1957) was the first academic to limit rationality by coining the term "bounded rationality", whereby market agents are said to be limited in their cognitive capacities or even choose to limit their understanding of their surrounding world. Even though the concept of bounded rationality goes back seventy years, contemporary academics still resort to it to some degree in attempts to explain market agents' behaviors (Hayunga and Lung, 2011). Selten et al. (2012) consider that full rationality is hardly achievable, in part because preferences are inconsistent over time, thus consumers may depart from one logic of product acquisition to another without apparent continuity. Dasgupta and Singh (2019) consider that irrationality is one of two components of investor sentiment, a concept widely used in finance, along with limits to arbitrage (arbitrage theory states that the markets should regulate themselves by way of arbitrageurs, who prevent excess pricing). Kim (2019) emphasizes, however, lenders' lack of efficacy when making lending decisions, including in alternative financial markets (such as peer-to-peer lending, where transaction costs are minimal) compared to the standard banking system.

More broadly, the literature on (ir)rationality has traditionally expanded along two strands. One strand focuses on inconsistent time preferences, whereby consumers seek short-term rewards to the detriment of long-term benefits (Harris and Laibson, 2001). Another strand that is regularly mentioned in attempts to explain financial crises and their corresponding proclaimed irrationality concerns cognitive biases and heuristics, which, as mentioned, were brought to the foreground of behavioral finance by the works of Kahneman and Tversky on prospect theory (1979).[2] Irrationality, on the other hand, is often discussed by financial academics through five components. One component is loss aversion (some borrowers-cum-investors are more responsive to losses than to gains) and, with it, diminishing sensitivity (people become less sensitive to market cues as they invest more under certain constraints). Another component is probability weighing (people estimate their chances of success based in part on biases and heuristics) and, with it, dependence on a referenced or anchor point (often, the most recent events or a market shock that has affected them greatly). Finally, financial behaviorists point to preferences that diverge from the expected utility framework used in finance (borrowers-cum-investors opt for preferences that are suboptimal). Biases under consideration include overconfidence, whereby consumers express overly optimistic expectations (with limited knowledge) and engage in heavy speculation accordingly (overestimating their skills) (Huston, 2012; Lewandowski, 2017). In his study, Perry (2008) notes that over 30 percent of consumers overvalue their credit ratings, while Seaward and Kemp (2000) find that people inflate their future income, and hence save less and borrow more. A slew of other biases is addressed by various authors, such as the anchoring effect: consumers may base their decisions on arbitrary anchor points, leading them to think they can stretch their borrowing limits, thus incurring heavy interest charges (Steward, 2009). The implication, of course, is that irrational, or "rationally rationed" investors do not have rational expectations, as has been stated for decades (Lagunoff and Schreft, 1999).

Investment or borrowing behaviors can also be labeled irrational from the permanent income hypothesis point of view (Friedman, 1957), as consumers should opt for conservative and realistic assumptions rather than wager on erroneous wealth expectations. Fuster et al. (2010) note that, as regards the heuristics (mental rules of thumb) th at people employ, investors make strong inferences based on a minimal amount of data or simplistic models. Barberis (2018), in examining the works of numerous academics over the last decades (e.g., Soll and Klayman, 2004; Moore and Healy, 2008) highlights a number of additional personal factors that could explain why people tend to extrapolate, at times beyond reason. These include sociodemographic profiles (including age and gender) and experience, as well as "sticky" beliefs (whereby people stick to their beliefs despite contradictory evidence provided by the market and/or the experts). On the other hand, some factors are social, such as the presence of others or even herding (people copy what others do) — (Chou and Nordgren, 2017). As noted by Eyster and Rabin (2010), "the full-rationality model predicts a relatively limited form of herding and does so in a relatively limited set of domains" (p. 222).

In line with the cognitive limitations approach are observations about consumers' intellectual shortcomings and knowledge. Benjamin et al. (2013) reiterated that not all borrowers excel at the higher cognitive tasks often required in the area of finance, such as reasoning with numbers, remembering complex data processes, and problem-solving in the face of market trends and uncertainty. Lower cognitive ability and limited financial literacy as tested by established questionnaires show a correlation with narrow thinking, shortness of financial horizon, and errors in decision-making (Frederick, 2005; Agarwal and Mazumder, 2013). Errors include choosing financial products with excessive interest and/or handling costs, over-borrowing, unnecessarily generating additional costs by delaying payments, and addiction-like, self-defeating investment behaviors (Shen and Giles, 2006; Shen, 2014). As stated by Huston (2012), "people should choose the least expensive form of borrowing available to them" (p. 566); this does not necessarily take place, in part because only a modest percentage of the population have sufficient financial literacy (Lusardi and Mitchell, 2014). Poor literacy, academics have noted, is accompanied by higher debt loads and compromised retirement plans (Brown et al., 2016).

To put things in perspective, financial rationality, as opposed to alleged irrationality, does indeed require high levels of reasoning and analytical skills. Historically, rationality has been associated with self-correcting markets through the process of the above-mentioned arbitrage, by which rational traders outclass irrational traders. However, academics (Shleifer and Vishny, 1997) and market events (e.g., the Global Financial Crisis) have proven this wrong, in part because real-world arbitrageurs incur non-negligible risks and costs when dealing with mispriced markets. Time-series analysis, an advanced statistical method, is also expected of rational investors (Campbell, 2018), especially when dealing with excess volatility for most asset categories, such as stock and real estate markets (Barberis, 2018). The benchmark rational model, the Capital Asset Pricing Model (CAPM), excludes all forms of emotional input and assumes rational expectations of returns on the portfolio ($[E(R_p)]$ in the well-known formula), but years of research have put its validity in doubt, even for its creators (Fama and French, 2004).

[2] In psychology, irrational beliefs are sometimes measured and comprehended in terms of medical treatment, often according to the rational emotive behavior therapy (REBT) approach (Terjesen et al., 2009). These two facets of reality bear no direct relevance to our study.

2.3. Indebtedness

Indebtedness refers to the moral or legal obligation of a market agent to pay back another market agent who granted the loan in the first place, under a certain number of conditions, such as a deadline for reimbursement and an interest charge to cover the cost of the money. The three main theoretical and business approaches are: accounting/finance (e.g., assets–liabilities–equity; public debt; personal debt that impedes consumers' purchasing power — (Dynan, 2012)), law (e.g., contractual obligations, usurious loans), and psychology.

As regards the psychological angle of interest in this article, the literature focuses on the effect of indebtedness on borrowers' sentiments and behaviors. Greenberg (1980) designed an indebtedness scale based in part on gratitude in the context of gift exchanges, which was used over the following decades (e.g., Elster et al., 2005). This paved the way to considering debt from a psychological perspective. Indebtedness, in the context not of gifts but of personal finance, may create a sense of deprivation, discomfort, guilt, reduced standard of living, stress (pressure often technically measured by the amount of unpaid debt and current income), and social distancing — emotional states that grow in intensity as the debt level becomes increasingly unsustainable. These symptoms worsen whether debt is continuous (weighs continuously over the long term) or dichotomous (sporadic) (Chotewattanakul et al., 2019). Another consideration is the liquidity of the assets or collaterals: the easier it is to obtain cash for these, the easier it will be to meet obligations to pay back the debt by the deadline, and the less stressful the situation will be. Ferreira et al. (2021) provide a recent review of the effects of over-indebtedness on borrowers (difficulty to pay back loans on time), including ailing health, sleep deprivation, and lower life satisfaction, stability, and wellbeing. All of these factors can ultimately hamper the ability to make the right financial decisions (Wittmann and Paulus, 2008; Leung and Lau, 2017).

As for the causes, various authors recognize the role of age (less experienced and riskier behaviors among younger people), family structure (e.g., single parents), impulsivity, income, and education (the lower the level, the higher the tendency to accumulate debt). Alleweldt et al. (2013) adopt the same viewpoint and link it to an underlying predatory paradigm, as follows: "… stakeholders saw predatory or usurious types of credit as amongst the most important causes of over-indebtedness (mentioned by about three in ten stakeholders), followed by other easy to obtain financial products (such as payday or SMS loans), and non-usurious credit from unregulated lenders". (p. 9).

2.4. Predatory paradigm and deception

The predatory paradigm was initially presented by Samuelson (1971). A 2021 study examining its evolution and interpretation over the last one hundred years in twelve high-ranked journals demonstrated that the paradigm has been loosely defined (Mesly et al., 2021). When analyzing the GFC under this lens, Huck et al. (2021) present the argument that what appears to be irrationality is *a contrario* rational. In predatory conditions, the logic used by market agents changes: maximizing wealth comes at the expense of other market agents. Thinking that predatory practices are the attributes of the GFC alone would be erroneous. As an example, and as pointed out by Mayer et al. (2014): "…the five largest mortgage service companies (…) settled [for USD 25 billion] with forty-nine state attorneys general and the Department of Justice in response to allegations of shoddy loan servicing, illegal robo-signing and faulty foreclosure processing". (p. 516). We hypothesize that there are reasons to believe that predatory paradigms permeate the financial markets, and that they affect borrowing–lending economic activities, if only by way of subprime mortgages, deceitful marketing practices, fraudulent accounting practices (e.g., Enron), usurious loans, and so forth.

Akerlof and Shiller (2015) stipulate that at the heart of predatory financial structures lies the behavior of deceit ("to phool"), whereby borrowers lie to potential lenders to secure loans, lenders accept unqualified borrowers knowing their assets will eventually be seized due to default, and lenders hide risk and revenues (accounting tricks and tax heavens) from market agents and government institutions. In the present article, we treat deception by borrowers (and borrowers-cum-investors) as a behavior that results from four mental states: irrationality, disconnection, indebtedness, and vulnerability (prey).

2.5. An example: the US subprime housing sector

The housing sector provides an example where the constructs of irrational exuberance, disconnection from the NGP bundle, predatory–prey dynamics (including deception), and indebtedness foster and interact. The above-mentioned 2007–2008 market boom leading to the Global Financial Crisis (GFC), which evolved from toxic predatory mortgages as well as more contemporary house market tendencies for ongoing price increases witnessed in areas like Toronto, Canada, indeed featured many signs of irrationality (see the excess prices of houses in Fig. 1, after 2006, which grew by 5% a year *versus* an average inflation rate of roughly 3%)[3]. The predatory mortgages were partly developed to attract vulnerable and unqualified borrowers and hide risk through a financial process called securitization (risk hiding). In their study, Favara and Imbs (2015) show that lenders benefited from lax regulations and expanded credit to borrowers, not because of market demand, but because deregulation played in their favor. They find a causal link between deregulation and the consequential inflated house prices, which eventually led to the infamous market downfall. (Appendix A offers some key market indicators pointing to predatory dynamics.) Immergluck (2008) suggests that in the US, this mechanism compounded with other factors to promote some deviation from sensible purchasing decisions. The US market is known to have unique mortgage characteristics that foster irrational financial decisions. These characteristics include thirty-year terms and the right to repay the entire sum without penalty (Zywicki, 2014), as well as other exotic mortgage features such as zero-down payment, which incites borrowers to contract loans beyond their means because they have few stakes in them, not having committed personal funds. This is well reflected not only in the Case–Shiller House Price Index but also in the house price-per-capita income ratio: while per capita income remained relatively stable, house prices grew exponentially from 2005 to 2007 only to reach a low in 2009, and an even lower level in 2012 (Appendix A). It is this phenomenon that Alan Greenspan labeled "irrational exuberance" as early as 1990.

One explanation is that many factors at the basis of house buying – credit availability, income, mortgage and interest rates, and planning constraints (Andre et al., 2014) – interacted to increase borrowers' risk tolerance, thus encouraging careless borrowing and unjustified risk-taking. Hoffmann et al. (2015) find that this risk tolerance, along with return expectations (boosted during the housing bubble of 2004–2007) and risk perception (biased by the heavy publicity surrounding rising prices and opportunities to earn a quick profit) account for the likelihood of trading

[3] This may indicate that higher-than-expected house prices cannot be explained by the inflation rate but are due to other factors. The bottom line here is that irrationality, as measured by excess house prices, does not alone account for the market boom and crash that took place.

on the market. In other words, high risk tolerance, overconfidence regarding return potential, and subdued perception of risk encouraged borrowers to engage in highly speculative market positions, such as borrowing heavily, that went against their financial welfare. In short, they behaved irrationally. Armona et al. (2019) qualify the return expectation by specifying that the average respondents in the research they conducted acted based on past information characterized by a short, one-year time horizon, which prevented them from developing a fair and clear picture of the market forces at play.

Rationality and irrationality in the context of house buying has been the subject of academic interest for decades. Clark et al. (2010) argue that the debate is unnecessary because borrowers face uncertainty and have various levels of financial competency, ranging from naïve and myopic to sophisticated. Others state that it is this uncertainty that forges risk, so that rationality should be defined with respect to risk (Gillon and Gibson, 2018). One factor identified so far that favors not only irrationality but, more to the point, irrational exuberance, is the combination of ease of credit, lax regulations, and perceived booming investment opportunities. However, conditions that push borrowers to the brink of despair may play a role as well. With respect to home ownership, Zywicki (2014) states that prime suspects are declining loan-to-value ratio (“underwater” mortgages), worsening loan-to-income ratio (due to loss of employment or illness, for example), and excessive insurance fees and lending rates. An example of financial self-harm is given by Alexiou et al. (2019) who see irrationality in the fact that house buyers neglect to consider affordability and the possible shrinking value of houses (in depressed markets). Along those lines and based on the extensive academic literature on risk aversion, Bucciol and Miniaci (2018), who conducted a survey on 1,851 households, discuss how risk version is sensitive to fear, especially when market conditions worsen.

2.6. Defining irrational exuberance

As mentioned, the term “irrational exuberance” was coined by Alan Greenspan, former Board Chairman of the US Federal Reserve, and later used for the title of a book by Nobel prize winner Robert Shiller (2005). The term exuberance itself was later formally defined by Baker and Wurgler (2006) using six non-psychological measures related to stocks. In this subsection, we opt for a psychological focus and view exuberance as the fact that some consumers aspire to live a life that is beyond their financial means, with the possible goal of presenting an image of wealth and success to others, such as family, friends, acquaintances, neighbors, and business contacts. We also examine how (ir)rationality has been discussed by various academics over the decades.

We venture to state for the purpose of the present study that irrationality, disconnection and indebtedness combine to form the construct of irrational exuberance. An irrational person takes excessive, likely self-detrimental financial risks in the short, medium, and/or long terms, given his/her current financial situation. Combined with the failure of two traditional tenets of finance – utility-maximization and frictionless markets (De Bondt, 2019) – irrationality spells defaults on loan payments and market turmoil. More precisely, people show irrational exuberance when they are both irrational and hope to achieve great and/or instant wealth regardless of their original needs, goals, and preferences, thus displaying overconfidence/over-optimism (Bandeira et al. 2002; (Coelho, 2010) and suboptimal choices given individual and market constraints (such as access to credit). Barberis (2018), supported by market data, links this phenomenon to market bubbles, which he defines as “an episode in which an asset becomes substantially overvalued for a significant period of time, where ‘overvalued’ means that the price of the asset exceeds a sensible present value of the asset’s future cash flows” (p. 11). According to Greenwood and Hanson (2015), this represents a form of irrationality, as market agents neglect competition and its effect on over-extrapolation of prices. De Long et al. (1990) show how, when bubbles grow in strength, rational investors increase their risk exposure, contrary to common sense, thus boosting trade volume and aggravating market volatility (Hong and Stein, 2007). From this perspective, a market is exuberant (or shows “highly extrapolative expectations”, p. 11) when it does not present a proper fit between present and future prices.

In Table 1, we summarize some of the factors that may lead people to behave irrationally and/or exuberantly.

In Table 1, we have separated the factors that are thought to fuel irrational exuberance into three categories: markets, personal, and events. The justification is as follows: first, market agents (lenders, borrowers) act in a market subject to economic rules, structures, and flows. Thus, it is normal that they be affected by market forces. Second, these agents cannot be purely rational : emotions do play a role in decision making (Henrich et al., 2005). Third, there are random events that change the course of human life from birth to death. As mentioned, from the perspective of this article, we address neither market forces nor unforeseen events, assuming that these are not decisive factors at the time of our study. We limit the number of variables to four mental states: irrational exuberance, disconnection (dis-anchoring) from the bundle of NGPs, irrationality, and predator–prey positions. We also focus on the behavior of deception: the more market agents engage in irrational exuberance, the more likely they will attempt to deceive others. Equipped with this understanding, we deployed a conceptual framework and implemented a field study.

3. The initial working framework

Our review of the literature for the variables of interest points towards some interactions between disconnection from the NGP bundle, irrationality and indebtedness (the three of them forming irrational exuberance), especially in a predatory paradigm, leading to recourse to deception. The more market agents disconnect from their NGPs, the less likely they are to make decisions that benefit them. As their decisions lead to higher levels of indebtedness, borrowers become more frantic or desperate, thus disconnecting further from their NGPs, especially when pressure for repayment mounts. This, we argue, takes place in an inevitable predatory economic context: the borrower is a prey of sorts to the lender-predator of sorts, according to the literature on the predatory paradigm. As borrowers feel more vulnerable and victimized, they increasingly disconnect, make more senseless decisions, and augment their level of indebtedness, accompanied by a sense of panic, guilt, and/or frustration. Soon, they may feel they have no choice but to deceive lenders to secure loans they desperately need.

We propose the framework presented in Fig. 4.

The loop may easily spin out of control when market conditions are ripe (conditions such as easy access to credit, incentives to hide risks, the presence of toxic products, and poor regulatory environment). This vicious circle applies to both individuals and organizations. For example, the bank Lehman Brothers, before its spectacular downfall of 2008, disregarded its risk-assessment standards, made decisions to engage in risky pools of predatory financial products (such as Special Purpose Entities or SPEs), and saw its debt level become unsustainable as the toxicity of the market started to gain ground (Singh and Aitken, 2009). In the process, it engaged in deceitful behaviors such as the setting up of the so-called “Repo 105” accounting maneuver aimed at hiding

Table 1
Some Factors Thought to Fuel Irrationality and/or Exuberance.

Factor	Possible Psychological Effect
Market Factors	
Boom	Market agents believe blindly so that they can become rich fast, without risk, and engage in financial transactions accordingly.
Bust	Market agents panic and disengage from the market, sometimes incurring unnecessary losses.
Sudden hike in the interest rate	For borrowers, this may send them "underwater" and cause them to panic.
Excessive deregulation	This invites lenders and borrowers to discard risk, which may hit them once the market becomes increasingly toxic.
Predatory paradigm	This situation develops when markets are filled with toxic products, the likes of predatory mortgages or fancy financial tools aimed at hiding risk. Market agents opt for deception rather than sound investment strategies.
Market frictions	This occurs when markets' key indicators, such as inflation or unemployment, start to cause havoc in the economy, thus inciting some market agents to take desperate measures, such as seeking predatory, usurious loans.
Volatility	This occurs when market prices change unexpectedly, either frequently and/or in strength, making market agents frantic or nervous.
Ease of credit	This invites lenders to seek unqualified borrowers and the latter to accumulate debt, an accumulation that will catch up with them in the future.
Personal (Psychological, Behavioral) Factors	
Overconfidence	This posture makes lenders and borrowers believe they can beat the market odds even though reason would dictate otherwise.
Other various biases and heuristics	Behavioral finance discusses a slew of biases that can affect market agents' decisions.
Disconnection from NGPs	This emerging concept has a parallel with the concept of dis-anchoring, which is the opposite of the concept of anchoring used in behavioral finance
Rationed rationality	A version of bounded rationality, except that here there is an underlying intention. The borrowers choose to minimize the amount of information they need to reach an optimal decision, and/or the lenders resort to information asymmetry to again an undue advantage.
Poor financial literacy	A well-known factor linked to indebtedness.
Risky behavior	Traditionally, risk behavior has been deployed around three sets of behavior: a narrow time horizon; poor portfolio diversification (Markowitz, 1952); and excessive speculation.
Sub-optimal financial decision making	This leads market agents to under-perform, which may precipitate their financial hardship. As stress augments, these agents may resort to desperate measures, such as borrowing at high interest rates from usurious lenders.
Cognitive weakness	A factor linked to indebtedness, especially when it comes to financial transactions that require advanced computing and/or mathematical skills.
Socio-demographic profile	A well-known factor linked to indebtedness.
Event Factors	
Traumatic events	In psychology, traumatic events are known to impair cognition or alter consumers (e.g., post-traumatic stress disorder — DSM-V).
Sudden loss of income/revenues	A well-known factor linked to indebtedness.
Family issues	These are important when they affect personal finances to a significant degree (e.g., divorce — (Sierminska and Silber, 2020)).
High levels of uncertainty	Volatility is a known factor of financial crises, which typify irrationality.

Note: The above list does not pretend to be exhaustive. However, it highlights some of the factors that academics have found to potentially influence irrational financial behaviors.

real risk. In the course of history, countless similar cases replicate this pattern, such as rogue trader Yasuo Hamanaka for Sumitomo in the copper sector (Kozinn, 2000). Given this framework, our seven hypotheses, largely based on Appendix A and the works of Mesly (2010), were as follows:

(1) H_1: There is a positive link between disconnection and irrationality. (Dis $\rightarrow(I^+)\rightarrow$Ir)
(2) H_2: Irrationality positively influences indebtedness. (Ir$\rightarrow(I^+)\rightarrow$ID)
(3) H_3: Indebtedness is positively linked to NGP disconnection. (ID$\rightarrow(I^+)\rightarrow$Dis).
(4) $H_{4,5,6}$: The predator/prey position (k') linearly and positively influences Dis, IR, and ID individually. ($k'\rightarrow(I^+)\rightarrow$ Dis, IR, ID)
(5) H_7: There is a mutual link between indebtedness and deceitful behavior. (Dc$\leftarrow(I)\rightarrow$ID)

Disconnection is measured with twelve questions, irrationality with nine, indebtedness with nine, predator–prey with ten (five each for predator and prey positions), and deception with four. Cronbach's alphas are provided besides the heading of the set of questions in Appendix B. To recall, Cronbach's alpha is a questionnaire score reliability coefficient that measures how consistent questions relating to a single construct are, given the size of the sample population investigated. High alphas (in the 0.90 range) should be interpreted as a sound appreciation of the construct (Cronbach, 1951).

4. Empirical research

4.1. Protocol and participants

For obvious reasons, we could not go back in time and test borrowers during the GFC. We decided to take advantage of the current, relatively stable economic climate in the US and assume that the market is not overly predatory, unlike in 2007–2009. Should our framework prove valuable, this would mean that even in low predatory market conditions, the loop would underlie economic activity, as dictated by the psychology of market agents. This makes sense: markets are not machines. They are created and operated by humans, and humans survive not only thanks to their cognitive abilities, but also to their emotional forces. We therefore set the following criteria for participation in the research: (1) English mother tongue; (2) US resident; and (3) university education (again, if respondents assumed as having low levels of irrationality substantiate the existence of the loop, then there is all the more reason to believe that irrationality drives the behavior of the majority of people, and hence, of the markets). While we collected sociodemographic data, our research was on

Table 2
Key Statistics ($N = 457$).

Construct	Mean	Std. Dev.	Construct	Mean	Std. Dev.
NGP Disconnection	2.2886	0.61789	Predator Position	2.9826	0.67127
Irrationality	2.5697	0.89437	Prey Position	2.5799	0.80296
Indebtedness	2.1953	0.95623	*k'*= Prey/Predator Ratio	–	0.49607
Deceit	2.1798	0.78170			

Note: The table gives basic statistics for the variables of interest. Std. Dev. = Standard deviation.

Table 3
Key Regressions for the First Study (N=457; Degrees of freedom (reg./res.) 1/455).

	H_1	H_2	H_3	H_4	H_5	H_6	H_7
Regression	Dis →Ir	Ir→ID	ID→Dis	*k'*→Dis	*k'*→Ir	*k'*→ID	ID→Dc
R^2	0.069	0.135	0.164	0.070	0.044	0.068	0.268
R^2 evaluation	Very W.	Weak	Mod.	Very W.	Very W.	Very W.	M. Str.
Durbin-Watson[a]	1.743	1.961	1.852	2.180	1.786	1.956	1.833
F-Value	33.983	70.799	89.143	34.248	21.100	34.291	166.615
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hypo. Supported?	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: To read the second line, where the regressions are coded, please refer back to the list of hypotheses. Very W. = Very weak; Mod. = Moderate; Mod. M. Str. = Moderately strong. Degrees of freedom (reg./res.) = regression, residuals.
[a]Typical value is below 2.

the constructs of interest, and we did not test for their influence. We do not deny their likely role, we simply reserve this analysis for a future article, as this topic deserves a full review on its own. Furthermore, our approach remains economic/financial, not marketing-oriented. As illustrated in Fig. 4, we posit that the loop may be the stochastic element that disrupts the regular flow of the markets under certain conditions. After checking the questionnaire with an expert to ensure that it corresponded to proper psychometric properties, we used an academic research platform to send it to 500 participants. The questionnaire contained some "check questions" meant to verify whether the respondents were paying attention to the questions or simply rushing to answer and collect the endowment associated with their effort on the platform. We received 457 valid questionnaires, enough to run a path analysis, a very appropriate statistical tool given our framework and hypotheses (Hair et al., 1998). The questionnaire was sent out during the summer of 2021 and the data was analyzed using IBM Amos 25.

Table 2 presents the key statistics.

Table 3 presents the single linear regressions for H_{1to7}), understanding that by themselves, they do not suffice given our model (hence, the recourse to path analysis further below). This analysis is meant to perform a preliminary testing to verify whether our hypotheses make sense within these statistical limits.

The two single linear regressions that account for a moderate explanatory power between the variables are that of the change in irrationality explaining the change in indebtedness at an approximate level of 14%, and the change in indebtedness explaining the change in disconnection at an approximate level of 16%. Overall, the regressions present weak R^2. This means that the constructs may perform better when considered all at once, with every possible interaction considered. We thus performed a path analysis whose results appear in Fig. 2.

Fig. 2 presents an excellent fit with the model presented in Fig. 1. The core path analysis values are: Chi-square = 0.169 (ideally = 0)[4]; probability level = 0.919 (good fit > 0.90); comparative fit index CFI = 1.000 (1.000); and the root mean square error of approximation RMSEA= 0.000 (0.000) — (Schumacker and Lomax, 2010). While single regressions consider the bonds between variables in relative isolation, path analysis considers all relationships at once, reinforcing the findings and highlighting the internal dynamic that unites them all. Overall, Fig. 2 is in line with the hypotheses we formulated and with the framework illustrated in Fig. 1.

5. Discussion

Regression analysis is not capable of assessing multiple relationships at once, except by way of one explained variable and a function of multiple explanatory variables. However, this statistical technique allows us to make a certain number of observations about our initial framework. First, all hypotheses are verified and proved significant at $p < 0.001$. The role of the *k'* construct (the ratio of prey to predator) is very weak, meaning that in the regression model (which cannot take into account multiple explained variables at once), it has no real impact on the dynamic that leads to deceitful behaviors. It may be the case that under different sets of circumstances, the R^2 associated with it in $H_{4,5,6}$ would be much stronger. The questionnaire was distributed in a moderate market that was not officially characterized by a predatory paradigm, as was the case during the GFC. However, the regression results do show quite convincingly that there is a relationship between indebtedness and deception. Among all the single linear regressions, this relationship is the strongest, at the level deemed moderate of $R^2 = 0.268$. This suggests that nearly 27 percent of the tendency to be deceitful is explained by the level of indebtedness in the context examined here. Given our framework, however, we cannot stand firm on the regression results because of the framework's complexity and inherent loop. To draw stronger inferences from the framework in Fig. 1, one must resort to path analysis, which we did in Fig. 2.

In this path analysis, the role of *k'* becomes non-equivocal: the standardized estimators approach the estimators of the other estimators for the other constructs as they interact with each other (about 0.20). The loop that we anticipated from the literature review is clearly laid out, with NGP disconnection influencing irrationality, which then inflates indebtedness, which then aggravates the phenomenon of disconnection. Each of these constructs is affected by *k'*, the prey/predator ratio. Hence, our analysis suggests that assessing the type of market in which agents behave may be a crucial consideration: likely, the more the market is

[4] The Chi-squared test is used to confirm that the imposed structural pathways (confirmatory) do not distort the information contained in the covariance matrix of the raw data. Ideally, the predicted (reconstructed) covariance matrix, after accounting for the imposed structure, should be equal to the raw sample covariance matrix. The Chi-square measures the difference between these two covariance matrices and should therefore ideally be close to zero. When it is, then the corresponding *p*-value (sig. in AMOS) should be higher than 0.05 since the null hypothesis is what we want to retain (rather than reject, as is often the case in statistical tests).

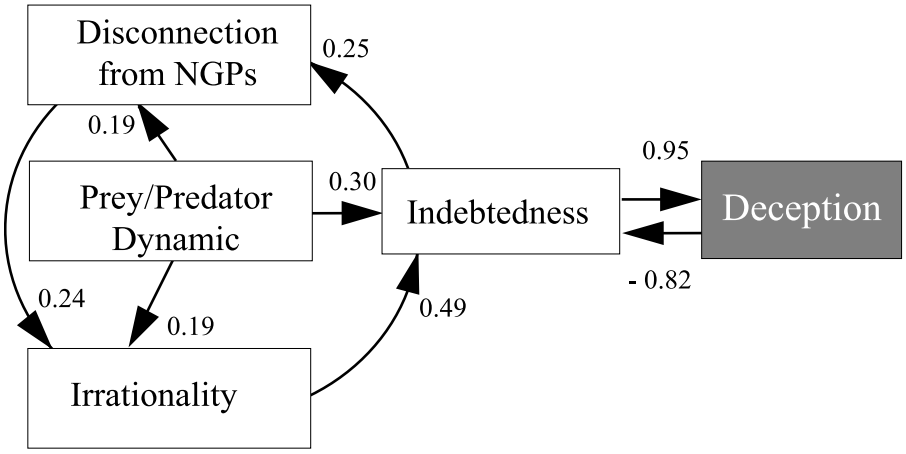

Fig. 2. Path Analysis for the Proposed Framework. *Note:* Here, the constructs are measured instead of being latent variables; hence, we use path analysis. The irrational exuberance loop, consisting of NGP disconnection-irrationality-indebtedness is fed by a prey–predator dynamic and justifies deceit.

filled with toxic products, con artists, rogue traders, unscrupulous lenders or the likes, the more it will degenerate. This dark scenario is revealed when examining the back and forth bonds between indebtedness and deceit (→, ← in Fig. 2). Just as was the case under the lens of regression analysis, path analysis shows that the strongest effect of one variable on another occurs between these two variables. More precisely, high levels of debt may push market agents to lie to access credit (as expected from Table 1 where the three sets of factors may come into play to justify deception). Yet, deception is not reflected in higher debt level. It is quite the opposite: the standardized estimator has a negative, strong value of −0.82. This may mean that the more market agents succeed at being deceitful, the more likely they are to secure funding, and hence at least partly reimburse their debts. As illustrated in Fig. 2, this return of influence from deception to indebtedness impacts the irrational exuberant loop. If debt decreases, one would expect the self-reinforcing loop to weaken, and that market agents would start connecting better with their initial financial needs, goals, and preferences. Hence, according to the framework, this means that the agents would end up making more rational decisions, which should further lower their debt. However, the market agents then face a conundrum. Assume the market is booming and that they have every reason, in their minds, to keep speculating. They may well decide to keep lying because, in the end, they will be better off. They may feel that if they do not trick their lenders to secure loans, they could miss out on the opportunity to get rich fast. This is what happened during the GFC for both individual and institutional market agents. In heavily noxious markets, it appears at first glance that one is better off deceiving others than not. This, of course, lasts only as long as risk can be hidden or transferred to others, and/or as long as money is not too expensive. However, when regulations all of a sudden make it more perilous to hide risks, and when interest rates reach new heights, as was eventually the case during the 2007–2009 period, deception catches up on unscrupulous lenders and buyers. Hence, we posit that our framework offers an explanation for what happens in times of financial crisis in general, from both personal and institutional points of view. The irrational exuberant stand will slow down as predatory conditions fade. The factors that set the wheel of misfortune in dreadful motion (as listed in Table 1) end up losing grip on the market; frictions have become so intense that the system can no longer operate (see Fig. 3).

The inevitable outcome of the wheel of misfortune (that encompasses a predatory paradigm) is an organizational or even a market crash. This assertion may well be supported by the examples of many past financial crises, going back as far as Tulipomania in 17th-century Holland (Kindleberger, 1996). A relatively recent example is the case of Nick Leeson, who caused the downfall of Barings, the UK's oldest bank (Rawnsley, 1996). Having erroneously bet huge amounts of money on the market in attempts to maximize his trader commissions, Leeson tried to cover up his actions in the hope of making up the losses. The debt he incurred for Barings led him to depart from Barings' financial needs, goals, and risk preferences, which then pushed him to make even more irrational decisions with further unwarranted investments, which then "forced" him to create a hidden account to hide his predicament (deception). Hence, we posit that when the factors identified in Table 1 play in favor of fueling the spin speed and intensity of the wheel of misfortune (irrational exuberance + predatory paradigm), individuals, and organizations such as banks, and/or markets, run the risk of ending up in a financial crisis. How exactly the three sets of factors affect the rise and fall of irrational exuberance remains to be studied. We hypothesize that the most direct and significant influence is on the core of the wheel of misfortune, i.e. on *k*' or, put differently, the way individuals and organizations position themselves as predators, prey, or a mixture thereof. Certainly, individual home owners' foreclosures and organizations' bankruptcies are the result of unsustainable debt. For both groups, this debt signifies that they can no longer fulfill their needs, achieve their goals, and attend to their preferences. The debt also reveals that wrong financial decisions were made at some point. Evidently, the factors we outlined (not exhaustively since the list would probably be endless) – market, psychological, and event factors – can either ensure a relative equilibrium among the forces that drive individuals and markets, or else lead them into a Dantesque spin.

6. Conclusion

This article makes a number of inroads on the theory of behavioral finance, economics, and the management of debt. First, we suggest that markets are not stable for long periods of time, and that some predatory dynamics take place in all kinds of forms, including through abusive or usurious loans (e.g., by way of predatory mortgages). We propose that crises are the result of the behaviors of market agents, who are governed by psychological forces, three of which we labeled as mental states. We identified a possible Dantesque loop, giving the real estate sector as an example: as household debt increases, market agents may no longer be able to ground themselves on their original needs, goals, and preferences. As disconnection increases, they may take

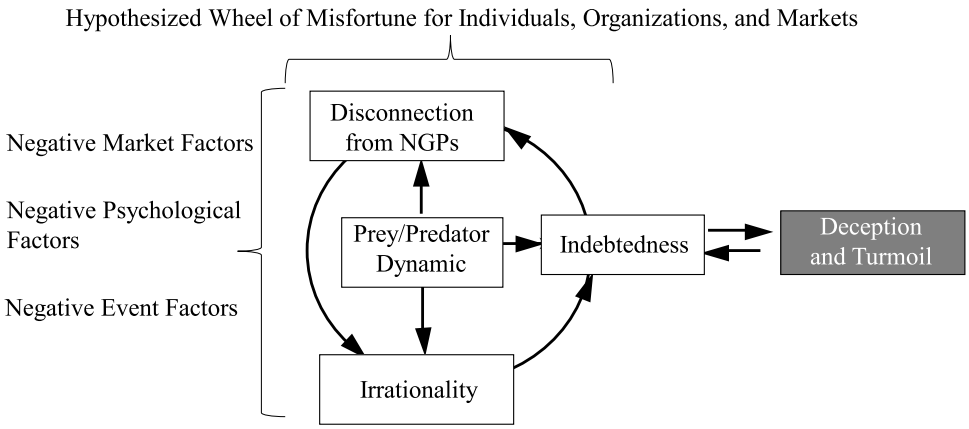

Fig. 3. The Hypothesized Making of Financial Crises. *Note*: This figure is designed to energize the discussion on the manufacturing of financial crises as a future development of this article. When market, psychological, and event factors are at manageable levels, the mental states and behavior of deceit remain functional and warrant market equilibrium. However, when factors exacerbate the underlying predatory paradigm of the market, both individuals and organizations end up spinning, ultimately acting to their own detriment.

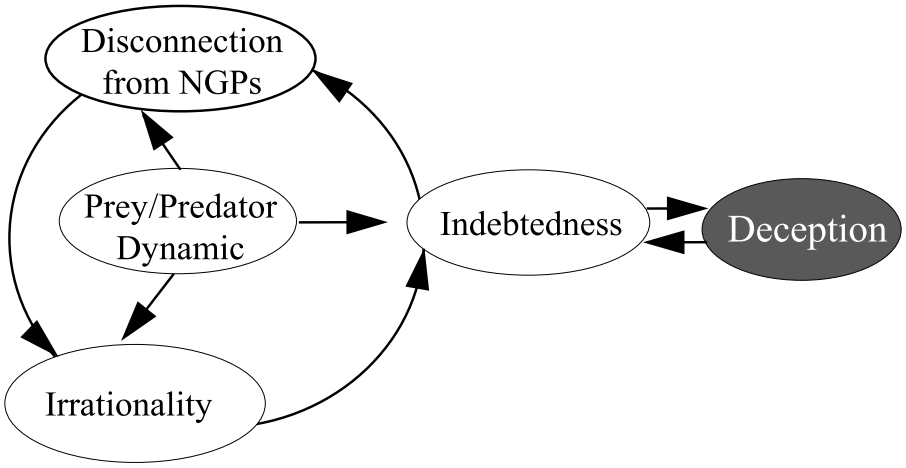

Fig. 4. A Proposed Framework Linking Irrational Exuberance to Deception. *Note:* In this framework, the self-sustaining wheel of misfortune formed by irrational exuberance (NGP disconnection, irrationality, and indebtedness) occurring in a predatory paradigm . In short, market agents – individuals or organizations – that disengage financially from their original needs, goals, and preferences, develop irrational thinking and decision-making, which increase their level of indebtedness, which aggravates their disconnection. As indebtedness increases, these market agents may resort to deceitful behavior in attempts to hide their real financial status and borrow money, the more so as their circumstances become increasingly desperate.

financial decisions that ultimately, often sooner rather than later, prove detrimental to their wellbeing. As their decisions result in poor financial performance, their debt level increases. This self-reinforcing loop is fed on all sides by a predator–prey dynamic: the more market agents feel vulnerable (and probably are), the more they spin within that loop, a loop that ends up forming their wheel of misfortune when a predatory economy prevails. We defined irrational exuberance. From a theoretical perspective, such a loop has never previously been discussed: the notion of (dis)anchoring has only been treated in isolation in behavioral finance, and the role of indebtedness has not been systematically studied in connection with the emerging concept of the NGP bundle. This represents a substantial theoretical move forward, as in this article, notions (or proxies thereof) that academics have long treated independently are articulated in an interconnected, dynamic fashion that improves our understanding of why market agents sink into debt, and rely on deception. We supported our analysis with proxies of real market data and concrete examples of misbehaviors, and provided a list of the behavioral effects of the three-category factors thought to trigger irrational exuberance. From a managerial point of view, this novel vision adds credibility to the efforts made by national and international regulators, especially since the GFC, to control the market and limit its eccentricities. An enhanced understanding of why market agents raise their debt level beyond what is good for them can only serve society and help push for safeguards against market abuse and the questionable tactics used by some lenders and/or marketers designed to trick these agents into debt. Fig. A.1 illustrates how waves take place in the market and how they interconnect. We believe this offers a promising research avenue; perhaps various economies can be looked at in a similar fashion across longitudinal studies; results may well reinforce the theoretical principles discussed in the article.

The limits of our research are that our sample was relatively small and that the test was conducted in a contemporary, well-behaved market. Using a wider sample and administering the questionnaire in various predatory market conditions would likely generalize our findings more convincingly. We anticipate that extreme predatory market conditions would highlight even more the interconnections between the variables of interest. Together with the questionnaire we used and tested, our article offers paths to future research, as presented in Fig. 3. On the one hand, narrowing down debt and crisis situations to hard market data without capturing the motivational drive of market agents only considers part of the overall dynamics of markets. On the other hand, solely focusing on assumptions about psychological

underpinnings by way of questionnaires distributed to a sample population or by way of laboratory tests (often using MBA students in behavioral studies) may only remotely address the reality of the markets as they struggle day to day. Our approach has attempted to look at both sides of the equation — hard market data and events as well as field research, thus offering a promising perspective, especially with respect to the phenomenon of disconnection. The questionnaire could be used by other academics and practitioners, even in the form of an amended version that would meet their requirements more specifically. Our results show that this questionnaire offers tangible results and that its future administration may help to delineate in more detail the relationships between indebtedness, deceit, and the other variables of interest.

Appendix A. Some key information on predatory mortgages in the USA

These figures reveal cues of a prevailing predatory paradigm leading to and during the US subprime crisis of 2007–2009. In the top figure, the trend for toxic, predatory mortgages rises as does the number of their providers. However, higher interest rates soon meant that monthly mortgage payments became too expensive for vulnerable borrowers to bear over the long term. Within four years, foreclosures peaked. As the market commenced its downslide, advertising and lobbying expenses grew dramatically in attempts to incite market agents to keep borrowing, despite the fact that the toxicity of the subprime mortgages became increasingly evident.

Appendix B. The questionnaire we used

Thank you for responding to this questionnaire. You do not have to identify yourself. Please answer all questions using the scale 1 = "I do not agree at all" to 5 = "I completely agree", with 3 being neutral. When mentioning "financial products and/or services", we refer to any products and/or services of a financial nature that represent a significant part of your budget, such as a car, a house, furniture, life insurance, bonds, company stocks, and other forms of equity. Please answer on your own behalf, not on behalf of someone else or someone in your household, which might include your spouse and/or children. There are no right or wrong answers. Simply answer the best you can spontaneously. The questionnaire will require roughly 10 min of your time. Thank you for your cooperation.

Scale: 1 = I do not agree at all; 2 = I do not agree; 3 = I neither agree nor disagree; 4 = I agree; 5 = I completely agree.

Disconnection from Bundle (Cronbach's Alpha = 0.832)

(1) I am not particularly attuned to my financial needs.
(2) I have not carefully identified my financial needs.
(3) I do not fully understand my financial needs.
(4) I have not identified my financial goals with great care.
(5) I have not set my financial goals yet.
(6) I do not always stick to the financial goals I set.
(7) I have not determined which financial products I prefer.
(8) I do not know for sure which attributes I like and do not like in financial products.
(9) I do not know for sure what I do and do not like about the financial products in which I invest.
(10) I often buy products without knowing why.
(11) I often find myself not knowing where I stand financially.
(12) I often buy financial products without really knowing what I favor.

Irrationality (Cronbach's Alpha = 0.802)

(1) I do not routinely keep track of my investments in financial products.
(2) I rarely seek expert knowledge when having to make a financial decision.
(3) I do not regularly keep abreast of the financial marketplace.
(4) I do not understand financial techniques well.
(5) I do not have a sound financial education.
(6) I do not invest based on a well-thought-out financial plan.
(7) Generally, I know little about the attributes of the financial products I buy.
(8) Before buying financial products, I rarely check competing products.
(9) Before buying financial products, I seldom verify whether there are substitutes.

Indebtedness (Cronbach's Alpha = 0.668)

(1) I very often borrow beyond my means.
(2) I tend to be late in paying my debts.
(3) I owe a lot of money.
(4) I have large debts compared to my capacity to reimburse them.
(5) My total income is not enough to cover my total debt.
(6) I am unlikely to be able to reimburse all my debts any time soon.
(7) I like to show people that I have achieved great financial success.
(8) I like to display as wealthy a lifestyle as possible.
(9) I judge people by their financial wealth.

Deception (Cronbach's Alpha = 0.841)

(1) I always tell the truth about the nature of my financial standing. (Reverse)
(2) I do not always reveal all of my financial problems when I should, for example, to my lender.
(3) I would twist the reality of my financial situation a bit if I had to do it to borrow money.
(4) Telling the entire truth about one's financial situation is a sure way to have a hard time borrowing money.

Predator (Cronbach's Alpha = 0.677)

(1) I identify people's strengths and especially their weaknesses.
(2) I often try to distract others when I negotiate.
(3) By negotiating hard with people, I can get more of what I want.
(4) I always look for the right moment before I respond to arguments others present to me.
(5) I intend to get a lot out of my relationships with others, with minimum effort.

Prey (Cronbach's Alpha = 0.774)

(1) I feel like most people do not respect me.
(2) I try to get people to empathize with me.
(3) People always want to have the last word when discussing with me.
(4) People are generally uncompromising with me.
(5) People always impose their conditions on me, regardless of my well-being.

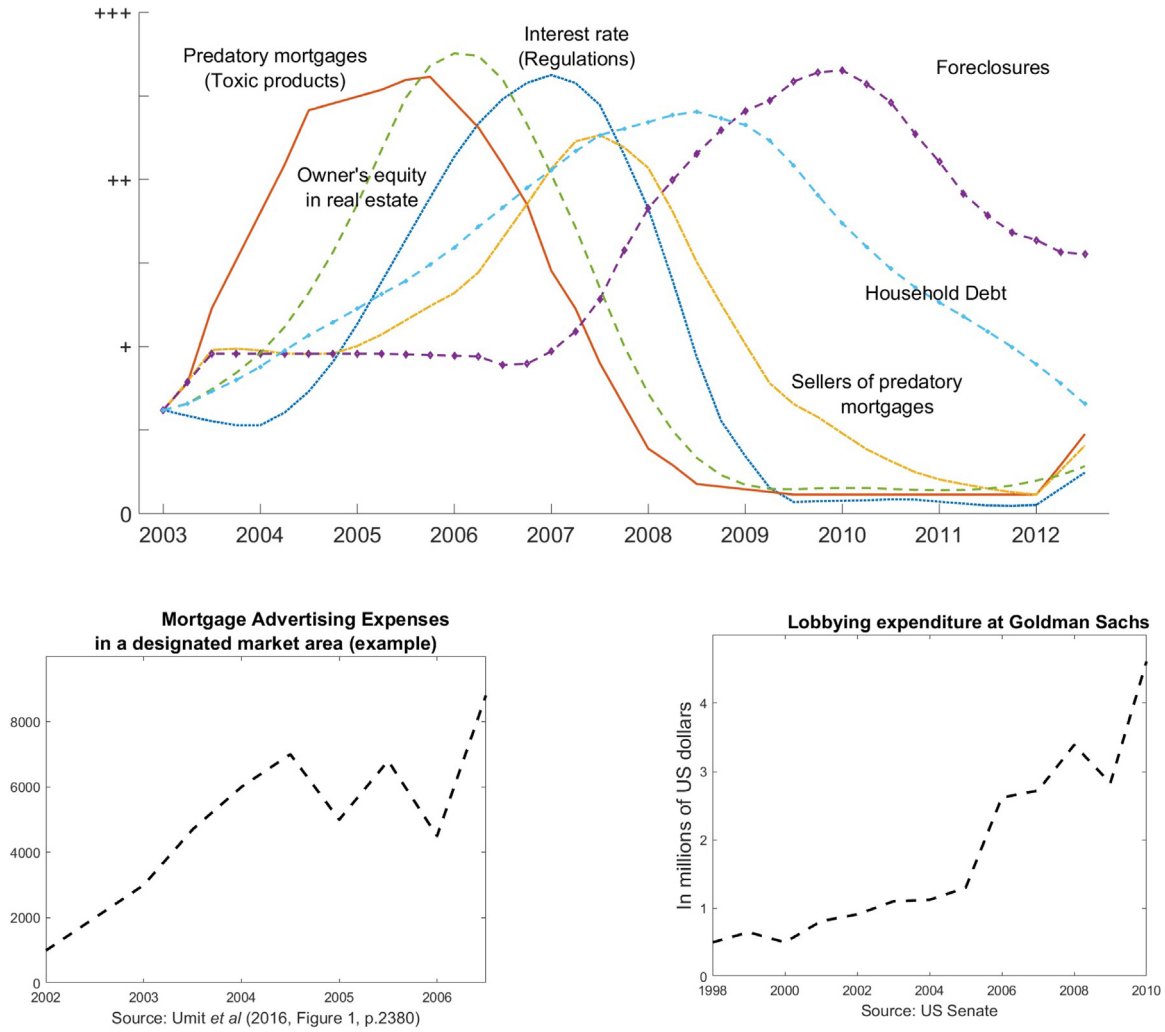

Fig. A.1. Some Key Indicators during the US GFC.

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