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Why Are There Financial Crises? Recent Developments in Theory

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Abstract

In financial crises, a period of overheated credit markets turns into a credit crunch accompanied by a systemic breakdown in the financial intermediary sector. Without a deep understanding of their roots, designing policies to decrease the probability of suffering from them or to avoid the worst consequences is like flying blind. In this review, I survey the recent development of the theory of financial crises. I focus on the answers these theories provide to four fundamental questions. What makes the booming phase fragile, and what are the incentives and frictions leading to that fragility? What triggers the crisis? Why is the downturn persistent? Should policy intervene, and if so, how?

1. INTRODUCTION

A financial crisis is widely described as a period of overheated credit markets that abruptly turns into a credit crunch accompanied by a systemic breakdown in the financial intermediary sector. During the boom phase, there is abundant available credit at small spreads, even to risky firms and households, and fast growth in investment and output. In the bust phase, the same risky entrepreneurs and households are squeezed, credit (if there is any) is expensive, and asset prices and output growth collapse.

Clearly, it is critical for both policy makers and academics to understand the mechanisms that cause financial crises. Without a deep understanding of their roots, designing policies to decrease the probability of suffering them, or to avoid the worst consequences, is like flying blind.

Before the Global Financial Crisis, there was a perception that, in the postwar world, such boom-and-bust patterns were characteristic of emerging markets only. Accordingly, empirical and theoretical research alike focused mostly on the emerging market crises of the 1980s and 1990s, highlighting the role of capital account liberalization, surges in capital inflows and sudden stops, real exchange rates, and evolution of terms of trade.

However, the Global Financial Crisis in 2008 and, to some extent, the European Debt Crisis in 2010 have dramatically exposed similar vulnerabilities in a group of advanced economies. This, in turn, has led to a shift in focus on the potential and existing problems of financial intermediation, even where it is the most developed.

In this review, I survey the development of financial crisis theory as a result of that shift in attention. I choose the seminal papers by Kiyotaki & Moore (1997) and Bernanke, Gertler & Gilchrist (1999) as the starting point. These papers had a fundamental impact on our thinking in that they provided a plausible mechanism for how relatively small adverse shocks can be amplified through asset prices when collateralized credit is present, leading to persistent downturns. From there, I take a bird's-eye view of the main directions in which the literature has developed since then. I focus exclusively on papers that contribute new theoretical insights to our understanding of the potential mechanisms behind these episodes.

As discussed below, most proposed mechanisms can be viewed as a combination of answers to some or all of four fundamental questions. First, what makes the boom phase fragile, and what are the incentives and frictions leading to that fragility? Second, what triggers the overheated market to turn into a credit crunch? Third, why is the downturn persistent? Finally, should policy intervene, and if so, how?

In the following sections, I discuss the main developments in theory through the suggested answers to these questions. To set the stage, Section 2 provides a brief summary of the recent empirical literature, highlighting the most robust empirical facts characterizing these episodes. Section 3 groups and summarizes papers according to their main insights. Instead of aiming for a comprehensive list, I select those papers that, quite subjectively, I feel are the most likely to change the direction of the future discussion, with an emphasis on more recent publications. Section 4 discusses the differences between policy implications of various theories. Section 5 concludes.

2. STYLIZED FACTS IN FINANCIAL CRISES

Financial crises are rare events. In an effort to separate the general features from the particularities of each episode, recent decades have seen attempts to build large, increasingly comprehensive data sets.

The first wave of this empirical research focused on financial crises in emerging markets of the 1980s and 1990s (e.g., Kaminsky & Reinhart 1999, Borio & Lowe 2002). Since the Global Financial Crisis, attention has shifted to advanced economies and extended the scope back to the prewar

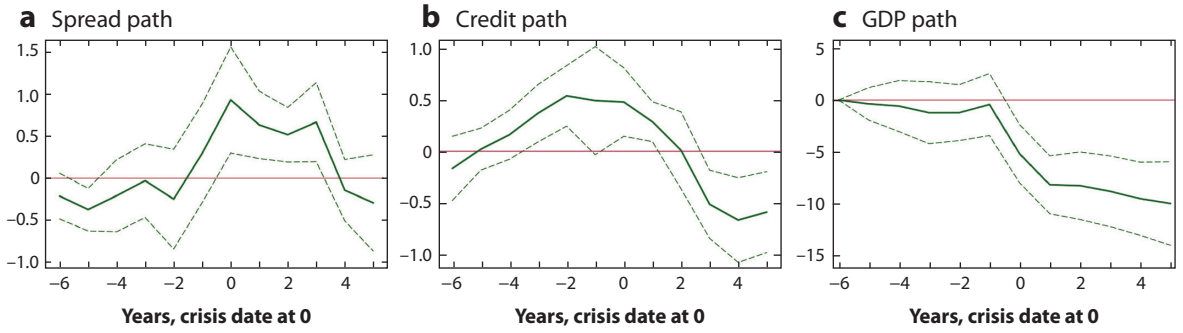

Figure 1

The behavior of (*a*) credit spreads, (*b*) the quantity of credit around crises, and (*c*) GDP across a sample of 40 financial crises. GDP is the demeaned percentage fall from year $t - 6$, credit is the demeaned and normalized 3-year growth in the ratio of credit to GDP, and spreads are percentage deviation from country mean (for further details, see Krishnamurthy & Muir 2025). Figure adapted from Krishnamurthy & Muir (2025, figure 1).

periods (e.g., Schularick & Taylor 2012; Jordà, Schularick & Taylor 2015). Even more recently, there has been increasing attention to the role of asset prices and the sectoral decomposition of credit aside from traditional macroeconomic variables (e.g., Baron & Xiong 2017, Greenwood et al. 2022, Müller & Verner 2024, Krishnamurthy & Muir 2025). I refer the interested reader to Sufi & Taylor (2022) and Frydman & Xu (2023) for recent surveys of this literature.

For the purposes of this review, it is sufficient to focus on the stylized facts of **Figure 1**. The figure plots the mean path of credit spread, bank loans, and GDP around 40 international financial crises. The episodes are identified by systemic problems in the banking sector. Credit spreads are measured as the difference between the normalized average yield of corporate and sovereign bonds in a given country in a given period, relative to the corresponding yield on UK government debt.

Looking at the precrisis dates in the three panels, we see that financial crises tend to be preceded by a period of increased quantity of credit issued at low spreads and higher-than-average GDP growth. This is the precrisis period, characterized by an overheated credit market.

When the crisis is triggered, spreads jump, showing a sharp negative update of assessed credit quality that corresponds to a collapse of credit quantity and GDP growth. Importantly, the postcrisis period is characterized by a persistent recession. Credit and GDP growth remain under the trend even 5 years after the crisis.

Krishnamurthy & Muir (2025) emphasize the considerable heterogeneity across episodes, which **Figure 1** masks. **Figure 2*a*** shows a scatterplot of the 3-year GDP growth rate against the spread change for 40 financial crisis episodes. While there is a significant negative relationship, clearly there are many episodes where the GDP collapse was not presaged by a jump in the credit spread.

Figure 2*a* and ***b*** represents a similar observation with respect to credit growth. The scatterplots show the 3-year GDP growth after crisis episodes against the 2-year credit growth before the episodes.[1] **Figure 2*c*** adds observations for noncrisis dates. While the presence of a credit boom increases the probability of a crisis, clearly it is neither sufficient nor necessary for one.

[1]I exclude years for World War I and World War II. GDP growth is computed as the cumulative percentage change of real GDP per capita in the 3 years following a given period *t*. It is demeaned by the sample growth rate in GDP for country *i*. Credit growth is the percentage change of total loans in the 2 years preceding a given period *t*. It is demeaned by the sample growth rate and normalized by the standard deviation of credit growth for country *i*.

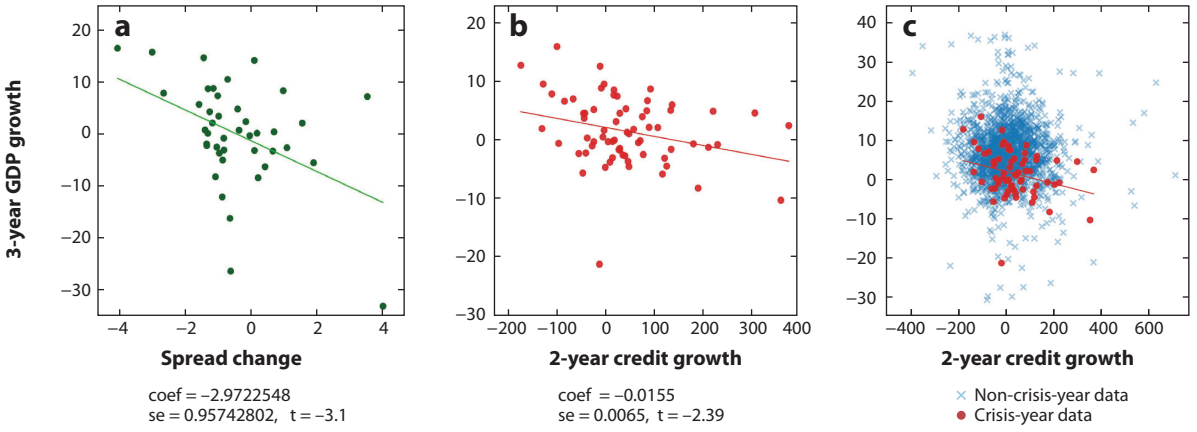

Figure 2

(*a*) Spread changes against future 3-year GDP growth around financial crisis dates. (*b*) 2-year credit growth before crisis dates against 3-year GDP growth after. (*c*) Addition of noncrisis dates (*blue crosses*). Abbreviations: coef, coefficient; se, standard error; t, *t*-statistic. Data and crisis dates are from Jordà, Schularick & Taylor (2015). Panel *a* adapted from Krishnamurthy & Muir (2025, figure 2).

Krishnamurthy & Muir (2025) argue that these stylized facts lend themselves to an "FZ" view of financial crises. That is, the crisis is severe when the product $\mathcal{F}_{i,t} \times z_t$, where z_t is the shock hitting the financial sector with fragility $\mathcal{F}_{i,t}$, is large. Their results indicate that the extent of the precrisis growth in credit and the increase in credit spreads are good proxies to measure the fragility of the financial sector and the size of the shock, respectively.

In the rest of this review, I discuss how various theories of financial crisis can shed more light on such mechanisms. Specifically, how does fragility ($\mathcal{F}_{i,t}$) build up in the financial sector? Why are periods with large fragility associated with an overheated credit market? What can be a trigger (z_t) that turns the booming credit market into a credit crunch? What makes the resulting recession deep and persistent? In what sense is any of the stages inefficient and, hence, in need of government intervention? Should the intervention be preemptive or ex post?

3. THEORIES OF FINANCIAL CRISES

This section focuses on the main distortions that can help us conceptualize the mechanisms of financial crises. Building on early insights from Kiyotaki & Moore (1997) and Bernanke, Gertler & Gilchrist (1999), a growing literature explores in greater detail the role of financial constraints within the intermediary sector in amplifying the size and persistence of initial adverse financial shocks to the economy, leading to deep and long recessions.

An important literature focuses on the normative side of such economies, specifically the question of how pecuniary externalities might justify the need for policy intervention. It was recognized early on that these externalities might help us understand why there is overborrowing in credit markets in the boom phase, leading to excessive deleveraging in the crisis. More recent literature highlights that the pecuniary externality might arise on the side of financial intermediaries instead of firms. It also argues that these externalities are conceptually distinct from fire sales and that they can lead not only to overborrowing but also to excessive risk-taking.

The literature also reflects growing interest in the role of demand externalities in the persistence of recessions following financial crisis. Demand externalities assume complete markets but nominally rigid prices and also lead to overborrowing in the boom phase.

I then turn to the role of belief distortions. I show that speculation due to dispersion in beliefs can simultaneously explain increased leverage and inflated asset prices in the boom phase and the abrupt crash in the bust phase as the most optimistic investors lose their capital. Consequently, their influence on the wealth-weighted average belief also decreases. In contrast, models with diagnostic expectations are particularly useful for explaining the low level of spreads in the boom phase, because the average investors' overreaction to recent news results in overoptimism. Then, disappointing shocks lead to a hike in spreads and a collapse.

Another stream of papers argues that the abrupt change of overheated credit markets to a credit crunch is due to lenders' rational decision to change the way they learn about the fundamentals of the economy, and, consequently, tighten their lending standards. Therefore, the crisis corresponds to a sudden revelation of information instead of a sudden change in beliefs. In this sense, this stream of papers provides a rationalization of the so-called Minsky moment. In these models, fragility and the probability of the crash are related. When fundamentals are sufficiently weak, it becomes rational for investors to change their lending standards.

The last stream of papers discussed in this section conceptualizes the occurrence of the crisis as a shift across multiple equilibria. This shift is interpreted as a bank run. In these models, the economy is fragile if it is in the region of multiplicity. However, beyond that there is no direct connection between fundamentals and the probability of a crisis. In that region, fundamentals are consistent both with a crisis and with no crisis.

3.1. Constrained Intermediaries: Amplification and Persistence

The Global Financial Crisis renewed attention to amplification effects through financial institutions' balance sheets (e.g., Gertler & Kiyotaki 2010, Gertler & Karadi 2011, He & Krishnamurthy 2012, Brunnermeier & Sannikov 2014, Di Tella 2017). A subset of papers developed a continuous-time formalization (e.g., He & Krishnamurthy 2012, Brunnermeier & Sannikov 2014) that contributed to a better understanding of certain aspects of financial crises as the nonlinear effect of shocks and the origins of endogenous risk.[2] In He & Krishnamurthy's (2012) model, only specialists have access to a high-return technology. Households would like to invest through the intermediaries managed by the specialist, but a moral-hazard problem implies a skin-in-the game constraint: Households can delegate their monies only up to a given fraction of the specialists' own wealth. Thus, when specialists are subject to losses, the constraint might become more binding, leading to less delegated capital, further losses of capital for specialists, and a lower price for the risky asset, reinforcing the deterioration of intermediaries' balance sheets. That is, the agency problem creates a concentration of aggregate risk on the intermediaries' balance sheet.

However, note that, just as in the classic versions presented by Kiyotaki & Moore (1997) and Bernanke, Gertler & Gilchrist (1999), these models do not separate the balance sheets of high-productivity agents (representing nonfinancial firms) from those of financial intermediaries (representing banks). The intermediation friction is captured in a minimal form, reduced to a financial constraint limiting the high-productivity agent's activity. The ambition of Gertler & Kiyotaki (2010) and Gertler & Karadi (2011) is to model an explicit banking sector as the source of financial acceleration to better understand how intermediation breaks down or, by extension, how policy instruments aiming to improve the health of banks can help.

In particular, Gertler & Kiyotaki (2010) assume bankers who can abscond with an exogenous fraction of their assets. Thus, they will be able to take deposits, and expand their assets, only to

[2]For a minimalist continuous-time model where standard risk-sharing and wealth effects lead to amplification and risk patterns similar to those of the Brunnermeier & Sannikov (2014) economy, see Kondor & Vayanos (2019).

the extent that their value is not too high compared with their own equity, which determines the continuation value of banking. That is, while for Kiyotaki & Moore (1997) the future value of firms' assets limits how much they can borrow, resulting in financial acceleration through the balance sheet of nonfinancial firms, for Gertler & Kiyotaki (2010) banks' equity places an endogenous limit on how much deposit they can collect, resulting in financial acceleration through banks' balance sheets.

In this version, the trigger of a financial crisis is a decline in capital quality, which reduces banks' net worth. This leads to a drop in their demand for assets and a subsequent drop in the value of assets, amplifying the reduction of net worth, especially when banks' leverage is high. Given banks' leverage constraints, their reduced net worth limits lending in subsequent periods. Consequently, the investment and growth rate of output are constrained, leading to long and persistent recessions.

3.2. Pecuniary Externalities: The Reason for Regulation

Since the seminal studies by Stiglitz (1982), Geanakoplos & Polemarchakis (1985), and Greenwald & Stiglitz (1986), it has been well-understood that when markets are incomplete, pecuniary externalities might distort agents' decisions in the market equilibrium. Two major types of such externalities are often connected to financial crises: the collateral externality and the distributive externality.

The collateral externality arises when firms or intermediaries face financial constraints that tighten when the price of capital is depressed. As firms do not internalize that the price effect of their decisions might tighten the constraint for other agents, their individual choices might not be socially optimal. The typical picture is that the capital price in the crisis period is too low from the planner's point of view, which is consistent with socially excessive borrowing in the ex ante period. The most prominent example is when firms' debt is limited by the future value of their capital (e.g., Kiyotaki & Moore 1997, Bianchi 2011).

The distributive externality, in contrast, can be consistent with either socially too high or too low capital prices in the crisis period. The critical observation is that incomplete markets might hinder the ability of capital markets to equalize the marginal rate of substitution of different groups of agents across dates and states. For instance, a high-productivity agent might be forced to sell capital to a low-productivity agent at a price that is in between their marginal valuations of capital. Then, if the planner can modify allocations in the ex ante period to raise the transaction price in the crisis period, that would transfer resources toward the high-productivity agent raising social welfare. However, in economies where the high-productivity agent buys capital in the crisis period, the direction of the externality is reversed.

Dávila & Korinek (2018) systematically analyze the effect of collateral or distributive externalities on welfare.[3] Importantly, they point out that even if we observe fire sales and financial amplification in the crisis state, that does not imply that limiting credit in the boom phase would

[3] Several papers focus on the interaction of the collateral and distributive externalities. In an early example by Gromb & Vayanos (2002), arbitrageurs trade between segmented markets but their activity is limited by a price-sensitive collateral constraint. The authors do not internalize that the price effect of higher risk-taking both redistributes utility across the segmented markets and affects the risk-taking ability of other arbitrageurs. Depending on the relative direction and size of these forces, arbitrageurs might take on too much or too little risk. In a more recent paper (Lanteri & Rampini 2023), constrained and unconstrained firms trade old and new capital, creating an economy where the collateral and the distributive externalities have opposite sign. Lanteri & Rampini (2023) provide a proof that in the stationary equilibrium the distributive externality must be larger, leading to inefficiently high prices for the old capital.

have increased welfare. In fact, through a series of examples, they demonstrate that fire sales and financial amplification can arise in a constrained efficient economy.

A study by Lorenzoni (2008) is a well-known example of how the distributive externality can lead to inefficient credit booms.[4] The basic idea is as follows. There are high-productivity entrepreneurs borrowing from low-productivity consumers and choosing their level of investment in the ex ante period. The investment produces high output by the final period if the capital is adequately maintained. Specifically, in the interim period, a maintenance cost has to be paid proportionally to the level of capital. If the entrepreneur does not have enough cash for maintenance, she has to sell her existing capital to consumers to cover the maintenance of the remaining stock. If contracting is subject to financial constraints, this will be the case after sufficiently adverse shocks in the interim period. As consumers have a decreasing marginal product of capital, the more entrepreneurs sell, the lower the price will be. As each agent takes prices as given, entrepreneurs do not internalize that if they were to invest less ex ante, they would liquidate less in the bad state, which would increase the interim price of capital. As entrepreneurs are the sellers in the interim period, the higher price is a transfer from consumers to entrepreneurs. Because entrepreneurs' marginal product is larger, this transfer would increase total consumption. Therefore, there is inefficiently high investment and borrowing in the ex ante period.

In a model where entrepreneurs' main choice is how much liquidity to hold in order to safeguard against maintenance shocks of capital and prepare for idiosyncratic new investment opportunities, He & Kondor (2016) show that the distributive externality often changes sign over the cycle. Specifically, it simultaneously leads to overinvestment in capital in the boom phase and underinvestment in the recession phase compared with second best.

In addition, a growing literature aims to understand better why financial institutions do not share their risk exposure with the rest of the economy to a greater extent. As pointed out early on by Krishnamurthy (2003), if agents can insure against aggregate shocks, then the amplification through the collateral constraint and the collateral externality disappear. Di Tella (2017) makes a similar point with respect to continuous-time balance-sheet recession models (e.g., He & Krishnamurthy 2012, Brunnermeier & Sannikov 2014). If short-term contracts on aggregate risk are available, then the concentration of aggregate risk on intermediaries' balance sheets, and the implied balance-sheet amplification channel, can be avoided.[5] In a follow-up paper, Di Tella (2019) provides a more detailed welfare and policy assessment for these type of models. Di Tella specifies the moral-hazard problem presented by He & Krishnamurthy (2012) in terms of hidden trade: The intermediary can secretly sell part of the managed capital on the market. This point is important, because it implies that the moral-hazard problem is more severe when asset prices are higher. In that framework, Di Tella shows that even if households and intermediaries can enter into general long-term contracts, a pecuniary externality arises. The planner prefers lower asset prices to alleviate the incentive problem, leading to a looser equity constraint and a lower risk concentration on intermediaries' balance sheets, even if that leads to less investment.

Bocola & Lorenzoni (2023) argue that, through macrospillovers, the distributive externality might also be responsible for firms' excessive risk-taking in the boom period even when the space for risk-sharing contracts is complete. The argument is as follows. Suppose that in the

[4]For early studies pointing out mechanisms related to the distributive externality, see Shleifer & Vishny (1992) and Allen & Gale (1994). There is also a long tradition of related mechanisms in international finance (Caballero & Krishnamurthy 2001, 2003; Bocola & Lorenzoni 2020) and in banking (Allen & Gale 2004, 2005; Farhi, Golosov & Tsyvinski 2009).

[5]Krishnamurthy (2003) raises the possibility that limited commitment on the household side to provide this insurance is the friction that restores amplification, while Di Tella (2017) points to shocks to idiosyncratic uncertainty.

ex ante period high-productivity entrepreneurs invest in capital. In the absence of risk sharing, a sufficiently adverse capital-quality shock in the interim period, through a binding borrowing constraint, lowers entrepreneurs' investment. As a result, potentially for many periods going forward, capital accumulation is slower. The resulting lower net worth of entrepreneurs implies a contraction in economic activity and a lower wage path: the macrospillover. What if consumers and entrepreneurs can enter into risk-sharing contracts to alleviate the adverse consequences of the capital-quality shock? Naturally, consumers will ask for a high price to provide such insurance as they have to pay out exactly when their own wealth is low. Moreover, Bocola & Lorenzoni's (2023) main result is that this price is too high from a second-best perspective. The reason is that consumers do not internalize that paying out more to entrepreneurs when the shock hits, easing entrepreneurs' collateral constraint, would lead to faster capital accumulation and, consequently, higher wages in subsequent periods. As a result, production is underhedged in the decentralized equilibrium and the credit boom is too risky.

Similarly, Asriyan (2020) argues that the inefficiently high equilibrium price of insuring against aggregate shocks is responsible for the overly risky production in the boom phase. However, Asriyan traces this distortion back to the information rents of insurance sellers due to their monopoly power. As rents wash out from the planner's objective, lower rents (implying more hedging) would improve welfare.

3.3. The Aggregate Demand Externality: Prolonged Recessions Due to Nominal Rigidities

In an economy where aggregate demand affects output and there are nominal rigidities, a recession can be prolonged by an illiquidity trap (Eggertsson & Krugman 2012, Farhi & Werning 2016, Korinek & Simsek 2016, Schmitt-Grohé & Uribe 2016, Guerrieri & Lorenzoni 2017). In a study by Korinek & Simsek (2016), impatient households borrow from patient ones in the ex ante period. Then, a financial shock hits, which is represented as a binding borrowing limit in the interim period. The binding constraint requires heavily indebted households to deleverage—decrease their consumption and increase their savings to service this debt. In a frictionless economy, interest rates would drop, limiting savings and increasing consumption of unconstrained households, which would limit the reduction in aggregate demand. However, if interest rates are subject to the zero lower bound, that might not be achievable. In this version, aggregate demand affects output, because of the combination of oligopolistic competition and sticky prices on the supply side. Because of the latter, firms cannot lower prices as a response to the smaller aggregate demand. Thus, they respond by producing less, leading to a sharp drop in output.

Similar to models with distributive externalities, the resulting allocation in these models is constrained inefficient, implying overborrowing in the precrisis period. The heart of the argument is that, in the interim period, constrained borrowers have a greater propensity to consume than unconstrained lenders. Because policies that constrain borrowing in the precrisis period imply a transfer from lenders to borrowers in the interim period, they also raise aggregate demand. Larger aggregate demand implies larger output, potentially increasing welfare to all. The externality arises because borrowers in the precrisis period do not internalize that overborrowing ex ante implies a lower aggregate output ex post. Note the contrast to models with distributive externalities, which usually require incomplete markets and flexible prices; here, markets are complete, but some prices cannot adjust.

3.4. Dispersed Beliefs: Speculative Bets Between Borrowers and Lenders

When investors do not share a common prior, they act according to their belief without learning from others' actions, resulting in a form of overconfidence. Geanakoplos (2010) and, in a more

canonical framework, Martin & Papadimitriou (2022) point out that heterogeneous priors naturally lead to exaggerated boom-and-bust patterns where investors are overly leveraged in the boom period. The idea is that it is natural for the most optimistic agents to borrow from the most pessimistic and invest in the risky asset, leading to overly optimistic marginal buyers. Thus, in the boom period, asset prices are high and marginal buyers have high leverage. When a bad shock hits, the most optimistic buyers suffer capital losses disproportionally. As a result, less optimistic buyers have to take their place, depressing asset prices further and thereby aggravating the losses of the original buyers.[6]

While Dávila & Walther (2023) exogenously separate agents into lenders and borrowers, they consider a richer space of potential heterogeneity in beliefs. In particular, they focus on the differential impact of lenders' and borrowers' belief distortions for the equilibrium leverage in the economy and, consequently, for policy implications. Intuitively, if borrowers are relatively more optimistic, then they expect to repay more often, decreasing equilibrium leverage; if creditors are more optimistic, then they are willing to lend at a lower interest rate. Therefore, equilibrium leverage increases. Both scenarios tend to increase market prices and investment, leading to a boom. However, the desirability and the effect of a stricter leverage constraint critically depend on the nature of the distortion. I return to this point in Section 4.

3.5. Distorted Beliefs: Excessive Optimism and Overheated Credit Markets

An increasing number of papers argue that it is hard to rationalize the small credit spreads on risky debt in precrisis periods without evoking overoptimistic beliefs. Bordalo, Gennaioli & Shleifer (2018) introduce the notion of diagnostic expectations: the idea that a typical investor overweighs those future states that are the most similar to the current state. In practice, this leads to overoptimism in good times, which in turn leads to too much debt sold at too low spreads. Several recent studies (Gertler, Kiyotaki & Prestipino 2020a; Maxted 2023; Krishnamurthy & Li 2025) have found that incorporating diagnostic expectations into a model with a standard financial accelerator mechanism can simultaneously capture the small spreads and increased leverage in the overheated boom phase as well as the persistently repressed investment and slow growth in the subsequent downturn.

Maxted (2023) incorporates diagnostic expectations into the continuous-time model used by He & Krishnamurthy (2019), where the moral-hazard problem of financial intermediaries leads to balance-sheet amplification. Maxted highlights that the interaction of diagnostic expectations with constrained financial intermediation implies opposite short-term and long-term effects. In the short term, initial good shocks are extrapolated by diagnostic expectations, leading to overoptimism. However, extending too much credit to bad-quality projects eventually erodes the equity of financial intermediaries, constraining their issuance of debt. Maxted also emphasizes that in the recession period diagnostic expectations might lead to faster recovery. The reason is that the extrapolation of bad shocks limits banks' investment in quantity, increasing its marginal return. The increased return can lead to faster internal accumulation of net worth.

In a study by Greenwood, Hanson & Jin (2024), investors also exhibit extrapolative beliefs, but of a different type. These authors assume that investors mistakenly believe that firms' default intensity is described by a latent two-state Markov process. Therefore, when investors do not observe a default for a long period, their belief converges to the lower state, whereas observing a default makes their belief jump toward the higher state. In contrast, equity holders of firms are

[6]Simsek (2013) points out that not every type of heterogeneity inflates asset prices and raises leverage if collateral constraints are also present (for an excellent survey of the role of heterogeneous beliefs across various areas of macroeconomics, see Simsek 2021).

rational and decide to default accordingly (as in Demarzo & He 2021). Just as in Maxted's (2023) paper, overoptimism has opposite short-term and long-term effects in this framework. Initially, overoptimistic expectations delay the default of firms facing adverse shocks, because refinancing is cheap. However, by exploiting overheated credit markets they also issue more debt, which eventually leads to more default.

Note that, as Maxted (2023) points out, diagnostic expectations do not add a new source of uncertainty but only alter how existing shocks affect the economy. The result is a more parsimonious model and, potentially, a simpler solution. This model contrasts with the extrapolative expectations of Greenwood, Hanson & Jin (2024), who posit that beliefs can improve when fundamentals do not. That is, their specification adds an independent state variable: investors' belief in default intensity. Consequently, in this model there are more degrees of freedom to match stylized facts. Greenwood, Hanson & Jin (2024) argue that the additional state variable significantly helps with fitting the data.

3.6. Endogenous Information: Lax Lending Standards and the Rationalization of the Minsky Moment

Several papers posit that the information choices of lenders and borrowers are crucial determinants of the characteristics of both the credit boom and the subsequent downturn (Gorton & Ordoñez 2014, 2019; Moreira & Savov 2017; Asriyan, Laeven & Martin 2022; Farboodi & Kondor 2022, 2023; Fishman, Parker & Straub 2024). They argue that there is a Minsky moment when lenders rationally change how they learn, leading to a sudden revelation of information on the quality of credit issued during the boom phase. This revelation triggers the credit crunch.

For Gorton & Ordoñez (2014), capital of uncertain quality serves as collateral for borrowing. Lenders can decide to pay a fixed cost to learn about the quality of collateral. As long as they decide not to do so, each unit of capital can be used as collateral, resulting in extensive lending and high consumption: a credit boom. At the same time, as long as there is no learning, information depreciates and the perceived quality of the collateral slowly decreases. These authors introduce an aggregate shock that affects the perceived quality of the collateral. If the preceding boom was long, then the perceived quality due to the shock might drop sufficiently to make agents pay the cost of learning. In this case only, the aggregate shock triggers the crisis. After the resolution of uncertainty, only good-quality capital is accepted as collateral, implying less lending: a credit crunch. The longer the boom lasts, the deeper the crisis will be. Still, in this model, ignorance is bliss. Learning generally harms welfare because it reduces the stock of capital that lenders accept as collateral. Therefore, as Gorton & Ordoñez (2014) emphasize, the planner might prefer to keep the economy in ignorance to maintain higher current output, even at the cost of a potentially larger crisis in the case of an aggregate shock.

Farboodi & Kondor (2023) argue that booming periods are special not because lenders do not learn at all but rather because in these periods they learn differently. In the model, lenders distinguish good from bad borrowers on the basis of the signals they choose to obtain. In particular, they can choose between two information structures. The first represents lax lending standards, giving favorable signals about all good borrowers but also some bad borrowers. The second represents tight lending standards, giving adverse signals about all bad borrowers but also some good borrowers. The authors show that lenders optimally choose lax lending standards if and only if the pool of borrowers is of relatively good quality. They also show that as long as lending standards are lax, the average quality worsens. In the resulting economy, credit market and production fundamentals generate cycles even in the absence of shocks. Lax lending fosters investment but also leads to a gradual deterioration in loan quality during the boom, which ultimately triggers lenders to tighten their lending standards, thus turning the credit boom into a credit crunch. While tight

lending standards do slow down the economy in the short term, they also improve fundamentals in the long term. Thus, in contrast to Gorton & Ordoñez (2014), Farboodi & Kondor (2023) find that the constrained planner would typically implement an economy with alternating periods of tight and lax standards. Still, as atomistic investors fail to internalize that their choice of lending standards affects the quality of the current and future lending pool, the decentralized equilibrium often features inefficiently long booms and inefficiently deep recessions.

Asriyan, Laeven & Martin (2022) emphasize that the price of collateral can have a crucial impact on how much lenders learn about the quality of the borrower. In particular, if lenders have the choice of securing lending by collateral or lending only to projects that are screened by a costly technology, they will choose the former when the value of collateral is high. This is usually the case in booms. Just as in Gorton & Ordoñez's (2014) paper, these periods with no screening result in the depletion of the stock of information. Thus, when the price of the collateral drops and lenders switch to screening, the problem of the small stock of acceptable collateral is aggravated by the low stock of accumulated information, leading to painful recessions.

3.7. Multiple Equilibria: Bank Runs and Rollover Crises

Another way to conceptualize the abrupt turning point of booms to credit crunches is to build a theory of multiple equilibria where the system can switch from a normal state to a crunch equilibrium. This switching point would correspond to a financial panic, a bank run, or a rollover crisis (akin to Cole & Kehoe 2000) in the real world. Several papers follow this route (Angeloni & Faia 2013; Martin, Skeie & von Thadden 2014; Gertler & Kiyotaki 2015; Boissay, Collard & Smets 2016; Gertler, Kiyotaki & Prestipino 2020a, 2020b; Schmitt-Grohé & Uribe 2020; Amador & Bianchi 2024).

Gertler & Kiyotaki (2015) incorporate the possibility of multiple equilibria in a dynamic endowment economy, and Gertler, Kiyotaki & Prestipino (2020a, 2020b) extend this study to a model of production. Importantly, in these models the run equilibrium exists only when fundamentals are weak. In particular, they assume that risk-neutral bank managers choose their leverage endogenously, subject to a moral-hazard constraint. Specifically, the possibility of absconding with a fraction of their assets if their continuation value is too low imposes an endogenous constraint on how much banks can borrow from depositors. Also, banks go bankrupt if their net worth, the gross return on assets net the cost of deposits, falls below zero. Banks' net worth depends on the equilibrium price of capital, raising the possibility of multiple equilibria. In the bad equilibrium, banks default and liquidate their capital to low-productivity households. This scenario is an equilibrium if the resulting return on assets is not sufficient to pay back existing depositors. Each depositor is worried about this scenario and does not roll over its debt if she expects it to play out. In contrast, there is also a good equilibrium if the gross return on assets is larger than the cost of paying back depositors, given the equilibrium price with no defaulting banks. Thus, whether a bad equilibrium exists depends on how low the liquidation price is. It is lower when the productivity of capital is low—that is, when fundamentals are weak. It is also lower when banks' leverage is large, so they liquidate large quantities when in default. Note that each debtor is motivated to run in the bad equilibrium independently of whether other debtors do. Also, there is no strict distinction between insolvency and illiquidity. In the bad equilibrium all banks are insolvent and illiquid, whereas in the good equilibrium all are solvent and liquid.

Amador & Bianchi (2024) define a self-fulfilling rollover crisis differently. In their economy, banks default strategically whenever the punishment of being excluded from the market is smaller than the benefit of not paying back their debt. The possibility of strategic default introduces an endogenous upper limit on the leverage each bank can take. However, due to a "sunspot," potential depositors might decide not to lend to a given bank. This is a run. As the leveraged return on

banks' capital is larger than the nonleveraged return, the run might be self-fulfilling. This is the case if a bank earning the nonleveraged return will not pay back its creditors (whereas one with the leveraged return would). Now suppose that banks are subject to heterogeneous productivity shocks. Banks with the worst shocks would default even without a run; they are fundamentally insolvent. Banks with the most favorable shocks would not default even with a run; they are fundamentally safe. All banks in between will default if and only if there is a run. Amador & Bianchi (2024) also propose that the natural buyers of defaulting banks' assets are the nondefaulting banks. This observation has important policy consequences, as explained in the next section.

4. WHY SHOULD THE POLICY MAKER CARE?

The preceding section reviews various potential mechanisms behind financial crises. Understanding the various frictions and distortions that can lead to the dysfunction of credit markets is important. However, for the policy maker, the distinction among these possibilities becomes crucial only if the implied policy responses differ. This section focuses on the main differences between policy implications.

4.1. Ex Ante Regulation: The Leverage Constraint

As discussed in Section 2, the general picture is that financial crises are preceded by a period of overheated credit markets. Thus, it is not surprising that most theories of financial crisis associate the precrisis period with overborrowing, implying that limiting credit ex ante would lead to a less severe downturn when the crisis hits. However, there are various caveats to this general picture.

First, in the case of constraining credit in the boom phase, the policy maker needs to establish that there is overborrowing in a second-best welfare sense. As Sections 3.2 and 3.3 demonstrate, this is far from obvious. For instance, even if the policy maker correctly foresees that credit growth in the boom phase implies financial acceleration and fire sales in the crisis period, constraining it might still decrease welfare if financial markets are sufficiently complete (Dávila & Korinek 2018). In contrast, even when financial markets are complete, agents might still overborrow in the presence of nominal rigidities (Farhi & Werning 2016) or take on too much risk in the presence of macrospillovers (Bocola & Lorenzoni 2023).

Second, as **Figure 2** highlights, a large fraction of credit booms do not lead to a financial crisis. Constraining credit in such "good" booms is sacrificing consumption growth. The way the policy maker should think about this trade-off depends crucially on the type of theory she uses as her conceptual framework.

In models with multiple equilibria, this trade-off is explicit. Depending on the equilibrium that materializes, a given set of fundamentals might or might not lead to a financial crisis. Then, the optimal tightness of the constraint is a quantitative question, depending on the assessed frequency of a bad equilibrium realization. Gertler, Kiyotaki & Prestipino (2020b) calibrate a sunspot-type shock to replicate the empirical frequency of runs. By quantifying the cost of countercyclical capital requirements in the case in which there is no run, and the benefits when there is, they conclude that the latter outweighs the former.

In contrast, in models where the crisis happens because of an endogenous shift in information regime (e.g., Gorton & Ordoñez 2014, 2019; Asriyan, Laeven & Martin 2022; Farboodi & Kondor 2022, 2023), the difference between bad booms and good booms boils down to fundamentals. For instance, in the good booms studied by Gorton & Ordoñez (2019), sufficiently fast productivity growth in new projects implies low default rates, so that capital with average quality is sufficient to collateralize credit for these new projects. These authors argue that a distance-to-default type of measure might distinguish between good and bad booms.

Instead, for Farboodi & Kondor (2023), both good booms, where lending standards switch in line with the constrained planner's problem, and bad booms, where lending standards are implied by the decentralized equilibrium, are followed by a downturn. However, in the decentralized equilibrium booms are inefficiently long, and the subsequent downturn is inefficiently deep because private incentives for lax lending standards differ from their social counterpart. That is why, in this economy, regulating lenders to tighten lending standards when the quality of their loan book is too low would improve welfare.

Third, different distortions might require different ex ante policies. For instance, Bocola & Lorenzoni (2023) emphasize that a general constraint on borrowing in booms might be suboptimal if, as in their model, the main symptom of fragility is excessive risk-taking as opposed to excessive borrowing. They show that the planner should limit borrowing specifically against states where the collateral constraint will bind the most when the crisis hits. Doing so not only limits risk-taking in general but also reduces financial amplification in case of a crisis. Such a policy can be implemented by a risk-weighted constraint on the issuance of debt.

Turning to distorted beliefs, Maxted (2023) warns that when overoptimistic expectations drive asset prices in the boom period, the health of intermediaries' balance sheets evaluated at those prices might be misleading in terms of the real fragility of the economy because, in these periods, financial institutions tend to invest in overvalued assets and lend at overly low spreads. If expectations are diagnostic, then a series of bad shocks will lead to a sharp change in asset prices, and, consequently, an abrupt deterioration of the balance sheet.

In contrast, Dávila & Walther (2023) argue that whether the policy maker should tighten leverage constraints in a boom with overoptimistic agents depends on which side of the credit market exhibits overoptimism. In particular, stricter leverage constraints improve welfare when lenders become overoptimistic. However, when the irrational exuberance is on the borrowers' side, the constrained planner would often like to encourage leverage rather than constrain it.

4.2. Ex Post Regulation: Bailouts and Stimuli

In the crisis period, almost by definition, some agents are constrained in their consumption, investment, and/or borrowing. Thus, if the planner can ease those constraints ex post, welfare tends to increase. However, again, depending on the underlying distortion, there are crucial details to consider.

First, tracing back a crisis episode to a particular distortion can help pin down the most efficient direction of intervention. For instance, in case of a recession due to demand externalities, a dollar in the hand of the agent with a high propensity to consume is more useful in boosting demand. In contrast, Geanakoplos (2010) points out that when the extensive collapse of asset prices is due to speculation with heterogeneous beliefs, easing the constraint of more optimistic agents helps asset prices recover faster.

Amador & Bianchi (2024) emphasize that in their economy where a fraction of banks might default either because they are fundamentally insolvent or because of a run, deciding on the beneficial ex post intervention can be more subtle. In particular, to proxy for quantitative easing–type policies, they consider the effect of a policy maker purchasing capital to raise depressed asset prices when the crisis hits. Recall from Section 3.7 that in this economy, when some banks default, the nondefaulting banks are the natural buyers of the liquidated assets. Then, the effect of the proposed policy is the opposite, depending on whether the crisis is driven by a run. The reason is that raising the capital price is a transfer from buyers to sellers. When the crisis is due to a run, the bank that survives tends to sell assets in order to raise enough cash to cover deposits. When the crisis is due to fundamentals, the surviving banks are healthy and buy assets from the fundamentally insolvent ones. Raising capital prices by asset purchases is a welfare-improving policy only in the

earlier case, when it helps fundamentally solvent banks liquidate less. In the latter case, it decreases the welfare of solvent banks and helps some insolvent banks survive, which reduces welfare.

Second, unless ex post policies are fully unexpected, they interact with ex ante incentives. The basic idea that ex post bailouts imply too much ex ante risk-taking through moral hazard is well-known. However, careful modeling can help with the nuances.

Bianchi (2016) focuses on the efficiency of a bailout policy in a quantitative model with a collateral constraint and an equity constraint. In this model, the main pecuniary externality stems from the fact that firms' hiring policies raise wages for the other firms, reducing profits and limiting investments when the equity constraint binds. He argues that ex post bailouts can improve welfare if they are used only in systematic financial crises. In this case, the moral-hazard problem is minor because individual decisions have little effect on the aggregate state of the economy. Thus, the ex post benefits dominate the ex ante costs.

In a similar spirit, Jeanne & Korinek (2020) consider a standard model with collateral externalities that lead to financial amplification ex post and overborrowing ex ante. They consider the choice and interaction of the ex ante policy of restricting leverage and the ex post policy of providing liquidity. They emphasize two lessons beyond the usual consideration of moral hazard. First, ex post liquidity provision limits the need for liquidity constraints, but it does not completely eliminate it as long as providing liquidity is costly. Second, if an unregulated shadow banking sector exists, restricting leverage in the regulated sector artificially increases the role of the former. Therefore, it is optimal to commit to less generous liquidity provision with a combination of less strict leverage constraints in order to limit this effect.

5. CONCLUSION

While financial crises are rare, their power of disruption has placed them at the forefront of academic research and policy discussions alike. With the benefit of hindsight, researchers have identified several common traits.

In this review, I have highlighted recent developments on the theoretical side of this literature, grouping and summarizing papers on the basis of their main insights. I have focused on a selective list that, quite subjectively, I feel has the potential to have the greatest influence on the discussion.

However, it is clear that this field of research is a moving target. As economies develop, the regulatory system changes, and global interactions strengthen, the root of the next global financial crisis might well be somewhere we are not yet looking. For this reason, the development of new, creative, and forward-looking theoretical research that identifies potential vulnerabilities and understands their policy implications is crucial for the future stability of the world economy.

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