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Dealing with Financial Crises: How Much Help from Research?

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Abstract

Has economic research been helpful in dealing with the financial crises of the early 2000s? On the whole, the answer is negative, although there are bright spots. Economists have largely failed to predict both crises, largely because most of them were not analytically equipped to understand them, in spite of their recurrence in the last 25 years. In the pre-crisis period, however, there have been important exceptions – theoretical and empirical strands of research that largely laid out the basis for our current thinking about financial crises. Since 2008, a flurry of new studies offered several different interpretations of the US crisis: to some extent, they point to potentially complementary factors, but disagree on their relative importance, and therefore on policy recommendations. Research on the euro debt crisis has so far been much more limited: even Europe-based researchers – including CEPR ones – have often directed their attention more to the US crisis than to that occurring on their doorstep. In terms of impact on policy and regulatory reform, the record is uneven. On the one hand, the swift and massive liquidity provision by central banks in the wake of both crises is, at least partly, to be credited to previous research on the role of central banks as lenders of last resort in crises and on the real effects of bank lending and monetary policy. On the other hand, economists have had limited impact on the reform of prudential and security market regulation. In part, this is due to their neglect of important regulatory choices, which policy-makers are therefore left to take without the guidance of academic research-based analysis.

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Table of contents

1. *Introduction*
 2. *Forecasting*
 3. *Analysis*
 - 3.1. Before the crisis: helpful ideas?
 - 3.2. During the crisis: interpretations
 - 3.3. How much attention has research devoted to the US and European crises?
 4. *Contributions to policy*
 - 4.1. Monetary policy
 - 4.2. Prudential regulation
 - 4.3. Rating agencies and security market regulation
 - 4.4. Uncharted waters
 - 4.4.1. Implementing macro-prudential policies
 - 4.4.2. Structural reform of banks
 - 4.4.3. Regulating banks' sovereign exposures
 5. *Conclusions*
- References*
- Appendix*

1. Introduction

How helpful has research by economists been in dealing with the two most recent financial crises – the 2007-09 US-originated crisis and the subsequent euro-area debt crisis? In principle, economists could have helped in three ways: first, by forecasting these crises, not just in terms of timing but also of magnitude, propagation and persistence; second, by providing analytical tools to understand and study them; third, by advising policy-makers and regulators on exit strategies and ways to avoid or mitigate future crises. This paper argues that, regrettably, to this date the record has been rather disappointing on each of these three dimensions.

Almost no economist saw either of the two crises coming. This is largely because the majority of economists was not analytically equipped to understand financial crises, in spite of their recurrence in the last 25 years. However, there were a few bright spots in research in the pre-crisis period – theoretical and empirical work that largely laid out the basis for our current thinking about financial crises.

Since 2008, a flurry of new studies has offered several distinct interpretations of the US crisis: to some extent, the factors they identify are complementary, but there is still no consensus on their relative importance, and therefore on policy recommendations. Research on the euro debt crisis has so far been much more limited: even Europe-based researchers – including CEPR ones – have often directed their attention more to the US crisis than to that occurring on their doorstep.

In terms of the impact of research on policy and regulatory reform, the record is uneven. On the one hand, the swift and massive liquidity provision by central banks in the wake of both crises is, at least partly, to be credited to previous research on the role of central banks as lenders of last resort in crises and on the real effects of bank lending and monetary policy. On the other hand, economists have had limited impact on the reform of prudential and security market regulation. In part, this is due to their neglect for important regulatory choices, which policy-makers are taking without the guidance of solid research-based analysis.

2. Forecasting

The failure to see the approaching tsunami – and even to appreciate its magnitude once it started – has been a common indictment of economists in the media, and is acknowledged also within the profession. In the words of Luigi Spaventa (2009): “were economists aware that the financial system was on an unsustainable path that would eventually lead to a crisis? Broadly speaking, they were not, as also shown by how long it took many to understand what was going on even after the crisis started.”

There are easy objections that can be raised to this criticism. First, politicians, bankers and entrepreneurs were caught by surprise no less than economists. Moreover, economics is not just (or even mainly) about prediction, and in any event crises are rare episodes, like earthquakes, and as such they are hard to predict: indeed, it is not uncommon for seismologists to fail predicting the timing, epicenter and magnitude of earthquakes.

Both of these arguments appear reasonable, yet both are at best a weak defense. First, by their very training and mission, economists should be better equipped to foresee such events than business practitioners, in terms of both modelling skills and econometric tools. Second, even though financial crises are relatively uncommon events, they have been far from infrequent since the late 1980s, with

most of them originating in developed countries: a probably incomplete list includes the 1987 stock market crash, the 1989–91 Savings & Loan crisis in the United States, the 1990 Japan asset price bubble collapse, the Scandinavian banking crisis in the early 1990s, the 1994-95 Mexican crisis, the 1997-98 Asian crisis, the 1998 Russian crisis and the related LTCM collapse, and the 2000-01 burst of the dotcom bubble.

Even more importantly, there are regularities to the occurrence of financial crises, to their causes and effects that could have been exploited in their prediction, as shown by Reinhart and Rogoff (2009) in their already classic book *This Time is Different: Eight Centuries of Financial Folly*: they canvas a huge amount of historical data, documenting that the 2007 subprime crisis was neither unprecedented nor extraordinary when compared to past history, and that many previous crises have been preceded by housing bubbles and abnormal expansions of the finance industry.

Indeed recent research, largely conducted by researchers at the Bank of International Settlements (BIS), has shown that an abnormally large private credit/GDP ratio and asset price growth predict financial unbalances and subsequent crises, even out of sample. For instance, Borio and Drehmann (2009) show that the best indicators take the form of joint deviations of credit and asset prices, especially housing prices, from historical trends, and would have predicted the build-up of risks in the United States and elsewhere by the mid-2000s. Good leading indicators can be constructed even from credit data alone, as shown by Jordá, Schularick and Taylor (2011) and Drehmann, Borio and Tsatsaronis (2011).

Essentially, the predictive failure of economists was not due to a minor misspecification of their typical models, but by the fact that those models neglected the mechanisms that produce financial crises. It was this neglect that blinded economists and induced them to overlook altogether variables that could act as leading indicators of financial instability. The prediction error was rooted in a fundamental analytical deficiency, to which I turn next.

3. Analysis

In the early 2000s, most research in finance (especially in asset pricing) was silent on bubbles and crises, especially on their relationship with credit, monetary policy, financial innovation and prudential regulation, in spite of the increasing frequency of bubbles and crises in previous years. And most research in macroeconomics, especially that based on dynamic stochastic general equilibrium (DSGE) models, had no role for financial markets, in stark contrast with the approaches by the macroeconomists of the 1960s and 1970s such as Franco Modigliani and James Tobin, where the interplay between real and financial markets played a key role. Since their time, financial economics and macroeconomics had grown into two largely separate tribes, with very limited dialogue.

However, there were at least four important exceptions: even before the recent crises, sometimes long before them, a minority of economists had been working out ideas and models that would turn out to be useful to analyze the turbulence of the 2000s, and actually provided the essential starting point to understand it.

3.1. Before the crisis: helpful ideas?

The first exception was the strand of research that views markets as often driven by the **irrational beliefs** of investors, a view that goes from Keynes' "animal spirits" to Shiller's "irrational exuberance", Shleifer's "limits to arbitrage", and lately the growing "behavioral finance" literature. In the *General*

Theory, Keynes (1936) already warned that financial markets may encourage short-term speculation rather than sound investment choices based on firms' long-term prospects. Keynes' viewpoint was echoed by several later researchers, such as Robert Shiller, who since the 1980s has argued that stock and housing prices are often propelled by fads, causing bubbles and crashes, and Andrei Shleifer, who has argued that rational investors may be unable (and in some cases unwilling) to correct the mispricing of financial assets induced by irrational traders. The financial crises of recent decades have spawned an expanding literature that subscribes to this view, known as "behavioral finance".

A second exception is the strand of research that sees bankers and asset managers as having **excessive risk-taking incentives** as the result of contractual relationships and misguided regulation. One needs to look no further than the classic texts by Freixas and Rochet (1994) and Dewatripont and Tirole (1994) to see that research in banking has seen clearly that banks have the incentive to take excessive risk with depositors' money, due to deposit insurance and to lack of monitoring by dispersed, uninformed depositors. The need to contain this incentive has provided the rationale for the "micro-prudential regulation" of banks. The limitation of this literature is its partial equilibrium nature, which has prevented it from seeing that the risk-taking incentives of banks can also lead them to take correlated bets and that their interlocking balance sheets can lead individual defaults to create domino effects – in other words, has stopped it short of analyzing "systemic risk".

A third, related strand of research has made precisely this further step forward, taking a **general equilibrium** approach to crises: Allen and Gale (2000a, 2000b), Freixas, Parigi, and Rochet (2000) and Rochet and Freixas (2004) modeled the systemic risk arising from chain reactions of defaults, and the need for liquidity provision by a "lender of last resort". These contributions have laid out some of the intellectual foundations of the "macro-prudential regulation", highlighting the need to intervene with economy-wide or sector-wide policies to address systemic instability.

A fourth strand of research, which in the past decades resisted the divorce between finance and macroeconomics, is that on the credit channel and the **financial accelerator**. Bernanke and Gertler (1989), Gertler (1992), Gertler and Gilchrist (1994), Greenwald and Stiglitz (1993), Hoshi, Kashyap and Scharfstein (1991) and others have documented that bank lending and collateral price changes affect the investment of financially constrained firms. Their insights about the financial accelerator have later been developed by Kiyotaki and Moore (1997) into a general equilibrium theory of credit cycles. The basic idea in this line of research is that, due to asymmetric information in the credit market, firms' ability to borrow depends on the market value of their collateral, so that a drop in asset prices deteriorates their borrowing capacity and forces them to cut back on investment; the resulting slowdown in economic activity reduces asset prices further. This generates a feedback loop of falling asset prices, deteriorating balance sheets, tighter credit and slowdown in real activity. Hence, even a small change in financial asset prices may produce a large recession or boom in the economy. This amplification mechanism is made even more powerful by the fact that changes in asset prices also affect the net worth of banks' equity, and thereby their lending capacity to firms.

3.2. During the crisis: interpretations

The US subprime crisis has been a potent wake-up call for the economic profession. Indeed so potent that it has generated a number of different interpretations of the facts, as documented by the excellent survey by Andy Lo (2012) of books published on the topic. To some extent, the variety of interpretations reflects the complexity of the crisis, where a variety of concomitant factors have

interacted and concurred to the propagation of the initial shock. As we shall see, economists have devoted far less attention to the euro-area crisis, which is even more complex than the US-born crisis that preceded it, since it involves not only distressed banks and collapsing asset prices but also distressed sovereigns, and the interplay between them.

Schematically, economists have highlighted no less than seven distinct causes of the subprime crisis:

1. The simplest view – close to Keynes’ “animal spirits” idea – identifies the source of the crisis with the **irrational beliefs** about the future held by investors, especially in the housing market: the basic idea is that these beliefs generated herd behavior in borrowing, and banks accommodated them by expanding credit on the back of persistent house price increases (Shiller, 2008).
2. A number of researchers blame **monetary policy** for being “too lax for too long”, especially in the mid-2000s: there is considerable evidence that the low interest rates encouraged banks to make larger and riskier bets in the “search for yield” both in lending and in proprietary trading. For instance, Dell’Ariccia, Igan, and Laeven (2012) document that prior to the subprime mortgage crisis the rapid expansion of credit went hand-in-hand with declining lending standards. Maddaloni and Peydró (2011) analyze the determinants of banks’ lending standards in the euro area, and show that low short-term interest rates softened lending standards for businesses and households alike, especially when kept persistently low. Jiménez, Ongena, Peydró and Saurina (forthcoming) use data on loan contracts and applications from Spain’s credit register since 1984, to distinguish the changes due to the composition of credit supply from those arising from changes in demand, and find that lower overnight interest rates induce less capitalized banks to expand credit to riskier firms, decrease the frequency with which they terminate loans to risky firms, and make them more likely to extend longer and larger loans to risky new applicants.
3. Other researchers point to **financial innovation** as a key determinant in the huge credit expansion during the run-up to the crisis: a variety of unregulated intermediaries managed to secure massive funding by issuing asset-backed securities (ABS) rather than by taking customer deposits (Pozsar, Adrian, Ashcraft and Boesky, 2010). These unregulated “shadow banks” created a more direct link between asset prices and credit than had existed in commercial banking: the rise in asset prices increased these intermediaries’ net worth, with very large multipliers owing to their very high leverage, thus enabling them to expand their balance sheets; this put additional upward pressure on asset prices, further increasing the net worth and balance sheets of intermediaries (Adrian and Shin, 2010). The same mechanism operated in reverse when housing and security prices started to decline in 2007. The violence of the crisis was aggravated by the freeze of ABS markets, in turn due to the opacity of the pre-crisis securitization process: as soon as asset prices started dropping, the markets for ABS froze because most investors had little idea of their riskiness and feared to be at a disadvantage in trading them (Gorton, 2008, 2010; Pagano and Volpin, 2012). Adverse selection created tensions also in interbank markets, where unsecured rates rose persistently above secured rates, as each bank had little idea of how many “toxic assets” other banks held and was afraid of lending unless protected by collateral (Heider and Hoerova, 2009).
4. The **conflict of interest** pitching banks and rating agencies against investors distorted or clouded the information provided to investors, which may also have contributed to pre-crisis underpricing of risk. Stiglitz (2010) traces the increased pervasiveness of these conflicts of interest to the wave of pre-crisis deregulation. The very growth of ABS issuance probably made it harder for credit rating agencies to resist opportunistic behavior, namely, induced them to lower their standards in

order to attract issuers (Pagano and Volpin, 2010). In fact, there is evidence that the ratings actually assigned to CDOs were more favorable to issuers than those that would have resulted from the agencies' own models (Griffin and Tang, 2012).

5. Many argue that the excessive risk-taking by banks before the crisis was due to the **bailout guarantees** offered explicitly or implicitly by governments and by monetary policy. For instance, Acharya, Richardson, van Nieuwerburgh and White (2011) point out that government-sponsored enterprises (GSEs), such as Fannie Mae and Freddie Mac, could participate to securitizations as publicly-traded companies but kept the privileges arising from their federal charters, so that investors believed them to be guaranteed by the US government, a belief that eventually proved to be right. This contributed to GSEs taking enormous risks. Also the expectation of post-crisis monetary accommodation may have contributed to this moral hazard problem – the so-called “Greenspan put” modelled by Fahri and Tirole (2012): collectively, banks have the incentive to indulge in excessive lending if they expect to be saved by lax monetary policy in case of distress; in turn, their expectation makes monetary accommodation optimal, ex post. The final outcome is undesirable monetary accommodation, too much lending and excessive risk-taking.
6. Others trace the origin of the crisis to the **political economy of financial regulation**. Johnson and Kwak (2010) point to the interconnection between financial and governmental elites in the US as the source of weak regulatory oversight, and Rajan (2010) highlights that US governments of all stripes backed the expansion of the role of Fannie Mae and Freddie Mac in the securitization process as a way to broaden homeownership and thus attract political support from the middle class. Similar instances occurred in Europe. For instance, Benediktsdottir, Danielsson and Zoega (2011) describe how politicians provided essential support to the transformation of Iceland from a tiny fishing and aluminum-producing economy into an international banking platform, just in time to be a protagonist in the debt expansion and asset price bubble of 2003-07 and the subsequent collapse. The government provided key implicit support to the Icelandic banks' record borrowing in 2004-05, enabling them to access cheap, abundant international funding; and politicians failed to equip their fledgling financial center with adequate supervisory authorities. Another example is that of Spain: the huge capital inflow into Spain prior to the crisis was mediated by a power bloc of managers of the savings banks (*cajas*), regional politicians and real estate developers, reciprocally supporting each other with favors and easy credit. They channeled massive amounts of credit into real estate, generating the housing bubble and substantial bad loans: Cuñat and Garicano (2009) show that the *cajas* whose chief executives had no banking experience, no graduate education but strong political connections extended more loans to real estate developers and fared substantially worse than other banks both before and during the crisis.
7. To some, **international macroeconomic imbalances** were a key determinant of the subprime crisis: a saving glut from developing countries, especially China, fostered demand for safe assets in developed markets, to which US financial intermediaries tried to cater by securitizing increasingly large and risky pools of loans (Reinhart and Rogoff, 2009; Caballero, Farhi and Gourinchas, 2008).

Clearly, several of these interpretations of the financial crisis may be complementary or causally related to each other. For instance, political economy factors can explain, at least partly, the leniency of the pre-crisis monetary policy, financial deregulation, and public bailout guarantees. Similarly, international imbalances may have contributed to financial innovations aimed at producing synthetic safe assets. And the process of securitization has grown on the back of the underpriced guarantees offered by GSEs in the US, as well as of the leniency of credit rating agencies. Thus, eventually each of

these interpretations may hold a portion of the truth: the daunting (and so far unsolved) problem is to establish the relative importance of these various determinants of the crisis.

The same problem arises with respect to the euro debt crisis, where it is actually compounded by the fact that the list of likely determinants also includes governments' fiscal solvency problems and the risk of collapse of the monetary union. Unfortunately, less progress has been made in the analysis of the euro crisis, not only because of its greater complexity but also because it has received far less attention by researchers than the US subprime crisis of 2007-09: more on this below.

3.3. How much attention has research devoted to the US and European crises?

Interestingly, many of the new ideas about systemic risk, its measurement and the policies to control it have come from researchers working in central banks (especially the New York Fed and the European Central Bank) and international institutions (chiefly the IMF and the BIS), who were on the front line facing the tsunami and had faster and better access to relevant data, so that they could better understand its magnitude and mechanisms. Moreover, contributions from academics have not come from researchers in mainstream finance or macroeconomics, but mainly from a small group of researchers in the fields of financial intermediation or economic theory (such as Viral Acharya, Franklin Allen, Markus Brunnermeier, Martin Hellwig, Jean-Charles Rochet, Hyun Song Shin, Jean Tirole), who were both prepared and inclined to cross "received boundaries" between finance and macroeconomics.

Around 2008, research refocused quickly on the crisis, both in the US and in Europe: this is illustrated not only by the brief survey in the previous subsection, but also by the data shown in Figure 1 and in Table 1. The red line in Figure 1 is the 3-months moving average of the fraction of CEPR Discussion Paper (DPs) dealing with crisis-related issues (broadly defined) within the Financial Economics Series between 2000 and 2013. The green line in the figure does not include in this indicator DPs co-authored by Viral Acharya, current Director of the CEPR research program in Financial Economics: this alternative measure may provide a more robust measure of the attention devoted by Europe-based researchers to the crisis, as Acharya – a leading researcher on financial instability – is currently based in the US; however, it should be noticed that several of his papers are co-authored with Europe-based researchers. Interestingly, starting from late 2008, the date of the Lehman collapse, the fraction of crisis-related DPs more than doubled from its 5% pre-crisis level: between January 2009 and December 2013, its average was 13% without counting DPs co-authored by Acharya and 17% including them.

A similar level of attention to the crisis is found on the other side of the Atlantic: column 1 of Table 1 shows the fraction of crisis-related articles published in the *Journal of Finance (JF)* in 2011, 2012 and 2013. These figures are of the same order of magnitude as the yearly averages of the percentage of crisis-related papers in the CEPR DP series in Financial Economics shown in column 2. Of course, in drawing a comparison, one should consider that a paper accepted by the *JF* is typically published a couple of years after submission, while publication in the CEPR DP series is almost immediate: hence the *JF* figure for 2013 is probably to be compared with the 2011 figure for CEPR DPs.

However, what is striking is that, even in Europe, so far most of the research on the crisis has been US-oriented: as shown by the data in column 3 of Table 1, the fraction of CEPR DPs in Financial Economics devoted to the euro debt crisis was only 5% in 2011, 6% in 2012 and rose to 8% only in 2013, so that it ranges approximately between 1/3 and about 1/2 of the total number of crisis-related

papers. Equally striking is the paucity of CEPR DPs dealing with the issue of financial integration, as shown by the fourth column of Table 1: yet, financial integration has acted as one of the channels of propagation of the crisis, especially in Europe, international capital flows in the euro area being associated with abnormal expansions of credit and housing market bubbles, especially in Ireland and Spain (Lane, 2013, and Lane and McQuade, forthcoming); and the crisis has been associated with a sharp decrease in the degree of euro-area financial integration.

One can think of three possible reasons for the low attention paid by Europe-based economists to the euro debt crisis and its specificities, such as the feedback loop between bank and sovereign distress and the role of international financial integration: first, the dominance of US journals probably induced also Europe-based researchers to focus on the US crisis, hoping to publish their results on more prestigious outlets and to build on previous research published there; second, data on European financial markets and banks may be of lower quality, less homogeneous or harder to access than US data, due to the fragmentation of data sources across national boundaries; (iii) the euro-area crisis started two years after the US crisis, and may not even be entirely over, so that a certain time lag may be natural. The situation may in fact be about to reverse, since currently the number of papers on the euro-area crisis is escalating rapidly.

4. Contributions to policy

The policy contributions produced by economists since the inception of the subprime crisis have been as many and varied as their interpretations – indeed far too many to attempt a complete list and *a fortiori* a thorough analysis. So here I will just touch on a few of them. As will be seen, their impact on policy and regulation has been uneven: stronger on the immediate monetary policy response, much more limited on prudential and security market regulation.

4.1. Monetary policy

Straight from the start of the subprime crisis, the Federal Reserve, the European Central Bank (ECB) and the Bank of England have engaged in massive provision of liquidity to banks, greatly expanding the range of collateral that they were ready to accept from them. This readiness of central banks to intervene as lenders of last resort prevented a widespread collapse of financial intermediaries and a disastrous depression of the real economy on the scale of the Great Crisis in the 1930s. To some extent, their readiness probably arose from the insights provided by economic research about the essential role of the lender of last resort in financial crises and on the real effects of bank lending and monetary policy outlined in Section 3.1. It is no coincidence that one of the main contributors to that literature, Ben Bernanke, has been at the helm of the Federal Reserve throughout these turbulent years.

4.2. Prudential regulation

Many of the policy prescriptions put forward by financial economists in the wake of the financial crisis have been directed at reducing the excess risk-taking incentives of banks, for example suggesting:

- (i) tighter capital requirements (Admati, DeMarzo, Hellwig and Pfleiderer, 2010; Admati and Hellwig, 2013), especially for systemically relevant banks (Korinek, 2011), not only to reduce their risk taking, but also raise their ex-post capacity to absorb losses;
- (ii) removal of the US government guarantees to Fannie Mae and Freddie Mac (Acharya, Richardson, van Nieuwerburgh and White, 2011);
- (iii) reduction of bank managers' risk-taking incentives (Rajan, 2005; Bebchuk and Spamann, 2010; Acharya, Pagano and Volpin, 2013);
- (iv) macroprudential policies directed at mitigating the buildup of systemic risk, such as countercyclical capital buffers or taxes on systemically relevant banks (Gersbach and Rochet, 2012; Jeanne and Korinek, 2012, Korinek, 2011; Martinez-Miera and Suarez, 2013, among others).

Some progress is indeed being made on banks' prudential regulation. With the introduction of Basel III, capital ratios are being increased, and additional capital requirements are being imposed on systemically important banks. Even though persistent reliance on internal-risk-based models may enable banks to water down stricter capital ratios, the problem should be at least partly corrected by the concomitant requirement of a maximum leverage ratio. Progress has been slower so far on the macro-prudential front: for instance, in the euro area the legal framework of macro-prudential policy instruments has been put in place only since mid-2013 with the enactment of the EU Capital Requirement Directive IV (CRD 4) and the Capital Requirements Regulation (CRR), while the actual implementation of macro-prudential instruments is still under way (more on this below).

4.3. Rating agencies and security market regulation

Other proposals by economists have been aimed at removing some of the market failures that led to the dissemination of biased or insufficient information to investors, and thus contributed to security market freezes:

- (i) remove "rating shopping" by issuers, namely, their ability to obtain several ratings for their securities and to report them selectively (Bolton, Freixas and Shapiro, 2012);
- (ii) transform rating agencies' from the "issuer-pays" to the "investor-pays" model (Pagano and Volpin, 2010);
- (iii) increase the transparency of the securitization process (Pagano and Volpin, 2012);
- (iv) increase trading transparency of over-the-counter markets (where typically derivatives and fixed-income securities are traded) and move them to centralized clearing (Acharya and Bisin, 2011).

In these areas, progress has been much more limited. The regulatory framework of credit rating agencies is largely unchanged, except for a reduction in the degree of regulatory delegation in banking and asset management: regulators have tried to reduce the extent to which prudential rules are based on ratings, so as to limit rating agencies' regulation-based rents and the resulting conflicts of interest, and also to induce investors to rely less on ratings and more on their own assessment of risks.

In security market regulation, part of the post-trading activity on over-the-counter markets (OTC) is being moved to centralized clearing. Moreover, in the United States the Dodd–Frank Act has imposed a ban of proprietary trading by US commercial banks (the “Volcker Rule”) to prevent them from taking bets in securities market with the safety net of publicly funded deposit insurance and implicit bailout guarantees. However, a number of exceptions to this ban were included in the regulations implementing it, in order to allow banks to keep performing a market-making role in securities markets. On the whole, on this front the regulatory response to the crisis has been much more modest than the response to the Great Crisis of the 1930s, which led to the Glass-Steagall Act, namely, the complete separation of commercial and investment banking.

4.4. Uncharted waters

The policy impact of economic research has also been limited by the fact that academic researchers have largely neglected some issues that are currently central to policy. Three examples here are (i) the implementation of macro-prudential policies, (ii) structural reform of banking, and (iii) the regulation of the sovereign exposures of banks.

4.4.1. Implementing macro-prudential policies

Although monetary policy is by now widely agreed to be a highly effective crisis-management policy instrument, it is increasingly clear that on its own it is not sufficient to prevent the buildup of financial imbalances: to that purpose, it must be complemented by macro-prudential policy instruments (e.g. countercyclical capital buffers, sector-specific capital buffers, LTV ratios in housing loans, capital surcharges for systemically important institutions, etc.), to be activated to correct financial imbalances when these are still building up.

Unfortunately, so far research has been largely silent on the effects of macro-prudential tools, on the complementarity or substitutability among them, and most importantly on how they should be coordinated with monetary policy. This is particularly important in the context of the euro area, where systemic issues may arise in a single country or in a group of countries: insofar as country-specific macro-prudential policies can address such issues, they may buy precious degrees of freedom for euro-area monetary policy. On these important issues, policy-makers are proceeding in a vacuum: they have little data to count on from past use of macro-prudential tools, and (so far) virtually no models from researchers to help assess when to trigger which macro-prudential policy instrument, how to combine these instruments, whether and how their enactment should be coordinated with the monetary policy stance, etc.

4.4.2. Structural reform of banks

A second hot policy issue on which research has been silent is structural reform of the banking system aimed at reducing the exposure of banks to security price risks, and especially their derivatives exposure, which keeps posing a very large threat to the systemic stability of the banking system. Some EU Member States have studied measures inspired by policy proposals advocating ring-fencing (Liikanen, Vickers) or full legal-entity (Volcker) separation. On 29th January 2014, the EU Commission published a proposal for a regulation implementing some of the recommendations of the Liikanen report. These proposals might reduce both the size of the largest banks and their risk-taking in

securities markets, by decreasing intra-group subsidies to securities trading activities within complex banking groups. Needless to say, these proposals meet with considerable hostility by bankers, and are far from being unanimously supported by the regulatory community. On this all-important policy issue, academic research is virtually silent.

4.4.3. Regulating banks' sovereign exposures

A third under-researched area is the regulation of the sovereign exposures of banks. Their exposure to high-yield, high-risk sovereign debt has contributed to the “diabolic loop” between sovereigns and banks, which is the hallmark of the euro debt crisis: drops in the price of sovereign debt lower the equity value of banks with large exposures, threatening their solvency, and this induces investors to expect governments to bail them out, which in turn exacerbates stress in sovereign debt markets.

One reason why euro-area banks have accumulated large positions in high-yield sovereign debt, especially in periphery countries, is that this has allowed them to engage in “carry trades” to earn the large margin between sovereign yields and their funding cost, kept low by their ability to borrow from the ECB (Acharya and Steffen, 2012; Battistini, Pagano and Simonelli, 2013). Discouraging such potentially destabilizing carry trades would require revising the prudential regulation of banks' sovereign exposures in the euro area, by scrapping the current preferential treatment of sovereign exposures: currently, euro-area banks face no capital requirement (a “zero risk weight”) for sovereign holdings of euro-area sovereign debt, irrespective of its issuer; moreover, sovereign holdings are exempted from the “large exposures regime”, which limits exposures to a single counterparty to a quarter of banks' eligible capital.

In principle, such carry trades can be discouraged either by imposing positive risk weights on sovereign debt in computing banks' prudential capital ratios or by setting limits to their exposure towards each single sovereign issuer, hence requiring them to diversify their sovereign portfolios. Each of these two choices is not without problems: on one hand, the responsiveness of banks' portfolio choices to the level of risk weights on sovereign exposures is unknown, and in practice may be quite low in the presence of very profitable carry trades, so that risk weights could prove ineffective; on the other hand, setting limits to exposures vis-à-vis each single sovereign issuer would require most euro-area banks to undertake very substantial portfolio adjustments, which may result in gyrations in relative yields in the euro-area sovereign debt market. Research has so far little to say about which option is to be preferred.

5. Conclusions

Economists often complain about the failures of regulation, blaming regulators for being slow to spot new problems and adapting the rules of the game (“fighting the last war”), and for being politically captured by lobbies. These complaints are often warranted, especially in financial regulation, which deals with a sector that features fast-paced innovation and can mobilize huge resources to lobby regulators.

However, the experience of the financial crises of the 2000s suggests that we economists deserve much blame ourselves for being slow at spotting the seeds of the crisis and for failing to reach an agreed account of its mechanisms, let alone agreed policy responses. Even currently, we are leaving policy makers in a void on key regulatory issues, especially in Europe.

References

- Acharya, Viral V., and Alberto Bisin (2010), "Counterparty Risk Externality: Centralized Versus Over-The-Counter Markets," unpublished manuscript.
- Acharya, Viral V., Matthew Richardson, Stijn van Nieuwerburgh, and Lawrence J. White (2011), *Guaranteed to Fail: Fannie Mae, Freddie Mac, and the Debacle of Mortgage Finance*. Princeton, NJ: Princeton University Press.
- Acharya, Viral V., Marco Pagano, and Paolo Volpin (2013), "Seeking Alpha: Excess Risk Taking and Competition for Managerial Talent," NBER Working Paper No. 18891.
- Acharya, Viral V., and Sascha Steffen (2012), "The 'Greatest' Carry Trade Ever? Understanding Eurozone Bank Risks," New University Working Paper.
- Admati, Anat R., Peter M. DeMarzo, Martin F. Hellwig and Paul Pfleiderer (2010), "Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity is Not Expensive," Stanford University Working Paper.
- Admati, Anat R., and Martin F. Hellwig (2013), *The Bankers' New Clothes: What's Wrong with Banking and What to Do about It*, Princeton University Press.
- Adrian, Tobias, and Hyun Song Shin (2010), "The Changing Nature of Financial Intermediation and the Financial Crisis of 2007–2009," *Annual Review of Economics* 2, 603–18.
- Allen, Franklin, and Douglas Gale (2000a), "Bubbles and Crises," *Economic Journal*, 2000, 110, 236–255.
- Allen, Franklin, and Douglas Gale (2000a), "Financial Contagion," *Journal of Political Economy* 108:1–33.
- Battistini, Niccolò, Marco Pagano, and Saverio Simonelli (2013), "Systemic Risk, Sovereign Yields and Bank Exposures in the Euro Crisis," CSEF Working Paper No. 345.
- Bebchuk, Lucian, and Holger Spamann (2010), "Regulating Bankers' Pay," *Georgetown Law Journal*, 98(2), 247–287.
- Benediktsdottir, Sigridur, Jon Danielsson, and Gylfi Zoega (2011), "Lessons from a collapse of a financial system," *Economic Policy* 26, 66, 183–231.
- Bernanke, Ben S., and Mark Gertler (1989), "Agency Costs, Net Worth, and Business Fluctuations," *American Economic Review* 79, 14–31.
- Bolton, Patrick, Xavier Freixas and Joel Shapiro (2012), "The Credit Ratings Game," *Journal of Finance* 67, 1, 85–111.

- Borio, Cludio, and Mathias Drehman (2009), "Assessing the risk of banking crises – revisited," *BIS Quarterly Review*, March, 29-46.
- Caballero, Ricardo J., Emmanuel Farhi, and Pierre-Olivier Gourinchas (2008), "An Equilibrium Model of 'Global Imbalances' and Low Interest Rates," *American Economic Review* 98, 1, 358-393.
- Cuñat, Vicente, and Luis Garicano (2009), "Did Good Cajas Extend Bad Loans? The Role of Governance and Human Capital in Cajas' Portfolio Decisions", FEDEA monograph.
- Dell'Ariccia, Giovanni, Deniz Igan, and Luc Laeven (2012), "Credit Booms and Lending Standards: Evidence from the Subprime Mortgage Market," *Journal of Money, Credit and Banking* 44, 367-384.
- Dewatripont, Mathias, and Jean Tirole (1994), *The Prudential Regulation of Banks*, MIT Press.
- Drehmann, Mathias, Claudio Borio and Kostas Tsatsaronis (2011), "Anchoring Countercyclical Capital Buffers: The Role of Credit Aggregates," *International Journal of Central Banking* 7(4), 189-239.
- Fahri, Emmanuel, and Jean Tirole (2012), "Collective Moral Hazard, Maturity Mismatch, and Systemic Bailouts," *American Economic Review* 102(1), 60-93.
- Freixas, Xavier, and Jean-Charles Rochet (1997), *Microeconomics of Banking*, MIT Press.
- Freixas, Xavier, Bruno Parigi, and Jean-Charles Rochet (2000), "Systemic Risk, Interbank Relations, and Liquidity Provision by the Central Bank," *Journal of Money, Credit, and Banking* 32, 611–38.
- Gersbach, Hans, and Jean-Charles Rochet (2012), "Aggregate Investment Externalities and Macroprudential Regulation," *Journal of Money, Credit and Banking* 44(s2), 73–109.
- Gertler, Mark (1992), "Financial Capacity and Output Fluctuations in an Economy with Multi-period Financial Relationships," *Review of Economic Studies* 59, 455–72.
- Gertler, Mark, and Gilchrist, Simon (1994), "Monetary Policy, Business Cycles, and the Behavior of Small Manufacturing Firms," *Quarterly Journal of Economics* 109, 309–40.
- Gorton, Gary (2008), *The Panic of 2007*. In *Maintaining Stability in a Changing Financial System*, Federal Reserve Bank of Kansas City.
- Gorton, Gary (2010), *Slapped by the Invisible Hand: The Panic of 2007*, Oxford: Oxford University Press.
- Greenwald, Bruce, and Stiglitz, Joseph E. (1993), "Financial Market Imperfections and Business Cycles," *Quarterly Journal of Economics* 108, 77–114.
- Griffin, John M., and Dragon Yongjun Tang (2012), "Did Subjectivity Play a Role in CDO Credit Ratings?" *Journal of Finance* 67(4), 1293–1328.

- Heider, Florian, and Marie Hoeroeva (2009), "Interbank Lending, Credit Risk Premia and Collateral," *International Journal of Central Banking*, 5, 1-39, (2009).
- Hoshi, Takeo, Anil K. Kashyap, and David Scharfstein (1991), "Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups," *Quarterly Journal of Economics* 106, 33-60.
- Jeanne, Olivier, and Anton Korinek (2012), "Macroprudential Regulation Versus Mopping Up After the Crash," unpublished manuscript.
- Jiménez, Gabriel, Steven Ongena, José-Luis Peydró, and Jesús Saurina (forthcoming), "Hazardous Times for Monetary Policy: What do 23 Million Loans Say About the Impact of Monetary Policy on Credit Risk-Taking?," *Econometrica*.
- Johnson, Simon, and James Kwak (2010), *13 Bankers: The Wall Street Takeover and the Next Financial Meltdown*. New York: Pantheon Books.
- Jordà, Òscar, Moritz Schularick, and Alan M. Taylor (2011), "When Credit Bites Back: Leverage, Business Cycles and Crises," Federal Reserve Bank of San Francisco Working Paper no. 2011-27.
- Keynes, John Maynard (1936), *The General Theory of Employment, Interest, and Money*, Harcourt, Brace, and Co.: New York.
- Kiyotaki, Nobu, and John Moore (1997), "Credit Cycles," *Journal of Political Economy*, 105, 2, 211-248.
- Korinek, Anton (2011), "Systemic Risk-Taking: Amplification Effects, Externalities, and Regulatory Responses," University of Maryland Working Paper.
- Lane, Philip (2013), "Capital Flows in the Euro Area," European Economy Economic Paper No. 497.
- Lane, Philip, and Peter McQuade (forthcoming), "Domestic Credit Growth and International Capital Flows," *Scandinavian Journal of Economics*.
- Lo, Andrew W. (2012), "Reading About the Financial Crisis: A Twenty-One-Book Review," *Journal of Economic Literature* 50(1), 151-78.
- Maddaloni, Angela, and José-Luis Peydró (2011), "Bank Risk-Taking, Securitization, Supervision, and Low Interest Rates: Evidence from the Euro Area and U.S. Lending Standards," *Review of Financial Studies* 24, 2121-65.
- Martinez-Miera, David, and Javier Suarez (2013), "Endogenous Systemic Risk Taking," unpublished manuscript.
- Pagano, Marco, and Paolo Volpin (2010), "Credit Ratings Failures and Policy Options," *Economic Policy* 25, 62, 403-431.

- Pagano, Marco, and Paolo Volpin (2012), "Securitization, Disclosure and Liquidity," *Review of Financial Studies* 25(8), 2417-2453.
- Pozsar, Zoltan, Tobias Adrian, Adam Ashcraft, and Hayley Boesky (2010), "Shadow Banking," Federal Reserve Bank of New York Staff Reports, no. 458, July, revised in February 2012.
- Rajan, Raghuram (2005), "Has financial development made the world riskier?" Proceedings of the Jackson Hole Conference organized by the Kansas City Fed.
- Rajan, Raghuram (2010), *Fault Lines: How Hidden Fractures Still Threaten the World Economy*, Princeton, NJ: Princeton University Press.
- Reinhart, Carmen, and Kenneth Rogoff (2009), *This Time Is Different: Eight Centuries of Financial Folly*. Princeton, NJ: Princeton University Press.
- Rochet, Jean-Charles, and Xavier Freixas (2004), "Coordination Failures and the Lender of Last Resort: Was Bagehot Right After All?" *Journal of the European Economic Association* 2, 1116-1147.
- Shiller, Robert (2008), *The Subprime Solution: How Today's Global Financial Crisis Happened and What to Do About It*. Princeton, NJ: Princeton University Press.
- Stiglitz, Josef (2010), *Freefall: America, Free Markets, and the Sinking of the World Economy*, New York: W. W. Norton.
- Spaventa, Luigi (2009), "Economists, Economics, and the Crisis", www.voxeu.org/article/economists-economics-and-crisis.

Table 1. Attention devoted by finance researchers to financial crises and to financial integration

Year	Fraction of crisis-related articles published in the <i>Journal of Finance</i>	Fraction of CEPR Discussion Papers in the Financial Economics Series devoted to:		
	(1)	crisis-related issues (2)	the euro-area debt crisis (3)	financial integration (4)
2011	10%	18%	5%	3%
2012	10%	24%	6%	1%
2013	14%	15%	8%	0%

Figure 1. Fraction of CEPR Discussion Papers (DPs) in the Financial Economics series on crisis-related issues, 2000-13 (total and net of DPs co-authored by V. Acharya)

