

The Financial Crisis in 2007 and 2008 Viewed from the Perspective of Economic Research

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Many economists monitored the developments that led to the financial crisis in 2007 and 2008 with concern. The course and depth of the crisis, however, came as a surprise to many. This paper discusses whether there are structural deficits in economic research which prevent a deeper analytical understanding of the current crisis. While research on specific aspects of the current crisis mechanisms and their structural causes has been pursued very actively in recent years, this research has not yet been incorporated into the mainstream of macroeconomics and finance – a fact that hinders analytical understanding of the crisis.

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Economic research on financial markets and financial institutions has experienced a boom in the past 20 years. Many new methodological developments have inspired both theoretical and empirical research. It was also during this time that finance eventually became established as an independent field of research within economics and – not least due to the booming financial industry and its tempting job offers – gained immense popularity among talented and ambitious students and researchers. In the 1990s, methods of quantitative risk management were recognized in bank regulation. The issue of financial stability was one of the top research priorities in central banks and international organizations such as the IMF, the World Bank and the BIS.

Despite all this research activity, the crisis, which originated in the United States in July 2007 and subsequently spread unexpectedly quickly to the rest of the world, caught the profession rather off guard. The magnitude and depth of the crisis took many by surprise. It was true that economists and policymakers had worried for quite

some time about global imbalances, the real estate boom and the high level of public and private debt in the United States, the lack of transparency of structured financial products as well as historically extremely low risk premiums. Concerns were frequently raised that correcting these imbalances would trigger a crisis. However, nobody foresaw the dramatic sequence of events that started in July 2007. This fact, on its own, would not be worth mentioning, since nobody – including economists – can predict the future. At the analytical level, though, our understanding of the structure of the current financial crisis has been and remains poor, which is rather alarming. Is the financial crisis 2007 and 2008 thus also a crisis of economic research? This contribution aims to explore this issue.

It is hardly possible to discuss these matters thoroughly and systematically; in any case, this would go beyond the scope of this paper: The scientific literature on financial markets is too comprehensive, too diverse and too specialized. This paper therefore employs a deliberately selective approach based

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upon the research experience of the OeNB's Economic Studies Division in the field of financial markets, financial stability and systemic risk.²

Section 1 discusses where theory has structural blind spots that hinder an analytical understanding of financial markets and financial crises. Section 2 examines the macroeconomic research issues, section 3 the microeconomic research issues arising from the current crisis. Section 4 highlights three current economic policy issues, and in section 5 conclusions are presented.

1 Two Structural Blind Spots in Economic Research

It would be inaccurate to claim that the economic research of the past two decades did not address financial crises, financial market risks and their impacts. In fact, quite the opposite is true, the research interest in financial market issues was tremendous. Despite this fact, blind spots can be identified in the two areas that are supposed to constitute the analytical core for understanding financial markets and financial crises – macroeconomics and finance.

First, modeling financial markets and financial institutions is just a side issue in current macroeconomics as represented in textbooks, taught at universities and discussed in academic journals.³ Macroeconomics is, however, the very field of research which is suited to putting the study of financial markets, their risks for the real econ-

omy as well as their economic possibilities and limitations into the proper perspective. Nevertheless, the discipline that by definition adopts a systemic perspective on economics has focused only poorly on the connections between the real economy and financial markets.

Second, many areas of finance, in particular quantitative risk management,⁴ are characterized by a somewhat problematic concept of financial risks that disregards the fact that financial risks arise endogenously from the collective action and the interaction of many players. The conceptual approach of many models in the field of finance treats financial risks just like the risk of the weather being good or bad tomorrow.⁵ Financial risks, however, are not exogenous, as this approach suggests, but mostly endogenous. Thus the discipline that focuses on financial risks fails to contribute sufficiently to understanding the current crisis.

How did these blind spots arise? First of all, research processes are inherently slow. This is related to the fact that scientific arguments have to adhere to particularly high standards: They must have a solid theoretic foundation and also be compatible with the facts. Given that science is based on these principles, but at the same time consistently fails to meet them, many discussions continue for quite some time. Thus it happens that some issues remain unresolved for a long period of time. Macroeconomics, for instance, for a

² The OeNB's Economic Studies Division has focused on these issues for some years, thus even before the current financial crisis. Other research areas of the Economic Studies Division comprise monetary policy, real macroeconomics and econometrics.

³ It must be mentioned that from the beginning of the 1980s until the early 1990s, more comprehensive research was performed on the macroeconomic consequences of financial market imperfections in macroeconomics, as reflected above all by the work of Bernanke (1983), Bernanke and Gertler (1989, 1990), Bernanke et al. (1999) as well as Stiglitz and Weiss (1981). This research program, however, was not actively pursued afterwards.

⁴ For a comprehensive treatment of the subject, see McNeil et al. (2005).

⁵ This is especially true for a large amount of research work in the area of asset pricing. For a detailed overview on the theory of asset pricing common in finance, see e.g. Duffie (2002).

long time focused on reformulating the theory of how aggregate demand and output are interrelated assuming rational expectations, after the consensus on these interrelations had collapsed in the early 1970s.⁶ The modern models, which emanated from this process as a new consensus, basically consist of three equations: One describes aggregate demand as a determinant of aggregate output, with demand in turn depending on expected future output and future inflation. The second describes a Phillips curve, in which inflation is determined by output as well as by anticipated future inflation. The third is a monetary policy rule according to which monetary policy can influence short-term real interest rates.⁷ Recent macroeconomic literature, in particular studies on monetary policy,⁸ rests almost entirely on this basic model, which does not consider the financial system.

Ignoring certain aspects of reality is, in fact, reasonable and necessary in any scientific work. Radical simplification and focusing on the essentials are precisely the features that define scientific reasoning. It is also clear that not all economic issues need to be examined with a model that explicitly accounts for financial markets. However, the fact that the mainstream discussion has neglected relationships between monetary policy, financial markets and real economic developments to such an extent has certainly contributed to a lack of analytical understanding of the current crisis, and it still does.

In the framework of this theory, inflation targeting became established as the prevailing doctrine in monetary policy. Central banks apply this adaptive monetary policy strategy when short-term interest rates deviate from target; they respond by moving interest rates in the opposite direction. The Federal Reserve System (Fed) averted a recession when it significantly lowered interest rates in response to the collapse of the stock market boom in 2001. Then it kept interest rates low for a long time because inflation remained low. These factors contributed substantially to the U.S. housing price boom as well as the events leading up to the current crisis. While the monetary policy blindness toward asset prices has been questioned repeatedly, the academic literature showed little interest in this critique.⁹ Thus the blind spot in macroeconomic mainstream theory definitely had practical consequences.¹⁰

Where did the blind spot in finance originate? Research in both finance and risk management focuses on financial market risks, albeit in a conceptually problematic way. In grossly simplified terms, the paradigm of quantitative risk management can be described as follows: Take a portfolio of financial instruments. The value of these instruments at a given time in the future is determined by risk factors. The future development of these factors can be described using probability distribution, which can be estimated on the basis of historical data. This probability law is exogenous and not affected by

⁶ For an example of the heated debate, see Lucas and Sargent (1978).

⁷ See Blanchard (2008).

⁸ See the reference monograph by Woodford (2003).

⁹ See Borio et al. (2003) as well as Leijonhufvud (2008).

¹⁰ This interpretation of the U.S. housing price bubble from a monetary point of view is generally not acknowledged as such; see Caballero (2006).

actions carried out by individuals who hold the portfolios. One of the reasons for this prevailing viewpoint is the fact that finance, as a practical field, often adopts the partial perspective of a single player, an investor, a risk manager or an institution, and tries to explain how they can or should act optimally in a given environment. In doing so, the core question – how this very environment is changed by the interaction of many players – is often overlooked. Risks occurring in financial systems are thus not likely to be captured, as they in fact arise from the mutual influence of individuals and institutions and their interaction with the environment – they are endogenous.¹¹ This is a key aspect of financial market risks, particularly in a time of crisis. Models ignoring this problem are thus not well suited for contributing to our understanding of a crisis such as that which began in July 2007.

This adverse overlapping of blind spots – no financial stability analysis in macroeconomics on the one hand, hardly any equilibrium relationships in financial market research on the other – is also reflected in the internal organization of responsibilities and the research structure within central banks. Monetary policy and financial stability can typically be found in separate departments, each of which use models where blind spots are found in precisely those areas which should be thoroughly analyzed in view of the current situation.

A second structural problem of academic research on financial markets can be identified in banking research literature, which has been influenced

since the 1990s by methodological impulses from microeconomics and the theory of asymmetric information.¹² The models used in this literature rely almost exclusively on partial models of individual institutions. Hence, they are inherently unsuited to providing research answers to those issues of the current crisis which result from the interaction of many institutions.¹³

In principle, these structural problems could be resolved by a reorientation of the individual research programs. A tendency toward such a redirection is in fact expected to arise. There have always been individual researchers who have been critical of the previously discussed shortcomings and who may now have a higher weight in the discussion.

A third structural problem may be more difficult or even impossible to resolve. While science and research are inherently slow, the reality of business life, in particular the reality of a booming financial system, is inherently fast, volatile. It is certainly true that researchers were not very familiar with financial innovations in the field of credit derivatives and structured financial products. Conversely, risk managers and finance experts possessed highly detailed knowledge that was, however, not suitable for understanding the systemic issues involved in these products. From the viewpoint of the above-mentioned risk concept, these products appeared to be no more than an additional, albeit more complex version of derivatives. Thus the blind spot regarding the concept of risk truly had repercussions. Most economists contented themselves with citing the benefits of

¹¹ See Shin (2008).

¹² See Freixas and Rochet (1997), Greenbaum and Thakor (1995) as well as Dewatripont and Tirole (1994).

¹³ See Summer (2003).

additional options for the distribution of aggregate risks derived from abstract allocation theory without studying the instruments in detail. Now we know that aggregate risks were by no means distributed but remained in the financial system. On the whole, academic expertise on financial innovation certainly lagged behind practical knowledge.

2 Macroeconomics and Financial Markets – A Research Program in Need of A Fresh Start

The current financial crisis clearly shows that a deeper analytical understanding of the role of financial institutions in macroeconomics, their business policy as well as their risk and accounting management is of major importance. While in the early 1990s numerous studies set out to address this classic issue with new methodological approaches, an integration of these insights into a macroeconomic mainstream model is not yet in the offing. The research program initiated 20 years ago by Bernanke, Gertler, Gilchrist, Stiglitz, Weiss and others requires new ideas.

The following passage from Charles Kindleberger's seminal work "A Financial History of Western Europe" clearly expresses several factors that impede integration of the role of financial institutions into current macro models:

"... Modern economic theory tends to ignore price changes on the ground that while a change in price produces a gain or loss for one set of economic actors, it simultaneously results in offsetting loss or gain for another. On this score, to worry about prices and price levels is "money illusion", mistaking nominal money values for real values. This fails to take account of dyna-

*mic effects of two kinds. From a monetary viewpoint, price increases and decreases stimulate bank expansion and contraction, respectively, and produce macroeconomic change. When price declines lead to bankruptcy, moreover that bankruptcy spreads through the system in cumulating fashion with results that are not offset elsewhere. In the second place, while one group gains and another loses from price changes, awareness of gain and loss is not likely to be simultaneous or to fall on groups that are identical in behaviour. On both accounts, the results of price changes are unlikely to be offsetting. In financial crises merchants and producers whose prices are falling are painfully conscious of losses and cut their spending well before consumers have become conscious of gains in real income and increase their spending ..."*¹⁴

The transmission of monetary policy through the banking system – an issue approached in the research program by Bernanke and others but not pursued any further – is of major significance in the quoted passage. While this relationship was always in the focus of older macroeconomic research, the combination of financial intermediaries and developed, modern capital markets shed new light on these interrelations. This requires new research approaches.

Adrian and Shin (2008a), for instance, illustrate how the business model of (former) investment banks combined with modern quantitative risk management at the level of individual institutions not only acted as an extreme cyclical amplifier but also generated a structural demand pull for new asset classes, thus contributing to the U.S. subprime boom.

Adrian and Shin (2008a) observed that large investment banks managed

¹⁴ Kindleberger (1993, p. 271).

the capital structure of their balance sheets in such a way that there is a positive one-to-one relation between asset growth and leverage. This implies a capital structure theory that is in contrast to a world where the size of the balance sheet (the selection of projects) is separated from the financing decision. The data seem to suggest a situation where equity grows at an exogenous rate, while total assets and leverage move up simultaneously when perceived risk is low and move down when perceived risk is high. This collective behavior fuels boom and bust cycles because it implies that banks react to increases in asset prices by buying more assets and to decreases in prices by selling assets. Procyclical leverage therefore implies that banks have an increasing demand curve and a decreasing supply curve for risky assets. It is obvious that a model where the financial sector as a whole behaves in this way results in direct feedback between monetary policy, banks' balance sheets and the real economy.¹⁵

Kindleberger (1993), in the passage quoted above, addresses bankruptcy, its spread across the financial system and its impact on the real economy. Research on the macroeconomic consequences of bankruptcy is not plentiful and so far has been more deeply analyzed rather in peripheral fields of economic theory only. At a practical level, it is clear why the insolvency of important financial intermediaries leads to severe problems. When a bank goes bankrupt, claims by shareholders and debtholders have to be reassessed.

If, during this process, the bank's operations are interrupted for too long, intermediation does not take place and investment opportunities cannot be financed. This financial sector event thus has a knock-on effect on the real economy. At a theoretical level, though, it is very difficult to illustrate and analyze insolvency and bankruptcy in current models. To date, progress in this area has been made mainly in the framework of the general equilibrium theory.¹⁶ The reason why these models have not been successfully integrated into the mainstream macroeconomic literature certainly also lies in the fact that they are formulated at such a level of abstraction as to allow for only limited results – apart from general statements about the existence of equilibrium – and thus for only very general statements about efficiency.¹⁷

Another aspect discussed by Kindleberger (1993) is the role of heterogeneity. The quoted passage addresses the asynchronous reaction of producers and consumers to price changes. Heterogeneity, however, is of significant importance in much broader economic contexts. Much of modern macroeconomic theory is based on ignoring this very fact, instead concentrating on models assuming a representative consumer. This reduces the chances of truly understanding financial markets and financial crises. The confines of the representative consumer model likely account for the fact that modern macroeconomics in the field of financial markets and financial systems have

¹⁵ For a detailed discussion on the relevant interrelations, see Adrian and Shin (2008b).

¹⁶ See Dubey et al. (2005).

¹⁷ Another reason might be the fact that the core problem of the impacts of insolvency and bankruptcy on the real economy is analyzed from a different point of view than that of an operational standstill of companies during bankruptcy proceedings. The literature has mainly examined the impacts of bankruptcy on risk allocation, and is based on the assumption that bankruptcy proceedings occur without friction.

hardly developed beyond a relatively specialized asset pricing theory.¹⁸

New impetus for a macroeconomic research program which targets financial markets could arise from a thriving modern literature, literature which has developed largely at the margin of current macroeconomic literature but still presents many interesting interfaces.¹⁹

The current research on liquidity and crisis dynamics is a case in point. One important study in this literature, Brunnermeier and Pedersen (2008), focuses on the interaction of funding liquidity (i.e. the ease with which traders can borrow funds) and market liquidity (i.e. the ease with which they can obtain funding by liquidating assets). This interaction may set off a self-reinforcing mechanism that leads up to a liquidity crisis – as clearly evidenced by the current crisis: It was triggered by a decline in U.S. housing prices in a situation when many large and highly leveraged financial institutions had a large exposure to this market. As a consequence, the banking sector faced massive writedowns and a sharp contraction of funding liquidity. Financial institutions focused on deleveraging by selling assets, hoarding money or introducing more stringent risk management provisions. When the interbank market came under pressure as many financial institutions attempted to deleverage at the same time, the funding liquidity problem spread beyond the banking sector and led to a market liquidity crisis that affected all asset classes around the world.

Brunnermeier and Pedersen (2008), in a similar vein as Morris and Shin (2008), show that it is misleading to

think of liquidity as a given stock of available funding that is allocated within a financial system. When liquidity dries up, it literally disappears from the system rather than being reallocated. Tighter funding conditions cause balance sheets to shrink simultaneously, and credit institutions are generally less willing to extend loans. Kyotaki and Moore (2008) combine modern liquidity theory with a macroeconomic analysis of monetary policy and the business cycle.

Current research on systemic risk also focuses on crisis amplification effects that are caused by structural characteristics of the financial system. Korinek (2008) examines these interrelations in a remarkable paper and finds that the structural problem lies in an externality that arises from market participants failing to consider that their individual financing decisions may set off liquidity spirals as described in the model of Brunnermeier and Pedersen. Thus, market participants undervalue the benefits of liquidity and take on excessive systemic risks in their financing and investment decisions.

Numerous recent contributions to the banking literature, especially those by Diamond and Rajan (2000, 2001, 2005 and 2006), and studies from the literature on public and private information in asset pricing²⁰ offer various insights that are directly relevant for research that combines a focus on financial markets and macroeconomics. There are, in fact, many approaches and ideas worth developing further, and such research activities may be expected to receive a new impetus from the current crisis.

¹⁸ See Magill and Quinzii (1996, section 3, p. 16).

¹⁹ The OeNB hosted a research workshop where some recent interesting studies in this field were presented and discussed. For a summary of this workshop entitled “The Economics of Financial Stability”, see Summer (2008).

²⁰ Morris and Shin (2002), Angeletos and Werning (2006).

3 Microeconomics and Financial Markets: Why Banking Research Needs to Focus More on the Interaction between Banks

Over the past ten years, the banking literature has probably made the most active contribution to the scientific debate on the banking system, its risk-bearing capacity, its optimal institutional design and its functions. This literature was strongly inspired by methodological advances in microeconomics, information economics and game theory.

What the numerous contributions have in common is that they focus on individual institutions with their internal incentive problems between the different investor groups of a bank, between the bank and its debtors, and between the bank's management and its owners.²¹ The same approach was adopted by financial regulators. Modern financial regulation, as laid down in the Basel standards,²² concentrates on the regulatory capital buffer of individual institutions. The size of this buffer has to be sufficient to absorb most of the risk taken on the asset side of the individual institutions. The hope is that safeguarding the solvency of each institution will also ensure systemic stability.

A simple example²³ shows, however, that safeguarding the soundness of an individual institution may very well conflict with the interests of systemic stability: Let us assume that bank 1 borrows from bank 2, and that bank 2 incurs credit losses from other assets it holds. This does not affect the creditworthiness of bank 1 but cuts into the capital of bank 2. As a result, bank 2 (in line with banking regulation focusing

on individual institutions) has to reduce its exposure and the size of its balance sheet. It will do so by lowering the volume of loans it extends, thus limiting the funding options of bank 1. If bank 1 has no alternative sources of funding, it has to reduce its assets, too, by either extending fewer loans or by selling assets. Given a combination of three conditions, the risk-adequate behavior by bank 2 in line with prudential supervision standards is equivalent to a bank run from the perspective of bank 1: if bank 1 has no alternative sources of funding, bank 2 reduces its exposure by a sufficiently large amount and the assets of bank 1 are illiquid. During the crisis in 2007 and 2008, the cases of Bear Stearns and Northern Rock were, in fact, characterized by certain elements of this simple logic. It is therefore entirely conceivable that measures safeguarding the soundness of individual institutions may jeopardize the stability of other institutions and undermine systemic stability.

In addition, a bank's assets may meet all regulatory capital requirements but still carry a large potential for instability from a systemic perspective. The following example was again taken from Morris and Shin (2008). This time, the system includes three banks. Bank 1 holds mortgage-backed securities and funds these assets by pledging them in overnight repos with bank 2: Bank 1 sells the securities to bank 2 and agrees to repurchase them at a specified price on the next day. This transaction is repeated at the end of each day. The repo is on the liability side of the balance sheet of bank 1, and a reverse repo is on the asset side of the balance sheet of bank 2. Bank 2 funds the loan it

²¹ See Freixas and Rochet (1997).

²² Basel Committee on Banking Supervision (2005).

²³ This example was taken from Morris and Shin (2008).

extends to bank 1 by pledging the same securities in a repo with bank 3.

From the perspective of bank 2, its assets are extremely safe. On the one hand, risk is limited by the short-term nature of the transaction, while on the other hand, the loan is fully collateralized (provided that the haircut is sufficiently large). Bank 2 incurs no credit risk vis-à-vis bank 1. In addition, it does not incur any maturity risk, because the asset and liability items have matching maturities. Bank 2 is free to reduce the size of its balance sheet flexibly, if circumstances require. It can diminish its asset exposure by reducing the value of the reverse repo with bank 1. It can also react to a withdrawal of funding: If bank 3 does not renew the repos, bank 2 can suspend the reverse repo with bank 1. Viewed from this perspective, bank 2 is in a very secure position and its required minimum capital in line with Basel standards would be low. Bank 2 can attain a high leverage ratio. From a systemic perspective, the assets of bank 2 are extremely relevant, however, as they correspond to the liabilities of bank 1. If the assets of bank 1 are illiquid, a reduction in the exposure of bank 2 would have severe consequences. If the repo transaction is no longer renewed, bank 1 is forced to sell the mortgage-backed securities (provided that it cannot use alternative sources of funding). The assets of bank 2 are thus highly important in terms of systemic stability, even though they are fully secured from the perspective of the individual bank.

During the financial crisis in 2007 and 2008, such effects materialized especially clearly in the interaction of banks and capital markets. The systemic impact of collateralized credit opera-

tions is particularly strong when the haircuts on repo transactions fluctuate in response to market conditions, because the haircut determines the maximum permissible leverage ratio of a credit institution.

The following example from Morris and Shin (2008) illustrates this connection. Bank 1 has to pay a haircut of 2% on a repo transaction, which means it must pledge securities worth EUR 100 to borrow EUR 98. In other words, to hold securities worth EUR 100, the bank has to come up with EUR 2 of equity. The maximum leverage is 50. If the haircut rises to 4%, the maximum leverage halves to 25. As a consequence, bank 1 has to either raise new equity so that its equity doubles from the previous level, or it must sell half its assets, or some combination of both. Both transactions are difficult in times of crisis and increase systemic stress. According to Adrian and Shin (2008a), a strong empirical link exists between leverage and the willingness to extend loans. They show that large investment banks adjust their leverage by expanding their balance sheets during economic upturns and shrinking them during downturns, thus contributing substantially to the amplification mechanism of boom-bust cycles. An ironic paradox of the current crisis lies in the fact that modern risk management methods, which are even reflected in banking regulation as a result of the Basel process, play an important role in the amplification mechanism, thus further underscoring the need to adopt a systemic perspective in banking research.²⁴

The crisis in 2007 and 2008 revealed a weakness in recent research work on systemic risk that received

²⁴ See Danielson and Shin (2003), Danielson et al. (2004), Shin (2008).

particular attention from central banks.²⁵ This strand of the literature highlights the need to adopt a systemic perspective for assessing the risk-bearing capacity of a banking system. It focuses on quantifying balance sheet domino effects that arise from a shock on the assets of a banking system. The modeling strategy of this literature relied on generalizing quantitative risk management approaches from one institution to a system of institutions. A consistent finding of these studies was that only implausibly severe shocks to bank assets would trigger significant domino effects. The experience of the current crisis has shown that an assessment of a banking system's risk-bearing capacity based on balance sheet mechanics alone fails to consider highly relevant shock amplification mechanisms. A crisis like the current one is inconceivable in a model that does not capture the behavior of banks and their balance sheet and exposure management. The financial crisis in 2007 and 2008 clearly shows that we should focus on explaining structures that amplify shocks. A total direct loss on subprime mortgages of between USD 500 billion and USD 1,500 billion would still roughly equal the loss caused by a normal swing in stock prices: A mere 2% movement in the U.S. stock index triggered a loss of more than USD 500 billion.²⁶ To understand the dimensions of the current crisis, we need to comprehend the amplification mechanisms that drive up losses.

The connection to the questions discussed in section 1 is obvious if we acknowledge the interaction between banks and between banks and capital markets. To date, many insights and

promising approaches exist also from a microeconomic perspective. It will probably require additional substantial effort to draw meaningful conclusions from these findings for economic policy.

4 Some Policy Issues

In a contribution like this, it seems logical to organize the discussion along the “blind spots” of banking research. Still, some insights from financial market research are helpful as points of reference for the current economic policy discussion. In the following, we will briefly highlight three issues – again selectively and not systematically – that have played a role in the public debate of the past weeks and months: Should short selling be prohibited? Would a tax on financial transactions help mitigate this or future crises? How should a bank bailout package be designed?

4.1 Should Short Selling Be Prohibited?

In the course of 2007, the supervisory authorities of numerous countries restricted or even prohibited the short selling of stocks in reaction to plunging stock markets and especially to plummeting bank stocks. Short selling means that investors borrow securities in the hope that their market price will drop and then sell them. Later, they buy the securities back at the current (lower) market price and return them to the lender. By restricting short selling, the authorities attempted to stabilize the markets and prevent investors from speculating on falling stock prices. This measure, which was implemented in many countries around the world, is

²⁵ See *Elsinger et al. (2006)* and *Upper (2007)*.

²⁶ See *Diamond (2008)*.

basically meant to support bank stock prices. Unsurprisingly, it was ineffective in stabilizing prices in the short run. After all, investors can simply imitate the strategy employed in short selling stocks on derivatives markets.²⁷ To prevent investors from speculating on falling prices, the authorities would have to prohibit short selling of stocks, while at the same time shutting down derivatives markets. The economic costs of doing that would be substantial, however.

From the perspective of economic research, imposing restrictions on short selling is questionable for two reasons: It impedes the efficient allocation of aggregated risks, and it reduces market liquidity. These are not merely academic statements – if short selling were generally prohibited, all markets for derivatives (futures, forwards, options, swaps, etc.) would cease to exist. But these markets make it possible to efficiently distribute aggregate risks (e.g. the risk of commodity price fluctuations, exchange rate variations and interest rate changes) among many individuals at a low cost. Investors have to be able to engage also in speculative transactions (both on rising and falling prices) for such risk transfers to be made on organized markets (i.e. at a low cost). Otherwise, what is now a competitive market would become a matching mechanism, which would be significantly more difficult and complex to handle. The liquidity that is created by permitting speculative transactions also simplifies pricing. During a

boom, a ban on short selling stocks would have a destabilizing effect, as those market participants who believe that certain stocks are overvalued would not be able to take this into account in their investment decisions. This is why prohibiting short selling is probably a bad idea; in addition, it would not solve the current problem with funding liquidity.

Still, permitting short selling in a market that is characterized by substantial market power can lead to serious problems that need to be remedied with regulatory measures.²⁸ In that case, however, it makes more sense to address the market power problem directly.²⁹ Permitting short selling in a functioning competitive financial market has considerable economic benefits: It makes it possible to transfer aggregated risk at a low cost and makes it easier to price securities.³⁰

4.2 Would a Tax on Financial Transactions Help Mitigate This or a Future Crisis?

The introduction of a tax on financial transactions has featured time and again in the public debate and in economic research. It was seen as a possible measure to deescalate crisis dynamics or even prevent crises from occurring. The debate centers on whether financial markets are characterized by excessive (as opposed to economically optimal) transaction volumes that lead to excessive price volatility, thus destabilizing markets and contributing to financial crisis.³¹ So far, no definitive

²⁷ For instance, by buying a put option on the stock.

²⁸ See Brunnermeier and Pedersen (2005).

²⁹ Interestingly, while there is extensive industrial economics literature that empirically examines the issue of market power in product markets, similar research hardly exists for financial markets. It would be important to know whether or not the requirements for effective competition are fulfilled in these markets so as to assess whether the theoretical advantages of a competitive market can actually be utilized.

³⁰ See Shiller (1993).

position has been reached in the literature, but the majority of contributions by researchers in the field of market microstructure, asset pricing and international finance³² indicate that a tax on financial transactions would increase price volatility and restrict market liquidity, which would have further indirect effects (up to and including effects on the financing costs of enterprises).

The analyses by Adrian and Shin (2008a), Morris and Shin (2008), Brunnermeier and Pedersen (2008), and others mentioned above identify four main factors that caused the financial system *as a whole* to accumulate an extremely high exposure to long-term illiquid assets (the U.S. mortgage market) that were mainly funded with extremely short-term capital market instruments and thus led to the crisis: structural incentive problems in the business model of investment banks, new credit risk transfer instruments, modern risk management focusing on individual institutions, and the Fed's easy monetary policy. The self-reinforcing processes observed in the unfolding of the crisis (money market freeze and extreme volatility across all asset classes) are therefore rather consequences than causes of the crisis. A tax on financial transactions, even if it had the beneficial effects assumed by its advocates, would at best mitigate a crisis symptom (enormous asset price volatility); it would certainly not resolve the crisis itself. If, however, the oppo-

nents of the tax are correct, it would further aggravate the tight liquidity situation.

4.3 How Should a Banking System Be Recapitalized?

What started out as a liquidity crisis in 2007 and 2008 quickly developed into a capital crisis affecting banking sectors on a global scale. To prevent the possible collapse of bank intermediation and thus a stop to lending and financing for households and enterprises, the EU Member States – following a similar initiative by the U.S.A. – launched bank rescue packages that included state guarantees on bank debt on the one hand, and recapitalization options funded by tax money on the other. A collapse of intermediation would imply enormous economic costs and would have unforeseeable short- and long-term economic, social and political consequences. Therefore, it is only sensible to take measures to prevent such a collapse. Most economists agree that a recapitalization program for the banking sector, in tandem with other measures that help revive intermediation, is in order in the current situation. Opinions are quite strongly divided about the details, however: What should this program include to make it fair and transparent and to factor in long-term consequences? The original version of the U.S. bank bailout plan, the Paulson Plan, named after U.S. Treasury Secretary Henry Paulson, for instance, was

³¹ The public debate is also driven by other arguments: Critics maintain that financial markets only redistribute existing wealth, but that these transfers do not generate economic benefits. While individuals can get rich this way, they argue, society as a whole loses out, as enormous resources are tied up unproductively. This argument is largely neglected in the academic discussion about taxes on financial transactions, because it is based on a misconception about the function of financial markets and especially about the public benefits generated by enabling risk transfer.

³² See Habermeier and Kirilenko (2003).

widely rejected by economists from academia.³³

One of the reasons banks and other financial institutions find it difficult or even impossible to obtain funding on the market lies in the fact that the private sector does not know how to estimate the current value of assets in which it acquires a stake. The public sector faces a similar valuation problem: Civil servants and politicians do not know either on what conditions they can reasonably provide banks with capital. The fact that the negotiations are conducted with bankers who stand to lose a lot also personally makes it exceedingly difficult to achieve taxpayer-friendly negotiation results.

At the same time, the process of determining how to distribute the assets of an insolvent bank in bankruptcy proceedings is time-consuming and may take years, a time during which this bank cannot fulfill its intermediation function. Letting intermediation collapse on a large scale, even for a short period of time, is not an option for the reasons mentioned above. If it were possible, however, to clarify all claims immediately in the wake of a bank insolvency, insolvency would not pose a danger to the economy.³⁴

Some insights from economic research on bankruptcy law suggest that facilitating an efficient and quick renegotiation of claims might be an alternative approach to recapitalizing the banking sector.³⁵

The core idea is to create a type of standardized bankruptcy procedure that would allow banks to quickly reorganize their capital structure and resume lending. A standardized procedure would thus replace time-consuming structured negotiations between investors. Under this approach, the equity held by a bank's current stockholders would become worthless and the bank's existing debt would be transformed into equity. This would immediately recapitalize the bank and allow it to resume lending. To avoid the de facto expropriation of current shareholders in this type of debt-to-equity swaps, Bebchuk (1988) suggests giving them a purchase option on their stock. Those who believe that the bank is actually solvent can pay their share of debt and thus regain their share of the bank's equity.

This approach, which is outlined only briefly in this contribution, has three advantages. First, banks are recapitalized at no cost to taxpayers. Second, the public sector does not have to solve the (difficult to impossible) valuation problem. The transformation of debt into equity does not affect its total value; it only changes the legal nature of the claim. And third, with this solution, the public sector would not have to decide which banks should survive and which ones should fail.

³³ See e.g. the letter drafted on the initiative of Luigi Zingales, Paola Sapienza, Anil Kashyap and Robert Shimer that was sent to Congress and the Senate on September 24, 2008. It can be downloaded from http://faculty.chicagogsb.edu/john.cochrane/research/Papers/mortgage_protest.htm. See also the special issue of *The Economists' Voice*, Vol. 5, of September 2008. Both address the original version of the Paulson Plan, which has been modified substantially in the meantime. See Veronesi and Zingales (2008) for a critique of the current plan.

³⁴ For an economic discussion of bankruptcy law, see Hart (1999).

³⁵ See Zingales (2008).

5 Conclusions

The current crisis highlights some structural weaknesses in economic models, especially in the fields of macroeconomics and finance. At the same time, we also find that the literature on financial crises – which has become quite extensive and varied in recent years – offers some useful insights into the nature of this crisis and its structural characteristics. Integrating these

insights into the mainstream of macroeconomics and finance seems to be the logical next step; attempts to do so will certainly be considered more relevant and important than before the unfolding of the crisis. In this sense, academic research will probably even benefit from the financial crisis 2007 and 2008, as it has raised numerous complex and topical issues.

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