Frank Heinemann · Ulrich Klüh
Sebastian Watzka *Editors*

Monetary Policy, Financial Crises, and the Macroeconomy

Festschrift for Gerhard Illing

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ISBN 978-3-319-56260-5 ISBN 978-3-319-56261-2 (eBook)
DOI 10.1007/978-3-319-56261-2

Library of Congress Control Number: 2017951194

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

This volume contains invited contributions by (former) students, colleagues, and friends of Gerhard Illing, whose 60th birthday served as an occasion for collecting these articles. Nearly all contributions were presented in a special birthday symposium.

Gerhard Illing's research focuses on the relation between monetary policy, financial crises, and the macroeconomy. He has often argued that financial and macroeconomic instabilities are a key issue for our societies, an important research topic, and a challenge for macroeconomic policy. He encouraged students and colleagues alike to take the issues of financial crisis prevention and resolution seriously, even at a time when most macroeconomists believed that the great moderation had made crises in mature economies a thing of the past. His pioneering approach combines strong theory to explain causal relationships with a clear view on data and general macroeconomic developments. His proficiency with game theoretic and microeconomic methods has helped him (and others) to advance macroeconomics in novel and very fruitful directions. In particular, he contributed to making mechanism design an important tool for macroeconomic policy analysis. The editors owe Gerhard many thanks for his inspiring views. His open, curious, and analytical mind often pointed us to upcoming research topics, policy debates, and methodological innovations.

Many chapters in this volume follow the approach of applying microeconomic and game theoretic methods to monetary policy and financial crises. They also contain interesting empirical results, reflecting Gerhard's view that evidence antecedes any application of models. They discuss recently suggested measures for central banks' responses to liquidity shortages and to the liquidity trap. They develop methods for assessing the potential of contagion via the interbank network and for capturing the interaction between micro- and macroprudential regulation. In addition, they contain empirical analyses of macroeconomic effects of German unification and current developments in the German housing market.

A wider audience might be especially interested in the chapters that point to avenues for re-conceptualizing and renovating macroeconomics. One potential starting point for such renovation is the application of new microeconomic methods

to macro problems. This is reflected in an insurance-based approach to evaluate proposals for solving the sovereign debt problem in the Euro Area. It is also clearly visible in a new explanation for rising income inequality that is based on contract theory and advances in IT technology. Re-conceptualization, however, will also require a more fundamental, transdisciplinary critique of the current state of macroeconomics. Such critique is provided in a detailed analysis of the dogmatic superstructure of the process of financialization, which many believe has been an important driver of the developments in recent decades.

The symposium on which this volume is based took place at Ludwig-Maximilians-University (LMU) in Munich from March 4 to 5, 2016. The conference was characterized by an extremely lively exchange between academics and practitioners, very much in the spirit of Gerhard's approach to economics. We would like to thank all participants for their participation in the conference and their contributions to this volume.

The atmosphere, depth, and policy relevance of the symposium greatly benefited from two policy panels. The panelists (Peter Bofinger, Charles Goodhart, Hans-Helmut Kotz, Bernhard Scholz, and Hans-Werner Sinn) have done a great job in translating research results into policy advice and to enliven the discussions during sessions and afterward. We thank them for their presence and their inputs.

One secret of a successful conference is a generous host providing the necessary infrastructure and a committed team doing the background work. Many thanks go to the Ludwig-Maximilians-University (LMU) for its support and hospitality. It allowed all participants, many of who had spent an important part of their career at LMU, to feel very much at home and at ease. Our special thanks go to Mrs. Agnes Bierprigl and to the other team members at the Seminar for Macroeconomics. Their dedication and effort were crucial to make this event happen and to ensure its success.

We also express our thanks to Mr. Alen Bosankic, Ms. Jasmina Ude, and Mr. Moritz Hütten for reading proofs and preparing chapter drafts. The team at Springer Publishing has not only been very patient but also very forthcoming with support and assistance.

Finally, it is our pleasant duty to acknowledge financial support from Deutsche Pfandbriefbank and Cesifo.

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Monetary Policy, Financial Crises, and the Macroeconomy: Introduction

Frank Heinemann, Ulrich Klüh, and Sebastian Watzka

Since the early 1970s, financial instability has been on the rise. For some time this trend had been mainly associated with emerging markets, even though there were occasional crises in some high-income countries as well. In the industrialized world, the increasing instability of economic systems had been masked by the fact that macroeconomic aggregates appeared to become more stable. The subdued fluctuations of the Great Moderation seemed to validate the view that crises and depressions were a thing of the past.

This changed in 2007/2008, when a global financial crisis of yet unknown magnitude and character hit the U.S., Europe, and, through spillovers, the whole world. This crisis validated all those who had warned that depressions were still one of the main problems with which economics had to cope. It brought up many new and controversial policy topics that still are not resolved satisfactorily. Also, it has put into question many of the dogmas that had characterized macroeconomic thinking since the late 1970s.

Gerhard Illing is at the forefront of those who have constantly argued that financial and macroeconomic instabilities are a key issue for our societies, an important research topic and a challenge for macroeconomic policy. Thus, he is one of those whose views have been validated by the crisis. This volume is a collection of contributions to a symposium held to celebrate Gerhard's sixtieth birthday.

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F. Heinemann et al. (eds.), *Monetary Policy, Financial Crises, and the Macroeconomy*, DOI 10.1007/978-3-319-56261-2_1

Gerhard's approach to macroeconomic analysis is unique in the way it balances different perspectives. He is one of the few German economists with an eye for the demand side of the economy. But he also looks at the supply side. He is a skillful microeconomist and he has used his microeconomic expertise frequently to illuminate macroeconomic puzzles. In spite of this ability, Gerhard is a macroeconomist by heart who does not force micro-foundations upon any macroeconomic problems. Finally, he is an economist with a strong preference for academic rigor *and* policy relevance, and wants to achieve both at the same time.

Gerhard's research interests are multifaceted. He has published and edited books and papers on diverse topics, such as game theory (Holler and Illing 2009), the digital economy (Illing and Peitz 2006), and spectrum auctions (Illing and Klüh 2004). But his main interest in recent years has been (i) the nature and role of liquidity for macroeconomic and financial policies; (ii) the design of policies, instruments, and strategies to cope with the macro-financial problems characterizing modern capitalist societies; (iii) the integration of new methods and views into macroeconomic thinking.

This volume is organized along the above three lines of research. Part I deals with liquidity and contagion of liquidity crises. Liquidity becomes a relevant issue through frictions, in particular those analyzed by information economics (Illing 1985). It has many facets, ranging from market and funding liquidity to monetary forms of liquidity. And it has been at the heart of the analysis of financial crises and the optimal response to their occurrence (Illing 2007).

Part II looks at policies, in particular those at the nexus between macroeconomics and finance. The crisis has brought about a revival of aggregate demand policies, a trend already foreseen in Illing (1992) and Beetsma and Illing (2005). It has put monetary policy in a very difficult position, caught between macroeconomic and financial stability (Cao and Illing 2015) and faced with the manifold challenges of the zero lower bound (Illing and Siemsen 2016). The crisis has made necessary a re-assessment of fiscal policy (Illing and Watzka 2014) and public debt (Holtfrerich et al. 2015), and it has raised the question of how to complete the re-regulation of the financial sector, with a view to strengthen its macroprudential dimension (Illing 2012).

Part III presents approaches for a re-conceptualization and renovation of macroeconomics. The failure of large parts of the economics profession before and during the crisis has made such a re-conceptualization necessary. Economists have trusted too much in efficient markets. As a consequence, they did not warn sufficiently about the imbalances that were building up. During the crisis, they were not able or not willing to prevent the austerity backlash that has kept so many economies in depression mode.

Looking for new approaches in macro-financial economics does not mean, however, that everything that has been done before should be disposed of. Those like Gerhard who have studied financial instability before the crisis have come up with important and often surprising insights (see, e.g. Heinemann and Illing 2002; Goodhart and Illing 2001). The problem has not been a lack of good theory, nor of good empirics, but a missing focus on relevant questions.

1 Liquidity and Contagion of Financial Crises

It is difficult to overestimate the role of liquidity as a key or possibly even paramount concept in macroeconomic thinking. Monetary macroeconomics as a discipline could not be constituted without the notion of liquidity. In the history of economic thought, liquidity has been central in constituting different paradigms of macroeconomics. It has informed early discussions of macroeconomic issues, such as in Gresham's law. It has been central to physiocratic views of the economy, in which some see the beginning of economic thinking in circular flows. The concept of liquidity is closely related to Say's law (Klüh 2014), and it is one of the main features of Keynesian economics and all "modern macroeconomic" DSGE models. The view on the role of monetary aggregates divides different schools and is a defining element of many controversies regarding monetary policy and financial market regulation.

Proponents of real business cycle theory and perhaps growth economics might argue that liquidity and monetary effects are only temporary and the welfare losses arising from fluctuations are small in comparison to the long-run gains of real economic growth. Indeed, if one assumes complete markets and perfect rationality, liquidity is of no major concern. This view, however, has been largely knocked down by recent experience. As soon as one starts to look at the pathologies of capitalist societies, focusing on liquidity becomes inevitable (Goodhart and Illing 2001) because the long-run effects of misdirected investment activities, long-run unemployment, and high youth unemployment rates that are associated with financial crises are estimated to protract growth for several years with no chance of returning to the old growth path.

In spite of its overwhelming importance, many economists perceive liquidity as a riddle within an enigma. Trained to think in models in which real exchange dominates, the importance of the nominal dimension of economics that directly follows from the notion of liquidity is often difficult to accept. More importantly, the frictionless or friction-poor world of many models provides only little space for a concept that is largely a consequence of frictions. These frictions are many and most can be traced back to incomplete information.

But what is liquidity? And when does it (or a shortage of it) constitute a problem? Charles Goodhart (2017), in the first chapter of this volume, sets out his analysis by asking these fundamental questions. He contextualizes his analysis of lender-of-last-resort (LOLR) policies by first looking at the nature of liquidity problems. Liquidity shortages have a dual nature. On the one hand, a lack of liquidity in most cases reflects some kind of solvency concern: if payments and repayments are certain, both with respect to their incidence and with respect to the details of their occurrence, the ability to borrow ensures liquidity. On the other hand, illiquidity does not necessarily reflect actual solvency problems, because fundamentally solvent banks can become illiquid due to the network effects in financial markets. Goodhart argues that there is no clear cut distinction between solvent but illiquid and insolvent banks.

Thus, the provision of liquidity during banking crises must compromise two goals: on one hand, systemic crises should be avoided because of the huge losses to society, on the other hand, any implicit guarantee for providing liquidity to banks in distress raises concerns that banks may game the rules and exploit tax payers. Moral-hazard should be avoided.

Against this background, determining optimal last resort policies involves difficult judgements. Depending on which of the two views of liquidity shortages is emphasized, very different policy recommendations follow. If liquidity problems are mainly a reflection of solvency problems, policy should be more restrictive. If liquidity problems are a reflection of the inherent fuzziness and non-linearity of the liquidity-solvency nexus, central banks should have maximum flexibility to prevent unnecessary harm to the economy.

The standard advice in the literature has been influenced strongly by the first view. To prevent lending to insolvent and thus likely irresponsible players, the central bank should mostly lend to the open market and not to individual banks via LOLR measures. The fear of unwarranted support to failed institutions has also dominated changes in crisis-management arrangements after the crisis, such as the Dodd-Frank act. As a consequence, there is a risk that central banks will have insufficient flexibility when the next crisis comes.

Goodhart argues that this underestimates the importance of the second view, and in particular the dynamics of contagion. Provision of liquidity to the market is not helpful to stave off contagious banking crises, because the market allocates extra liquidity to those institutions who are not directly affected by the crisis. While open-market operations may prevent a complete meltdown, they may leave us with a partial meltdown and severe macroeconomic consequences.

Instead, Goodhart recommends that a central bank should treat the first bank to run out of liquidity most toughly up to letting the bank fail, but provide liquidity at more favorable conditions to other banks in distress that may have been affected by contagion. This mechanism raises incentives for banks to avoid illiquidity but saves them from the network effects and, thereby, avoids systemic crises. Nevertheless, any LOLR policy creates moral-hazard incentives. For Goodhart, the only way to properly take this into account would be a much more ambitious approach to change incentives. The rules should be such that they come as close as possible to an unlimited liability arrangement, for example through multiple liability schemes and a much stronger emphasis on bail-in-able debt.

The question, whether central banks should provide liquidity to the market or to individual institutions in distress, is also analyzed by Falko Fecht and Marcel Tyrell (2017) in the second chapter of this volume. Building up on a model by Diamond and Rajan (2001), they ask whether the answer may also depend on the nature of the financial system. A key ingredient are the losses that arise if a bank needs to liquidate or sell projects that it cannot continue to finance. Fecht and Tyrell assume that in bank-based financial systems, such as continental Europe, intermediaries have more information about the profitability of projects that they are financing than in a market-based system such as the United States. Bank-based financing allows banks to extract a larger share of the liquidation value of a project, while the market

value to outside investors is higher in market-based systems, where information is less asymmetric.

From these assumptions, Fecht and Tyrell derive a number of results that inform us about differences in LOLR policies between the two systems. They show that the provision of liquidity by open-market operations leads to inefficiencies that are more severe for a bank-based than for market-based system. Providing liquidity to individual institutions is more preferable in a bank-dominated system.

The employed model does not account for moral hazard effects that may provide a general argument for open-market operations. LOLR assistance to individual institutions may also be more costly for the central bank. Assuming that these costs are comparable in both systems, Fecht and Tyrell conclude that in bank-based financial systems with their rather illiquid assets, LOLR assistance to individual institutions may be a more favorable instrument than providing liquidity to the market via open-market operations, while the opposite may be true in a market-oriented financial system.

The model by Fecht and Tyrell considers contagion via the relative prices of assets in terms of liquidity, but it does not account for contagion arising from direct links between banks. These contagion effects are the reason why Goodhart rejects the clear distinction between insolvency and illiquidity. The dynamics of contagion that are at the heart of Goodhart's analysis are largely a consequence of the fact that financial systems are complex networks. Should the central bank or supervisor have a very good grasp of the systemic consequences of a specific support measure or punishment, official responses to liquidity problems could be much more targeted. The degree of moral hazard would be reduced and the flexibility of the central bank increased. Moreover, one could start devising incentives to reduce systemically relevant network effects, for example through special rules for money-center banks.

In his contribution, Thomas Lux (2017) argues that the pre-2008 mainstream approach to macroeconomic research had "deliberately blinded out" these issues, mainly because of the purported efficiency of financial markets. The post-crisis research on interbank networks and contagion dynamics is becoming more receptive to the alternative view, which emphasizes market inefficiencies, behavioral aspects, non-linearity, and non-standard probability distributions.

Lux shows that this literature has yielded a set of important stylized facts ranging from topological features such as core-periphery structures to stability characteristics (such as the surprising persistence of certain linkages). He also recognizes first successes in explaining the self-organization of the system. However, attempts to theoretically measure and then internalize network externalities are in the fledgling stages, at least academically. Thus, the potential for informing policies to change the system's structure in an attempt to contain contagion remains limited.

Lux presents simulations of a stochastic model of link formation and spillovers. An individual default of one bank affects in most cases only few other institutions. But for a small number of banks, their default triggers a system-wide collapse. Most stress tests by monetary authorities have only considered the financial stability of individual institutions and neglected the propagation of liquidity shortages through the banking system. One reason is data limitations. Moreover, as contagion happens

through a multitude of channels and because balance sheets change quickly, policies grounded in theory may quickly be outdated. What, then, is the role of the new generation of models described in the chapter? According to Lux, network models may help to get a better grasp of the capital cushions needed to prevent shocks and shock transmission in an otherwise fragile system. By focusing on capital buffers, Lux picks up an argument that has been crucial for the crisis response so far: more targeted measures focusing more explicitly on the structural problems would be desirable. However, a lack of knowledge about the impact of these policies precludes their implementation. The second-best method might be to focus on capital, an argument implicit in Illing (2012, p. 17).

Sebastian Watzka (2017), in his chapter, considers the liquidity risk again from a different angle. He discusses the euro area debt crisis—and in particular the Greek tragedy—under the assumption that some of the risk premia in Greek government bond yields were due to what the ECB referred to as "convertibility" risk, i.e. the break-up risk of the euro area. This idea has forcefully been demonstrated by De Grauwe and Ji (2013) arguing that an individual euro area member country is naturally lacking a LOLR and this by itself would generate multiple equilibria with unduly high liquidity risk premia for countries of which investors believe that public debt is too high. To test for such effects, Watzka empirically assesses how important non-fundamental contagion was during the early phase of the Greek debt crisis. He concludes that Mario Draghi in his famous 2012 London speech reassured markets that the ECB was in fact acting as LOLR for euro area countries, if certain criteria were met.

A crucial and usually innocuous assumption in most papers on banking crises is that money and credit are intrinsically conjoined. Does this need to be the case? The crisis shows that the pursuit of price stability (which had been achieved almost universally before 2007) does not imply financial stability. In contrast, there are important ways in which policies to achieve one can be detrimental to the other.

An important reason for this perceived antagonism is the nature of money creation through credit markets. It is therefore not surprising that a radical departure from this approach has been envisioned by some. In his contribution to this volume, Romain Baeriswyl (2017) argues that the close connection between money and credit is a relic of the Gold Standard. With unredeemable fiat money, there are few reasons to stick with it. But what would be the inter-sectoral and inter-temporal implications of such a departure? Baeriswyl argues that the provision of liquidity via the credit market has the largest effects on private credit volume and primarily stimulates demand for goods that are bought on credit such as real estate. Hence, expansionary monetary policy fuels asset prices and may cause price bubbles, along with its stimulus effects for aggregate demand.

For targeting consumer price inflation, lump-sum transfers of money to consumers are likely to be more effective. Lump-sum transfers from the central bank to the citizens sound radical at first, but has some important advantages. In Baeriswyl's view, these advantages strongly outweigh the disadvantages. In particular, the pursuit of price stability would no longer require destabilizing the financial system through credit creation or contraction. Finally, there would be less interference with

inter-temporal decisions, because interest-rate policies prevent the free adjustment of credit markets to supply and demand of real resources as savings and investment. By contrast, lump-sum transfers of money stimulate demand without directly affecting interest rates.

Baeriswyl's analysis does not stop here. Separating money from credit would have far-reaching implications that go beyond monetary policy. For example, it seems to require a departure from fractional-reserve banking. Lump-sum transfers also require a re-assessment of the way central banks absorb liquidity. Proponents of credit-based money creation often raise three interrelated arguments against its abolition. First, they argue that lump-sum transfers constitute fiscal policy. Because of their distributional consequences, transfers need to be decided upon by elected officials, not technocrats. Second, they believe that the current system is better than often assumed in bringing investment and savings in balance. Has it not allowed economic growth for large spells of the last two centuries? Third, they question the need to focus so much attention on central bank policy. If fiscal policy is pro-active, a credit-based monetary system can work smoothly. Fiscal policy takes center stage in absorbing excess liquidity and savings and in making sure that investment expenditures are sufficient. It can also take the necessary steps to prevent or escape a liquidity trap.

Unfortunately, European fiscal policy currently appears rather dysfunctional: it neither uses the opportunity of a huge excess supply of savings and demand for safe assets to boost public investment, nor does it exploit the large multiplier effects of fiscal policy in a liquidity trap for stimulating demand. This has raised a discussion for helicopter money as an additional instrument for central banks. Baeriswyl just goes one step beyond and suggests to replace the credit channel completely by a helicopter.

2 Putting Theory to Work

Macroeconomics is a policy-orientated science. A main challenge is to take theory and empirical scrutiny as far as possible while always having policy in mind. Bringing cognitive interest and policy relevance together has always been a hallmark of Gerhard Illing's thinking. This has been most visible during the symposium that has given rise to this volume. A frequent comment of participating central bankers was that if academic conferences would always be so interesting, they would have rather remained in academia. While all three parts of this book reflect this practical side of macroeconomics, this section puts special emphasis on it.

Financial markets and institutions are not just playing a dominant role in transmitting monetary policy to the real sector. In recent years, they have often absorbed policy impulses. Macroeconomic policy feeds into the peculiar logic of expansion and contraction that increasingly characterized the financial sector. From a certain point on, however, periods of financial contraction become a source of fiscal and growth risk. Finance, thus, simultaneously charges and discharges policy.

As fiscal policy has taken a backseat since the beginning of the 1970s, monetary policy has found itself in the center of this double role. It faces a difficult conflict. On the one hand, it tries to fulfill its role as a levee against the negative real consequences of financial contraction. On the other, it tries to enclose the dangers of excessive financial expansion. As the instruments to achieve the first may inhibit or even foil the instruments available to achieve the second, a conflict emerges. An intriguing analysis of this conflict and its relation to liquidity issues is provided in Cao and Illing (2010, 2011).

The challenges for monetary policy are all the more acute when fiscal policy becomes increasingly passive. This is most obvious in the case of the Euro crisis, which is surveyed and analyzed in the first chapter of the second part. Here, Sascha Bützer (2017) first illustrates the dramatic failure of fiscal policy. The institutions of the European Monetary Union lack mechanisms to pool risks across its member states and put the burden of adjustment on these national states while stripping them of some of the most effective instruments to achieve these adjustments, like national interest and exchange rates. Integrated financial markets would be an alternative to fiscal risk pooling, but financial integration stopped short of the standards achieved in other currency areas. Apparently, several member states have been overcharged by these demands. An almost religious belief in austerity and structural reform has prolonged the recession. It has led to an increase in indebtedness and thus defeated itself. Finally, it has pushed monetary policy in a situation that is perceived as an overburdening of its possibilities and mandate.

In Bützer's view, monetary policy has been the victim of a cure that has nearly proven fatal. While the detrimental effects of fiscal contraction were recognized by many monetary policymakers, structural reforms have been viewed at as "*a panacea to jump-start growth and generate employment*" (p. 143). Against the backdrop of hysteresis, the combination of procyclical fiscal, impotent structural and insufficient monetary policy is now yielding medium- to long-term effects.

After describing the current situation, Bützer looks at options available now. He analyses their potential in keeping the Euro area together and leading the way out of depression. Simultaneously, he asks whether the expansionary effects of these policies are outweighed by their disadvantages in terms of financial stability and redistributive effects. He concludes that conventional monetary policy and quantitative easing "*have run out of steam at the zero lower bound and increasingly pose risks to financial stability, the outright creation of broad money through lump-sum transfers from the central bank to private households may well be the most effective measure to achieve the Eurosystem's primary objective and lift the economy out of its slump*" (p. 155).

He recognizes that there are dangers associated with putting the central bank in such an exposed position. In the end, however, he favors managing credibility, independence, and financial stability risk to letting the Eurozone unravel.

Bützer's analysis illustrates the ever expanding universe of central bank instruments. This points to a policy challenge that emerging-market central banks have already faced long before the crisis. In these countries, monetary policy has often

been characterized by the use of multiple instruments. Sometimes this has been due to multiple objectives. In other cases, central banks have felt that a combination of instruments might be preferable to achieve a single goal.

Using the example of foreign-exchange-market interventions, Ivana Rajković and Branko Urošević (2017) develop a framework to analyze this multiplicity. The context is a small open economy with pronounced euroization. It follows an inflation-targeting strategy. In such a dual currency setup, the degree to which foreign currency is employed to store value or extend credit affects how the policy rate is set. If interest rates are the only instrument, monetary policy faces constraints that can be relaxed by foreign-exchange interventions. The responses to domestic and international shocks become less extreme and policy is less distortionary. However, to successfully operate with different instruments requires pre-conditions. In particular, central-bank risk management needs to be developed further to take into account the cost of foreign exchange interventions. Furthermore, monetary and macroprudential polices have to be calibrated jointly.

This important take-away from the chapter of Rajković and Urošević is further refined in the next three contributions of this volume that deal with the conceptual basis, measurement, and data requirements of macroprudential regulation.

Katri Mikkonen (2017) reviews recent contributions to macroprudential policy analysis. She first looks at the relationship among macroprudential, monetary and microprudential policies, emphasizing synergies and the need to focus on comparative advantages. In a second part, she presents an operationalization of macroprudential policy. Recent work at central banks has come up with new ways of risk identification and assessment. With a view to get a holistic picture of macro-financial risks, qualitative and quantitative techniques have been married in innovative ways, for example in novel early warning systems. Recent work has also come up with new views on macroprudential instruments, for example countercyclical capital buffers, loan-to-income ratios, or a time-varying net stable funding ratio.

Mikkonen concludes that much has been done to improve macroprudential policy. However, policies so far cannot be based on a stable set of stylized facts and instruments. The financial cycle has received less attention than the business cycles. Missing data and tools to model complexity in quickly changing systems limit the applicability of many models. "*There is no universally accepted dogma for macroprudential policy*" (p. 196). Trial and error will remain important elements of existing policy approaches. Much more empirical research needs to be carried out.

Manuel Mayer and Stephan Sauer (2017), in their contribution, study macroprudential aspects of measuring credit risk. Though the practice is currently contested, banks use their own estimates for the probability of default and the loss given default. The respective models follow different approaches. Accordingly, an important distinction with macro-financial relevance is the one between point-in-time (PIT) models (using all currently available information) and through-the-cycle (TTC) models (canceling out information that depends on the current position in the macro-financial cycle). TTC models are often viewed as favorable for

macroprudential regulation, because credit risk estimates do not improve (deteriorate) in a boom (recession). Thereby, constant equity requirements are less procyclical than if risk weights need to be adjusted when risk is measured by PIT models.

Mayer and Sauer question the perceived superiority of TTC, performing a range of empirical tests on the relative reliability of the two methods. They show that TTC are more difficult to validate. Having a theoretically good but empirically questionable method might do more harm than good. It also opens the door for misunderstandings between the supervisors and the supervised. Taken together, their arguments favor PIT models for measurement purposes. To compensate for the pro-cyclical nature of these models, the authors argue for a more extensive use of counter-cyclical capital buffers.

Florian Kajuth (2017) concludes Part II with a discussion of a current macroprudential topic, the rise in house prices, in particular in German urban agglomerations. House price developments are crucial to understand macro-financial dynamics (Illing and Klüh 2005). The analysis looks at German house prices from at least two different angles. One the one hand, it discusses issues of data availability and quality, comparing parametric and non-parametric approaches. In this way, it raises awareness for an often neglected but extremely important issue: the availability (or lack thereof) of data for macroprudential and other policy purposes. On the other hand, the chapter asks whether there is reason for concern. Did expansionary monetary policy result in substantial overvaluations, thus giving rise to prudential concerns?

Kajuth provides extensive evidence for the deplorable state of property price statistics in Germany. In particular, there is a lack of time series that go back sufficiently in time. Moreover, existing statistics lack comprehensiveness. It is therefore necessary to rely on cross-sectional variations of housing markets in Germany. Using this information and a range of other sources confirms that some urban areas do indeed seem to be overvalued. For Germany as a whole, however, there is no indication of a bubble, at least not yet.

3 Re-conceptualizing Macroeconomics

The financial crisis has left a deep mark on the kind of topics that are on macroeconomists minds. New methods have evolved, and macroeconomic issues have become more interesting to those who were previously focused on microeconomics. Macroeconomics has changed quite a deal since Lucas's now infamous quote that "*depression prevention has been solved*" (Lucas 2003, p. 1). The chapters in this volume reflect some of these developments. Macroeconomics is currently undergoing a period of re-conceptualization (Blanchard et al. 2010). This period started already before the crisis, but went largely unnoted, with few exceptions, such as the ones discussed in Beetsma and Illing (2005). The final section of this

volume looks at five elements of this trend:

- A renewed focus on stylized facts, economic history and path dependence,
- The application of established methods to new problems, such as the institutional structure of the Euro area,
- The application of new methods to old topics, building in particular on insights from behavioral and experimental economics,
- The resurgence of distributional issues as a topic of macroeconomic research, and
- The emergence of inter-disciplinary work to re-embed economics in the social sciences and contextualize its findings.

Axel Lindner (2017), in the first chapter of Part III, shows that going back a little further can yield important insights about the present situation. He looks at the macroeconomic effects of German unification and argues that the German economy had been off steady state already before unification. At the same time, Germany seems to have been on a trajectory that very much resembles the dynamics that we now associate with the anamnesis of the Euro crisis. In particular, investment was trending down already before unification, and continued to do so after a brief jump in the beginning of the 1990s. Moreover, the financial balance had been on an increasing trend during the eighties, a trend it returned to around 10 years after unification. The wage share in national income follows a similar pattern, yet with the opposite sign. These observations cast some doubts on the view that these developments were a consequence of introducing the Euro.

The problems of the Euro area are at the core of the chapter by Ray Rees and Nadjeschda Arnold (2017). They ask whether insurance-based approaches can help solving the sovereign default problem and argue that the economics of insurance markets can guide a redesign of the common currency area. This redesign seeks to preserve decentralized fiscal policy. Its main idea is to use risk-based insurance premia as an instrument to increase fiscal discipline. Rees and Arnold encourage the creation of an independent insurance agency. This agency ensures incentive compatibility by promising to remove the threat of sovereign default if certain conditions are fulfilled. Its main instrument are risk-based premia "*payable ex ante into a mutual fund that must at least break even in expectation*" (p. 267). In case of a fiscal emergency, the mutual fund arranges automatic payouts. Regular reviews of fiscal plans, minimum insurance reserves, and reinsurance arrangements complement the set-up.

Rees and Arnold compare this insurance-based approach with the existing European Stability Mechanism and different suggestions for Eurobonds. They conclude that none of these alternatives is incentive compatible, because they fail to make the costs of default risk accountable for governments ex ante.

Camille Cornand (2017) shows in her contribution that new empirical approaches can yield important insights about macroeconomic phenomena. In an attempt to provide additional foundations for the non-neutrality of money, she compares the role of three potential explanations for nominal rigidities: sticky prices à la Calvo (1983), sticky information à la Mankiw and Reis (2002), and limits to the level

of reasoning that price setters achieve. The latter is based on the observation that subjects in laboratory experiments fail to reach common knowledge when information abounds.

Cornand uses the data from an experiment by Davis and Korenok (2011), in which subjects play the role of price-setting firms in a macro-environment with stochastic demand shocks. The data reveal a sluggish adjustment to shocks, even if these shocks are publicly revealed. Cornand investigates which model yields the best fit of these price adjustments and finds that the sticky-information model fits best.

Selecting models on the basis of laboratory experiments provides an alternative to assuming artificial frictions in macroeconomic models. Experimental data also allow estimating behavioral parameters independently from other model parameters, while empirical tests with macroeconomic field data allow only a joint estimation of all model parameters. The estimated behavioral parameters may then be used for calibrations and as restrictions in the joint estimates of other model parameters with macroeconomic field data.

One should not underestimate the significance of these and other behavioral insights into wage and price stickiness. The rejection of Keynesianism by Lucas and others was largely justified with the argument that Keynesians were unable to derive such stickiness from micro-founded models with optimizing agents. The data from experiments and the results from behavioral economics more generally show that nominal rigidities and non-rational expectations are just a fact of life. This makes pragmatic reasoning much easier, as it is not hampered anymore by the requirement that all macroeconomic variables need to be derived from rational choices.

In the penultimate chapter, Dominique Demougin (2017) analyses an issue that more and more dominates the policy debate. After having long been relegated to the fringes of macroeconomics, the rising inequality of income and wealth now takes center stage. Using an incentive contract approach, Demougin provides a novel explanation for this trend. Information and communication technology allows managers to better monitor worker behavior. This redistributes informational rents from the bottom to the top of the income distribution. While middle management wins, firm owners win big. They do not just gain from a redistribution of rents from a given output: they also benefit from increased worker effort and productivity. The mirror image of this effect is that workers are penalized twice. They lose the rents that they had enjoyed before, and they suffer from a work environment that requires higher effort.

Demougin uses a standard hidden action problem to explain increasing income inequality. The argument is solely based on the organizational structure of the firm and, thus, provides an alternative to standard explanations based on globalization or skill-biased technological progress. Demougin's numerical exercise replicates a sizeable number of crucial features of the macroeconomic environment since the early 1970s. While technology advances, wages dynamics are at best subdued, if not stagnant. The wage share in income declines. Working conditions are increasingly resembling a treadmill with little space for discretionary decisions by workers. Certain groups of the society are able to keep up as middle managers, so the wage

distribution starts to become more uneven. But the strongest implication of the rise in information and communication technology is that the very top of the income and wealth distribution experiences large gains, a feature that cannot be explained by skill-biased technological progress.

Moritz Hütten and Ulrich Klüh (2017), in the final chapter of this volume, pick up the fact that macroeconomic developments since the end of the Bretton-Woods regime display peculiar characteristics. Not only has there been a redistribution from the bottom to the top and from labor to capital, but in parallel, inflation has come down and is too often close to deflationary levels. Unemployment has become a constant feature of capitalist societies, while it was largely absent in the decades before. Public debt as a share of GDP has trended up, in part because the incidence of financial crisis has increased continuously. Exchange rates and other prices on financial markets have exhibited a degree of volatility seemingly unrelated to fluctuations in fundamental variables.

All this has taken place in a context in which the task of stabilizing macroeconomic and financial fluctuations has been concentrated in the hands of central banks. These, in turn, have largely bought into the notion that some degree of unemployment is necessary to keep inflation in check, in particular the very low inflation targets that have become standard. Fiscal policy has been confined to implement a regime of institutionalized austerity (Streeck and Mertens 2010). And structural policies have often followed the prescriptions of the so called Washington consensus.

Hütten and Klüh argue that the beginning of the 1970s is a watershed between two ways of organizing economic activity in capitalist societies. The end of the Bretton-Woods system did not only change the way exchange rate movements and international capital flows are organized. A "regime change" occurred that led to a dynamic adjustment of capitalism, in which finance becomes increasingly important (financialization). Regrettably, there have been only few attempts to characterize these two phases of economic history holistically.

The chapter first introduces the concept of "*macro regimes*" as a framework for analyzing macroeconomic aspects during periods of large social transformations. Building on approaches from political science and sociology, macro regimes are defined as arrays of implicit or explicit principles, norms, rules and decision-formation procedures that lead to a convergence of actor expectations. Both the convergence of expectations (i.e. the emergence of regimes) and the divergence of expectations (which usually marks the beginning of a regime change) are reflected in specific characteristics of time series.

In the view of many observers from other social sciences, a characteristic feature of the macro regime in the last four decades is the increasing role of finance in society. This element of the current macro regime, often coined financialization, is the focus of the chapter. Can the macro regime approach itself explain financialization? What does financial sociology contribute to its understanding? And how could financialization happen on the watch of economic experts that now frequently reject it?

Thereby, this volume ends with a reflection on the roles that economics in general and macroeconomics in particular play in our society. This question has also been

characteristic for the symposium held in honor of Gerhard Illing and for Bob Solow's letter at the very end of this book. Solow asks: "*Why is it so difficult?*" referring to the combination of expert technique with common sense in economics. One explanation might be that economics is faced with a difficult double role. On the one hand, it can be considered a science (the objective of which is to distinguish true and false). On the other hand, it is a toolbox for policy. Put differently, it is a language that is employed within the economy to organize discourse about the economy. In this second role, it is highly political, applied, sometimes useful, and sometimes counterproductive.

Gerhard Illing has taught many people how to walk on the fine line between academic scrutiny and policy relevance that emerges from this double role.

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Part I
Liquidity From a Macroeconomic Perspective

Balancing Lender of Last Resort Assistance with Avoidance of Moral Hazard

Charles Goodhart

Abstract Solvency is rarely clearly defined, since it depends on valuations relating to future outcomes, which are themselves affected by policy decisions, including Central Bank Lending of Last Resort (LOLR). Positive LOLR may cause losses and moral hazard, whereas refusal could trigger a contagious panic. Measures to limit moral hazard, and hence allow more systemic protection include: (i) treating the first failure more strictly; (ii) involving other banks in any rescue; (iii) toughening the incentive structure for bank borrowers.

1 Introduction

If an agent is certain to repay her debts, on time and meeting all the required terms and covenants, she can always borrow at current riskless market interest rates. So a liquidity problem[1] almost always indicates deeper-lying solvency concerns.

The solvency concerns that lenders may have about borrowers may, or may not, however, be well founded. I start in Sect. 2 by noting that the definition of solvency is fuzzy. The future likelihood of a borrower defaulting is probabilistic, and so the terms (the risk premia) and conditions on which a borrower can raise cash, her access to liquidity, are stochastic and time varying, Sect. 3.

There is a common view that a Central Bank should restrict its activities in support of financial market stability to lending into the general market via open market activities, rather than lending to individual banks via Lender of Last Resort (LOLR) measures. I explain why I disagree with that argument in Sect. 4. Nevertheless the banks most in need of LOLR will generally be those that have been least prudent. Even though the Central Bank will choose *not* to support the most egregiously badly-behaved (and/or those whose failure is least likely to generate

[1]That may be defined as an inability to access cash to meet due outflows, except perhaps at enhanced premia that reveal existing solvency concerns to a wider public.

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F. Heinemann et al. (eds.), *Monetary Policy, Financial Crises, and the Macroeconomy*, DOI 10.1007/978-3-319-56261-2_2

secondary contagious-failures), the use of LOLR *does* entail a degree of insurance (against failure) and hence generates moral hazard. I discuss in Sect. 5 various ways of mitigating such moral hazard.

2 The Meaning of Solvency?

The use of language in macro-economics is slipshod[2]; (perhaps this helps to explain our penchant for arid mathematical models). Solvency is just such a slippery term. We think that we know what it means, i.e. that the value of assets is greater than the valuation of the liabilities. But in practice we do not, because it all depends on how the assets (and liabilities) are valued, and that depends on the viewpoint of the valuer, and also on the (changing) conventions and practices of the accountant.

Consider, for example, the British mortgage bank (Northern Rock) in September 2007, at the time when it asked the Bank of England for liquidity assistance. Looking backwards, to the prior bubble phase, it had very few non-performing loans, and was undoubtedly solvent (historic cost accounting). Looking forwards, to the likely future bust phase in housing, it was most probably insolvent (since it had expanded aggressively), as turned out later to be the case.

Moreover, the assessment of the solvency of an institution, especially one seeking LOLR assistance from a Central Bank (CB), is *not* independent of the CB's own actions and of the wider public's (the market's) interpretation of those same actions, (as in the case of Northern Rock).[3] The valuation of a going concern (where any help has been covert) is much greater than that of a concern, which is either gone or

[2]Examples are:

1. 'Real', as in real interest rates: Really means 'adjusted for (expected) price changes', but whose expectations and what prices? Not much 'real' about it; at best 'uncertainly measured adjustment for future price changes'.
2. 'Natural', as in the natural rate of unemployment. Really means the level at which some other variable, e.g. inflation, would remain stable. Often treated as being synonymous with 'equilibrium', but equilibrium carries a connotation that there are forces restoring such an equilibrium, once disturbed. This latter remains contentious.

[3]When LOLR assistance to a bank is revealed, the reaction can either be one of relief, i.e. the Central Bank will now restore order, or of greater concern, i.e. I did not know things were so bad. In the case of Northern Rock, Robert Peston of the BBC leaked that LOLR and had no incentive to calm the public. Moreover, Northern Rock had many depositors who interacted electronically. When a large number of these sought to withdraw simultaneously, the Northern Rock website crashed. The depositors interpreted this as a refusal of Northern Rock to allow withdrawals, and physically ran to do so from their nearest branch. Similarly when the authorities, e.g. the Treasury, guarantees the withdrawal value of an asset, as in the Irish bank deposits or US Money Market Mutual Funds, in 2008, this may calm the situation so that no further supporting action is needed. But alternatively, if the potential financial losses are feared to be large and the solvency of the guarantor is itself questionable, as it was in the Irish case, this can lead to both entities, guarantor and guarantee, dragging each other down, in a 'doom loop'.

needed patent public help to continue; hence there is a serious stigma effect of being observed to need LOLR assistance from the Central Bank, with potentially severe effect in delaying and distorting recovery processes.

Accountants have their own incentives. Although it is a crime to continue trading when knowingly insolvent, I am unaware of any bank having closed its doors because its accountant told them to do so. But, once a bank does close, most often because its liquidity problems become insuperable, the incentive of an incoming forensic accountant will be to exaggerate the potential scale of problems, thereby fuelling potential panic and risk aversion, because such an accountant will not want to have to claw back money from creditors on a future occasion, to meet further losses, if, indeed, such future claw back can be done at all. Too often creditors are originally told to expect large losses, whereas, after several years and a recovery from the crisis, they get paid back practically in full, (e.g. as in Lehman Bros London).

3 A Liquidity Problem Is a Solvency Problem

So (forward-looking) solvency problems exhibit themselves as liquidity problems. Borrowers, including banks, would, as a generality, not have a problem in gaining (funding) liquidity from markets if they were perceived as absolutely certain to pay back in full as contracted. There are a very few technical exceptions, where timing, terrorism, IT breakdowns, as with Bank of New York in the 1980s, or some other exogenous event prevents access to markets; but the common, heuristic rule is that a shortage of liquidity presages (market) concerns about solvency.

The CB then has to balance concerns both about potential loss from LOLR lending and the implications of being seen to support risk-loving, even reckless, management on the one hand (if it does support), against concerns about fuelling the panic, amplifying downwards pressures on asset prices and contagion on the other, (if it does not support). It is a difficult act of judgment, and there are no absolute clear rules.

In particular, the 'solvency' of any potential borrower is not a deterministic, exogenous, knowable datum, but depends on many time-varying future developments, not least how the CB itself responds to requests for LOLR assistance, and whether (and how) that becomes known. There is a most unhelpful misinterpretation of Bagehot (1873) that contends that he claimed that the Bank of England should only lend to solvent institutions.

But the Bank of England had no supervisory powers then, or the right to inspect other financial institution's books. So how could the Bank of England know who was solvent, and who not? Instead, what he meant, and said clearly, in his second rule for LOLR is that the Bank of England should lend freely on all 'good

securities'.[4] The criterion for Bagehot was the quality of the collateral, which could be assessed,[5] rather than the solvency of the borrower, which could not be.

4 Lend to the Market, not to an Individual Borrower?

There is a common view, more prevalent in the USA than in Europe, that the authorities, including the CB, should intervene as little as possible in markets, and/or that markets are better informed (efficient market hypothesis) than any authority can be, (despite CB's role as supervisor). If so, so it is asserted, in a panic the CB should provide liquidity to the market as a whole via open market operations, and leave the distribution of such liquidity to the market, which will sort out those deserving of support from those who *should* be let go, (better than CB).

This is, I believe, wrong, because it fails to grasp the dynamics of contagion. In a panic, the weakest is forced to close. Its failure will worsen the crisis. The market will then withdraw funds from the next weakest, further amplifying the downwards spiral. To prevent total collapse at some point the authorities will have to step in to support *every* institution which can meet certain criteria, as the G20 did in October 2008. Bagehot's criterion was the availability of 'good collateral'.

Such was the political revulsion from public sector support, 'bail out', of the banking sector in the USA, that the conditions under which the Fed could provide liquidity support to individual financial institutions were made somewhat more

[4] 'The great majority, the majority to be protected, are the "sound" people, the people who have good security to offer', p. 198, (1999 version: John Wiley: NY. HG3000. L8283).

[5] But if the collateral was good, why could not a bank raise money on the open market? There are two answers to this, the first being more applicable to the nineteenth century, the second more to subsequent centuries, twentieth and twenty-first. First, during panics financial markets tend to become dysfunctional, with no one being prepared to part with cash at any reasonable price. In such circumstances, the Central Bank is not only the Lender of Last Resort, but also the market maker of last resort. In such a situation what interest rate should it set? As Bagehot states, a 'high' one, but obviously *not* a 'penalty' rate. Bagehot never uses the word 'penalty' in this context. Second, such has become the stigma of being seen to borrow on LOLR terms from the Central Bank that banks tend to use up all their good quality collateral to borrow from the market, before turning, if all else fails, to the Central Bank for succour. With banks also of the view, prior to 2007–2009, that they could always borrow cash in wholesale markets (funding liquidity), they had run down their holdings of high quality liquid assets to almost nothing at the start of the Great Financial Crisis. So amongst the various unconventional monetary measures then taken were those that swapped less liquid assets (held by banks) for more liquid assets, e.g. Treasury Bills. The Bank of England's Special Liquidity Scheme is a prime example. In the aftermath of the Great Financial Crisis various requirements have been put in place, such as the Liquidity Coverage Ratio, to try to ensure that banks will always have enough high quality liquid assets to enable banks to be rescued from a panic, and associated liquidity troubles, without forcing the Central Bank to choose between accepting poor collateral, i.e. taking a credit risk, and letting that bank fail.

restrictive under Title XI, Sections 1101–1109, of the Dodd-Frank Act, passed by the House of Representatives in H.R. 4173, pp. 738–752, passed in 2011. Under this,

A. Section 13.3 lending, under which previously the Fed could lend to anybody, *not* just to banks, under 'unusual and exigent' circumstances has been curtailed. In future the Fed can only lend to eligible banks, and/or to "any participant in any program or facility with broad-based eligibility". What does this mean in practice?
B. The Fed cannot now lend to 'insolvent' borrowers; though [the CEO of] the borrowing bank may certify the solvency of her bank, with a duty to update any material information on such solvency.
C. More information on such emergency liquidity assistance has to be provided, and sooner.

Also provision of additional *guarantees* to depositors and other creditors of financial institutions can only be provided after a 'liquidity event' is agreed by the Federal Reserve Board, Federal Deposit Insurance Corporation and the Executive (President and Secretary of the Treasury). This must then be accepted by both Houses of Congress.

All this could make emergency liquidity assistance in a crisis less flexible, and make the Federal Reserve Board's freedom of action constrained by legal interpretation of the Dodd-Frank Act. Would, for example, the Fed be expected to audit the books of a potential borrower, prior to granting emergency liquidity assistance, or could it rely on the borrower's self-certification? If Bank A borrowed from the Fed in, say, May 2017 and then subsequently went into bankruptcy in July 2017, would there be (political) penalties, and, if so what, on the Fed and/or the self-certifier?

It is my view that the Dodd-Frank Act has already imposed undesirably rigid constraints on the Fed's flexible freedom of manoeuvre to respond to financial crises, though this is contentious. The Warren/Vitter Bill would have made such constraints *much* tighter, and the Fed has accepted, in November 2015, that 'broad-based' means at least five participants.

The contrasting view is that the Fed used a legal loop-hole, in Section 13.3, to expand its powers to act in a way that was close to, if not beyond, its proper capacity, i.e. ultra vires, as even Volcker complained. Rules of behaviour and accountability should be made by the legislature. The problem with that is that no one can foresee the future. So, binding the hands of the authorities tightly in *advance*, ex ante, may force them to stand idly by as the financial system unravels, as turned out to be the case with the failure of Lehman Bros. Accountability to the legislature for actions already taken, ex post, is necessary, but tight prescription in advance overlooks the inherent uncertainty of an ever changing financial system. The future will not just be a re-run of the past, not just a different draw from an unchanging probability distribution.