

## *Introduction*

ESA JOKIVUOLLE AND RADU TUNARU

Financial markets have become one of the most important areas of economic activities in developed countries. Trillions of dollars are traded on these markets and financial risks are diversified to a larger pool of investors than ever before. The benefits of these highly lucrative and sophisticated markets are overshadowed from time to time by spectacular crashes and crises. Many times, the financial markets have the capacity to regenerate and continue as if very little happened. Some other times, the crashes lead to crises and the crises spill over to the real economy. When that happens, there is a wave of criticism against banks and financial markets and a new wave of regulatory legislation is passed to fix the situation such that these crises should never occur in the future. Yet, in spite of increased regulation crises seem to recur again and again.

Crises seem to be different every time and there is no regularity as such, although problems seem to recur in certain asset classes such as real estate. The equity crash of 1987 was followed by the fall of the sterling pound in 1992, then the Asian crisis of 1997 and the Russian default of 1998 that led to the collapse of Long-Term Capital Management (LTCM), the first gigantic hedge fund. Then we had the dot.com crisis at the beginning of the 2000s and finally the series of crises that started in 2007. One regularity suggests itself: when severe banking problems are involved, the real economic consequences tend to be bigger and more enduring.

At the time of publication of this book we are confronted with very low, even negative interest rates, stagnation, deflationary pressures in some regions, political risks and Brexit. These can hardly be called normal times, and are to a large extent a legacy of the most recent crises. The future looks perhaps even too interesting for academics, and anxiety has been spreading out in many places. This may be the beginning of a new realism in finance and banking and many of the old norms may need to be reconsidered.

Although it is imperative that we analyse the most recent crises thoroughly, we hopefully do not miss the risks of the *next* possible crisis before they grow too big. Almost by definition, the materialisation and timing of a crisis are unpredictable, at least well in advance, because otherwise measures would apparently be taken to stop the crisis from happening. What we should do, however, is to better understand and identify dangerous developments that increase the likelihood of a major crisis, and take measures to reduce that likelihood early enough.

In the aftermath of any event many people know what we should have done to prevent the event, but that may be of limited help when preparing for future events. We may need to spend more time to look forward and try to prevent the next crisis if possible. To that end we need to create better tools to monitor the prevailing situation in order to chart a wider range of problem scenarios. Perhaps academics and experts in financial economics should spend more time ‘indulging in controlled fantasies, trying to dream up new ... phenomenon(a) that (are) not contrary to our knowledge, but perhaps beyond our experience’, to borrow the adapted words of a famous physicist.<sup>1</sup>

This book outlines the discussions that took place during a one-day workshop organised in September 2015 by the Kent Business School at the University of Kent in the United Kingdom in close collaboration with the Bank of Finland. In that workshop various specialists debated on what could be and how we can prepare for the next financial crisis that may hit financial markets and economies worldwide. The chapters included in this book present macropolicy issues, stress testing issues, experimental finance and model risk views that may help regulators, policymakers, risk managers, academics and general practitioners in becoming more aware of the sources, channels and modes of manifestation of the next financial crisis.

Our view is that it is highly unlikely that financial crises could be eliminated completely, although we should be able to reduce their probability. Being better prepared also means better crisis management: that we can act quicker to deal with problems and avoid larger losses that would ultimately fall on the entire society. Neither would it be realistic to claim that this book covers all possible angles. The Brexit

<sup>1</sup> Excerpted from the libretto of the opera *Doctor Atomic*, written by Peter Sellars.

result highlights this, very little being mentioned during the workshop about this possibility and what it would mean. So, our scope is not to pretend we have a crystal ball or that we know what is coming next but rather to emphasize the diverse character of the next possible crisis scenarios. We promote learning from the past but also looking to the future and we advocate tool building and collective thinking about the problems emerging in financial markets.

It was our aim to bring together experts from a wide range of areas involving finance, policymakers, chief economists of investment banks, central bankers, academics and regulators from the United States, United Kingdom and European Union. We hope we have started a useful dialogue that should continue more regularly.

The book is structured in two parts. The first part comprises more policy-oriented views while the second offers a few analytical studies from a ‘financial stability laboratory’.

Part I starts with Chapter 1, ‘Non-Standard Monetary Policy and Financial Stability: Developing an Appropriate Macrofinancial Policy Mix’ by Lucrezia Reichlin (LBS) and Huw Pill (Goldman Sachs). Focusing primarily on the European Central Bank (ECB)’s post-crises monetary policy, they consider the potential risks of central banks’ non-standard policies for financial stability. They suggest a useful taxonomy of the different types of balance sheet policies and the types of financial stability risks to study these questions. They argue that central bank intermediation which substitutes for private intermediation during a crisis tends to bolster financial stability. By contrast, central bank asset purchases aimed at reducing returns on safe assets and thereby pushing private investors to longer term and higher risk investments may generate financial stability concerns. This can be the case if a flat yield curve puts pressure on banks’ profitability, although the flat curve can also discourage maturity transformation. They conclude by pointing to the current discussion concerning the appropriate policy mix – comprising conventional and unconventional monetary policies, micro- and macroprudential policies, as well as fiscal policy – which could help achieve the aims of monetary policy without risking stability.

In Chapter 2, Seppo Honkapohja (Board member of the Bank of Finland) first discusses the various financial market developments that led to the most recent crises. Thus this chapter also serves as a

useful prelude to many of the themes developed later in the book. As the title of his chapter, ‘Financial Innovation and Financial Stability’, suggests, one of the key lessons from the crisis is to understand the linkages between seemingly beneficial financial developments and the risks they generate. He then provides a concise account of regulatory reforms in Europe. Considering some of the same issues that will be discussed further in Chapter 4, he concludes by discussing the challenges facing post-crisis macroeconomic research in its pursuit to better incorporate financial factors and to guide future macroprudential policy making.

In Chapter 3, Larry Wall (Federal Reserve Bank of Atlanta) reviews ‘Post-Crisis Changes in US Bank Prudential Regulation’. He also offers some comparisons with the corresponding European reforms (which Seppo Honkapohja discussed in more detail in Chapter 2). Wall argues that in many cases the new regulatory rules adopted by the United States largely as part of the Dodd–Frank Act have been stricter than those required by the international agreements. The United States has also taken additional measures that are not required by international agreements. On the other hand, Wall notes that as a result of differences in the US generally accepted accounting principles (GAAP) framework, the largest US banks report significantly higher regulatory leverage ratios than would be the case under the International Financial Reporting Standards (IFRS), the accounting framework used in the European Union. Europe has also adopted stricter regulations on bankers’ variable compensation than the United States.

In Chapter 4, ‘Financial Markets and Policy through the Lens of Macroeconomics’, Jouko Vilmunen (Bank of Finland) reviews the state of macro modelling in the wake of the crises. He focuses on the Dynamic Stochastic General Equilibrium (DSGE) models, which have over the years become the ‘workhorse’ modelling framework for central banks in particular. He considers the criticism these models have encountered in the wake of the crisis, and takes a constructive view of how to move forward. Continuing the work on incorporating financial frictions in these models will be the key, but that may not be enough, given the current limitations of the DSGE framework. Alternative modelling approaches including smaller and more partial models will also be needed. A constructive ‘dialogue’ between the different modelling approaches is also necessary.

Part I ends with Juha Tarkka's (Bank of Finland) fascinating historical perspective on regulatory ideas on how banks should invest, titled 'Investment Doctrines for Banks, from Real Bills to Post-Crisis Reforms' (Chapter 5). He shows how thinking in this area has evolved over time with a varying emphasis on liquidity and solidity of bank assets. The emphasis has changed as a result of developments in central banking and the growth of money markets. According to him, attention shifted from liquidity, which the real bills doctrine emphasized, to the solidity of collateral. As a result of the *anticipated income doctrine* of banking and the idea of liability management, liquidity considerations were displaced by credit risk management and capital adequacy. However, the latest crisis has forced a reconsideration whereby the liquidity of bank portfolios is again emphasized.

The second part is dedicated to what may constitute tolls in a financial laboratory that may improve our knowledge of how crises appear and what to do to capture early signals about them.

In Chapter 6, 'Stress Testing in Banking: A Critical Review', Adrian Pop (University of Nantes/Nantes-Atlantic Economics and Management Laboratory LEMNA) revisits the main theoretical underpinnings of the various stress testing methodologies used by the main central banks and prudential authorities, highlighting the macroprudential lessons learned thus far. In addition, a rigorous and practically flexible new methodology for stress testing is revealed that is aiming to detect 'extreme but plausible' economic scenarios, using statistical techniques proven to be capable of detecting outliers in macroeconomic time-series data. This new methodology infers the shocks endogenously, circumventing the ad hoc approach used in the literature and practice so far.

Chapter 7, 'Making Sense of the EU Wide Stress Test: Comparing SRISK and the European Central Bank/European Banking Authority Measures of Bank Vulnerability', by Timotej Homar (ECB and University of Amsterdam), Heinrich Kick (ECB and Goethe University Frankfurt) and Carmelo Salleo (ECB) is also dedicated to stress testing. The authors present a practical comparison of the SRISK approach and the ECB/EBA method to assess stress test results through the lenses of capital shortfall. They found significant differences between the two stress measuring methodologies, with the ECB/EBA measure being driven by bank credit losses and bank vulnerability while the

SRISK measure used largely in the United States being driven mainly by the banks' leverage ratios. Their conclusions point to a direct relationship between SRISK stress impact and market leverage ratio, which may explain the discrepancies between the SRISK and ECB/EBA approaches in particular for banks that are on their way to bankruptcy and also for banks that are extremely well capitalised.

In Chapter 8, 'The Role of Personality in Financial Decisions and Financial Crises', Thomas Noe (Said Business School, Oxford University) and Nir Vulkan (Said Business School, Oxford University) use a psychological laboratory style of investigation to track down the role of personality traits as contributors to the behaviour of financial actors. The ultimate aim is to assess the effects of personality on aggregate economic outcomes. Their research shows that personality variables may play a significant role in predicting economic behaviour. Furthermore, they also reveal that personality had a strong impact in group decision context while being insignificant in individual decision contexts. This is an area of research that will attract no doubt intensive research in the immediate future, with a focus on integrating the personality variables into a general economic framework for decision making.

Part II ends with 'Model Apocalypso' Chapter 9). In this chapter Radu Tunaru (University of Kent) presents a critique of the model development process in finance. The field of finance, being intrinsically an empirical science, requires robust inference tools. Models are the primary tools of knowledge discovery but the rate of their production seems to increase exponentially. It is argued that more models will not necessarily improve knowledge in finance. Lack of understanding of models' capabilities and pitfalls contributed to huge losses in the banking system. He argues that the lack of understanding of models applied in the financial sector may generate a significant crisis in the near future.

The book is aimed at academic specialists, practitioners and professionals in the field of finance and financial markets. The volume should be attractive to regulators, risk managers, economists at financial institutions and central banks, journalists, investment bankers and hedge fund managers covering macro event risk, as well as academics and postgraduate research students working in finance and risk management areas.

*Introduction*

7

We would like to thank Cambridge University Press, and in particular Phil Good, for helping us to bring this volume to light.

We are also indebted to several people who provided their support in organising and running the event in Canterbury. To this end we would like to thank Kimberley Attard-Owen, Jagjit Chadha, Catherine Lucas, Ian Marsh, Roman Matousek, Martin Meyer, and Paul Verrion for all their good will.

# 1 *Non-Standard Monetary Policy and Financial Stability: Developing an Appropriate Macrofinancial Policy Mix*

HUW PILL AND LUCREZIA REICHLIN

An ultra-accommodative monetary policy brings with it long-term risks to the stability of the financial system. First, because of the mounting risk of financial market bubbles, ... [and] second, because profitability in the banking sector can take a hit.

Dr Jens Weidmann, president of the Deutsche Bundesbank<sup>1</sup>

## 1.1 Introduction

Central bank balance sheets in advanced economies have expanded significantly since the onset of the 2007–2009 financial crisis. Faced with market dislocations and the threat of deflation, all the leading central banks have engaged in non-standard monetary policy actions (such as quantitative easing, credit easing, liquidity injections and forward guidance) in an attempt to contain the crisis, revive economic activity and stabilise the outlook for price developments.

Yet such non-standard measures are understood to come with risks which are larger than those associated with the standard monetary policy practice aimed at lowering the target short-term interest rate.

Initially, the rapid expansion of central bank balance sheets associated with the adoption of various non-standard policy measures was seen to portend inflation risk.<sup>2</sup> But, at least thus far, inflation has failed to materialise. On the contrary, despite an ongoing expansion of both the European Central Bank (ECB)'s and Bank of Japan's balance sheets, concerns in Europe and Japan remain centred on downside risks to price stability

<sup>1</sup> See Weidmann (2016).

<sup>2</sup> See Meltzer (2009), A23, which contains the sentence: "The enormous increase in bank reserves – caused by the Fed's purchases of bonds and mortgages – will surely bring on severe inflation if allowed to remain."



(and deflation), rather than on inflation. Even in countries that are more advanced in their recovery (the United States, the United Kingdom and – within the euro area – Germany), price and wage developments have been persistently and surprisingly weak. In most macroeconomic forecasts, the global inflation outlook remains benign across the advanced economies, with risks to the downside rather than the upside.

Nonetheless, concerns about the pace and magnitude of central bank balance sheet expansion endure. But these have shifted away from inflation towards worries about financial stability.

In this chapter, we argue that not all central bank balance sheet expansions are the same in this regard. Allowing central bank intermediation to substitute for private intermediation when markets seize up tends to bolster financial stability.<sup>3</sup> By contrast, asset purchases aimed at reducing returns on safe assets and pushing private investors further along the risk and maturity spectra than they would otherwise choose to go may have an ambiguous effect on financial instability risks.

Unlike with a traditional reduction in the policy rate, which is associated with a steepening of the yield curve, active central banks' purchases of longer term government securities have a flattening effect on the yield curve. As a consequence, these policies squeeze financial institutions' profitability, which may raise concerns about the effect this has on their capital. On the other hand, a flatter yield curve reduces the incentives for banks to engage in maturity transformation and therefore makes these institutions safer.

Therefore, even abstracting from the beneficial effects that balance sheet policies have on aggregate demand, their effects on financial stability depend on a variety of factors: the 'active' or 'passive' nature of these policies and the way in which financial intermediaries respond in their balance sheet management, which in turn depends on their business model and the characteristics of the financial sector.

## 1.2 Two Rationales for Central Bank Balance Sheet Expansion

In the academic monetary policy literature, non-standard central bank measures have been based on two broad motivations.<sup>4</sup>

<sup>3</sup> See Giannone, Lenza, Pill and Reichlin (2012).

<sup>4</sup> See Lenza, Pill and Reichlin (2010) and Pill (2010). A third motivation is often also highlighted, although it remains something of a legal and institutional taboo: supporting government financing. In the euro area, non-standard central

### *1.2.1 Complementing Standard Policy by Supporting Conventional Transmission Channels*

One set of measures aims at maintaining the normal channels of monetary policy transmission, from interest rate decisions to price-setting behaviour. By their nature, such non-standard measures are natural *complements* to the conduct of conventional monetary policy. The two elements work together: unconventional tools act to maintain the transmission of conventional instruments in what would otherwise be difficult circumstances.

Viewed from this perspective, central banks provide support to the private sector through non-standard measures at times of stress, so as to maintain the functioning of financial markets, institutions and infrastructure. In essence, the central bank acts as a ‘central counterparty of last resort’, facilitating trades that are necessary for the operation of the wider financial system (and thus for the economy as a whole) that the private market can no longer intermediate. The expansion of the central bank balance sheet – as larger monetary policy operations on the asset side accompany an accumulation of excess reserves on the liability side – is typically one outcome of such support.

In the euro area context, one prominent example of such a measure was the introduction of fixed rate/full allotment tender procedures at the ECB’s monetary policy operations in October 2008 (Figure 1.1) at a time when the private interbank money market had seized up owing to concerns about bank default risk following the failure of Lehman Bros. In mid-September,<sup>5</sup> the ECB acted as a *de facto* central counterparty, replacing interbank payments via private intermediation that were no longer possible.

Not only did such actions contain and ultimately reduce money market spreads (Figure 1.2), but by maintaining interbank flows these actions were crucial in preventing other market malfunctions and ultimately had a more significant impact on credit flows, economic activity and the outlook for price developments.

bank policy measures – in the form of sovereign asset purchases by the ECB – have created ‘fiscal space’ on government balance sheets, allowing easier fiscal policies than would otherwise have been the case.

<sup>5</sup> See Heider, Hoerova and Holthausen (2015), who propose a model of adverse selection in the interbank money market to explain the seizing up of private intermediation in this period.