FUNDAMENTALS OF CENTRAL BANKING

Lessons from the Crisis

GROUP OF THIRTY

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Abbreviations

AMEs	advanced market economies
BIS	Bank for International Settlements
CPI	Consumer Price Index
ECB	European Central Bank
EME	emerging market economies
FOMC	Federal Open Market Committee
FX	foreign exchange
GDP	gross domestic product
IMF	International Monetary Fund
lhs	left-hand side
LTROs	long-term refinancing operations
OECD	Organisation for Economic Co-operation and Development
OMTs	Outright Monetary Transactions
QE	quantitative easing
rhs	right-hand side
RORO	risk on, risk off
SMEs	small and medium-sized enterprises
TALF	Term Asset-Backed Securities Loan Facility
VIX	Volatility Index
y/y	year-over-year
ZLB	zero lower bound

Foreword

The Group of Thirty's (G30's) mission is to deepen the understanding of international economic and financial issues, to explore the international repercussions of decisions taken in the public and private sectors, and to examine the choices available to market practitioners and policy makers.

Pursuing that important mission, the G30 decided to undertake a major study of the evolving role of central banking. That role has changed over the years, and in particular the developments around the economic and financial crisis of 2007–09 have led to a reappraisal of the role that central banks play in a modern economy. The study was led by a Steering Committee comprised of Jacob A. Frenkel (chairman), and Arminio Fraga, and Axel Weber. They were supported in their efforts by project director William White and a Working Group comprised of sixteen members, all of whom are members of the G30. The study continues the G30's history and tradition of contributing to public debate on policy topics of major concern to the global financial community.

The G30 believed that a study was needed to place recent central bank policy actions within the historical context. The study illuminates where the roles, responsibilities, objectives, and policy instruments of central banks have changed and where they ought to remain the same.

Despite the institutional and conceptual changes that have taken place, certain key principles held by central bankers adhered to over the years remain valid and need to be maintained. Key among those are that central banks must continue to pursue long-term price stability. Crucially, this must be underpinned by strong, independent central banks. This independence must be secured. At the same time, without prejudice to the principle of central bank independence, public accountability should be ensured.

Fostering financial stability must also be an important part of a central bank's mandate. The study finds that avoiding excessive credit dynamics is instrumental in achieving this objective, since the accumulation of debt over time can lead to growing imbalances in both the real and financial sectors that can culminate in systemic financial crisis.

The report underscores the critical role of central banks in the management and resolution of crises. Central banks also have a vital role in maintaining financial stability, and in crisis prevention efforts. These tasks should remain part of the central banks' responsibilities. But central banks should not be expected to do it alone.

The immediate and short-term benefits associated with conventional and unconventional monetary policies are recognized. At the same time, some of these policies might have unintended consequences, and how to minimize them remains a challenge.

The study warns that the ultimate resolution of crises often can only be dealt with through arms of government other than the central bank. However, central bank policy actions can be supportive and complementary to effective government actions.

Serious risks may arise if governments, parliaments, public authorities, and the private sector assume that central bank policies can substitute for the structural and other policies they should take themselves. Failure to grasp the opportunity offered by central banks might risk the precipitation of future crises.

The report is the product of the Steering Committee and Working Group on Central Banking and reflects broad support and agreement among participants about the general principles and conclusions. It does not imply agreement with every specific observation or nuance. Members participated in their personal

capacity, and their participation does not imply support from their respective public or private institutions. The report does not necessarily represent the views of the membership of the G30 as a whole.

We hope this report adds to the debate on the lessons to be learned from the 2007–09 crisis, and the continued role of central banks going forward as they pursue price stability and financial stability in the context of a changing global economy.

Jacob A. Frenkel
Chairman of the Board of Trustees
Group of Thirty

Jean-Claude Trichet
Chairman and CEO
Group of Thirty

Acknowledgments

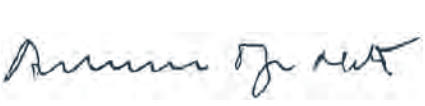
On behalf of the entire Group of Thirty (G30), we would like to express our appreciation to those whose time, talent, and energy have driven this project to a rapid and successful completion.

We would like to thank the members of the Working Group on Central Banking, all of whom are members of the G30, who collaborated in our work at every stage and added their unique insight. The intellect and experience brought to the deliberations by the sixteen members, which consisted of former central bank governors, regulators, and academics, was remarkable and essential to the success of the project.

No study of this magnitude can be accomplished without the committed effort of a strong team. The G30 extends its deep appreciation to William White, who performed superbly as Project Director and draftsman. We all appreciated his hard work on synthesizing the collective wisdom of the Working Group members into a cohesive narrative and final report.

The coordination of this project and many aspects of project management, Working Group logistics, and report production were centered at the G30 offices in Washington, D.C. This project could not have been completed without the careful eye of our editor, Diane Stamm, and the dedicated efforts of Executive Director Stuart Mackintosh and his team, including Corinne Tomasi and Stephanie Tarnovetchi of the G30 staff, and former Associate Director, Meg Doherty. We also wish to acknowledge the able assistance provided by Volker Schieck of UBS.

Jacob A. Frenkel
Chairman, Working Group on Central Banking



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Executive Summary

INTRODUCTION

Almost from their beginnings, over three centuries ago, the ultimate objective of central banks has been to support sustainable economic growth through the pursuit of price stability and financial stability. Over time, however, the balance of each goal has fluctuated according to existing cultural, economic, and political pressures.

In the immediate decades prior to the 2007–09 economic and financial crisis, the policy pendulum swung strongly toward favoring price stability, with the focus on the relatively short term. The Great Moderation—a period of apparent relative economic calm and stability—occurred in the advanced market economies (AMEs). This economic stability supported a theoretical view and mindset that saw the economy as being inherently self-stabilizing, and efficient in its allocation of scarce resources. This view prevailed despite building evidence of underlying tensions or imbalances, and the proliferation of localized economic and financial crises. In hindsight, the economic calm obscured a credit bubble that was growing and becoming precarious. When the bubble collapsed, the crisis erupted and central banks and governments responded swiftly.

During the response to the economic and financial crisis, central banks played an essential crisis management role alongside governments. Central banks in the major AMEs reacted with vigor. Policy rates were reduced essentially to zero, forward guidance was used to help lower medium-term rates, and the balance sheets of central banks expanded enormously, while their composition altered significantly. Central banks fought to restore financial stability, and aggressive unconventional policy action was necessary and effective in the crisis response phase, in particular. Collectively, central bank policies since the outbreak of the crisis have made a crucial contribution to restoring financial stability.

In 2015, eight years on since the eruption of the crisis, the central banking community still faces many difficulties and challenges as it surveys possible exit strategies from their current policy stances and grapples with the possible medium-term impacts. While the short-term benefits associated with conventional and unconventional monetary policies are self-evident, the costs of the unintended consequences are not. Only time and further policy measures will reveal the magnitude of such costs.

In light of the crisis and the subsequent policy responses, important questions have arisen as to the proper roles, duties, and obligations of central banks in the years ahead.

This report seeks to illuminate central banking lessons from the pre-crisis period, the crisis itself, and the subsequent policy responses, and to add to the important process of delineating central banking roles and responsibilities, and how they have been reinforced and modified. Central banks and their leaderships are continuing a process of self-critical assessment, what should be learned from the crisis, the policy responses, and the outcomes, positive and negative, intended and unintended, that have resulted from those policies.

The report finds that while some of the earlier beliefs held by central bankers need to be modified, there are key pillars that constitute the foundations of central banking that must be maintained. The report identifies three key principles and ten key observations dealing with the Frameworks to Manage and Resolve Crises, and Financial Stability and Crisis Prevention.

KEY PRINCIPLES

The three key principles that are indispensable facets of central banking today and going forward are:

1. **Longer-term price stability is the most important contribution central banks can make to ensuring strong and sustainable growth.** Both high inflation and significant deflation can entail heavy economic costs. Maintaining price stability, frequently understood as a low, stable inflation rate over the medium term, will also contribute to stabilizing business cyclical fluctuations in economic activity through a solid anchoring of inflation expectations.
2. **Fostering financial stability should also be an important part of a central bank's mandate.** Avoiding excessive credit dynamics is instrumental in achieving this objective, since the accumulation of debt over time can lead to growing imbalances in both the real and financial sectors that can culminate in systemic financial crisis. Central banks should be given responsibility for identifying such systemic threats and for trying to offset related risks to long-term price stability. This implies that central banks must have ultimate authority over all the relevant policy tools, including macroprudential instruments.
3. **It is crucial that the independence of central banks be maintained.** Central banks must be able to focus on policies orientated toward longer-term objectives. They must be kept free from undue political or popular pressures to provide short-term stimulus or other policy actions that are ultimately inconsistent with this core mandate. The indispensable accountability should be ensured without prejudice to the principle of central bank independence.

KEY OBSERVATIONS

In addition to the three key principles, the report makes ten key observations addressing the Frameworks to Manage and Resolve Crises, and Financial Stability and Crisis Prevention. The report recognizes the important role that central banks must play in the management and resolution of crises, as part of their responsibility to contribute to the stability of the financial system as a whole. But central banks should not be overburdened and cannot do it alone. Governments should also play an important role in crisis resolution, management, and prevention. Governments have a responsibility to address structural, regulatory, and other weaknesses in the real economy that might otherwise contribute to the gestation of future crises.

Frameworks to Manage and Resolve Crises

1. **The principal lesson to be drawn from the economic and financial crisis that erupted in 2007 is that serious economic and financial crises can happen, even in low inflation advanced market economies. Thus, all countries must prepare by putting in place frameworks both to manage and to resolve crises.** Central banks need to be cognizant of the lessons of economic history, and be ready to explore various analytical frameworks that would help anticipate the emergence of such crises. This would also contribute to preventing crises.
2. **Central banks have a crucial role to play in crisis management and, in particular, in ensuring the stability and smooth functioning of the financial system.** Preparations beforehand, in association with other government bodies, are of crucial importance in ensuring the crisis does not spin out of control. Central banks must also have flexibility and, where necessary, be strengthened in their flexibility and powers to act to deal with unexpected and rapidly changing circumstances. This includes not only the traditional instrument of Lender of Last Resort, but also the powers to deploy unconventional monetary instruments like those used in recent years.
3. **However, the ultimate resolution of crises that have their roots in excessive credit creation and debt accumulation often can only be accomplished through arms of government other than the central bank.** Preparations made beforehand, such as legislation concerning bankruptcies, are crucial.
4. **Supportive actions by central banks can be useful, but there are serious risks involved if governments, parliaments, public authorities, and the private sector assume central bank policies can substitute for the structural and other policies they should take themselves.** The principal

risk is that excessive reliance on ever more central bank action could aggravate the underlying systemic problems and delay or prevent the necessary structural adjustments.

5. **While unconventional policies such as quantitative easing, off-balance-sheet commitments, and forward guidance have played an important role in the management of recent crises, deeper studies are still needed to ascertain their longer-term overall benefits and unintended consequences.** In particular, the possibility that such unconventional policies might encourage excessive risk taking, and appropriate means to counter such risks, should be considered.

Frameworks for Financial Stability and Crisis Prevention

The report underscores the important role played by central banks regarding financial stability and crisis prevention. At the same time, it highlights the challenges that might arise as central banks seek to carry out their responsibilities using conventional and unconventional policies that might have potentially unintended consequences over the medium term.

1. **Central banks have a primary responsibility to ensure the efficiency and stability of the global payments and settlements systems.** Failures in the function of such systems would likely have serious systemic implications for the economy.
2. **Macroprudential policies have a role to play in crisis prevention, especially in dealing with credit-supported booms, particularly those in the housing sector.** However, the effectiveness of these tools will have to be carefully monitored and evaluated. Microprudential polices, designed to improve the health of individual financial institutions rather than the system as a whole, might also be useful in reducing the magnitude of both credit booms and subsequent busts. While there is a growing consensus that central banks should play a key role in ordinary bank supervision, opinions differ on whether central banks should take on a larger role in microprudential supervision more generally.
3. **There is broad-based consensus that flexible exchange rates are the best way to minimize the international repercussions of domestic monetary policies.** In order to avoid having to resort to administrative measures to deal with such "spillover" effects, central banks should support structural measures to improve the functioning of their domestic financial markets and to increase their resilience to external shocks.
4. **Central banks must be transparent in explaining their policy actions.** This will increase the capacity of markets to understand monetary policy decisions, and thereby contribute to financial stability.
5. **While macroprudential policies are the preferred choice to address financial stability concerns, there is no consensus as to whether monetary policy should be used to lean against excessive credit expansion and the resulting buildup of (noninflationary) "imbalances" in the economy.** While "leaning against the wind," that is, using interest rates in order to do so, could play a useful role, it would lead to prices undershooting near-term desired levels. Therefore, the price stability target should be set over a longer horizon, with less near-term precision than is currently the case. At the least, care should be taken to ensure that monetary policy is conducted more symmetrically over a financial cycle.

CONCLUSION

Central banks worked alongside governments to address the unfolding crises during 2007–09, and their actions were a necessary and appropriate crisis management response. But central bank policies alone should not be expected to deliver sustainable economic growth. Such policies must be complemented by other policy measures implemented by governments. At present, much remains to be done by governments, parliaments, public authorities, and the private sector to tackle policy, economic, and structural weaknesses that originate outside the control or influence of central banks. In order to contribute to sustainable economic growth, the report presumes that all other actors fulfill their responsibilities.

CHAPTER 1

The Evolving Role of Central Banks

SYNOPSIS

Almost from their beginnings, over three centuries ago, the ultimate objective of central banks has been to support sustainable economic growth through the pursuit of price and financial stability. However, the balance of emphasis on these two intermediate objectives has varied over time. Early on in central bank history, the objective of financial stability had primacy. However, by the eve of the crisis that erupted in 2007, the balance had swung almost totally in the direction of seeking price stability, and that over a relatively short policy horizon. The magnitude, scope, and long duration of this unexpected crisis now demands a reevaluation of how central banks might best contribute to the pursuit of strong and stable growth. While many of the pre-crisis beliefs held by central bankers need to be maintained, not least of which is the pursuit of longer-run price stability, others need to be adapted or even rejected to ensure their continued appropriateness in light of the continuing evolution of the global economy. There are important lessons to be drawn from recent events, but the lessons suggested by the longer sweep of central banking history must not be forgotten. One key lesson is that central banking should be guided by medium-term rather than short-term considerations, which implies that central banks should avoid fine-tuning policies.

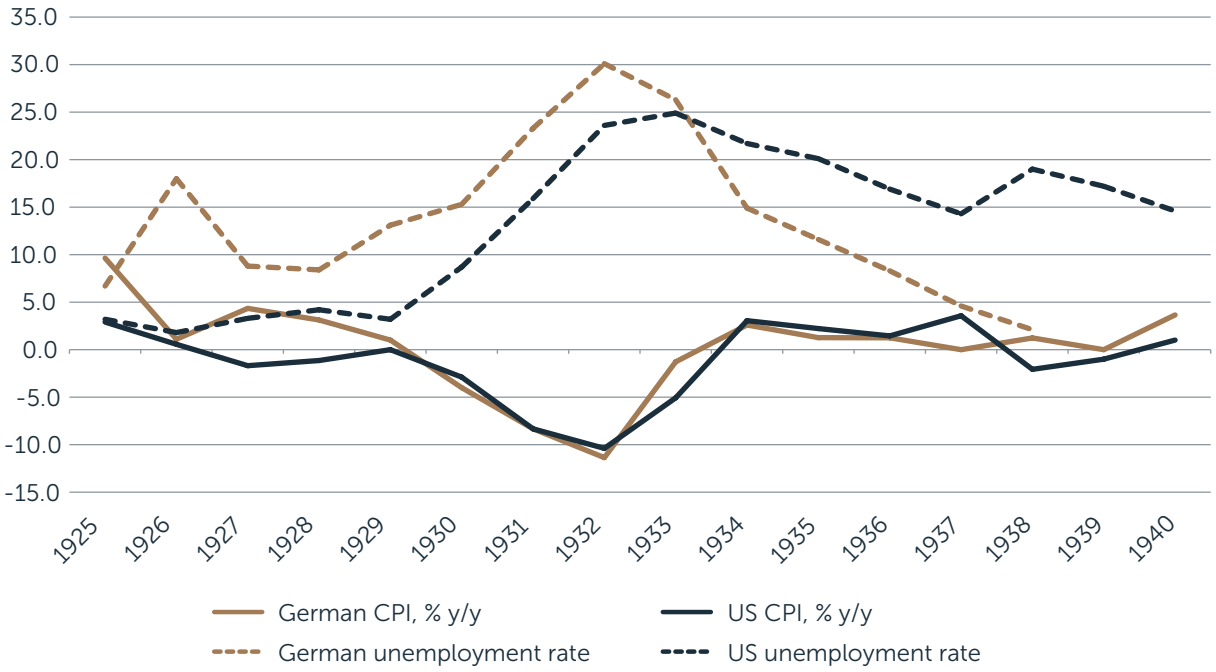
INTRODUCTION

Central banks were first established in the 17th century, with the primary purpose of providing war finance to governments and managing their debts. Their role in the economy has since evolved in a very different direction. The pursuit of sustainable economic growth became fundamental to their activities from the early 19th century onward. Nevertheless, views about the relative importance of price and financial stability in contributing to these broader objectives have fluctuated over time. Nor can it be said that central banks have always successfully achieved their broader objectives, since periods of relative success have been punctuated by periods of significant economic instability. However, these periods generally led to a transitional phase of reflection about what had gone wrong and how to fix it. A common finding of these reflections was that the economy itself had been evolving, either endogenously or in response to previously taken policy initiatives. Given a gap between the theory and reality of how the economy works, theory had to give way to reality. Central bank practices have had to evolve, as well.

In light of the global economic and financial crisis that began in 2007, and whose impact continues to be felt, we have clearly entered another such transitional period. Previously held beliefs about how the economy works, and how central banks should behave in pursuit of their objectives, are now being seriously questioned. New hypotheses are being proposed and debated. This report will highlight areas of current consensus in this debate, and also areas where there continue to be significant disagreements.

A critical finding is that the pursuit of longer-term price stability continues to be an indispensable guide for central banks going forward. Both high and variable inflation and significant deflation can have heavy costs, including periods of both economic and

FIGURE 1. Inflation and Unemployment in the United States and Germany during the Interwar Period



SOURCES: Mitchell International Historical Statistics; UBS.

financial instability (see figure 1). Central Europe in the 1920s, and recurrent events in Latin America, provide good examples of the former, while the United States in the 1930s is a good example of the latter. Since history teaches that such periods have often led to social and political instability, as well, they are clearly best avoided.

At the same time, the simple observation of sustained price stability is no guarantee that economic and financial instability will be avoided. History indicates that other dangerous imbalances often build up under the calm surface of price stability, only to erupt with devastating consequences. It is notable that there was no significant inflationary pressure in the United States prior to the 1929 Great Depression, nor in Japan prior to its Great Recession, nor in Southeast Asia prior to the crisis of the late 1990s. Central banks need to keep their minds open to the disquieting possibility that stability of one sort can breed instability of another sort.[1] Indeed, history is replete with major economic and financial crises that have occurred under a wide range of circumstances. That said, a unifying theme throughout history seems to have been "booms," driven by a rapid rate of growth of credit, followed by a "bust" whose seriousness was highly correlated with the magnitude of the boom that preceded it.[2]

Similarly, the indispensable role of central banks in helping manage and contain periods of financial instability needs to be recognized and continued. Over the centuries, central banks have been able to react flexibly to constrain market disruptions. Not only have they provided lender-of-last-resort facilities, but they have also used their extensive knowledge of financial structures and market practices to ensure the maintenance of essential financial services. Given the economic costs associated with the loss of such services, this has been a crucial function. Nevertheless,

1 The classic statement on this is Minsky (1986).

2 For overviews of such episodes, see Jorda, Schularick, and Taylor (2014), Kindelberger and Aliber (2005), and Reinhart and Rogoff (2009).

as with all such public sector interventions, central bank support could also encourage private sector participants to behave imprudently in the future. This issue of potential moral hazard generated by public policies needs significantly more attention than it has received to date.

In a complex and evolving world, there is not likely to be a single template for how central banks should best behave, nor for how best to allocate responsibilities between central banks and other arms of government. Local conditions, institutions, stages of development, and history must all matter. However, there are some key principles that are universal, and they involve the division of responsibility between governments and central banks. It is of particular importance that governments do not overburden central banks in trying to make the economy work better. There are limitations to what monetary policy alone can do. This applies not only to the prevention of future crises but, perhaps particularly so, to the management of the current one.

SOME HISTORICAL PERSPECTIVE

Early central banks were commonly set up to provide finance to help fund wartime governments. In return, they were given certain advantages that initially enabled them to become the largest commercial bank, the manager of government debt, and the main issuer of currency notes.[3] As a large private bank, they also came to occupy a central position facilitating interbank transactions and providing an array of services to correspondent banks. It was from this central position that lender-of-last-resort facilities developed, since central banks provided emergency funds to banks caught up in recurrent banking panics. Even in these early years of central banking, it was recognized that financial instability was incompatible with stability in the real economy, and perhaps with price stability, as well.

Similarly, central banks began conducting monetary policy through discounting debt securities offered by other banks. The interest rate established on these collateralized loans then became the fulcrum for credit conditions throughout the economy. The need for such a governance mechanism stemmed from the recognition that an economy with a developed banking system is profoundly different from a barter economy. In a barter economy, there can rarely be investment without prior saving. However, in a world where a private bank's liabilities are widely accepted as a medium of exchange, banks can and do create both credit and money. They do this by making loans, or purchasing some other asset, and simply writing up both sides of their balance sheet.

On the one hand, such a system provides a welcome form of lubrication for the real economy, fostering both investment and economic growth. On the other hand, unfettered monetary and credit creation has the potential to generate inflation[4] and create unsustainable distortions in both the financial sector and the real economy. In fulfilling their monetary policy function, central banks have always been confronted with the need to find the balance between these contradictory forces. In the end, their credibility rests on their being able to resist the temptation to seek short-term benefits at the expense of longer-term costs.

Central banking was at its simplest from around the 1870s to 1914, under the classical gold standard. This regime was based on a credible commitment of the central bank to exchange its notes for gold at a fixed price, and to follow the rules of the game when faced with either international inflows or outflows of gold. The gold standard ensured the stability of the price level over time, albeit at the expense of long swings in prices both up and down. These swings, however, were not thought of significant concern given the flexibility at that time of both prices and wages throughout the economy.

Moreover, the regime made a significant contribution to financial stability, as well. Recourse to

3 See Goodhart (1988) and James (2013).

4 For decades, monetary theory revolved around the equation MV = PY, which linked money (M) directly to prices (P) if V (the velocity of circulation of money) and Y (real output) were assumed constant. While it is recognized today that V can be highly variable, as a longer-run proposition, the equation has a timeless allure.

lender-of-last-resort lending, in the face of banking panics, was only possible because it did not lead to capital flight encouraged by fears of longer-term inflationary finance. The fact that policy rates were generally raised at the same time provided further support for this belief. Given the credibility of the regime, the expansion of the central bank's balance sheet was judged a temporary expedient only. That said, there were major bouts of financial instability during this period, not least in 1873 and 1907. Generally, they had their roots in positive real side shocks that eventually led to excessive exuberance, often made worse by financial innovations having unexpected consequences.[5]

The gold standard was overwhelmed by the financing needs of governments during World War I. As central banks were forced to revert to their original function of buying government debt, inflation rose sharply in all the belligerent countries. Moreover, in the postwar period, a combination of recessions, hyperinflation, and exchange rate instability further indicated the costs of losing control over the monetary system. This in turn led to efforts to reestablish the prewar gold standard, but these efforts failed for a variety of reasons.

Perhaps the most important reason was that the credibility of the commitment to gold convertibility was never reestablished in the postwar period. For countries short of gold, like Great Britain, increasingly inflexible labor markets implied that honoring the commitment would likely result in unacceptable levels of unemployment. In contrast, the United States, while a recipient of gold inflows, sterilized these inflows, violating the agreed rules of the game. This reaction was not surprising given that, in the 1920s, domestic monetary and credit growth was already very rapid, that banks were engaged in increasingly risky behavior, and that US stock prices were hitting record highs.[6] In short, domestic preoccupations everywhere eventually overwhelmed international commitments.

The failure of these commitments ushered in the 1929 Great Depression, which was characterized by sharply falling prices and financial instability on a vast scale. Neither of the intermediate objectives then sought by central banks had been realized. Whether justified or not, central banks and the financial system were apportioned a significant part of the blame. In many countries, including the United States and Great Britain, the monetary policy function of the central bank was increasingly taken over by the Treasury, and domestic financial systems became subject to a significant degree of regulation. Not surprisingly, the first of these acts led to significant inflation during and after World War II. However, the suppression of domestic financial systems, together with deposit insurance and new safety net features in many countries, sharply reduced the number of bank failures and incidences of financial instability between the 1940s and 1980s.[7] As an unexpected side effect, however, domestic financial repression led many large banks to engage in regulatory arbitrage and to expand internationally, with a view to avoiding restrictions in their home markets.

Central banks began to recover some of their monetary policy functions in the 1950s, and initially focused on pursuing the objective of price stability. This was also deemed consistent with the rules of the game under the Bretton Woods system of fixed but adjustable exchange rates set up in 1944. However, the United States was at the very core of this new international system, which was referred to as the US dollar exchange standard, and it gradually reverted to the pursuit of inflationary policies deemed to be in its own national interest. There was at the time a widespread belief in the United States that unemployment could be permanently lowered at the cost of only a slight increase in inflation (referred to as the Philips curve relationship). Nevertheless, these higher inflation levels discomforted other countries, some of which announced their intention to exchange dollars for gold. Germany, whose central bank had for many years strictly pursued price stability through the lens of the monetary aggregates, was instrumental in this development. The Bretton Woods system ended formally in 1971, when President Nixon closed the gold window.

5 See Schumpeter (1934) and *The Economist* (2014) for an overview of some earlier crises. What is striking is the pervasive interaction through time of real and financial innovations.

6 James (2013) notes that the Federal Reserve did lower its policy rate in 1927 to help relieve downward pressure on the British pound, but this also gave impetus to a further sharp increase in stock prices.

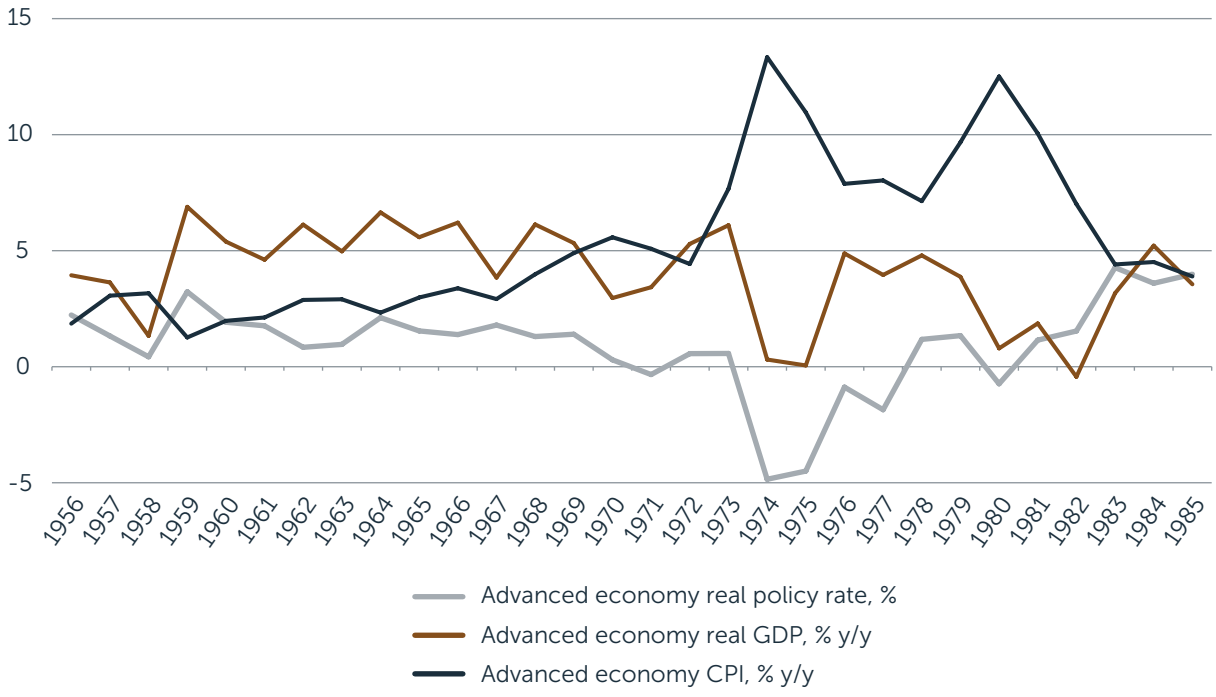
7 For a review of this, see Bordo et al. (2001).

The breakdown of the Bretton Woods system was followed by a sharp acceleration of inflationary pressures worldwide and a deep recession beginning in 1974. Freed from international constraints, many central banks focused their monetary policy on reducing unemployment, which had risen sharply after the first oil price shock of 1973. However, as inflationary expectations quickly ratcheted up, many central banks came to the unpleasant realization that they had truly opened a Pandora's box. In a number of countries, a short-lived attempt was made to try to stabilize these rising inflationary expectations through the introduction of monetary targets. However, this stratagem foundered as new technological developments led to large shifts in demand for money functions that had previously seemed quite stable. By 1979, when the second oil price increase occurred, most central banks had become significantly more focused on containing its inflationary effects rather than leaning against its effects on unemployment (see figure 2).

Perhaps of equal significance, as a result of the two oil price shocks of the 1970s, there was a perceived need to "recycle" internationally the receipts of the oil producers back into the hands of the oil consumers. Given the relatively low spending propensities of the oil producers, overall global demand could not be maintained otherwise. As it happened, this recycling was done primarily through loans to emerging market economies (EMEs) whose capacity to repay became more doubtful when policy rates began to rise in the early 1980s. In this manner, concerns about financial stability, so long quiescent, once again became an issue with the solvency of large, internationally active banks being increasingly questioned.

In fact, central banks and others had in the mid-1970s already been given a forewarning about the potential problems associated with the internationalization of commercial banking activity. The failure in 1974 of two banks, the Franklin National Bank in the United States and Bank Herstatt in Germany, not only had international causes but also significant international implications. As a result, central banks cooperated closely at the international level to mitigate the fallout from these events, and also took cooperative

FIGURE 2. AME Inflation, Real Growth, and Real Policy Rates, 1956–85



SOURCES: International Monetary Fund; UBS.

steps to reduce the prospective costs of future crises.[8] In particular, they established the Basel Committee for Banking Supervision. Attended by both regulators and central bankers, the Basel Committee continues to be active to the present day. Moreover, the rather particular circumstances surrounding the failure of Bank Herstatt motivated central banks to pay much more attention to problems in the payments and settlement systems, both domestic and international.[9] Over subsequent decades, significant improvements have been introduced under the general guidance of the Committee on Payments and Settlements Systems, also based at the Bank for International Settlements (BIS). These ongoing improvements to the "plumbing" have been an invaluable contribution by central banks to the stability of the international financial system.

Central banks have a primary responsibility to ensure the efficiency and stability of the global payments and settlements systems.

However, by the late 1970s, banking problems were not the only concern of central bankers. The continued acceleration of inflation in many advanced market economies (AMEs) had taken it to uncomfortably high levels. Crucially, this indicated the falsity of some earlier beliefs. Most important, the facts made it clear that unemployment could not be permanently decreased by accepting only a slight increase in inflation. Moreover, somewhat earlier, Milton Friedman (1968) and Edmund Phelps (1968) had also provided theoretical justification for arriving at the same conclusion. These insights led central banks to sharply reorient their policies back toward the achievement of price stability. At first, emphasis was placed on stabilizing inflation, but as central banks increasingly recognized the harm generated by high inflation, the focus of AME central banks shifted during the 1980s to reducing inflation back down to low levels. Central banks in many Latin American and Central European countries drew similar lessons, as did the central bank in Israel.

Longer-term price stability is the most important contribution central banks can make to ensuring strong and sustainable growth.

This renewed and primary focus on maintaining low inflation continued through to the onset of the crisis in 2007. It was supported, as well, by the adoption of inflation targeting regimes in many countries. These regimes had official targets (or bands) for inflation, and strong commitments and incentives (mandates, explicit powers, and political accountability) to achieve them. They became particularly popular in countries, both advanced and emerging, whose record of controlling inflation in the past had not been so good. In effect, these regimes constituted attempts to build institutional credibility and to shock down inflationary expectations. In general, these efforts proved successful, not least due to target goals being accompanied by legislation that assured the functional independence of central banks.

It is crucial that the independence of central banks be maintained.

At a more technical level, most central banks came increasingly to rely on an assessment of the size of the output gap (the gap between aggregate demand and potential supply) in determining the extent of inflationary or disinflationary pressures in the economy. It also became general practice for central banks to set their policy instrument, commonly a short-term policy rate, to be consistent with a forecast for inflation that was "on target" over a two-year horizon. In

8 James (2013).

9 Bank Herstatt was declared insolvent around noon, European time. At that point, Bank Herstatt had already received payments in Deutsche marks in Frankfurt, but time zone differences meant it had not yet settled with dollar payments to counterparties in New York. These creditors were then left unpaid, a possibility that is now known as Herstatt risk. This experience led central bankers in virtually all major countries to introduce Real Time Gross Settlement Systems, which ensure that payments between banks are made simultaneously in real time and are treated as final and irreversible.

this process, the use of a Taylor rule, linking policy rate changes to the output gap, and deviations of inflation from targeted levels, became common practice.[10]

It is, moreover, also notable that three of the world's most important central banks—the Federal Reserve, the European Central Bank, and the Bank of Japan—have not committed to a rigid inflation targeting regime. Moreover, as will be made clearer in subsequent chapters, central bank policies have sometimes differed, as well, even in the face of seemingly similar economic circumstances. In part, this reflects the different financial structures faced by central banks in different parts of the world.[11]

Different central banks have also commonly emphasized different indicators in assessing the appropriate stance for monetary policy.[12] The Federal Reserve has a dual mandate comprising both unemployment and inflation, and focuses on the output gap to gauge both. The European Central Bank also assesses the medium-term inflationary pressures through its economic analysis pillar, but has a second monetary pillar to which it pays significant attention. The Bank of Japan also puts great weight on the output gap but, from the early 2000s until recently, also had a second perspective. In effect, it stated that the Bank of Japan was committed to avoiding a repeat of the Japanese excesses of the 1980s. That said, from the 1980s through to the onset of the current crisis, all of these central banks made price stability the central objective of their monetary policy actions. Further, they seem since then to have undergone a process of conceptual convergence,[13] which, while it stopped short of explicit inflation targeting, had the effect of establishing 2 percent as the generally desired price stability goal.

Pursuit of the objective of price stability was remarkably successful in most of the AMEs, and of many EMEs. Both the level and volatility of inflation fell sharply (see figure 3). Moreover, following the deep recession that accompanied the beginning of disinflation in the early 1980s, recessions in many countries (particularly the United States) also became less frequent and less severe. The confluence of these two developments was increasingly referred to as the Great Moderation. At the same time, financial instability again became much more of a problem. Rapid credit growth, often linked to the markets for houses and commercial property, seemed to be the proximate cause. Underlying this development was the process of financial deregulation that began in the 1980s. However, increased risk taking by financial institutions and other lenders might also have been encouraged by the success of successive public sector attempts to moderate cyclical downturns. This issue is returned to below.

In the early 1980s, as the loans made to emerging markets to recycle oil revenues began to deteriorate, the solvency of the banks granting the loans was increasingly called into question. Regulatory forbearance through the 1980s, together with faster economic growth and a series of restructuring plans, eventually resolved that problem. Yet, even as this was happening, other financial problems were emerging. In the United States, the removal of the regulatory cap on deposit rates at savings and loan associations in the 1980s led to a greater reliance on short-term funding for fixed-rate 30-year mortgages. Not surprisingly, by the early 1990s, this had resulted in many bankruptcies. A sharp stock market decline in the United States in 1987 also led to similar price decreases in a number of other countries. In the Nordic countries and Japan, rapid credit growth related to rising property prices culminated in severe crises in the early 1990s, which eventually required wholesale restructuring of their banking systems.

Similarly, the banking systems of many countries in Southeast Asia were threatened in 1997 by maturity and currency mismatch problems. Restructuring was required, accompanied by a massive recession in

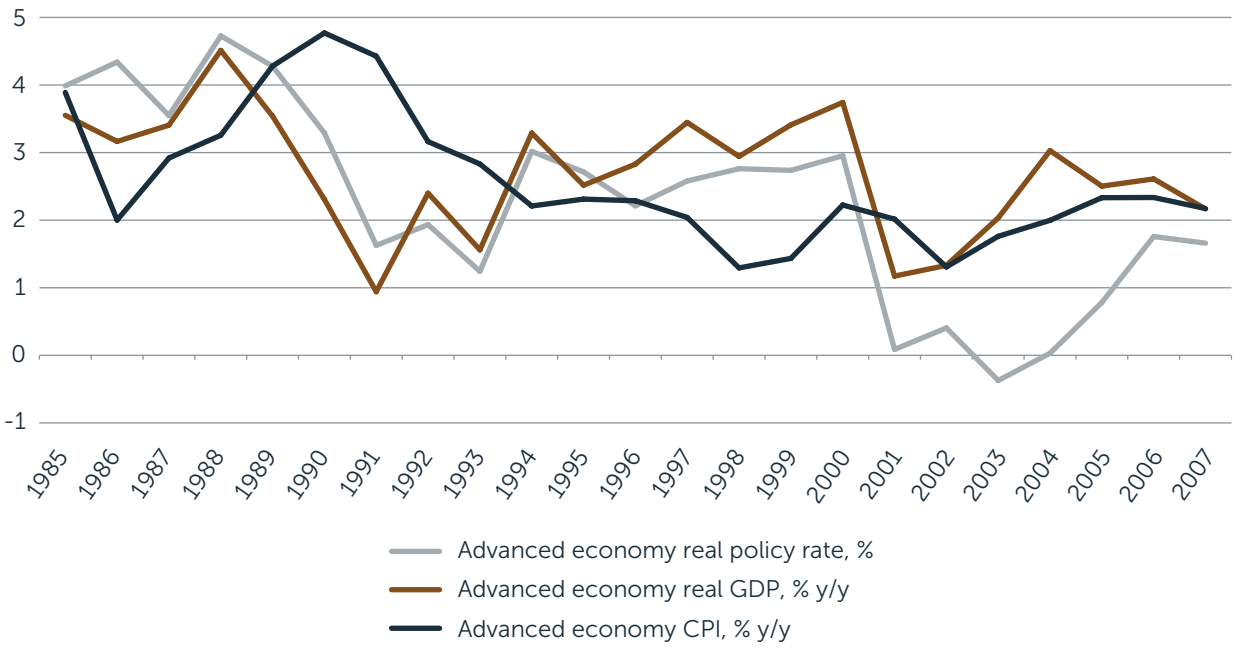
10 See Taylor (1993).

11 For example, in Europe the financial system is largely based on intermediation by banks, whereas in the United States, direct financing through markets plays a much more important role. It is not surprising then that the ECB and the Fed have different views about the effectiveness of various instruments of monetary policy.

12 These are not the only reasons why central bank policies can differ. They can have different biases in responding to the risks of inflation as opposed to the risks of unemployment. Different tradeoffs between near-term risks and longer-term risks are also common. See White (2011) for a general treatment of these issues. For a more focused assessment of differences between the Federal Reserve and the European Central Bank, see Fahr et al. (2011).

13 Trichet (2013).

FIGURE 3. AME Inflation, Real Growth, and Real Policy Rates, 1985–2007



SOURCES: International Monetary Fund; UBS.

many countries. Still further problems arose in the financial systems of AMEs when a large hedge fund, Long-Term Capital Management, had to be unwound by a consortium of its counterparties. Finally, in 2001, stock exchanges around the world fell sharply after an unprecedented price boom, noted particularly in the technology, media, and telecommunications sectors. However, policy rates were subsequently lowered by unprecedented amounts and with unprecedented speed, and the subsequent recession in fact proved quite moderate.

All these financial developments might have prompted the major central banks to ask whether monetary policy had any role to play in helping prevent such crises. Apart from the fact that the two-year horizon of inflation targeting was in many countries extended to a medium-term duration, central banks' beliefs in the correctness of their policy approach hardened. The contention that price stability was necessary for stability in the real and financial sectors seemed transformed into the contention that price stability was actually sufficient to avoid most macroeconomic problems. It took the crisis that began in 2007 to catalyze another fundamental rethink.

CENTRAL BANKERS' BELIEFS ON THE EVE OF THE CRISIS

What did central bankers believe on the eve of the crisis and why did they believe it? While the beliefs of central bankers differed in various ways, there was a rough consensus on certain fundamental principles.[14] These were suggested by the long historical experience referred to above, and ongoing developments in economic theory.

First, there was the belief that price stability (a low but positive inflation rate) should be the core mandate for central banks. The experience of the AMEs with inflation in the 1970s left a huge scar. High inflation had inflicted major costs to the real economy, reducing growth and raising volatility. While inflationary expectations had proved easier to shock down than earlier feared, it was recognized that this might not always be the case. Moreover, sporadic experience

14 A helpful reference in this regard is the chapter by Blinder in Blinder et al. (2013).

with very high inflation in certain EMEs indicated the possible magnitude of the damage when a fiat money system was allowed to get totally out of control. In contrast, the restoration of price stability had ushered in the Great Moderation, as indeed many had predicted.

Evolving mainstream macroeconomic theory also contributed to this belief. It essentially said that over the long run monetary policy could only affect prices, not real variables. Thus, targeting real variables was not only impractical, but impossible. Further, in the face of a demand-side shock, there was no conflict between the pursuit of full employment and the pursuit of low inflation. In effect, too-high inflation indicates that unemployment has been unsustainably low. Finally, it was generally believed that the search for protection against high inflation led to speculative excesses, not least in housing, and financial instability, in turn.

Second, there was the belief that central banks should be free from political interference in pursuing the objective of price stability. Such pressure seemed, from historical experience, always to be exerted in the direction of easing monetary policy and encouraging inflation. Closely related, central banks should not provide financing to governments that was in any way inconsistent with their chosen monetary policy stance. Above all, history showed that fiscal dominance had to be avoided.

At the same time, it was also generally accepted that central banks had to be accountable for their actions to those democratically elected. Nevertheless, there also remained different legislation, views, and practices concerning the relative roles of the central bank and the government in setting the specific mandate or the level of the inflation target. Similarly, methods of ensuring central bank accountability varied widely across countries. In the case of the United Kingdom, the level of the inflation target was decided by the government, the Bank of England having only "instrument independence."[15] In contrast, in the United States and in the euro area, the central banks defined for themselves what price stability meant.

Third, it was crucial that central bank commitments were credible. That is, it was not only important that a central bank was institutionally capable (above all independent) of action, but also that it was thought willing to do what was required to honor its commitments. Historically, the interwar period had shown the damage that could result when credibility was lost. Economic theory also indicated that credible commitments could have direct effects on inflationary expectations, thus reducing the economic costs of higher unemployment in keeping inflation under control.

Fourth, it was believed that credibility would be enhanced by transparency and clear communication, both about the central bank's objectives and how it intended to achieve them. Further, clear communication about policy intentions would give ample time for portfolio protection and would thus support financial stability.

Fifth, clear communication and accountability are only possible when the central bank's mandate is simple. Thus, central bank concerns about financial stability should essentially be limited to crisis management, including the exercise of the lender-of-last-resort function. While central banks were clearly concerned about financial stability, and their warnings could also be useful, primary responsibility for action should rest elsewhere to avoid the central bank having conflicting objectives. Should central banks have a supervisory function with respect to financial institutions, firewalls should be erected to ensure monetary policy continued to focus primarily on price stability.

Sixth, central banks should leave credit allocation to markets that are allocationally efficient and capable of managing risks. Thus, central banks should rely on policy instruments without allocational effects. The size and composition of assets on central bank balance sheets should be commensurate with those required to carry out its basic functions. As a corollary, regulation should be light touch only.

Seventh, to avoid monetary policies being overburdened in the pursuit of low inflation, central banks should advocate the supportive use of fiscal, regulatory, and structural policies. The loss of wage and price flexibility after World War I had carried a heavy price.

Eighth, if each country were to keep its own house in order, a system of floating exchange rates would be consistent with growing trade and the efficient allocation of capital internationally.

15 This phrase was first suggested in Debelle and Fischer (1994).

* * *

Many of these pre-crisis beliefs remain valid today, such as the fundamental importance of longer-run price stability, and the need for independence from political constraints and the associated credibility of central bank promises.[16] However, the crisis has also taught us that not all of what we previously believed was true, or at least remained true, given changes in the economy itself. In a constantly changing economy, such an adaptation of beliefs to new realities would seem not only necessary, but simple common sense. Accordingly, the following chapters focus on the character of the crisis, and the lessons we might draw from it against the backdrop of history.

This process of reevaluation should also serve to remind us of how complex and adaptive the economy actually is. In turn, policy makers might become more humble in assessing how much (or little) they actually know about how the economy works or about the uncertain effects of policies over time. Policies that offer short-term solutions, but at the expense of aggravating longer-term problems, clearly need to be carefully assessed in terms of their net benefits. In this process, the temptation to assume that longer-term effects that are uncertain must also be inconsequential must be firmly resisted.

16 The credibility of central banks and their operation rests fundamentally on their being viewed as being free from undue political interference and influence. This independence must be maintained. In this regard, the Working Group underscores that efforts by political actors to audit the U.S. Federal Reserve Board or otherwise limit its independence of policy action should be opposed, because they are not conducive to ensuring the continued effectiveness of the US central bank.

CHAPTER 2

The Global Economy Before and After the Crisis

SYNOPSIS

The economic stability observed in the major advanced market economies (AMEs) during the decades preceding the crisis led to the period being called the Great Moderation. Observation of this stability supported a theoretical view of the economy as being both inherently self-stabilizing and efficient in its allocation of scarce resources. This mindset prevailed despite accumulating evidence of underlying tensions (imbalances) and a growing number of localized economic and financial crises. Further supporting this mindset, specific improvements were identified in the productive capacity of the global economy, in the management of monetary policy, and in the provision of financial services. Only with hindsight did it become clear that the optimism generated by this combination of "improvements" had helped create a credit bubble of significant proportions. Once triggered, the crisis spread rapidly, leaving the global economy with misalignments and vulnerabilities that endure today.

INTRODUCTION

This chapter focuses on the continuing economic and financial crisis in the global economy. It is a three-part chronology. The first section looks at the economic and financial market environment in the two decades preceding the crisis that began in 2007, and suggests reasons why a crisis might have been expected, and why it nevertheless failed to be predicted. The second section looks at how the crisis began, triggered by problems in the US market for subprime mortgages, and how it spread to other financial markets, the global real economy, and economic agents of many sorts. The third section describes the macroeconomic and financial setting around the end of 2014. This provides a backdrop against which to assess the conduct of monetary policy going forward.

What emerges from this assessment of the recent past is that domestic economies are complex, adaptive systems of interacting agents, and that this applies even more so to the international economy. The domestic complexity arises from the rich interactions within the economic and financial sectors, and the two-way influences between the real and financial sectors. The international complexity partly reflects financial linkages between the economies of both advanced and emerging market countries. However, it also reflects other factors such as trade ties, immigration patterns and, perhaps most important, shared information and instantaneous communication links between economic agents everywhere.

The fact that the global economy is adaptive can be inferred from the almost constant process of structural change observed over the last century. Moreover, these changes have been accelerating over the last twenty years or so. The search for increased efficiency has been relentless. Recent and dramatic changes have occurred in the real, financial, and monetary spheres, often in response to changes going on elsewhere. Evidently, such ongoing processes of change fundamentally affect the environment in which central banks work, and they have equally important implications for policy.

THE GREAT MODERATION

The period between the mid-1980s and the start of the crisis in 2007 became known as the Great Moderation, for reasons described in Chapter 1. However, the Great Moderation was not only a state of affairs, a set of empirical observations; it gradually became a state of mind, as well. As memories of the Great Depression faded, the neoclassical school of macroeconomic thought gradually became the conventional wisdom in academia. Moreover, through the influence of staff economists trained in that school of thought, its influence also spread to central banks. This school essentially held that the economy had strong self-stabilizing properties, and that the economy would quickly return to full employment if shocked away from that position.[17] Inflation was thought to be largely determined by inflationary expectations, which a determined and focused central bank (like the Federal Reserve under Chairman Volcker) could control. Moreover, these properties of mild cycles and low inflation provided the best environment for promoting rapid and sustainable growth. The empirical characteristics of the Great Moderation thus supported a particular school of thought about how the economy works.

In a similar zeitgeist, prices of financial assets were assumed to be determined by markets in an efficient manner on the basis of underlying fundamentals. In any event, over most of this period, developments affecting credit, money, and financial markets were considered a side show to developments affecting the real economy. With a few notable exceptions, economists used models with financial sectors that extended no further than a policy rate and, sometimes, a longer-term "risk-free" rate connected to the policy rate through a term structure equation. Correspondingly, regulators of financial institutions and markets in the major financial centers were encouraged to continue the dismantling of the heavy regulatory infrastructure set up in the wake of the financial problems of the 1930s. Self-discipline and market discipline, albeit supported by some capital requirements, were increasingly thought sufficient to ensure stability within the financial sector.

Given this combination of theory and supporting facts, the intellectual mindset prior to 2007 was that serious crises in AMEs were highly unlikely, if not impossible. This had a number of important practical implications.

First, few economists actually foresaw the turmoil to come. Second, no attempt was made to tighten either monetary or regulatory instruments to either avoid or help mitigate the prospective damage. Third, no measures were taken ex ante to allow a crisis to be better managed when it did arrive. In particular, many countries did not have adequate deposit insurance schemes, special legislation for quickly resolving troubled financial institutions, or adequate agreements about interagency cooperation during a crisis. At the international level, the preparatory shortcomings were even worse. Not least, little if any practical progress was made in how to resolve large financial institutions with global reach. As will be explored further in Chapter 5, such shortcomings are important because they increase the likelihood that central banks will become overburdened in trying to resolve problems they are inherently incapable of resolving.

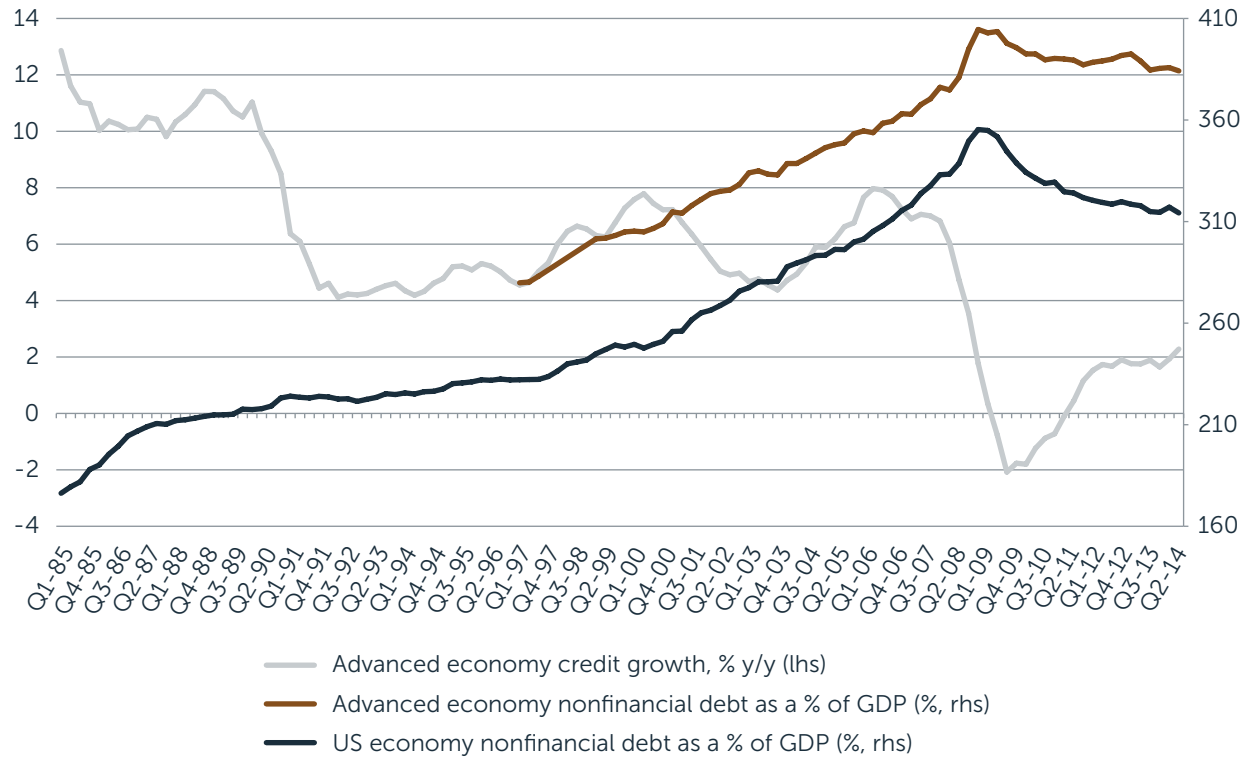
The power and tenacity of the mindset was such that it allowed most analysts to ignore or downplay two sets of important developments. The first of these was empirical. There was a growing list of statistical indicators and actual crises supporting the view that problems might be building up under the surface of the Great Moderation. The second was a configuration of structural changes that provided an alternative explanation to received theory about the reasons for the Great Moderation. Both should have led to the conclusion that the current, welcome state of economic affairs might not extend into an indefinite future.

INDICATORS AND INCIDENTS

As for indicators of underlying problems, over the whole period in question, the relatively rapid growth of broad money and credit supported strong increases in the ratio of nonfinancial debt to GDP (see figure 4). Many prewar and some postwar economists would

17 While plausible in principle, the models developed by this school of thought generally failed to incorporate a well-developed financial sector. See also Grant (2014) for a discussion of the US recession of 1921, described by the author in the book's subtitle as "The Crash that Cured Itself."

FIGURE 4. AME Rate of Credit Growth and Nonfinancial Debt Relative to GDP, 1985–2014



SOURCES: Haver; UBS.

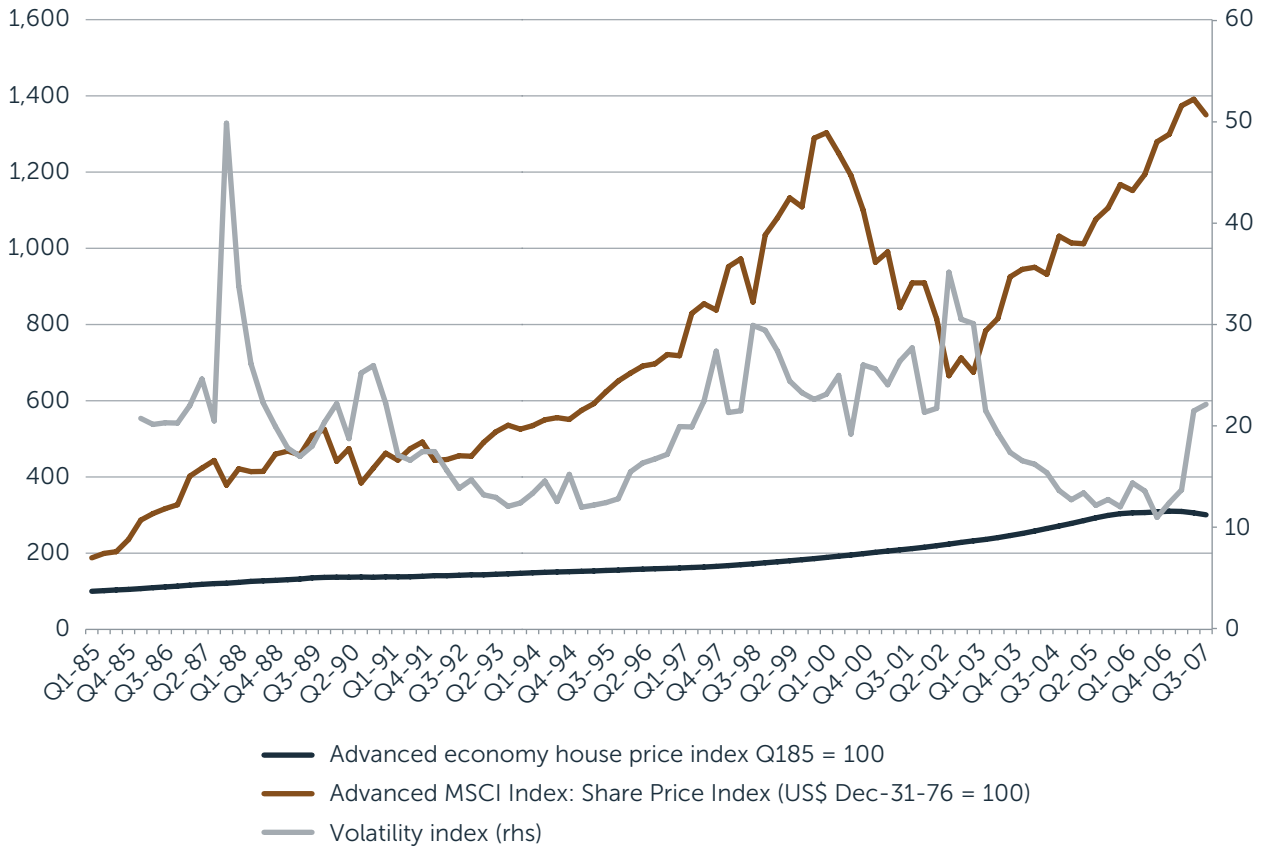
have seen this as contributing to unwarranted increases in asset prices as well as imbalances in the real economy.[18] Either or both would eventually renormalize with the potential for serious negative implications for output and employment, a typical boom-bust cycle. The fact that in some countries a substantial proportion of the credit growth emanated from foreign sources (that is, capital inflows) should also have been seen as a further sign of latent instability.

Two sets of countries seemed most affected in this regard. The English-speaking countries began to exhibit a number of boom-like indicators and most, not least the United States, began to run large current account deficits. In the United States, however, the status of the dollar as the global reserve currency served to alleviate concerns about a future dollar crisis. The peripheral countries in the Eurozone also exhibited similar symptoms as a result of massive capital inflows intermediated through core European countries. Rising current account deficits, and declining competitiveness, were nevertheless ignored. This reflected the generally held belief, now proven false, that current account crises could not occur within a currency union such as the Eurozone.

These global developments were accompanied by sharp increases in the prices of equity and houses in a number of countries during the 1990s (see figure 5). However, a still broader inflection point for asset prices was observed after 2003, when policy rates in the AMEs reached their lowest level. House prices increases in the United States began to accelerate, as did house prices and commercial property prices in most AMEs and EMEs. Global financial markets also surged. Equity prices rose still further, while

18 For a review of the prewar literature, see Haberler (1939). For an important postwar insight based on Japanese experience, see Koo (2003).

FIGURE 5. AME Level of House Prices, Equity Prices, and Volatility, 1985–2007



NOTE: MSCI Index = Morgan Stanley Capital International Index.
SOURCES: Haver; Oxford Economic Forecasting; UBS.

high-yield and sovereign spreads, along with the VIX,[19] fell to record lows by 2007. Evidently, as the prices of all assets rose, their value as collateral also rose, supporting still further recourse to credit. This in turn supported both asset prices and more spending in what appeared to be a virtuous circle.

Further, this credit growth led to a gradual but steady increase in the leverage ratios of lenders and the debt levels of borrowers (especially households) in many countries. While regulators at the time generally expressed little concern, Minsky (1986) would have seen the former as foreshadowing a "Minsky moment" when financial institutions would cease to lend, especially to each other. As for high debt levels, both Fisher (1936) and Koo (2003), after the onset of the Great US Depression and the Great Japanese Recession, respectively, highlighted debt as a serious impediment to future borrowing and sustainable growth.[20] In short, such a period of rapid credit growth could culminate in a situation where borrowers no longer wished to borrow and lenders no longer wished to lend.

There were also indicators in the real economy of potential problems associated with excessive credit expansion. In many AMEs, not least the English-speaking ones, household savings rates dipped to

19 The Volatility Index (VIX) is a contrarian sentiment indicator that helps to determine when there is too much optimism or fear in the market. When sentiment reaches one extreme or the other, the market typically reverses course (http://www.investinganswers.com/financial-dictionary/stock-market/volatility-index-vix-872).

20 Fisher was focused almost entirely on how Consumer Price Index deflation would make nominal debts unserviceable. Koo was concerned as well with the effects on solvency of falling asset prices.

unprecedentedly low levels. Closely related, rising imports led to current account deficits and rising levels of external debt. In many AMEs, not least the peripheral countries of Europe, easy access to mortgage credit also led to significant increases in the size of the construction sector. In China, a country with a very high domestic savings rate but a repressed financial system, the construction sector also expanded massively with housing, commercial property, and infrastructure all benefiting. Investment rose to over 40 percent of GDP just prior to the crisis, a proportion virtually without historical precedent.

Finally, and perhaps more contentious analytically, over most of this period, there was a widening gap between a generally falling policy rate, measured in real terms, and the generally rising rate of growth of global potential. In terms used by Knut Wicksell,[21] this implied that the financial rate of interest was falling increasingly below the natural rate of interest. He would have interpreted this as foreshadowing an eventual resurgence of inflation. For reasons discussed below, inflation was not a problem over most of the Great Moderation. However, just prior to the crisis, inflationary pressures were clearly on the rise, with food and energy prices most affected.

As discussed in Chapter 1, there were also a number of specific incidents that clearly indicated that underlying imbalances could culminate in serious economic and financial difficulties. These incidents did lead to a growing interest in financial stability and measures that might be taken to improve the stability of the financial system. Nevertheless, they failed to change the fundamental view that the major AMEs were not similarly exposed. Nor did they lead to the conclusion that measures should be taken to lean against the wind of credit expansion. Indeed, prior to the crisis, this issue was not directly engaged. Rather, it was confounded with the much narrower issue of whether monetary policy should prick asset price bubbles. Framed this way, the proposal was more easily rejected and extant beliefs more easily maintained.

A number of reasons were put forward to discount the importance of these incidents for the major AMEs. First, it was noted that many of these crises had occurred in EMEs where the efficiency of markets and the quality of macroeconomic and regulatory policies were more questionable than elsewhere. Second, some crises had occurred in the wake of a process of financial deregulation. This pointed to transitional problems only. Third, many suggested that policy error rather than inherent instability was the problem—most notably in the Japanese case. Finally, a great deal of comfort was taken from the responsiveness of major AMEs to the easing of monetary policy whenever real or financial instability threatened during the period of the Great Moderation. This encouraged the belief that leaning against rapid credit growth was not necessary, since cleaning up any undesired side effects would always be possible.

AN ALTERNATIVE EXPLANATION FOR THE GREAT MODERATION

The confluence of low and stable inflation and high and stable growth was unusual and demanded explanation. The most commonly held view was that high and variable inflation in the 1960s and 1970s had held back growth, and that the resolute squeezing out of inflation by the global community of central banks had delivered the benefits it had promised. There is clearly an element of truth to this, though it must be noted that the benefits promised were supposed to be permanent rather than only temporary. However, there was an alternative (or perhaps) complementary explanation that should have been thought more worrisome. Not only did it imply that the welcome features of the Great Moderation were only temporary, but also that imbalances leading to crisis were building up under the surface.

Both before and during the period of the Great Moderation, fundamental structural changes were taking place in virtually all sectors of the global economy—real, monetary, and financial. Taken in isolation, each might be described as improving efficiency. Taken together, however, they produced the unexpected consequence of the current crisis. Such outcomes are common in complex, adaptive systems.

21 Wicksell (1936).

Succinctly, a shortfall in global demand, relative to an expanding supply, was effectively offset by monetary stimulus. This policy response was justified in turn by the need to resist excessively disinflationary pressures. A combination of low policy rates, technological progress, and deregulation then led to a significant expansion of credit worldwide and an associated build-up of debt by borrowers. The dangers this posed were obscured by an analytical framework in which credit and debt played no part, and by the focus of policy makers on the short-term benefits of these structural changes rather than their possible long-term costs. In effect, at the time, global trade imbalances were seen as the only potential source of trouble (other than inflation) going forward.

There have been many credit cycles in history, as documented by Reinhart and Rogoff (2009), Schularik and Taylor (2009), and others. These cycles invariably begin with some piece of good news that justifies "rational exuberance." This then, commonly but subtly, transforms itself into "irrational exuberance." Structural developments in the real economy provided ample grounds for optimism. In many AMEs, a continuing process of deregulation opened new prospects for increasing profits. In addition, new technology, especially involving IT and the extension of the internet, gave grounds for expecting significant increases in productivity. However, of even greater significance in the lead-up to the crisis were developments taking place in EMEs.[22] With the breaking up of the USSR, and the return of China, India, and many other countries to the international trading system, the production potential of hundreds of millions of new workers could be realized. The adoption of Western technology and the introduction of cross-border value-added chains added to the productive potential. This put significant disinflationary pressure directly into the global economy. Similar pressures emerged indirectly as workers in AMEs were faced with credible threats of jobs being exported to EMEs.

A key characteristic of a monetary economy is that demand does not adjust automatically to increases in supply. This was certainly the case during the Great Moderation, and was aided in some countries (particularly China) by explicit policies to restrain consumer demand to foster export-led growth.[23] Almost everywhere, although the causes are not yet totally clear, it is also a fact that the labor share of factor income fell sharply over this whole period,[24] potentially constraining consumption. In addition, corporate investment in AMEs grew increasingly weak later in the period. In part, this might have been due to overinvestment earlier in the period in Japan (the boom of the 1980s), in Germany (after reunification), and in the United States (the expansion of the technology, media, and telecommunications sectors prior to the market crash of 2000). However, this accelerating weakness remained puzzling in light of corporate profits, which reached record heights prior to the crisis.

Against this disinflationary backdrop, arising from both demand-side and supply-side developments, monetary policy in the AMEs was generally highly accommodative. This reflected the more single-minded pursuit of price stability by central banks after the 1970s. Accordingly, policy rates could be reduced in response to perceived threats to growth and employment, arising variously in both the real and financial sectors, and these measures did succeed in stabilizing the real economy. It was also notable, however, that the swings in rates required to do this seemed to increase over successive cycles. This might have raised the issue of sustainability.

The process began with the easing following the stock market crash of 1987. It continued with the easing cycle of the early 1990s (recession and various financial crises), in 1997 (after the Long-Term Capital Management and Asian crises), and in 2001 (stock market crash, recession, and fears of deflation). Moreover, with inflation continuing to trend downward, increases in policy rates during upswings were generally less pronounced. Evidently, this asymmetry over successive cycles implied a general ratcheting down of policy rates over time toward the zero nominal bound.

22 Brynjolfsson and McAfee (2014) argue that advancing technology will eventually prove the dominant influence in global supply-side developments. They further contend this will have a major impact on inequality in a winner-take-all world.

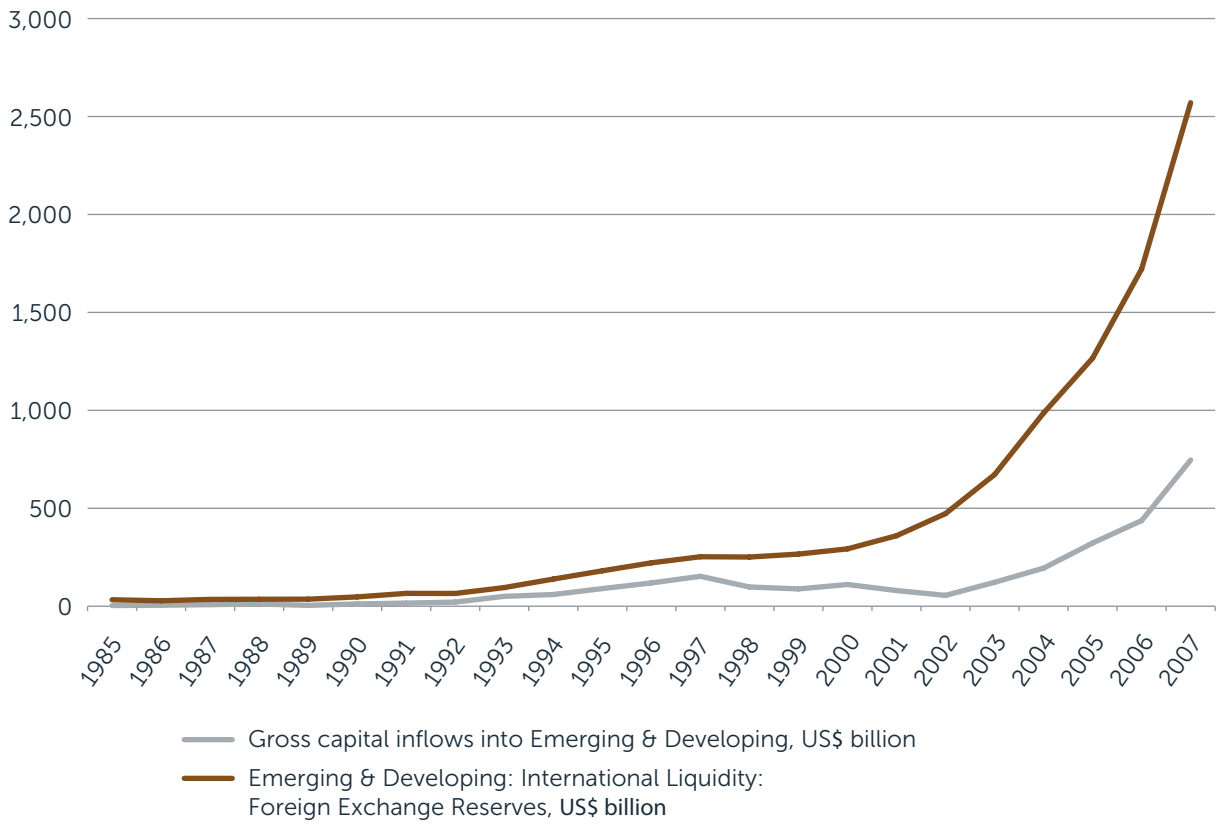
23 See Pettis (2013).

24 Rajan (2011) suggests that this contributed to an underlying weakness in consumption that had to be offset by credit creation and debt accumulation. Distributional issues, including their possible macroeconomic implications are, rightly, receiving increased attention from both policy makers and academics. See, for example, Adair Turner (2014).

Given their general adherence to floating exchange rate regimes, the relatively accommodative stance of monetary policy in the AMEs might have been expected to put downward pressure on their collective exchange rates against those of EMEs. This tendency should have been accentuated by the relatively faster rates of productivity growth in tradable goods and services in developing countries. To some degree this did occur, and gross capital inflows to EMEs increased markedly (see figure 6). However, as the period of the Great Moderation progressed, EMEs took increasingly strong steps to moderate the upward pressure on their currencies. One rationalization was the need to build up foreign exchange reserves as insurance against future crises. Another was that momentum trading could push their currencies dangerously above levels consistent with fundamentals. Still another was the need to stay competitive, given an export-led growth strategy.

Whatever the rationale, EMEs intervened massively in foreign exchange markets and, in the years prior to the crisis, they accumulated record-high levels of foreign exchange reserves. Moreover, their domestic monetary policies were more accommodative than would otherwise have been the case. The upshot of this semi-fixing of exchange rates is that a number of EMEs effectively imported the excessive credit growth and imbalances characterizing the AMEs. This raised the possibility of crises related to future capital outflows, a possibility that clearly materialized in Southeast Asia in the late 1990s. Finally, as EMEs recycled the accumulated reserves back into the AMEs, they contributed to lowering longer-term borrowing rates there as well. This in turn had the effect of exacerbating any problems that might have been developing in the AMEs themselves. This helps explain why, when the crisis hit, its scope was truly global.

FIGURE 6. EME Gross Capital Inflows and Level of FX Reserves, 1985–2007



SOURCES: International Monetary Fund; UBS.

Major structural changes were also occurring in the financial sector during the period of the Great Moderation. However, before turning to these structural changes, it should be recorded that low policy rates themselves seemed to encourage an enhanced appetite for risk and for imprudent lending more generally.[25] As leverage rose, so too did the possibility of strains within the financial system that could feed back on the real economy. Alternatively, imprudent lending implied that an economic slowdown from whatever source would reveal large loan losses that would in turn impede further credit creation and aggravate the downturn. Since the crisis began, both transmission channels have been in evidence.

Some of the structural changes in the financial sector during the Great Moderation were normal innovations in the increasingly competitive environment made possible by financial deregulation. Rapid advances in technology were used to provide cheaper and better services to customers. Similarly, technological developments allowed financial firms to decompose risks more accurately and, in principle, manage those risks better. In practice, however, such developments posed their own threats to stability. Not least, if the real problem faced by financial institutions was not risk (where probabilities can be estimated), but uncertainty (where they cannot), new techniques emboldened lenders without actually protecting them. This simply added to the hubris, and the risk taking, generated by ever increasing profits in the financial sector. Perceptions of the availability of a public sector safety net, not least for firms thought too big to fail, also encouraged imprudent behavior.

Lower interest rates, in association with regulatory and technological developments, also encouraged the rapid growth of the shadow banking system based on the originate-to-distribute model.[26,27] Shadow banking involves making loans, securitizing them, selling and insuring them, and actively trading all the assets created in the process. In effect, traditional relationship banking was increasingly replaced by collateralized lending with the market for repos at its core. This new approach was convenient for banks, since it reduced regulatory capital requirements and alleviated longer-term funding constraints. Moreover, it involved fees at every stage of the process and increased profits from both proprietary trading and market making (see figure 7).

Unfortunately, this new system was inherently even more risky than the one it replaced. First, it became so complex that regulatory oversight and market discipline became almost impossible. As for self-discipline (proper or prudent behavior), it was actively discouraged by the long chain of transactions separating ultimate lenders from ultimate borrowers. Everyone expected someone else to have done due diligence, when in fact no one was doing it. Second, being based on collateralized lending, such a system strongly encouraged existing lending trends. For example, when credit is expanding strongly, the value of collateral tends to rise and the haircuts imposed on the collateral tend to fall. Third, the system encouraged the creation of new financial instruments (like collateralized debt obligations) whose risks were not properly or fully understood.[28] Finally, the system was ultimately dependent upon the use of very short-term funds (generally not covered by deposit insurance) to purchase much longer assets. The fact that much of the funding was done cross-border was a further impediment to official oversight and a further contributor to local runs having global implications.

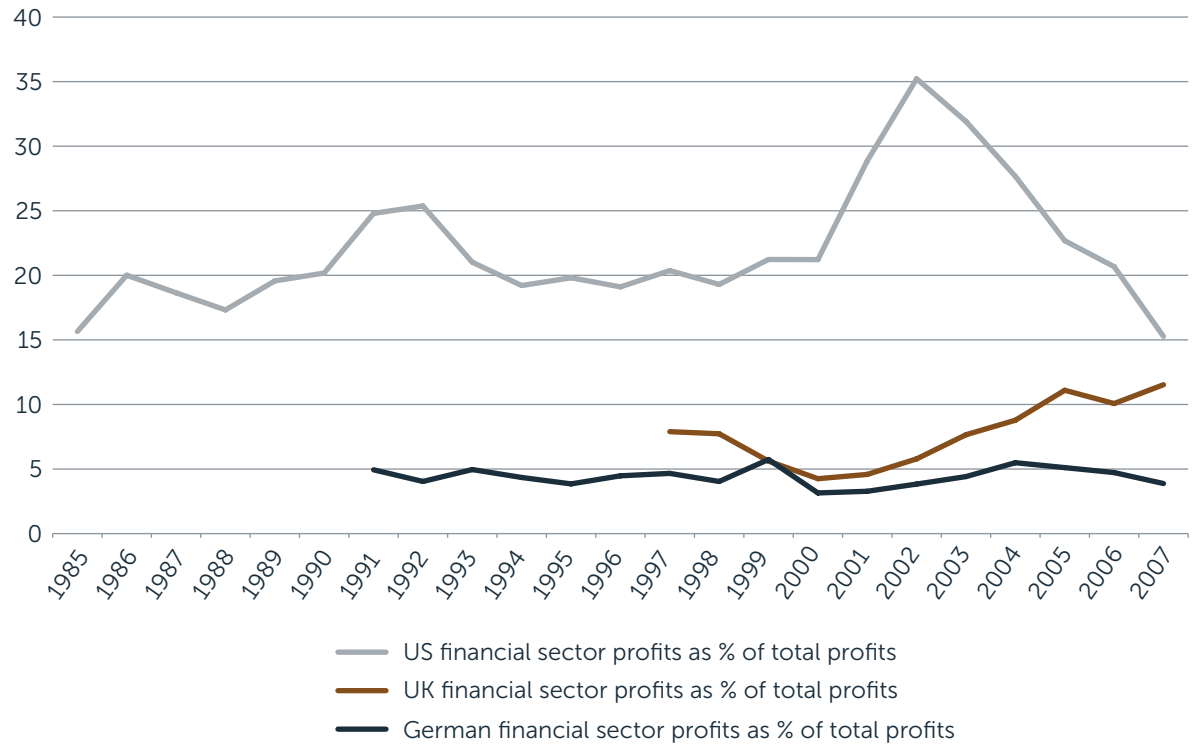
25 Borio and Zhu (2008).

26 Under the originate-to-distribute model, lenders make loans with the intention of selling them to other institutions and/or investors, as opposed to holding the loans through maturity. This is in contrast to the originate-to-hold model, under which lenders make loans with the intention of holding them through maturity, as opposed to selling them to other financial institutions and/or investors (http://www.nasdaq.com/investing/glossary/o/originate-to-distribute; http://www.nasdaq.com/investing/glossary/o/originate-to-hold).

27 For an excellent overview, see Claessens et al. (2012).

28 Rajan (2005).

FIGURE 7. Financial Sector Profits, 1985–2007



SOURCES: Haver; national sources; UBS.

HOW THE CRISIS WAS TRIGGERED AND SPREAD

A wide body of research indicates that all complex systems are inherently vulnerable to crises, and that the trigger for a crisis can be almost insignificantly small compared to the damage caused by the crisis itself.[29] This explains how declines, in 2005, in the price of houses purchased with subprime mortgages in the United States could have still reverberating effects on the whole global economy in 2015. The problem was not a spreading contagion from a source but, rather, widespread initial weakness in the system itself, including a massive bubble in the US housing sector that extended well beyond the subprime sector,[30] inflated in part and exacerbated by the home loans in the US being "nonrecourse."[31] Similarly, difficulties in tiny Greece at one point seemed to threaten the very existence of the Eurozone. The same insight implies that, although this global crisis began in the financial sector, it was not just a crisis in the financial sector, but a much broader macroeconomic crisis. In fact, historical studies of earlier such crises indicate that more than half of them were triggered by disruptions in the real side of the economy.[32] This is not an inconsequential observation. An accurate framing of the crisis is essential if we are to draw the appropriate lessons for the future conduct of policy.

29 For a popular introduction to this literature, see Buchanan (2002).

30 See Shiller (2008).

31 A non-recourse loan is a type of loan that is secured by collateral, usually property. If the borrower defaults, the issuer can seize the collateral, but cannot seek out the borrower for any further compensation even if the collateral does not cover the full value of the defaulted amount. Critics of these loans suggest that they exacerbated the depth of the housing market collapse in the US.

32 Reinhart and Rogoff (2009, p. 145) note that "Severe financial crises rarely occur in isolation. Rather than being a trigger of recession, they are more often an amplification mechanism."

Fostering financial stability should also be an important part of a central bank's mandate.

The turmoil proceeded in stages, each of which was commonly and wrongly thought to be the last. The first stage began in 2005 when US house prices began to decline and delinquency rates on subprime mortgages began to rise almost simultaneously. However, financial markets effectively ignored these developments until early in 2007, fully two years later. In part, they were reassured by official observations that US house prices had never fallen on a national basis since the 1930s, and that any difficulties would in any event be confined to the subprime sector.

Eventually, in the second stage, credit spreads on structured products began to rise. Structured products were complex derivatives, many based on subprime mortgages, created by the shadow banking system. Simultaneously, rating downgrades increased and the process gained momentum. On August 7, 2007, a small number of European investment funds froze redemptions of liabilities on the grounds that the underlying assets (complex structured products) could not be accurately valued. Within days, the market for structured products based on mortgages had collapsed, the global market in commercial paper had seized up, and interbank lending markets in all the major currencies had dried up. Central banks responded massively, as will be described in the next chapter, but their essential premise was that the global financial system faced a severe liquidity problem.

In September 2008, the third phase began. Before that, in March 2008, Bear Stearns, a large investment bank, ran into major difficulties and had to be merged with JPMorgan Chase. At that stage, concerns began to surface that the underlying problem might be more generalized insolvency rather than illiquidity. There was, of course, enormous uncertainty since there was virtually no information available about who owned the structured products and what their market value might be. When Lehman Brothers failed on September 15, 2008, and subsequently a number of other large firms had to be rescued by the governments of the US, the UK, and a number of European countries, the markets' worst fears were realized.

Essentially, and practically overnight, all the financial indicators that had reflected the prevailing economic optimism prior to mid-2007, then sharply reversed. Moreover, stock prices, which had been trending downward only slowly, fell precipitously in both AMEs and in EMEs. That the crisis had spread to Main Street, as well as Wall Street, was also manifest in massive withdrawals of deposits from US mutual funds after a few such funds indicated that depositors might in fact face losses. Unfortunately, many non-US banks (especially in Europe) were dependent on these mutual funds for short-term dollar funding. Thus, they faced further liquidity problems and many were obliged to sell assets at fire-sale prices. In this way, the complex web of financial interrelationships gradually began to unwind. Coordinated measures taken by central banks were of critical importance and clearly helped stabilize financial markets. Nevertheless, it was also clear that recent events had led to a fundamental loss of confidence in the stability of the financial sector as a whole.

The fourth stage began in late 2008 when economic agents began to seriously consider the possibility that the real economy of the US might be significantly affected by the financial turmoil. Such a slowdown would then be likely to affect other trading partners, in addition to the dangerous financial links already noted. Data for the fourth quarter indeed showed that GDP had fallen sharply in most AMEs, and in most large EMEs, as well. This weakness then persisted for most of 2009, with corporate investment being extraordinarily weak almost everywhere. By the end of the year, with some signs of recovery emerging, the only thing that was clear was that a return to normality was by no means assured. Moreover, any such process would, in any event, take considerable time.

Subsequent events through mid-2015 have supported this conclusion. Three broad sets of issues can be highlighted. Each, however, has been characterized by the swings between pessimism and optimism typical of a continuing and profound underlying uncertainty about future prospects for the global economy.

First, as discussed below, there has been a broad but oscillating standoff between the headwinds of excessive debt and dysfunctional financial systems in AMEs on the one hand, and the stimulatory efforts made by central banks on the other. The recovery from the 2009 recession has been remarkably slow, with fiscal

restraint and regulatory reform in the financial system having near-term negative effects on demand.

Second, the outbreak of the Eurozone crisis in 2010 was a significant setback to those hoping for a global economic recovery. However, the European crisis is best interpreted as a microcosm of what went wrong at the global level. As noted above, core European countries lent excessive amounts to peripheral countries on the false belief that there could not be balance-of-payment crises within a currency union. This led in turn to excessive leverage, real-side misallocations, and a growing concern about the viability of both ultimate borrowers and the Eurozone banking system. These concerns have not yet been fully eliminated.

Third, emerging market economies were first thought likely to be severely affected by the global crisis. However, from 2009 through 2011, the mood changed. EMEs were increasingly seen as safe havens, and capital inflows rose markedly. China, in particular, was viewed favorably, given its massive credit expansion and investment spending after the crisis began. More recently, however, the mood has suffered. Growth has slowed markedly in the largest of the EMEs, and capital outflows have replaced the previous inflows, even in the case of China. In a number of EMEs, reserves of foreign exchange have fallen, and the value of the domestic currency against the dollar has also declined sharply. Countries with twin deficits (current account and government) have generally been the most severely affected. This brings us to where we are today.

ENDURING MISALIGNMENTS

Looking forward from mid-2015, there continue to be forces supporting both optimistic and pessimistic outlooks for the global economy. That is to say, the period of profound uncertainty generated by the crisis continues to prevail.

Optimists would point to the fact that the crisis began over eight years ago and that all crises eventually culminate in a renewed period of growth. Simple depreciation and constant technological change imply the need for a resurgence of fixed capital investment.[33] The IMF and OECD are in fact forecasting continued recovery, noting that recent low levels of corporate investment along with ample cash reserves imply a strong potential for expansion. It also appears that the period of fiscal restraint, thought required to put sovereign debt levels on a sustainable path, might be moderating or even coming to an end. Further, many structural reforms have actually been carried out, and there have been promises of significant further reforms to come in Japan (Abenomics), in China (consumer-led growth), and in Europe (completing the single market). And the fact that secular growth trends in almost all the EMEs have risen significantly in recent decades offers further grounds for optimism.

Pessimists, however, have cause to see the glass as still half-empty, since each of the above arguments remains highly contestable. It has indeed been a number of years since the crisis began. Yet, studies of previous serious crises in which both the real economy and the financial sector were significantly damaged, point to even longer periods of recovery.[34] Moreover, what also seems reasonably well established from such episodes is that the magnitude and length of the downturn is roughly related to the size of the credit- and debt-fueled upturn that preceded it. Referring to credit and debt levels as of 2007, the current downturn might then have been expected to be particularly severe. The fact that both the IMF and the OECD are forecasting continued recovery must also be viewed against their own assessment of their recent forecasting performance,[35] which has not been stellar.

While the need for further fiscal restraint in many AMEs seems to be moderating, confidence in the capacity of many sovereigns to service debt remains fragile, and ultimately dependent on recovery in the underlying economy. Interest rates could still increase in response to such fears. As for the promised structural reforms in Japan, China, and Europe, they are in large part repeats of promises made many times before that have failed to materialize in the face of entrenched interests. Secular tendencies to higher growth in EMEs must also be set against much weaker growth over the

33 Haberler (1939, Chapter 11).

34 See Reinhart and Reinhart (2010).

35 Independent Evaluation Office (2011) and Pain et al. (2014).

last two years. Indeed, some commentators have even begun asking whether, in addition to slower growth of the working-age population, some EMEs have become caught in the middle-income trap. Finally, from a still broader perspective, every major region has important downside risks attached to current growth prospects.

It must also be recognized that some improvement in the capacity to service swollen debt levels would seem a prerequisite for reestablishing "strong, sustainable and balanced growth," as the G20 would like. Borrowers must once again be willing to borrow. Deleveraging would seem one option in this regard, but since the crisis, the situation has grown worse, not better. As a percentage of GDP, the sum total of nonfinancial debt in 45 major countries (20 advanced and 25 emerging) was 17 percentage points higher in mid-2014 than it was in 2007.[36] Moreover, the sharpest expansion was in private sector debt in EMEs, although overall (nonfinancial) debt rose in AMEs, as well.[37] Among larger countries, only in the US, the UK, and Germany has there been a significant degree of deleveraging on the part of households.

Growth in nominal expenditures would have also helped improve debt service capacities, but again the numbers have not been moving in welcome directions. Inflation, particularly in the AMEs, has been very low, and concerns about deflation have been receiving increased attention. As for real growth, it has also been held back for all the reasons discussed above. Turning to the EMEs, nominal growth in the economy was generally higher than in AMEs, but this differential has recently been reversed.

Another prerequisite for renewed growth would be the reestablishment of healthy financial systems. Lenders must once again be willing to lend. With the possible exception of the United States, this is not yet the case in those AMEs whose financial systems were hit hard by the crisis. As for AMEs not so affected, the continued growth of credit to the household sector has resulted in record-high house prices and debt levels. These now constitute new sources of vulnerability going forward. Finally, the financial systems in EMEs look healthier on the surface, but there are rising concerns about developments beneath the surface. In China, in particular, the growth of their shadow banking system has been spectacular and worrisome to many.

* * *

Chapters 3 and 4 review the policies carried out by central banks since the beginnings of the crisis in 2007. These policies have had clear short-term benefits (Chapter 3), but perhaps have come with longer-term costs attached, as well (Chapter 4). The crisis has been managed but not yet resolved.

Against the background of the long history of central banking, and these continuing difficulties, Chapter 5 is directed to what lessons central banks might draw when looking forward. With respect to the lessons for crisis management and crisis resolution, it is concluded that supportive policies from other arms of government might have reduced the current overburdening of monetary policy. With respect to the lessons for crisis prevention, measures must be taken to help ensure that a crisis of this magnitude never happens again. In this context, questions remain as to the institutional relationships that ought to prevail between central banks and other arms of government. Here the danger is less the overburdening of monetary policy specifically, but of central banks being given a mandate that will prove too wide to manage effectively.

36 McKinsey Global Institute (2015). See also Caruana (2014) and Buttiglione et al. (2014).

37 Blundell-Wignall and Roulet (2014) reveal another unwelcome fact. Much of the increased borrowing in EMEs appears to have been used by corporations to expand production capacity in countries where rates of return on equity are already falling.

CHAPTER 3

The Reaction of Central Banks in the Major AMEs

SYNOPSIS

Central banks in the major advanced market economies (AMEs) reacted with extraordinary vigor to the crisis, though not always in identical fashion. Policy rates were reduced essentially to zero, forward guidance was used to help lower medium-term rates, and the balance sheets of central banks expanded enormously while their composition altered significantly. Initially, the focus was on restoring financial stability, but over time many of these central banks hoped to stimulate aggregate demand as well, in order to resist excessive disinflationary pressures. While the former objective was in large measure achieved, the economic recovery in the AMEs has been held back by the headwinds of debt and misalignments built up prior to the crisis. These problems are real, not monetary, and call for additional policy reaction by governments to resolve them. As implied by both economic history and the history of economic thought, they are unlikely to be resolved solely by liquidity infusions from central banks.

INTRODUCTION

The response to the crisis by the central banks of the major AMEs was extraordinarily robust. Just as significant, the response exerted considerable influence on the behavior of other central banks across the globe. Policy rates in the AMEs were reduced to unusually low levels by early 2009 and have essentially remained there ever since. In real terms, interest rates have not been so low for so long since the 1970s. In addition, the balance sheets of the major central banks were allowed to expand by many multiples of their normal size, and the assets held became significantly riskier. In other AMEs, central banks took similar steps, though policy rates generally remained higher than in the major countries. The central banks of the EMEs also expanded their balance sheets aggressively as they eased monetary policy and intervened in foreign exchange markets to prevent their exchange rates from rising in response to capital inflows.

Two factors underpinned this aggressive easing by the major AME central banks. The first was that the measures taken at successive moments in the crisis failed to resolve it. Thus, still stronger monetary measures always seemed called for and were indeed provided. For example, policies directed to stabilizing the financial system successfully averted collapse but did not fully restore the system's capacity to make loans and support growth going forward. Whereas financial stability might have been restored by quickly recognizing impaired assets and recapitalizing financial systems, with government funds if need be, in most countries there was a marked political reluctance to do this. Similarly, aggressive measures to restore aggregate demand were nevertheless met by the weakest economic recovery in recent history.

The second factor was that monetary policy in the major AMEs was increasingly called upon to offset the influence of other government policies. After an immediate post-crisis phase of fiscal expansion, many countries turned to fiscal restraint. In effect, the speed with which sovereign debt levels rose after the onset of the crisis raised fears of unsustainability and adverse market reactions. In addition, significant regulatory changes were introduced, designed to strengthen

the health of the financial system over time and to make it more resilient in future crises. In the short run, however, it is possible that they might also have reduced the availability and raised the cost of credit.

The combined effects of these developments were that, when it came to policies to encourage the growth of aggregate demand in AMEs, monetary policy became the only game in town. Consequently, it also ran the risk of becoming seriously overburdened. That is, central banks were being increasingly asked to produce short-term results that they could not deliver or, at least, could not deliver without serious risks of unintended and undesirable consequences over the longer term. The first aspect of this challenge is treated in this chapter, while the second aspect of it will be treated in Chapter 4. Chapter 4 will also deal with the spillover effects to EMEs, another unintended consequence.

While broadly the same motivations underpinned the aggressive easing by most AME central banks, there were also many differences among them. Recall from Chapter 1 that, just before the failure of Lehman Brothers, there were growing fears of financial instability but also a sharp increase in inflation. Some central banks chose to respond to the former and lowered the policy rate, while others chose to respond to the latter and raised rates. The Federal Reserve was among the former set of central banks, and the European Central Bank among the latter. Each, perhaps, was preoccupied with avoiding a repetition of their respective historical defining moment—the Great Depression in the case of the United States, and the post-World War I hyperinflation experienced in central Europe. As documented below, similar differences in emphasis among central banks have also been seen more recently.

In the course of the crisis, a variety of unconventional policy instruments were also introduced by the major central banks. Differences among them reflected in part the different structures of their respective financial systems, but also the essentially experimental nature of the central bank response to the crisis.[38] Perhaps most importantly, the approach taken by the European Central Bank differed in significant ways from that taken by the Federal Reserve, the Bank of England, and the Bank of Japan. The European Central Bank treated its unconventional instruments as new (separate) tools to be handled independently from the conventional interest rates monetary policy measures (that is, the separation principle). In effect, the unconventional instruments were introduced to help repair a broken transmission mechanism, even when policy rates were above zero. In contrast, other major central banks treated them more as substitutes, introducing them when the policy rate became constrained by the zero lower bound.

This chapter will describe the various problems faced by central banks during the crisis. Then, consideration will be given to the wide range of policy instruments used by central banks to respond to those problems. Finally, an assessment will be made of the effectiveness of these policies, particularly the more unconventional ones. This could provide some guidance as to whether use of such instruments might be recommended in the future, either in the course of managing crises or preventing them.

THE OBJECTIVES SOUGHT BY CENTRAL BANK POLICY INTERVENTION

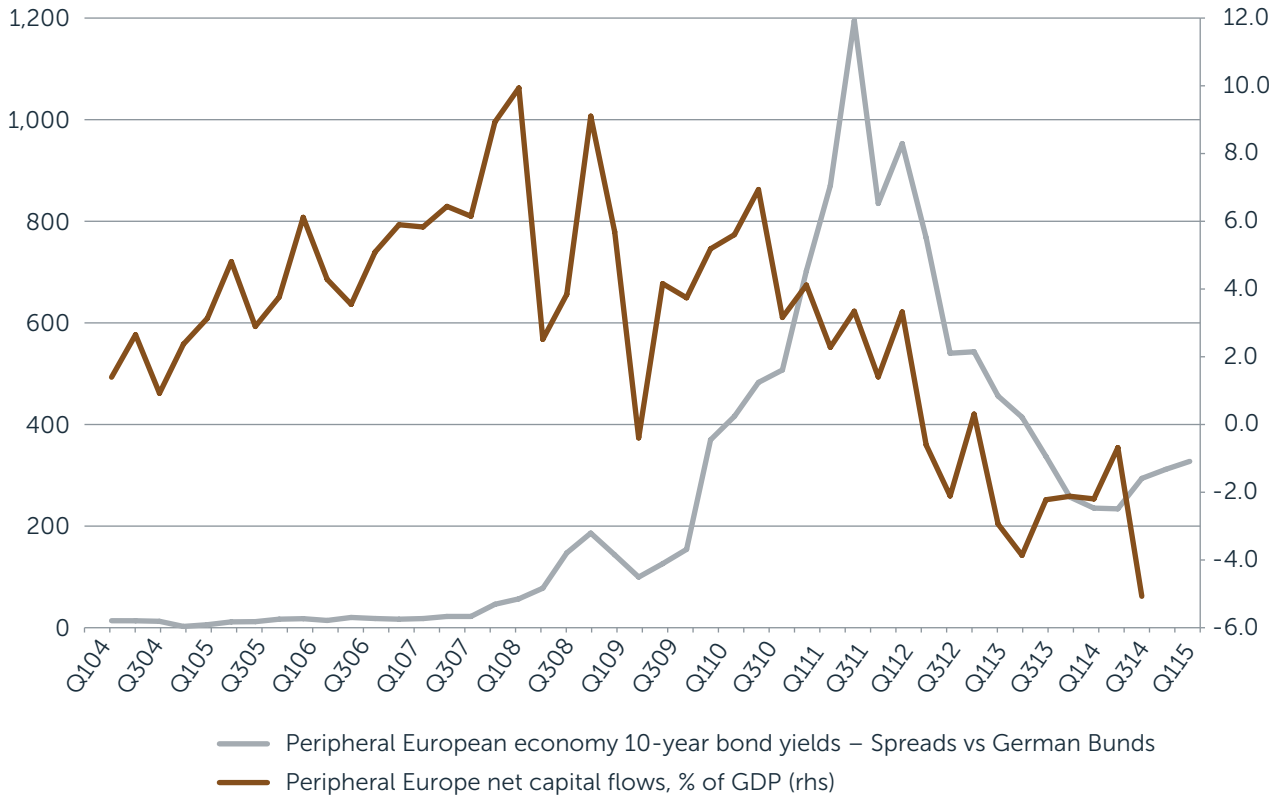
Central banks have been faced with two related problems. The first has been to contribute to restoring the proper functioning of financial markets and the process of financial intermediation. The second has been to offset weak aggregate demand that threatens excessive disinflation or even deflation. Both are traditional objectives for central banks. Moreover, they are closely related in that a badly functioning financial system will itself restrain credit growth and demand in turn.

38 Put otherwise, the ECB focused more on supporting bank lending, in particular through the concept of unlimited supply of liquidity at fixed rates to banks and the policy of "enhanced credit support," while the Fed emphasized supporting lending by nonbanks. This difference reflected in part the greater role played by banks in the Eurozone and the greater role played by markets in the US. Central banks also differed in the degree to which they purchased government paper as opposed to privately issued liabilities, and in a variety of other ways as well.

In the early phases of the crisis, doubts emerged about the solvency of many financial institutions as the asset value of structured products based on mortgages (especially, but not just subprime) became ever more uncertain. As a result, the interbank market dried up almost completely from August 2007 onward. Then, in the wake of the failure of Lehman Brothers in September 2008, there was an almost total breakdown in the functioning of financial markets more broadly. Liquidity dried up completely, a so-called Minsky moment, and governments in the United States, the United Kingdom, and other advanced economies were forced to intervene directly to provide state support for a number of financial institutions. Many European institutions faced particular shortages of dollar funding, which they had used to support purchases of assets in the United States. Central banks used various measures to provide liquidity support for individual institutions and to reliquify financial markets more generally. They did so in the expectation that this support would be of a temporary nature, and that governments would have to deal with any more fundamental concerns having to do with possible insolvency.

When the crisis morphed from a private financial crisis to a sovereign risk crisis, a similar set of problems emerged within the Eurozone, which became the new epicenter of the global crisis at the beginning of 2010. After many years of sharply compressed yield spreads against German Bunds, the yields on sovereign bonds issued by a number of governments rose sharply (see figure 8). In turn, the prices of many private sector instruments also plummeted, not least the share prices of many European banks. In addition, capital flows

FIGURE 8. Average Yield Spread of Eurozone Peripheral Country Sovereign Debt against Bunds and Private Sector Capital Net Inflows/Outflows, Q1 2004–Q2 2015



NOTE: Bunds in basis points (lhs).
SOURCES: Haver; International Monetary Fund; UBS.

from core European countries to peripheral countries, which had previously supported demand growth, went sharply into reverse. To some degree, both a natural defensiveness on the part of wounded lenders and regulatory guidance seem to have had some influence. While bond yields in peripheral countries subsequently responded to supportive measures taken by the ECB, lending by banks continued to be constrained, especially to small and medium-sized enterprises.

The second challenge faced by major central banks during the crisis was to support aggregate demand growth to avoid excessive disinflation. The steep drop in output from mid-2008 to mid-2009 was followed by a quite tepid recovery. Moreover, with a few notable exceptions, the level of output by end-2014 had still not recovered to the peaks recorded prior to the crisis. On the one hand, it could be argued that the onset of the crisis simply indicated that pre-crisis levels of output were unsustainable.[39] Further, many commentators have suggested that the crisis itself permanently lowered the level (if not necessarily the growth rate) of potential going forward.[40] On the other hand, most of the major central banks felt that a significant output gap had opened in 2009 and that a substantial degree of excessive capacity persisted subsequently. This provided the rationale for reducing interest rates to very low levels by mid-2009 and for introducing other policies designed to be supportive of aggregate demand.

MEASURES TAKEN BY THE CENTRAL BANKS IN MAJOR AMES

The various measures taken by the central banks in major AMEs can be classified into three categories: measures affecting rates set most directly by central banks, forward guidance about future policy rate movements, and aggressive use (both actual and threatened) of the central bank balance sheet. While in principle some measures were primarily designed to foster financial stability, and others primarily to support aggregate demand, in practice many measures contributed to both objectives.

Similarly, it is not quite right to refer to some measures as conventional and others as unconventional. Many of the latter measures were simple extensions to different markets of practices (especially the lender-of-last resort function)[41] thought conventional in a different set of markets. Moreover, some of these unconventional practices had been thought of as conventional in earlier times.[42] However defined, what cannot be denied is that the measures taken by central banks since the start of the crisis have been without historical precedent in both their scope and duration. This may increase the likelihood of both unexpected and undesirable consequences.

Measures affecting rates set by central banks

For some decades now, the principal instrument used to affect monetary conditions has been the central bank's policy rate. Whereas an earlier literature suggested the possibility of controlling the monetary base, central bankers rejected this on the grounds that it would lead to excessive volatility of short-term rates.[43] That said, central banks commonly did use slight variations in their own balance sheet to ensure that short-term market rates stayed close to policy rates. The effects of policy changes on all other financial markets were then determined by market processes without any explicit targeting by central banks.

The Federal Reserve began to lower rates in late 2007 and, by early 2008, all the other major central banks except the ECB had followed. By early 2009, reflecting the particular need to respond to the failure of Lehman Brothers, overnight rates everywhere had reached the low levels that have been maintained until now. By this standard, the central banks of the AMEs acted in a powerfully anticyclical fashion. Indeed, the policy rate change was more extreme, more rapid, and more internationally coordinated than in any other postwar cycle (see figure 9).

39 Borio et al. (2013).

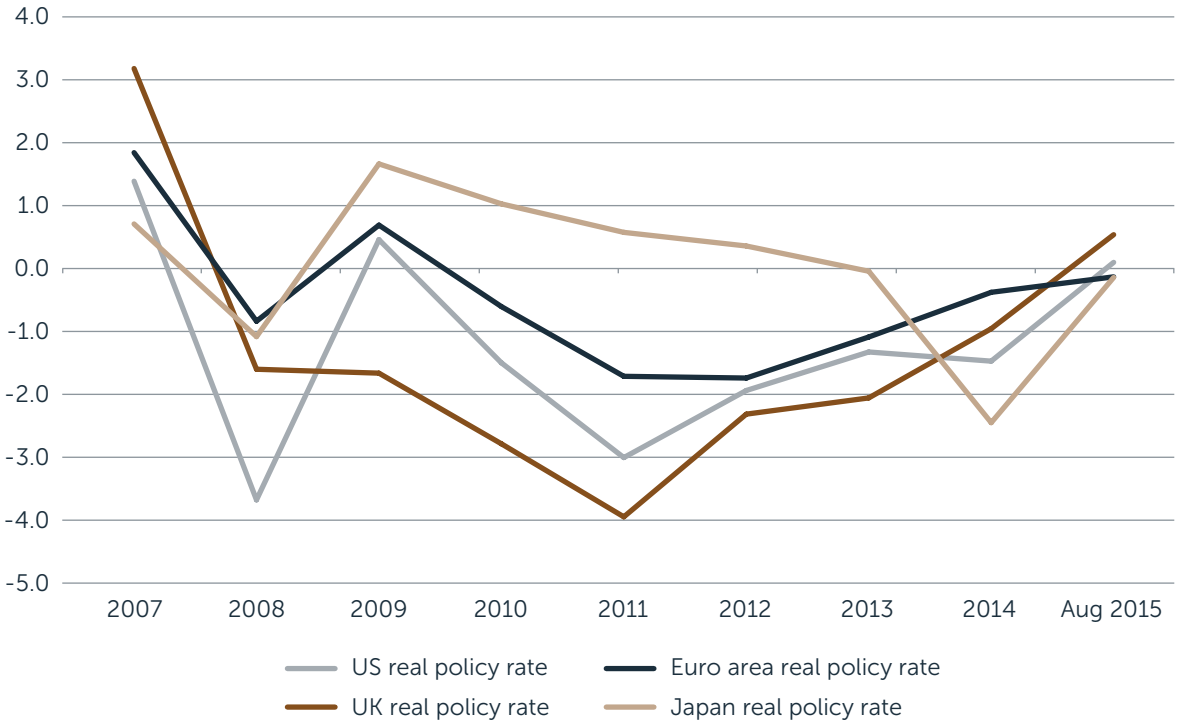
40 The OECD has suggested an average reduction in the level of potential of 3 percentage points in OECD countries. See Ollivaud and Turner (2014).

41 Shirakawa (2012).

42 There is debate over the use of the word "unconventional" to describe the policies pursued by central banks in the crisis. Certainly, central banks have used policy tools other than the policy rate to respond to crises in the past. And in that sense, the current policies may be seen as an extension of previous approaches. Nonetheless, the magnitude and duration of the policies used during the 2007–09 crisis were much greater than in past instances.

43 The classic academic article is Poole (1970).

FIGURE 9. Real Policy Rates, 2007 to Mid-August 2015



SOURCES: Haver; International Monetary Fund; UBS.

Reflecting concerns about rising inflation, the ECB had raised its policy rate just prior to the unexpected onslaught of the global crisis. Similarly, it raised the policy rate again in 2011 in the face of what seemed to be significantly improving European growth prospects. Again, however, it quickly reversed course as the Greek crisis erupted and a broader Eurozone crisis threatened. Indeed, in the spring of 2014 the ECB took a pioneering step by being the first of the major central banks to introduce a negative interest rate on commercial bank reserves held by central banks within the system. The objectives sought included incentives for more commercial bank lending, particularly in peripheral countries in the Eurozone, and some offset to persistent strength in the value of the euro.

In addition to its positive contribution to financial stability, three arguments supported this vigorous monetary policy response. First, extant models said that it would work. Lower policy rates would feed through to lower long-term rates, which would in turn stimulate demand, help remove excess capacity, and cause inflation to stabilize around desired levels. Demand stimulus would be affected through various channels. In particular, lower long rates would cause future spending to be brought forward in time, and a lower exchange rate would lead to a substitution of domestic for foreign spending. Lower rates might also buoy asset prices and the perceptions of increased wealth might then lead to increased spending. At various times, informal references have also been made to the stimulative effects provided by other channels in the transmission mechanism, but these have generally proved harder to model formally.

A second reason for easing policy was that recent experience with respect to policy easing also led to the conclusion that it would work. Easing in 1987, 1997, and 2001 had been followed by rising aggregate demand, validating the assertion by Fed Chairman Greenspan that it was more efficient to clean up after a period of excessive credit expansion than it was to lean against the expansion in the first place. Third, and particularly in the United States, there was concern

that the economy might be on the edge of a Fisher-type debt deflation[44] that would prove extremely hard to combat. Indeed, this seemed to be the principle rationale for turning to unconventional measures of stimulating demand when policy rules[45] seemed to suggest the need for a nominal policy rate well below the zero lower bound.

Forward guidance and revised policy objectives

The Federal Reserve was the first central bank to provide forward guidance in response to this crisis.[46] In December 2008, the Federal Open Market Committee (FOMC) said it "anticipates … exceptionally low levels of the federal funds rate for some time."[47] Subsequently, forward-looking guidance was given by the Bank of Japan and the Bank of England. Finally, after earlier eschewing its use, the European Central Bank in the summer of 2013 also indicated its expectation that the policy rate would stay at a low level for an extended period.

The theoretical basis for such guidance had been around for decades, but became more compelling when the policy rate hit the zero lower bound. If the longer-term riskless rate is essentially an average of current and future expected short rates, then the latter can be manipulated even if the current rate is effectively zero. This raises the prospect of reducing both the level and the variance (and thus the term risk premium) of longer-term rates. Further, so called neoclassical models (see Chapter 2) implied a direct link between central bank policy commitments and expectations of both economic growth and future inflation. In effect, if the central bank could convince the markets that previous reaction functions would be overridden by these new policy commitments, they could effortlessly create the desired recovery.

There are essentially two variants of forward guidance—unconditional and conditional—and each has flaws. First, an unconditional commitment is literally not credible; that is, it is not time consistent. While a central bank could initially commit to allowing inflation to rise faster than it would normally like, there is nothing to stop it from raising policy rates as normal when the inflation actually starts to materialize. To combat this, some commentators have suggested that central banks actually change their target from a level of inflation to a price level target or a target for the level of GDP at some future period.[48] Both would explicitly allow faster growth and near-term inflation without requiring a normal policy response. In practice, central banks have been reluctant to do this, fearing that inflationary expectations might rise uncontrollably. As for conditional commitments, they also have a shortcoming. They must change as conditions change, and this can happen both frequently and unpredictably. In this latter case, the intended clarity of forward guidance could actually become a source of still greater confusion about the central banks' future intentions.

Measures affecting the central bank balance sheet

During the crisis, the balance sheets of the major central banks increased greatly in size and changed greatly in composition (see figure 10). With the exception of the Bank of Japan, and its introduction of quantitative and qualitative monetary easing in April 2013, the increase in the size of the liabilities of the central bank was not viewed as an end in itself.[49] Rather, it was the byproduct of central bank's desire to either make loans to financial institutions or to purchase other assets in the interest of pursuing financial stability and/or increasing aggregate demand. In effect, these asset-based measures gave

44 Fisher (1936).

45 Central banks in major AMEs typically follow Taylor-type rules for adjusting the policy rate, as described in Chapter 1.

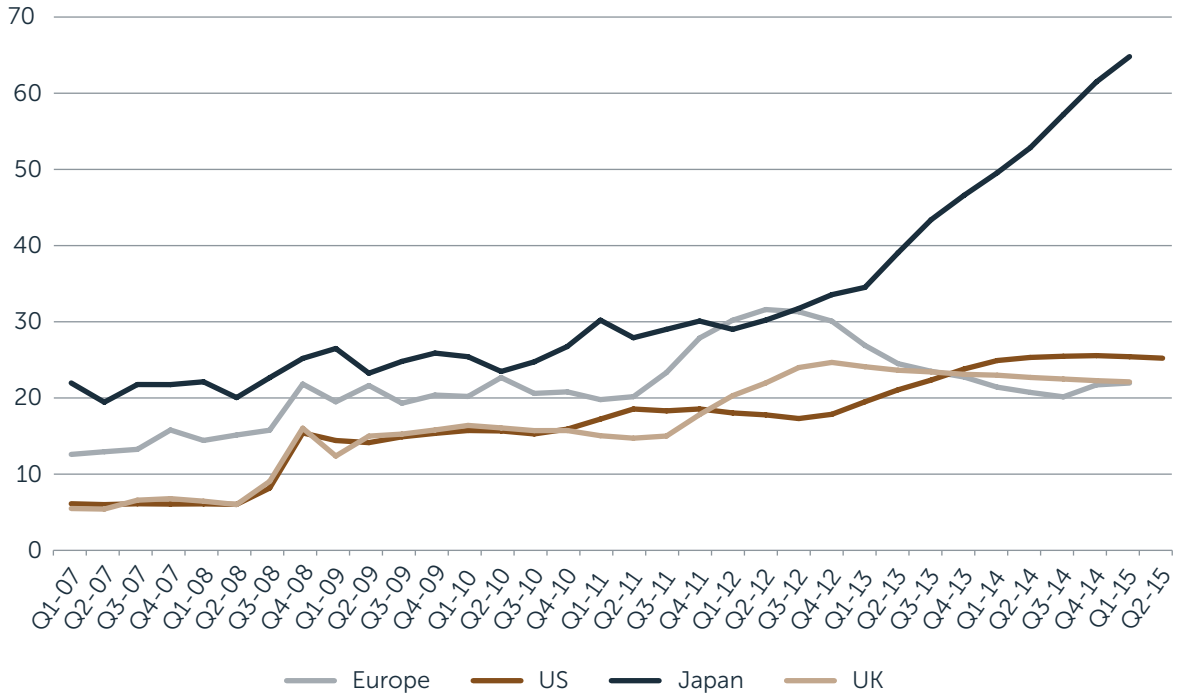
46 The Bank of Japan was the first to use forward guidance at the zero lower bound in 1999.

47 Federal Open Market Committee (2008).

48 For a recent example, see Woodford (2012).

49 Similarly, the Bank of Japan had already pursued a policy of quantitative easing between 2001 and 2006. The underlying hypothesis was that an increase in the reserve base available to commercial banks would lead to increased lending and a concomitant expansion of the money supply. This failed to work as originally intended, since the bank's demand for reserves tended to rise with the supply, thus cutting the supposed channel of transmission.

FIGURE 10. Central Bank Balance Sheets as a Percentage of GDP, Q1 2007–Q2 2015



SOURCES: Haver; national sources; UBS.

central banks a policy instrument that could be used independently of the policy rate. Moreover, there were also grounds for belief that simple threats of future action might prove as effective as actual balance sheet changes themselves—truly a free lunch. However, as will be discussed further below, this added freedom also exposed central banks to added dangers.

To alleviate strains in the interbank lending market, central banks acted early in the crisis (QE1) to provide large quantities of liquidity to commercial banks to which they were traditional lenders of last resort. Further, in the United States in particular, access to this facility was extended to investment banks and to money market mutual funds. Moreover, central banks offered longer-term funding to financial institutions for very large amounts on the basis of an expanded spectrum of collateral. Perhaps most prominent were the series of long-term refinancing operations (LTROs), successively introduced with durations of six months, one year, and three years, by the European Central Bank, but there were similar programs offered elsewhere. Recognizing the dollar funding requirements of many non-American banks, the Federal Reserve and a number of other central banks opened up swap lines to facilitate such funding.

Central banks also provided direct funding to support certain markets and provided indirect support for prices by buying large quantities of private sector assets in secondary markets. Good examples would be purchases of agency paper by the Federal Reserve, of covered bonds by the ECB, and a variety of investments by the Bank of Japan. These are also good examples of measures that both supported financial stability and contributed to demand growth.

The ECB also took important measures to stabilize bond yields in peripheral European countries. They first bought bonds under the Securities Market Program (Greek, Irish, and Portuguese starting in 2010, and Spanish and Italian starting in August 2011). Later, as a renewed sell-off in peripheral markets appeared to pose an existential threat to the Eurozone, the ECB pledged to introduce Outright Monetary Transactions (OMTs or "whatever it takes within the mandate") to support these countries. The pledge, however, was

made highly conditional and support had in fact neither been requested nor provided by the middle of 2015.

Central banks, other than the ECB, also used their balance sheets explicitly to stimulate spending. This was particularly the case after the policy rate had been reduced close to the zero lower bound, and after the limitations of forward guidance had become more widely appreciated. Large-scale purchases of bonds by the Federal Reserve (QE2 and QE3) were explicitly directed to reducing long-term sovereign rates and sometimes the private sector yield differentials with sovereign rates. These longer-term rates were thought to have a more direct impact on spending decisions than the policy rate itself.[50]

One channel[51] thought to lead to lower long rates was that bond purchases would be a signal to financial markets that the policy rate would not be raised for an extended period. In that sense, it supported forward guidance, as described above. A second channel was thought to be substitution effects. If a particular bond tranche had less than infinite substitutability with other tranches, then reducing the supply to the private sector would cause its rate to fall. This was presumably the rationale for the Fed's Maturity Extension Program (Operation Twist),[52] which ran from September 2011 to December 2012.[53] Third, a general transfer of both credit risk and maturity risk to the public sectors would cause both risk premia to fall for similar reasons.

EVALUATION OF THE EFFECTIVENESS OF THESE POLICIES

Attention will be focused on the extent to which the two broad objectives of central bank policy were realized; namely, the restoration of the proper functioning of financial markets and institutions, and the restoration of aggregate demand and full employment. The conclusion drawn is that central banks made an invaluable contribution to achieving the former objective. While as suspect as all counterfactuals, there might well have been a disastrous collapse of the financial sector without the support provided by central banks. That contribution recognized, it must also be said that the central banks did more to control and manage the crisis than to resolve it. This issue is returned to below. As for the objective of restoring aggregate demand, the efforts of central banks were much less successful. An attempt will also be made in this section to evaluate the effectiveness of different policy instruments in pursuit of the two specified objectives. This is inherently a much more difficult task since it involves disentangling the separate effects of different instruments often introduced as a package.

Restoring the proper functioning of financial markets and institutions

The measures taken to restore the functioning of domestic financial markets and financial institutions appear to have been reasonably effective. Over time, credit spreads and maturity spreads narrowed virtually everywhere, while overnight funding rates fell back into line with policy rates. More specifically with respect to wholesale funding, the liquidity insurance provided by the LTRO gave an alternative source of funds to European banks, prior to the interbank market opening up again, and likely prevented an even larger deleveraging than actually occurred. It is notable that rates along the yield curve for core sovereigns in Europe actually fell more than in the US and the UK. In the US, the introduction of the Term Asset-Backed Securities Loan Facility (TALF) restored liquidity in the market for securitized credits. In addition, large-scale purchases of private sector assets (especially mortgage-backed securities) appear to have pushed down yield spreads on such securities, as well as mortgage spreads more generally.

50 An associated initiative was also undertaken by the Swiss National Bank. It intervened massively in the foreign exchange market for the Swiss franc and then announced that the exchange rate with the euro would not be allowed to exceed 1.2 francs per euro. The purpose was to preserve the competitiveness of Swiss industry and thus to support Swiss economic activity. The peg to the euro was abandoned in early 2015 following a sharp weakening of the euro against the dollar, and fears of further declines to come.

51 For a broader discussion of these channels, see International Monetary Fund (2013).

52 Operation Twist, or "Twist," is a policy by which the Federal Reserve sells short-term government bonds and buys long-dated Treasuries, in an effort to push down long-term interest rates and therefore boost the economy (http://lexicon.ft.com/Term?term=Operation-Twist).

53 Note that substitution effects due to central bank purchases of sovereign debt could, in principle, be offset by Treasuries issuing larger quantities of such debt to profit from lower rates.

Central banks have a crucial role to play in crisis management and, in particular, in ensuring the stability and smooth functioning of the financial system.

Mention must also be made of the effectiveness of central bank promises to act, as opposed to actually acting. The ECB pledge of OMTs ("whatever it takes") clearly and almost instantaneously restored order to Eurozone financial markets. It reduced the fear that individual countries might leave the Eurozone and, an even graver risk, that the Eurozone itself might disintegrate.[54] As a result of the announcement of OMTs, there was a remarkable reduction in the yield spreads for sovereign borrowers in peripheral countries. However, it is still too early to suggest that this confidence will be maintained permanently. The conditions required to trigger the OMT facility are very specific and, if tested, might not be met. Further, a number of legal challenges to these prospective ECB policy initiatives have already been launched.[55] At some point, markets might refocus on such issues. Further, sustaining confidence in the future of the Eurozone will demand discernable progress in establishing the various other unions[56] required to support monetary union. None of this is guaranteed.

At the international level, the currency swap agreements in late 2008 also played an effective role, so much so that recourse to these lines began to decline shortly afterward and, in some cases, lines were actually left untouched. As well, international capital flows recovered sharply, to the particular benefit of corporate borrowers with access to the bond market. While reference has been made to the contribution made to these outcomes by specific, national policy measures, the broader contribution made by the package of global policy measures should also not be forgotten.

One area where policy measures have had less success has been in restoring bank lending at more or less normal intermediation spreads. This is certainly the case in peripheral countries in the Eurozone where credit conditions have tightened and spreads to small and medium-sized corporate borrowers remain large (see figure 11). In fact, many banks seemed to use funds available from the ECB not to support lending to the private sector, but to purchase still more of their sovereign's bond issues.[57] This problem came to be seen as a serious shortcoming in the transmission mechanism of the ECB's monetary policy. The Asset Quality Review and the stress tests of European banks, undertaken in 2014 under the leadership of the ECB, were intended to restore confidence in the banking system more generally. While successful to some degree, yield spreads charged by banks to smaller borrowers, especially in the peripheral countries, have remained large. As a result, much attention is being directed to the issue of how nonbank financing of small and medium-sized enterprises might be encouraged, particularly through the securitization process. This, however, is likely to take considerable time.

More generally, despite the efforts of central banks, bank lending remains weak relative to GDP in many countries. In part, this reflects fundamental problems having to do with the supply of credit. Banks thought to have impaired loans, poor profit prospects, and inadequate levels of capital still have high funding costs that they must pass on to their customers. In Europe, negative interest rates on bank reserves held at central banks might actually exacerbate this problem.[58] Further, banks are tempted to hold on to high reserve levels as an option against continuing uncertainty. In part, slow credit growth might also have to do with low demand for credit in the face of both uncertainty

54 While not a major AME, it is still noteworthy that the Swiss National Bank's promise to peg the exchange rate of the Swiss franc (at 1.2 to the euro) had the same effect. Speculation ceased almost immediately. However, by early 2015 such pressures had begun to reemerge again, in part due to anticipation of the announcement of Quantitative Easing by the ECB, and the Swiss National Bank announced that it was lifting the peg. An initial sharp appreciation of the Swiss franc was subsequently largely reversed.

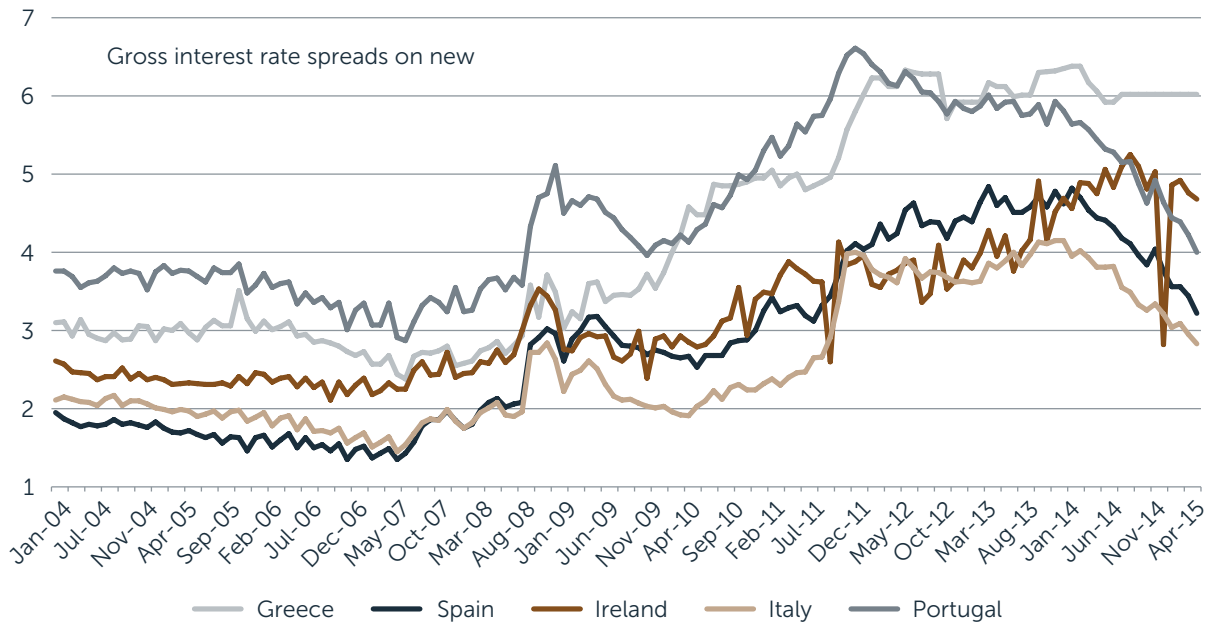
55 For an elaboration of the arguments, see Sinn (2014). It is noteworthy that recent decisions by the European Court of Justice have not supported the predominant German view that the actions taken by the ECB have been illegal.

56 These are often described as banking union, fiscal union, economic union, and eventually political union.

57 Such purchases also worsened the bank-sovereign nexus, whereas it was the broader objective of policy to lessen such mutual interactions.

58 In early January 2015, Credit Suisse in Switzerland announced an increase in mortgage rates that it attributed to an increase in the negative interest rate on reserves held by banks at the Swiss National Bank.

FIGURE 11. Interest Rate Spreads on SME Loans in Eurozone Periphery, January 2004–July 2015



SOURCES: European Central Bank; UBS.

and already high debt burdens. Evidently, these more fundamental problems cannot be sustainably resolved through central bank actions alone.

Measures to stimulate aggregate demand and resist excessive disinflation

As noted above, the recovery of spending in the major AMEs has been remarkably weak despite the measures taken by central banks. This weakness should not have been surprising in light of either economic history or the history of economic thought. As for history, Reinhart and Reinhart (2010) document the aftermath of a large number of historical crises in which both the real and financial sectors of the economy were adversely affected. Generally speaking, the recovery was very halting and pre-crisis levels of output were often not achieved for over a decade. The International Monetary Fund (2009) adds that, in many such cases, monetary policy was eased aggressively in response but simply failed to gain traction.

As for the history of economic thought, a number of theorists had earlier suggested that monetary easing might not resolve a deep crisis. Indeed, Kregel (2011) notes that the monetary easing witnessed to date has many similarities to the policies recommended by Keynes in *A Treatise on Money* (1930). However, Keynes had repudiated his own, earlier views by the time he wrote *The General Theory of Employment, Interest, and Money* (1936). He states explicitly in Chapter 13 of *General Theory*, "If, however, we are tempted to assert that money is the drink which stimulates the system to activity, we must remind ourselves that there may be several slips between the cup and the lip."[59] Much more recently, Meltzer (2013, p. 7) seems to confirm this conclusion by stating, "I argue that there is no analytic basis for the policies we have. It is a misreading or more probably a non-reading of

59 More specifically with respect to monetary measures to stimulate consumption, Meltzer (2013, p. 4) adds, "No one who has read Keynes's work carefully can find him favoring policies to boost consumer spending. He opposed them throughout his life."

Keynes to claim his work as the model for short-run problems." Other prewar theoreticians reached even more negative conclusions. Albeit based on a very different conceptual model, Schumpeter concluded, "our story provides presumption against remedial measures that work through money and credit."[60] Such warnings, from across the spectrum of thinking at the time of the Great Depression, might have warranted greater pause for thought about the merits of relying almost exclusively on monetary policy to deal with the current crisis.

In evaluating the effectiveness of the policy measures taken by the central banks, two issues must be addressed. First, did the measures alter financial conditions in a direction that would seem likely to support more spending? Put otherwise, did the signal get through? Second, did the various economic agents (households and corporate, in particular) respond and, if not, why not? While both the signal and the response bear some blame, the latter seems relatively more culpable.

To discuss whether the signal got through is, largely, to repeat the discussion above about the proper functioning of financial markets and institutions. The conclusion reached is that the policy measures actually introduced were reasonably effective. In addition, promises to act (like OMTs) have been remarkably successful to date, but their continuing effectiveness cannot be guaranteed.

While unconventional policies such as quantitative easing (QE), off-balance-sheet commitments, and forward guidance have played an important role in the management of recent crises, deeper studies are still needed to ascertain their longer-term overall benefits and unintended consequences.

Still at issue, however, is which of the policy measures introduced were relatively more effective. Work available to date[61] seems to indicate that forward guidance did, earlier in the crisis, have the effect of nudging medium-term rates lower. However, more recently, its effectiveness in the US and the UK has been increasingly questioned. The principal technical problem has been constant changes to the economic conditions specified as being necessary to support an increase in the policy rate.[62] More fundamentally, skepticism has also been growing that central banks can alter economic behavior simply by stating their ultimate objectives, especially when other means to achieve these objectives are limited at the zero lower bound. A discussion of the risk that forward guidance might actually encourage destabilizing speculation in financial markets is contained in the next chapter.

The use of the central bank's balance sheet to lower long-term rates seems to have been more successful. Williams (2011) looks at eleven studies about the effects on bond rates of large-scale asset purchases in the US. He concludes that US$600 billion of such purchases by the Fed has the same effect on the ten-year rate as a reduction of 75 basis points in the policy rate. This is substantial. Krishnamurthy and Vissing-Jorgesen (2011, p. 1) also conclude that longer-term rates were significantly affected, but note that the "effects…depend critically on which assets are purchased." Somewhat at odds with these findings are those of Wright (2012), who agrees that longer-term rates were affected, but contends that the effects lasted for only a relatively short period of time. Finally, Thorton (2014) casts doubt on the reliability of event studies that link the announcement of quantitative easing to subsequent interest rate declines. He contends that, "At a minimum, the event-study evidence is fragile, if not inconclusive" (p. 27).

Nor is there agreement about the channels through which this has been achieved. Krishnamurthy and Vissing-Jorgesen (an event study) contend that different channels can work at different times. The International Monetary Fund (2013) suggests the dominance of the signaling channel, while Williams

60 Schumpeter (1934, p. 21).

61 See International Monetary Fund (2013), Williams (2011), and Bank for International Settlements (2009), in particular.

62 Friedman (2014) documents these changes in the case of the US. He concludes, "the likely future of forward guidance as an explicit tool of monetary policy implementation … is dubious" (p. 17).

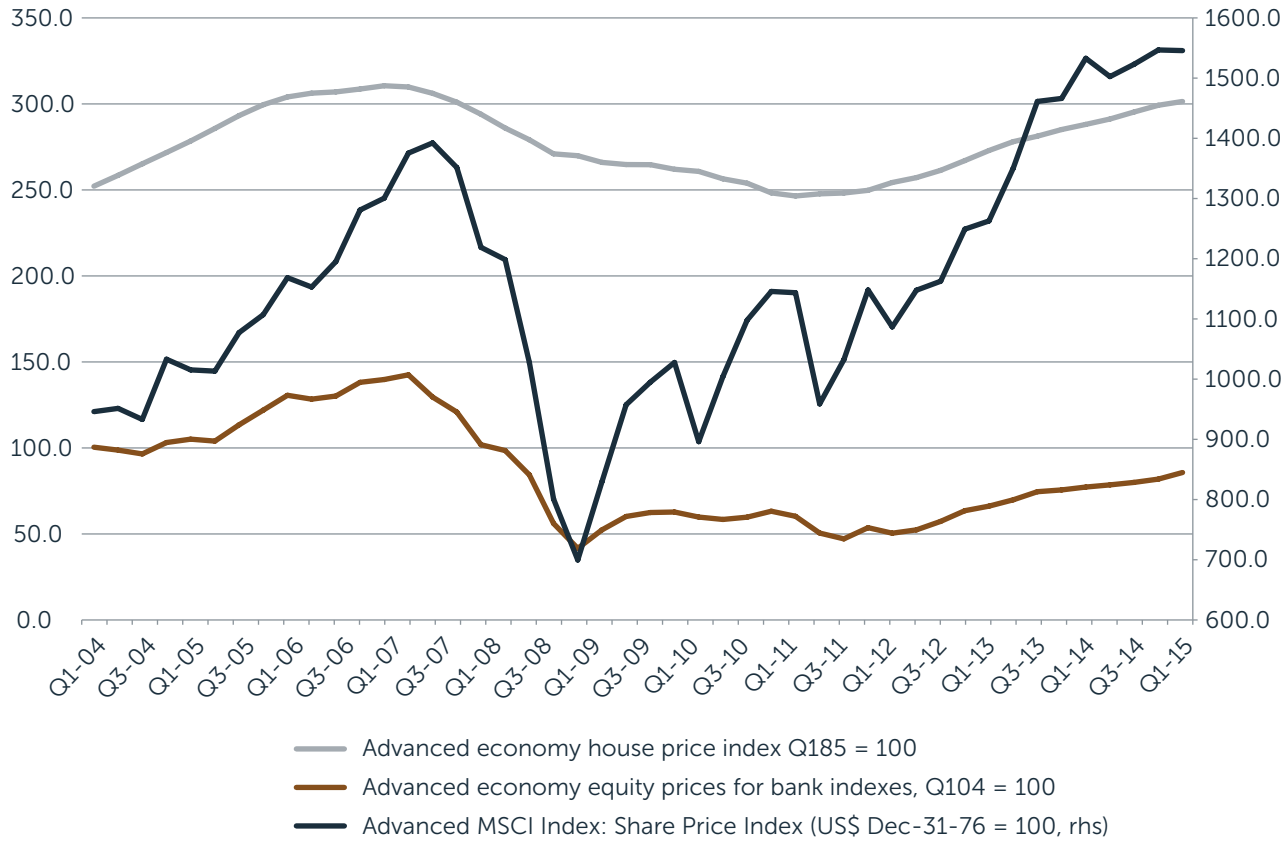
(2011) underlines the dominance of portfolio balance (shortage) effects. The IMF's conclusion also seems supported by what happened in markets in May 2013. Portfolio balance effects on longer-term rates should in principle work through relative changes in the stocks of assets in the hands of the private sector. In contrast, in May 2013, mere hints by the Federal Reserve of a possible tapering of a still positive flow of new bond purchases had massive negative effects on the prices of financial assets around the globe.

A final point about the transmission mechanism is that easy monetary conditions appeared to buoy equity prices and to support house prices in the major AMEs (see figure 12). By the end of 2013, equity prices in many markets (including the US) had risen to record levels. Even in Japan, under the influence of Abenomics, the stock market staged a significant recovery. House prices also tended to stabilize, and in the case of the US and the UK, they actually increased significantly. These supposed additions to wealth should also have increased tendencies to spend.

Despite these incentives, the actual upturn of spending in the major AMEs has been unusually weak. A general factor inhibiting spending has been unusual uncertainty about the future, not least uncertainty about future monetary and fiscal policies.[63] This induces people to keep their options open as much as they can. This uncertainty could even be

63 See Meltzer (2013, p. 5).

FIGURE 12. Equity Prices, Prices for Bank Equity, and House Prices, Q1 2004–Q2 2015



NOTE: MSCI = Morgan Stanley Capital International
SOURCES: Haver; Oxford Economic Forecasting; UBS.

aggravated by unprecedented policies that could be interpreted as desperate acts. Moreover, differences in actions among different central banks can also contribute to uncertainty by drawing attention to the essentially experimental nature of what is being done. Finally, and perhaps most important, lower interest rates stimulate demand by bringing forward in time spending that would otherwise have occurred later. In this process, debts are created that are claims on future spending. As the future becomes the present, the weight of these claims grows ever more evident. In short, this logic indicates that easy monetary policies must lose their effectiveness over time. And six years of unusually easy monetary policies would seem quite a long time by any standard.

Turning more specifically to household spending, at least three reasons can be suggested to explain its general weakness. First, people wishing to save a certain sum for retirement purposes must save more if the rate of return on accumulated funds fall. One example of this has been a call for increases in regular contributions to defined benefit pension schemes. Second, consumption might also have suffered from distributional issues. In most countries, the rich seem to have been gaining at the expense of the middle classes, and it can be argued that easy monetary policies have contributed to this. If the rich have a relatively low propensity to consume, this puts constraints on consumption overall. Third, the assertion that low interest creates spendable wealth in the form of higher prices for financial assets and houses, needs to be reassessed. Without improvements in underlying fundamentals, artificially high prices for financial assets will not be sustained. As for higher house prices, they clearly reallocate wealth, but it is hard to see how they can make a nation wealthier in aggregate.[64]

As for business investment in AMEs, it was weakening prior to the crisis and has fallen even more sharply since. This is surprising since profits have generally been very high, as have been levels of corporate liquidity. What could explain this and the failure to respond to easy monetary policies? First, if future consumption is expected to be weak, then business investment must surely follow. Second, many corporations have associated pension funds, and lower roll-up rates imply charges to corporate profits. This leaves fewer funds for investment. Finally, and perhaps most important, uncertainty weighs most heavily on fixed capital because it only pays off over longer horizons. As Keynes (1936) pointed out, uncertainty (not risk) is inherent in such decisions, and "animal spirits" both wax and wane. Today, the animal spirits seem deeply depressed by uncertainty about future consumption, future tax and exchange rate regimes, access to foreign markets, and a general worsening of geopolitical circumstances.

* * *

The central banks of the major AMEs reacted vigorously and inventively to the onset of the crisis. Most of them have even intensified their efforts over recent years. Most dramatically, the Bank of Japan in 2013 promised to double the size of its balance sheet in pursuit of an inflation target of 2 percent. Late in 2014, it announced an even more aggressive schedule of asset purchases, as inflation failed to respond as desired. Under a new Governor, the Bank of England in 2013 intensified its forward guidance. In June 2014, the ECB unveiled a further stimulus package including a negative deposit rate on reserves held at the central bank. Perhaps more important, it also indicated its willingness to make large-scale purchases of longer-term bonds if circumstances required. A new program of asset purchases was announced in January 2015, and purchases actually began shortly thereafter.

Somewhat in contrast, the Federal Reserve announced the end of its asset purchase program on October 20, 2014. Note, however, that this constituted the end of further easing, rather than the beginning of tightening. Further, the Fed indicated at first that it would not raise its policy rate until "a considerable time after"[65] its purchases ended, and then suggested it would be "patient"[66] before doing so. While the reference to patience was withdrawn early in 2015, no action was taken to actually begin the tightening process. As of mid-2015, the dominant market view was that this would not begin before the

64 For a formal analysis of this issue, see Muellbauer (2007).

65 Federal Open Market Committee (October 2014).

66 Federal Open Market Committee (December 2014).

fall of 2015, and perhaps even later. Moreover, market expectations of the future path of policy rates in the US were considerably less steep than that predicted by the members of the FOMC.

Central bank interventions, first thought of as necessary and temporary measures to support the financial sector, have now turned into something quite different. They have become semipermanent measures in pursuit of stronger demand growth and the avoidance of disinflationary pressures. This is curious since the evidence reviewed above indicates that they have been relatively less successful in pursuit of this second purpose. Central banks have described their actions as "buying time" for governments to finally resolve the crisis through policies like those described in Chapter 5. But time is wearing on, and purchases have their price. Chapter 4 assesses the price being paid for government inaction, namely, the unintended side effects of current monetary policy in the major AMEs. These include, but are not limited to, the effects on other countries and the difficulties that might be associated with exiting from these policies.

CHAPTER 4

Undesirable Side Effects and the Need to "Exit"

SYNOPSIS

The long period of extremely easy monetary conditions has not generated inflationary pressures in the advanced market economies (AMEs), as many initially feared. However, it might well have contributed to further misallocations of real resources in the economy, to reducing potential output, and to unsustainable increases in asset prices. The emerging market economies (EMEs) have imported similar undesirable forces, in part due to their own efforts to hold down exchange rates subject to the influence of large-scale capital inflows. There seems to be widespread agreement that central banks must exit from these abnormal policies at some point. However, uncertainty about both the modalities and implications of such an exit implies a bias toward this happening too late rather than too soon. Evaluation of a number of possible scenarios reveals a growing and worrisome set of exposures to future economic instability despite seven years of extraordinarily easy monetary conditions.

INTRODUCTION

It was suggested in Chapter 3 that the policy measures taken by the central banks of the major AMEs have had only limited effectiveness in restoring global aggregate demand. It was further suggested that the effectiveness of these measures might have been declining over time as the headwinds of debt have continued to rise. In this chapter, it will be suggested that these policies have also had undesirable side effects whose importance, in contrast to their effectiveness, has been rising over time. In principle, this implies a crossover point at which central banks should exit from their policies regardless of whether or not they have succeeded in stimulating near-term growth. In effect, such an exit would be a recognition that central bank policies had begun to do more harm than good.

In practice, political economy arguments might well imply that such a reversal is impossible in the absence of a resumption of stronger demand growth. Moreover, even should such growth materialize, similar arguments imply that the exit is likely to be delayed and hesitant. The dangers associated with even this relatively optimistic outcome are also addressed below. Finally, there remains the possibility that faster demand growth will not materialize and that current central bank policies will be maintained or even extended into an indefinite future. The even greater dangers inherent in such an outturn will also be discussed below.

It has recently become fashionable to invoke the Wicksellian framework described in Chapter 2, in which a distinction is drawn between the natural rate of interest and the financial rate of interest. The former is related to the expected rate of return on investments (profits),[67] whereas the latter is a longer-term rate set by the financial system under the influence of the central bank. It has been contended that the natural rate has

67 It is also important to distinguish between the long-term natural rate and the short-term natural rate. The long-term natural rate is related to the rate of growth of potential, assuming factor shares are constant. The short-term natural rate (expected profits) can be much more variable. As will be described below, easy credit conditions can cause the short-term natural rate to rise in booms and collapse in the bust. More insidiously, easy credit conditions in the bust can reduce the potential growth rate as well as the long-term natural rate of interest.

collapsed under the influence of the crisis and is now well below the zero lower bound that constrains the financial rate. This framework would seem to provide a justification for supporting the current stance of monetary policy almost indefinitely. However, there are two qualifications to this conclusion.

First, if expected profits have collapsed because of the policies that were followed in the past, this is hardly a reason for maintaining those policies. As described in Chapter 2, the current crisis comes at the end of a whole series of bubbles in different markets, each supported by unusually accommodative monetary policies. A single period model is simply not adequate to evaluate such dynamic processes.[68] Second, instead of relying on monetary policy alone, we should instead be focusing more on other policies that might better serve to restore expected profits. Some concrete suggestions in this regard are made in Chapter 5. The inference to be drawn is that government actions to resolve the crisis are not just desirable but indispensable.

UNDESIRABLE MACROECONOMIC SIDE EFFECTS

Recall from Chapter 2 that Wicksell, Hayek, Koo, Minsky, and others have, over many decades, identified a variety of theoretical concerns arising from the excessive expansion of money and credit during booms. Rising inflation, investment misallocations, balance sheet overhangs, banking sector instability, and volatile international capital flows were all highlighted as threats to future economic stability. Moreover, by 2007 it was evident that these were matters of practical concern as well.

In this section, it will be argued that the policies followed by the major central banks since 2008, while contributing to stability in the short run and conceivably avoiding a second great depression, might also have aggravated threats to future stability. These policies have had undesirable macroeconomic side effects both in the AMEs themselves and in EMEs. Admittedly, in the latter case, the policy responses of the EMEs themselves to inflows of foreign capital have also played a contributing role. Finally, some other undesirable side effects will be noted.

Macroeconomic side effects in AMEs

The initial concern raised about highly expansionary monetary policies, particularly the expansion in base money, was that they might lead to higher inflation in the AMEs. However, the mechanism by which this might occur was never well laid out.[69] Most economists felt that the initial degree of excess capacity in the economy was so high that rising inflation could not become a problem for a long while. Moreover, if and when this slack was absorbed by rising aggregate demand, there would be ample time for central banks to take steps to prevent inflation from rising. This issue of exit is discussed further below, not least the problems associated with measuring output gaps in real time and the associated possibility of rising inflation in the future. However, as a simple matter of fact, inflation has not been a problem in the major AMEs since the crisis began. Indeed, more widespread concerns have emerged about excessive disinflation and even deflation.

A second concern might be more substantial. Estimates of the level, and sometimes the growth rate, of potential in most AMEs have recently been trending downward.[70] The stance of monetary policy might inadvertently have contributed to this. As noted at the end of Chapter 2, far from having been a post-crisis phase of necessary deleveraging, the period since 2007 has seen a sharp increase in the ratio of nonfinancial debt to GDP in the AMEs. This raises the possibility of what the Bank for International Settlements has called the debt trap, and is described in more detail in Buttiglione et al. (2014).

At the heart of this process is a positive feedback loop between the ratio of debt to GDP and the GDP

68 This is a low frequency variant on the problem of instrument instability, which is well-known to engineers. Attempts to tightly control a dependent variable in a system with lags leads to ever wilder swings in the controlling variable, and to inevitable collapse. See Cooper (2008).

69 There was a popular sense of foreboding to which a number of politicians also acceded. Behind it seemed to be a simple version of the quantity theory of money (MV = PY), in which an increase in base money would push up M (via a stable money multiplier), which in turn would push up P (assuming a stable V). As noted in Chapter 3, the earlier Japanese experience with quantitative easing proved this need not happen.

70 For example, see Gordon (2012), Ollivaud and Turner (2014), and Summers (2014).

growth rate. Suppose, and this remains a hypothesis, the ratio of debt rises when GDP growth slows for whatever reason. Suppose further, that the headwinds of debt slow growth further. The interaction of these two relationships will push debt ratios ever higher, and GDP growth rates ever lower, until the unsustainability of debt service becomes obvious.

Processes of this kind contrast sharply with traditional models of the economy, based on the usual multiplier-accelerator mechanism. These traditional models strongly suggest that easier monetary conditions contribute to more investment, which increases both near-term demand and potential supply in a virtuous circle. Unfortunately for these models, the reality is that investment in the AMEs has been particularly weak since the crisis began. A number of reasons to explain this were presented at the end of Chapter 3, most of which rely on channels linking monetary policy and investment outcomes that are not present in traditional models.

A related consideration having to do with potential growth has less to do with the amount of investment than with its composition. Shirakawa (2012) notes that resource allocation is inefficient if projects go forward that can only be viable at very low interest rates. In addition, an environment of ample liquidity supports the survival of zombie banks, which tend to evergreen loans to avoid recognizing losses. Peek and Rosengren (2003) earlier noted this phenomenon in Japan, and concluded that productivity was significantly affected in the sectors most populated by such zombie companies. Since the crisis, evidence has accumulated of similar behavior in other AMEs.

Harder to evaluate is the effect on credit availability to other potential borrowers, though a combination of deleveraging and the evergreening of old loans would seem to leave new clients vulnerable. A shortage of credit for small and medium-sized enterprises, and for new firms investing in ideas (thus lacking physical collateral), would particularly harm innovation, total factor productivity, and potential growth going forward. Europe would seem particularly exposed in this regard, with the drying up of credit flows to peripheral countries in the Eurozone being an additional source of concern.

Other financial effects of recent monetary policies in the AMEs can also be identified which, while welcome in some respects, also constitute potential exposures going forward. In virtually every country that retained a sound banking system, residential property prices and household debt had reached record levels by the end of 2014. Stock prices in many countries also hit new peaks, while spreads on high-yield bonds and even peripheral sovereigns in Europe fell to extremely low levels (see figure 13). The emergence in early 2015 of negative bond yields for core sovereigns in the Eurozone area, often well out of the yield curve, constituted a totally unprecedented development.[71] Moreover, as measured by the cost of insurance against future volatility (the VIX, in particular), markets had seemed highly confident that this benign state of affairs would continue for some time, although significant corrections started to appear after June 2015. Lending standards had also deteriorated, with covenant-lite loans once again rising sharply. Although real estate bubbles were not apparent in larger countries, and there was not as much leverage, the situation in financial markets up to mid-2015 was somewhat similar to that observed in the run-up to the crisis in 2007.[72]

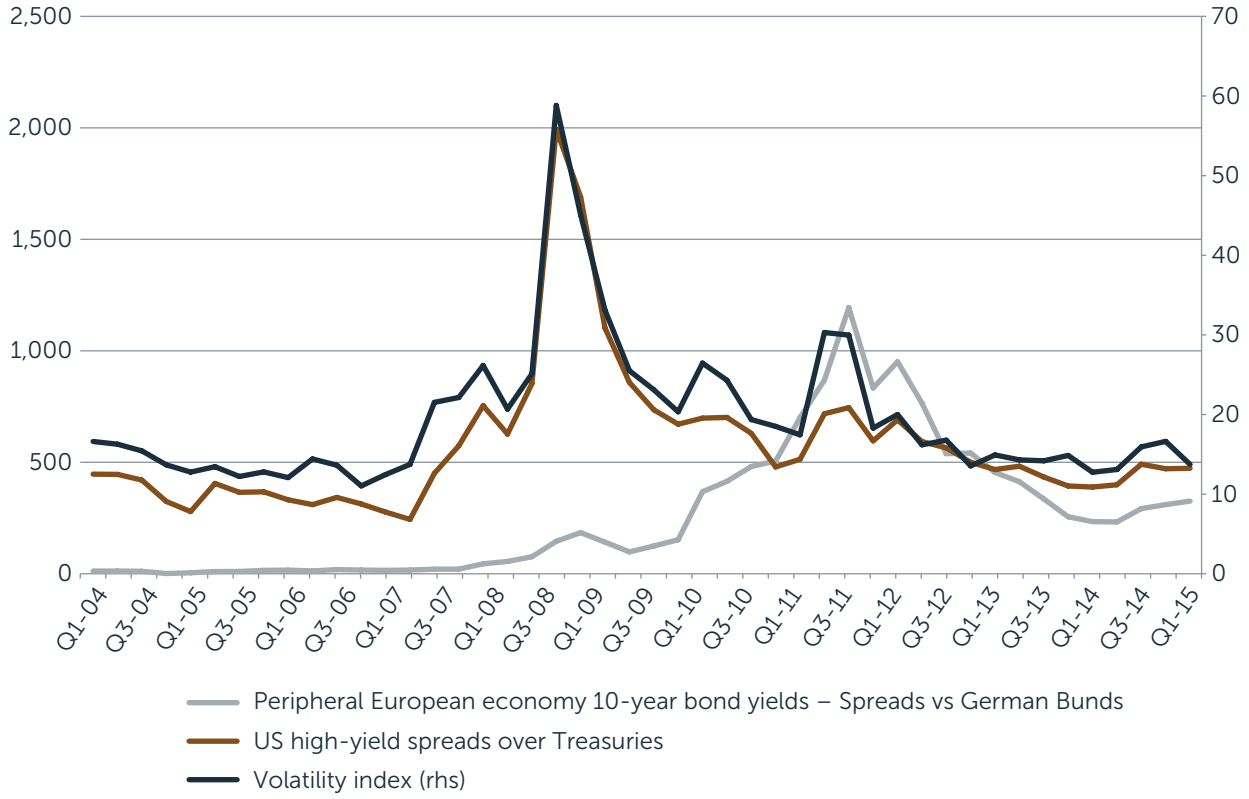
A number of smaller AME countries have attempted to mitigate the undesirable effects of easy monetary conditions through the use of macroprudential policies, mostly directed to cooling the housing market.[73] The Nordic countries, in particular, have experimented with higher risk weights for mortgages and higher loan-to-value ratios. In Canada, as well, a series of steps have been taken since 2008 to reduce both the demand for household credit and the willingness of lenders to supply such credit. Switzerland, the United Kingdom, and New Zealand have recently taken similar steps.

71 To have unusually high bond prices (low interest rates) and unusually high equity prices at the same time attests to the role of easy monetary conditions in supporting both.

72 The *2014 Annual Report* of the US Office of Financial Research highlighted three specific areas of concern: excessive risk taking, an increase in market fragility related to declining liquidity and the unavailability of good collateral, and the migration of activity to unregulated sectors.

73 While thought of as new, similar measures were used in many AMEs in the 1950s and 1960s. Prior to the crisis, the Bank of Spain introduced dynamic provisioning, which raised provisioning requirements as the size of the loan book increased. This did not prevent the Spanish housing bubble.

FIGURE 13. US High-Yield Spreads (against Treasuries), Peripheral Sovereign Debt Spreads (against Bunds), and Volatility, Q1 2004–Q2 2015



SOURCES: Bloomberg; Haver; UBS.

While these efforts are thought to have had some influence, it remains the case that debt levels and house prices in all the countries referred to above remained worryingly high,[74] and indeed were still increasing as of mid-2015. In most cases, policy rates were held down even as macroprudential measures were directed to cooling particular sectors. Only in Sweden and Norway were policy rates raised temporarily, as a complement to such measures, but this increase was subsequently reversed. One reason was that the higher rates seemed to be having more negative effects on the nonhousing sectors of the economy than on the housing sector. In short, there continues to be an active debate on macroprudential policies, but no consensus on their effectiveness, the timing of their introduction, and how they might be used in conjunction with monetary policy. We return to these issues in Chapter 5.

The current, unprecedented stance of monetary policy might also have some undesirable side effects on the structure of the financial system over the longer run. First, in many countries, the interbank market is not functioning properly, given the easy availability of funding from central banks. This is potentially an important issue since it implies banks with excess demand for loans, often small and medium-sized borrowers, cannot get access to the excess deposits at other banks.[75] Second, insurance companies and pension funds are also increasingly worried about the adequacy of asset returns to meet their future liabilities.[76] Third, international capital markets have become dominated by RORO (risk on, risk off)

74 See Harding (2014).

75 See McKinnon (2012).

76 For a convincing analysis of the costs and associated dangers for insurance companies and others, see Swiss Re Asset Management (2015).

behavior in which concern about tail events seems to dominate traditional investment criteria, such as the need for diversification and the search for value. None of this is consistent with a well-functioning financial system going forward. Finally, it bears noting that unprecedented monetary policies might be encouraging other structural changes, thus far unnoticed, that could yet prove dangerous. The growth of the shadow banking system in the run-up to the crisis provides a good example of such possibilities.[77] Pozsar (2015) assesses the changing relationships between shadow banking and the asset management industry since the crisis began.

Macroeconomic side effects in EMEs

EMEs have clearly been influenced by push factors arising in the AMEs. While subject to RORO-driven capital swings, there has been a longer-run trend to currency appreciation in EMEs that has been attributed by some to the easy monetary conditions in AMEs (currency wars). The transmission mechanism has been well documented by Shin (2011), Bruno and Shin (2012), Rey (2013), and McCauley, McGuire, and Sushko (2015).[78] Indeed, the interactions between financial developments in the AMEs and EMEs have become so pervasive they have generated a whole new literature on global liquidity.[79]

However, the pressure toward currency appreciation was also associated with pull factors in many EMEs; market perceptions of favorable secular growth trends, of rising productivity in the traded goods sectors of EMEs, and of their having relatively low levels of government debt. The upward pressure on EME currencies was more noticeable early on in the crisis, as sentiment toward them has subsequently become less favorable. In part, this erosion was linked to the undesirable side effects on EMEs of the inflows themselves.

Faced with general upward pressure on their currencies after the crisis began, most EMEs continued to resist vigorously. With one possible difference,[80] their motivations were essentially similar to those prevailing prior to the crisis, as already described in Chapter 2. Whatever the motivation, many EMEs stepped up their intervention in foreign exchange markets while continuing to reinvest the proceeds in the bond markets of the AMEs. This acted to depress longer-term bond yields in the AMEs, reinforcing the influence of domestic measures taken by the major central banks to the same end. In addition, many EMEs allowed a further massive expansion in the balance sheet of their central bank and easier monetary policies than would otherwise have been the case (see figure 14). While the rate of growth of credit decelerated, it remained high, with household debt levels rising commensurately. In effect, through closely managing their exchange rates after the crisis began, these countries imported the credit-based problems originally affecting the AMEs alone.

In recent years, inflationary pressures in EMEs have risen in some countries, while not in others. There has also been growing evidence of imbalances in a number of countries. High-end properties have risen sharply in price in many large urban centers, and the share of construction in GDP has also risen. In China, the share of investment in GDP rose to 45 percent of GDP, with new credits to state-owned enterprises and local authorities (in response to the crisis) being a major driving force. In addition, credit provided by the shadow banking system has also been expanding, with China again being the principal source of concern. Conditions such as these are commonly followed by sharp slowdowns. Indeed, the larger EMEs (the BRICS—Brazil, Russia, India, China, and South Africa) have all slowed significantly over the last year or so.

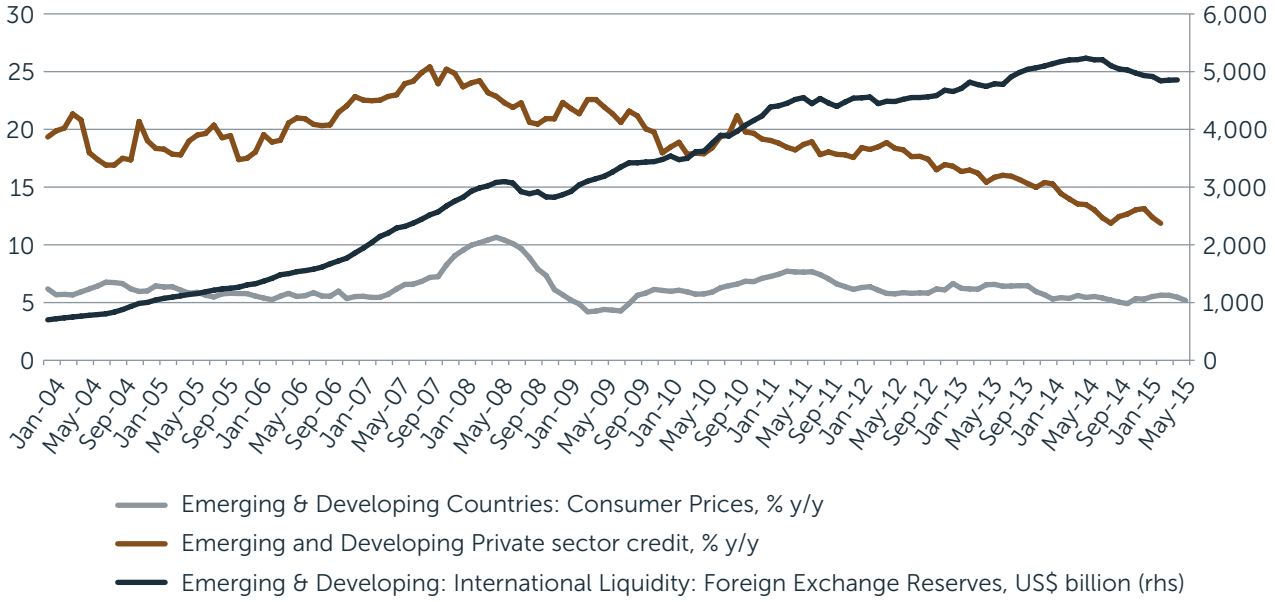
77 See Rajan (2005).

78 The general argument is that a low Fed Funds rate lowers the VIX and therefore the estimated value at risk for large global firms. This results in increased bank leverage and larger capital outflows to EMEs. As a corollary, many authors note the increased correlation in bond yields and other "all in" returns in financial markets across countries. McCauley, McGuire, and Sushko (2015) link easy US monetary policy to inflows to EMEs in the form of both bank loans (largely prior to 2008) and bond purchases (largely after 2008).

79 In addition to Bruno and Shin (2012), Rey (2013), and Shin (2011), see CGFS (2011), International Monetary Fund (2014), and Philip Turner (2014). Borio (2013) defines liquidity as "the ease with which perceptions of value can be turned into purchasing power." The emphasis on perceptions indicates how ephemeral the concept is and how easily it can ebb and flow.

80 On the one hand, given the level of reserves they had already accumulated prior to the crisis, the desire of EMEs to accumulate still more as insurance might be faulted. On the other hand, the very character of the crisis affecting the AMEs might have sharpened perceptions of the need for EMEs to protect themselves.

FIGURE 14. EME Credit Growth, Inflation, and Level of FX Reserves, January 2004–June 2015



SOURCES: Haver; International Monetary Fund; UBS.

Inflows of short-term capital increase the potential for outflows and subsequent currency depreciation. Indeed, this has already begun to materialize. The currencies of many EMEs have in fact been under downward pressure against the dollar since mid-2014. Moreover, they remain vulnerable to possible future outflows, as well. Faster growth in AMEs would help support growth in EMEs, but could also lead to higher rates in AMEs and a withdrawal of capital from EMEs. Worse, a reversion to "risk off" behavior by investors from AMEs could put downward pressure on EME currencies without offsetting support from prospects of faster global growth. The trigger for this could be materialization of any of the risks facing the AMEs and China, with trouble anywhere spreading everywhere through both trade and capital markets. Lower commodity prices have already affected many producing countries, with increasing concerns being expressed about both financial fallout and the fiscal implications for governments.[81] Risks to the EMEs, in part the side effects of monetary easing elsewhere, now pose a significant threat to the whole global economy.

The character of the inflows has also changed in recent years, with asset management companies replacing banks, though the risk of currency mismatch problems remains as great as ever.[82] In both Latin America and South Asia, there has been a marked increase in the issue by corporations of dollar bonds, often through offshore centers. These developments were likely motivated by remarkably low interest rates on such instruments. Anecdotal evidence also indicates that the credit quality of the issuers has been falling, consistent with the view that the appetite for risk increases in a low rate environment.[83] It remains

81 A good example of such concerns is provided by the oil market, where prices have recently more than halved to around US$50 a barrel. On the financial side, much recent oil (and gas) investment in Canada and the US was financed with borrowed funds provided on the assumption of much higher prices. A sharp rise in bankruptcies of smaller companies seems likely. Large oil companies have already announced massive layoffs and cutbacks in expenditure plans. As for governments, many oil producers can only balance their budgets with oil prices at or above US$100 a barrel. In mid-2015, the Kingdom of Saudi Arabia chose to top up its reserves with a large dollar bond issue. Countries like Russia and Venezuela might not have such a possibility.

82 McCauley, McGuire, and Sushko (2015), as well as Avdjiev et al. (2014).

83 See Bruno and Shin (2012), and Blundell-Wignall and Roulet (2014).

to be seen whether asset management companies will be more or less skittish than banks were in the past. Similarly, it remains to be seen whether such companies will demonstrate herding behavior or not, but it certainly cannot be ruled out.

OTHER UNDESIRED SIDE EFFECTS

Distributional issues are quintessentially political, and that is why independent central banks try to eschew policies with such implications. Unfortunately, since the crisis began, increasing attention has been drawn to the fact that many of the policies that central banks have followed do have clear distributional implications. This has invited increased government scrutiny of what central banks do, thus constituting a threat to central bank independence. We return to this issue, along with other threats to central bank independence, in Chapter 5.

Another side effect of central bank policies during the crisis is still more worrying. Central banks see their actions as buying time for governments to address problems that are essentially real, not monetary. However, as described in Chapter 5, governments have thus far not reacted as necessary. Recognizing the political difficulties of addressing these underlying problems, they prefer to believe that central bank actions will be sufficient to restore strong, stable, and balanced growth. Thus, they are strongly tempted to forebear in the pursuit of policies that might be more effective. The longer this standoff persists, the more dangerous it becomes as the undesirable side effects of current central bank policies continue to cumulate.

Supportive actions by central banks can be useful, but there are serious risks involved if governments, parliaments, public authorities, and the private sector assume central bank policies can substitute for the structural and other policies they should take themselves.

THE NEED TO EXIT AND SOME POSSIBLE END GAMES

There seems to be an almost unanimous view that monetary policy in the major AMEs will have to be normalized at some point. However, even if views differ about what precisely normal might mean, presumed dates for exit also differ due to different countries being at different points in the business cycle.[84] There is also agreement that a danger exists of exiting too soon, thus aborting a nascent recovery, and also of exiting too late, thus encouraging some combination of higher inflation and other imbalances that could also weigh on recovery. However, where serious disagreement arises is when it comes to discussing which danger is the greater. Those worried about too early an exit point to the example of the Federal Reserve in 1937. In contrast, those worried about too late an exit point to the inflation that followed the Fed-Treasury Accord in the late 1940s and to the inflationary surge in the early part of the 1970s.[85] In recent years, distortions in financial markets and the effects on EMEs have also moved much higher up the list of concerns of this latter group.

While reasonable people can disagree on such objective issues, a number of political economy factors seem to make exiting too late the more likely outcome. First, there is great uncertainty concerning the consequences of tightening, a subject treated below in several alternative scenarios. Faced with such uncertainty, the natural default position is the status quo. Second, in some cases it will in fact be clear that tightening will reveal some debts as being unserviceable, and some financial institutions as undercapitalized. Central banks will then be asked to wait until these other sectors have become more robust, which could well take a long time. The danger is that debt levels will rise with the passage of time, strengthening the arguments for still more forbearance—the debt trap discussed above.

Third, debtors will obviously resist the tightening of policy. Since governments are struggling to manage record-high sovereign debt levels, they too will be tempted to put pressure on their central banks to push back tightening as far as possible. This might well

84 See Blinder et al. (2013).
85 See Volcker (2013).

be combined with other forms of financial repression designed to reduce debt service charges over time.[86] In addition, more common recourse to macroprudential instruments and capital controls will also allow monetary policy to stay easier for longer. Fourth, central banks themselves could suffer capital losses when rates rise (given the increased size and riskiness of their balance sheets), and could attract massive public opprobrium if higher rates were to abort the recovery. Better, then, to just stay put?

Even given an eventual decision to tighten, a number of more technical uncertainties remain. First, given the huge overhang of excess reserves, questions can be raised about the technical capacity of central banks to raise policy rates in a smooth fashion.[87] For a period of time, it was believed that new operating procedures (at the Fed, in particular) could overcome these problems. However, by early 2015, doubts seemed to be reemerging.[88] In any event, it was also becoming clear that the new operating procedures could have some downsides.[89] Second, there continues to be a debate over the order in which the various unusual policy procedures should be reversed. Third, there remains great uncertainty as to what the future level of the neutral interest rate might look like. Finally, the pace of tightening will necessarily have to be highly conditional on economic developments, which means that providing any forward guidance during the transition process will be very difficult.

This last observation raises a still more fundamental issue. Is transparency during such a transitional process desirable or not? On the one hand, it has been argued by the Federal Reserve that, given such guidance, investors can take steps to protect themselves. This would seem likely then to contribute to financial stability more generally. On the other hand, Adrian and Shin (2008) argue that declining carry trade returns, when combined with certainty about the risks being run (that is, no risk), is a strong invitation to leverage and risk taking more generally.

Given the enormous uncertainty about both what should be done, and what is likely to be done, the best that can be offered here are some scenarios based on alternative economic outcomes. They serve to underline the dangers to which the global economy remains exposed after six years of extraordinarily easy monetary conditions.

A scenario of stronger global growth

Assume that the current recovery in the AMEs, led by the United States, continues to gain momentum and that growth in other countries also accelerates. Assume further that the tightening of policy, with the exit beginning in the United States, is of the proper timing and magnitude to restrain any significant inflationary pressures. In this best case situation, both short rates and long rates could move up in an orderly way. In addition, faster growth would provide support for asset prices (not least equity and high-risk bonds) that might otherwise be judged excessive. If all regions were expanding, the likelihood of disruptive exchange rate movements would also be much reduced. Faster growth, if sustained, would also eat away at the overhang of debt, assuming that longer-term rates did not rise as much. In effect, a stronger growth scenario would help align valuations and fundamentals that would further support stronger growth. The likelihood of such an outcome would be materially improved if governments were to support stimulative monetary policies through the complementary policies suggested in Chapter 5.

Unfortunately, there is still much that could go wrong even in the supportive economic environment assumed here. One possibility is that long rates might rise in a disorderly way, causing other asset prices (not least equity and high-risk bonds) to decline sharply in consequence. A variety of factors might lead to such an outcome. However, they are almost all related in some way to recent policy decisions, both monetary and regulatory.

86 See Reinhart and Sbrancia (2011).

87 The traditional means of doing this was for the central bank to cut the supply of excess reserves below the level that the banks wished to hold. However, if the initial level of reserves was high but falling, it would be more difficult for the central bank to do this successfully.

88 See Fleming and Wigglesworth (2015).

89 For example, one way to raise the demand for excess reserves closer to the actual level of supply would be to pay interest on them. The public might well find hard to grasp the advantages of transferring substantial sums of money away from cash-strapped governments (otherwise recipients of the profits earned by central banks) to private bankers.

First, in the US and a number of other countries, current long rates are well below historical averages and even below current estimates of neutral rates. This implies there is significant room for an upward adjustment. Second, once markets started to move significantly, bandwagon effects could quickly gain momentum[90] as those encouraged to hold risky positions tried to close them out simultaneously in markets that have become increasingly illiquid.[91] Indeed, those holding such positions (say, asset managers) might be forced to unwind them by the withdrawal of funds made available to them by ultimate investors. These risks are considerable given the potentially significant distortions in bond and other asset prices driven by massive amounts of QE and central bank buying through reserve accumulation. Third, recent regulatory changes might also contribute to such an outcome. High-quality collateral is increasingly tied up, and traditional market makers now hold less than a third of the inventory of higher-risk paper that they held before the crisis. Should financial markets overshoot, this might then feed back negatively on a recovery judged to be otherwise robust.

Further, there are plausible grounds for concern about the robustness of the recovery in many regions. Maintaining current levels of confidence in the Eurozone, especially the peripheral countries with extremely high sovereign debt levels, will not be easy. China is pledged to undertake a massive transition from investment-lead growth to consumer-led growth, and all transitions involve risks. Abenomics in Japan is threatened by the failure to implement significant structural reforms to raise potential growth rates. As of early 2015, the prospects of relatively slower growth outside the United States had already significantly pushed up the effective value of the US dollar. This too became seen as a possible threat to a US recovery, judged to be otherwise robust.

Nor can we be assured that central banks will correctly assess the level of inflationary pressures. Output gaps are normally difficult to measure in real time,[92] and it has been contended this becomes even more difficult in the wake of a credit-driven boom.[93] Whether due to an analytical error, or the bias to inaction referred to above, inflation could in fact rise significantly, and inflationary expectations could begin to come unanchored. In that case, the overhang of central bank base money might at last become a serious source of concern.

A scenario of continuing weak or even weaker growth

Should the global economy stay weak, or indeed should it weaken again as financial markets overshoot, we could face the possibility of debt deflation. The almost 40 percent decline in commodity prices since mid-2014 could be a precursor of such a slowdown. In this environment, risk-free rates would stay very low and there would be no exit for monetary policy. Nevertheless, the current prices of many other financial assets would be revealed as excessive. Capital losses would affect many investors, including banks, and the process of extend and pretend for poor loans would have to come to a stop. In this scenario, for all the political economy arguments presented above, attempts might nevertheless be made to rely on monetary policy to restore demand. However, just as past efforts have failed to gain traction, renewed efforts would likely have a similar outcome. This would be particularly likely if the overhang of debt had worsened in the interval as has indeed happened over the last few years.

In such circumstances, governments would also be faced with chronic revenue shortfalls. This could lead to a worst-case situation where deflation would actually sow the seeds for an uncontrolled inflationary outcome. Governments with both large deficits and large debts must borrow to survive, but worries about debt accumulation might imply an increasing reluctance on the part of the private sector to lend to them at sustainable rates. In that case, recourse to the central bank is inevitable, and hyperinflation often the final result. This is essentially the process

90 See Feroli et al. (2014).

91 For an exhaustive treatment of this topic, see the Committee on the Global Financial System (2014). See also Alloway (2014) and Riley (2014). The events of October 15, 2014, when even US Treasury rates showed wild gyrations, indicated that there could well be a problem in this regard.

92 Orphanides (2001).

93 Borio, Disyatat, and Juselius (2013).

that Sargent and Wallace (1981)[94] described as "Some Unpleasant Monetarist Arithmetic." Bernholz (2006) has also documented a number of historical episodes that have actually ended in this fashion.

* * *

Central bank policies since the outbreak of the crisis have made a crucial contribution to restoring the appearance of financial stability. Nevertheless, for this appearance to become a reality, underlying problems rooted in very high debt levels must be resolved if global growth is to be more sustainably restored. Chapter 5 reviews the pros and cons of various suggestions made since the crisis for improving crisis management, crisis resolution, and crisis prevention going forward. Needless to say, while there has been a new convergence of views in some areas, views elsewhere remain sharply divided.

94 While Japan might be judged the most currently exposed in this regard, the Japanese government to date has continued to be able to borrow at extremely low rates. However, many of the fundamental factors that have supported Japanese government bond rates and the stability of the yen have deteriorated significantly in recent years and could well continue to do so. The household savings rate is now very low, the home bias of investments seems to be declining, and the current account has deteriorated markedly. Were expectations of higher inflation to rise, as currently desired by the Japanese authorities, purchases by the Bank of Japan might be even more necessary to keep rates down. As of end-2014, the Bank of Japan's scheduled purchases of government bonds amounted to twice the current deficit and 40 percent of total (general government) expenditures.

CHAPTER 5

How to Manage, Resolve, and Prevent Crises

SYNOPSIS

Central banks have a crucial role to play in managing financial crises and limiting their short-term costs. However, they cannot on their own restore good health to the economic and financial system if it is characterized by overindebtedness and a level of aggregate demand that is unresponsive to monetary stimulus. Various suggestions have been made as to how the responsiveness of demand might be increased and how the undesired side effects of persistent monetary stimulus might be reduced. Yet all these suggestions have their limitations. To finally resolve crises requires policy actions by governments. Prevention of credit-driven crises in the future will require central banks to carefully monitor the buildup of systemic risks and to take measures to offset them. At present, there is no agreement on which instruments—conventional monetary policy, unconventional monetary policy, macroprudential instruments, or combinations thereof—might best suit this purpose. Broadening the mandate of central banks beyond the pursuit of price stability will complicate relationships between central banks and their governments. However, their current instrument independence must be maintained.

INTRODUCTION

Recent history attests to a simple fact: serious macroeconomic crises can occur even against a backdrop of Consumer Price Index price stability. Indeed, the historical record reveals many relevant economic downturns that were not preceded by high inflation—including the Great Depression. Accepting this fact leads to a number of policy conclusions. Perhaps most important at the current moment is that central banks, even in the advanced market economies (AMEs), must develop an improved set of beliefs about how best to manage (short term), resolve (medium term), and prevent (longer term) such crises.[95] There was inadequate reflection on such problems prior to the crisis, for all the reasons discussed in Chapter 2.

By crisis *management* is meant the initial introduction of policies to ensure that the short-term costs of a crisis are limited. These policies would include central bank liquidity support and associated efforts to ensure continued access to funding for financial institutions. Central bank knowledge and expertise make their contribution invaluable in such circumstances. This is the first set of issues dealt with below.

By crisis *resolution* is meant policies to ensure that debts are serviceable over time, thus ensuring a return to normal market functioning and sustainable growth. Such policies might include the explicit restructuring of balance sheets, including through bankruptcies, and policies to ensure the longer-run solvency of surviving entities. Such policies would seem primarily to be in the hands of governments. While it is not excluded that central banks could play a supporting role in stabilizing markets and helping the economy grow out of debt service problems, the danger that monetary policy could become overburdened and actually counterproductive must also be recognized. Ways in which the effectiveness of monetary policy in

95 For a broader discussion, see Borio, Vale, and von Peter (2010).

stimulating demand might be improved, and possible side effects reduced, are among the second set of issues dealt with below.

The principal lesson to be drawn from the crisis that erupted in 2007 is that serious economic and financial crises can happen, even in low-inflation advanced market economies. Thus, all countries must prepare by putting in place frameworks both to manage and to resolve crises.

The third set of issues has to do with crisis *prevention*. Should a central bank have a broader set of objectives than just short-term price stability when setting policies to support sustainable growth and help avoid future macroeconomic disturbances? This possibility was also eschewed in the pre-crisis beliefs recorded at the end of Chapter 1. While the longer historical record shows that price stability has many benefits, this objective must be augmented by official concern (although not necessarily led by central banks) to constrain the buildup of other "imbalances" that can also lead to crisis. A discussion should be held on the contradictions, tradeoffs, and institutional implications of broadening a central bank's mandate.

Finally, the fact that neither the current, nor many previous, crises were preceded by rising inflation implies a fundamental rethink of the *methodologies* used by central banks both to arrive at their policy decisions and to implement them effectively. Concerning the former, the analytical frameworks relied upon by central banks must be reevaluated to increase the probability that policy makers will see the next crisis coming before it hits us. To achieve this, we must try to develop alternative frameworks that embrace new ways of thinking and/or the instincts of older schools of economic theorists who earlier raised concerns about the implications of growing imbalances in both the real and financial sectors. Concerning the effective implementation of policy, central bankers must become more aware of the limits of their knowledge. In particular, risks are constantly evolving and central banks must adapt accordingly. These issues are discussed in the last section below.

NEAR-TERM CRISIS MANAGEMENT

First, crises are inevitable in complex systems (Buchanan 2002). While relatively minor downturns might actually be desirable,[96] deeper crises associated with disruption in the financial system can have enduring negative effects.[97] Governments should be prepared for such crises. While preparations of this sort do raise issues of moral hazard, their absence could result in crisis-driven policies which, in the end, can prove counterproductive. Think, for example, of how inadequate bank insolvency laws in the current crisis led to a reliance on mergers and acquisitions that sharply increased banking concentration ratios in a number of countries. Think, too, of the crisis-driven introduction in Ireland of guarantees for all bank liabilities. This had significant implications for other countries all across the Eurozone.

Preparation for crises should include ex-ante measures such as explicit deposit insurance schemes, Memorandums of Understanding among all the official institutions likely to be involved, special bank insolvency regimes, and regular war games to test the degree of official preparedness for potential future crises. While the formal leadership of crisis management teams should likely be left to the central bank, with their superior informational advantages, national Treasuries must also be intimately involved. If judgments must be made that could entail the spending of taxpayers' money, elected governments and their direct representatives must take ultimate responsibility.

Second, central banks clearly have an important role in ex-post crisis management. In particular, central banks should help ensure the short-term stability of the financial system through the provision of lender-of-last-resort facilities to those thought eligible. They should also take the lead in managing other short-term problems; for example, ensuring adequate liquidity in foreign currency when required. Further,

96 Here, the Schumpeterian concept of "creative destruction" comes to mind.
97 Reinhart and Reinhart (2010).

they might also ease monetary policy to help support economic activity. It is important that central banks be given a high degree of flexibility in such circumstances. While most crises have the same basic features, they can differ significantly when it comes to the details. Indeed, the triggers for crises have varied widely over history. Given the costs associated with poor crisis management, constraints that prevent central banks from responding to novel circumstances would seem pennywise but pound foolish.

At this point one must ask whether institutional improvements such as the ones mentioned above will not exacerbate a tendency observed over the years for ever growing crises. Risk is more than ever endogenous, driven by asymmetric monetary policy, explicit and implicit deposit insurance, and the mere existence of a lender of last resort. These are important issues, and must be kept in mind in quiet times. As of now, the best response available seems to be a concomitant focus on better crisis prevention and resolution systems and procedures, topics to which we now turn.

MEDIUM-TERM CRISIS RESOLUTION

After eight years of relying on central banks to resolve the crisis, it remains fundamentally unresolved. Except perhaps in the United States, there is nowhere a sense that the global economy is now back on a normal growth path unimpeded by the headwinds of debt and excessive leverage. Indeed, concerns about the health of most AMEs remain significant, and those concerns have now been extended to many EMEs, as described in Chapter 4. What then might governments do to help resolve the crisis and thereby help restore sustainable growth? Briefly, since this is a paper about central banking, both demand-side and supply-side measures would seem required, though many suggested policies affect both over different time frames.

The ultimate resolution of crises that have their roots in excessive credit creation and debt accumulation often can only be accomplished through arms of government other than the central bank.

The case for generalized fiscal stimulus, or even a reduction of recent austerity programs in many countries, remains hugely controversial. On the one hand, there are those who argue that more stimulus (or less austerity) would provide a significant short-term boost to aggregate demand. On the other hand, others worry about the longer-term restraining effects of higher sovereign debt levels and the possibility of adverse market reactions to policies deemed imprudent.[98] The initial experience of many peripheral countries in the Eurozone crisis would seem to indicate that these latter concerns are valid, although the recent narrowing of spreads might seem to argue in the opposite direction. Perhaps all that can be said is that those who judge themselves as having some room to maneuver should use it. Those who do not should implement sustainable long-term fiscal regimes as soon as the macroeconomic situation allows.

Among the demand-side measures that seem to command more general support would be efforts to increase public investment in AMEs. This would not only increase demand in the short term, but could increase potential growth over time. Many studies indicate a significant deterioration of public infrastructure in many AMEs. Admittedly, this would raise government debt levels as well, but this liability would be offset by a physical asset with a high social and perhaps even market rate of return. By lowering production costs, such public investments might even encourage private sector investment, as has happened earlier.[99] Further, identifying (see Chapter 3) and removing impediments to private sector investment in AMEs (not least, uncertainty about future government policies) is an urgent requirement. Finally, governments in a number of countries (both AMEs and EMEs) could take steps to increase domestic private sector consumption (again, see Chapter 3). This applies particularly to countries that have relied heavily on export-led growth strategies and have large

98 The *Financial Times* in the summer of 2010 invited contributions to such a debate from over a dozen of the world's best known economists. Opinions were about equally divided.

99 See Field (2003).

current account surpluses. This also implies the need to revisit the still more fundamental issues of the declining wage share of factor incomes and rising inequality, each of which might weigh on private consumption.

Among the supply-side measures, priority should be given to addressing the need for formal (orderly) debt restructurings[100] and financial sector recapitalizations. This would not only help reduce the possibility of disorderly outcomes, but would also help restore the supply of credit to firms wishing to both invest and innovate. In part, the relatively favorable performance of the United States has been due to the widespread availability of non-recourse mortgages. While damaging in many respects, they have had the effect of significantly reducing household debt, since householders have walked away from both their homes and their debt obligations. This suggests that governments in many countries, while remaining mindful of moral hazard, should consider introducing bankruptcy regimes that are somewhat friendlier to debtors than is currently the case. Ireland recently passed legislation in this regard.

Structural reforms to raise potential growth rates and to allow internal reallocation of resources would also seem essential even if their short-term effects might not be wholly positive. The OECD has for many years provided a country-by-country assessment of which such reforms might prove most useful,[101] and has also reflected on the political economy of implementing them. At the current juncture, the opportunities provided by technological developments should be kept front and center.[102] As well, countries with large current account surpluses would benefit most from opening up their services sectors to more competition. This would not only raise potential growth but, particularly in the Eurozone, might help resolve external imbalance issues as well.

Of course, all of these policies will be politically difficult to implement. Arguably, this is the most important reason why monetary policy has been relied on so much to date. Governments wish to believe that central banks have matters under control and therefore other government policies are not required. Moreover, it seems possible, perhaps even likely, that governments will nevertheless choose to continue down this path in the future. This raises the fundamental question of how central banks should respond. Again, there is a considerable amount of controversy.

One school of thought says that monetary stimulus will never work effectively given high debt levels, and that the side effects are likely to be significant —not least on EMEs. Those adhering to this view recommend a more rapid renormalization of monetary policy, even absent signs of any inflationary pressure, because it threatens to do more harm than good. However, a second school of thought is more optimistic. It thinks that monetary policy can be made more effective and that the side effects are not likely to be dangerous. This school is more inclined to renormalize monetary policy only when inflation begins to rise again, or indeed only when it rises above a certain threshold.[103] This second school has also made specific suggestions as to how the effectiveness of monetary policy might be improved, particularly when policy rates are effectively at the zero nominal bound, and also how the potential side effects might be minimized. The answers differ between AMEs in crisis and EMEs in crisis.

Improving the effectiveness of monetary policy in AMEs

How could monetary stimulus in AMEs work better to revive real demand? In Europe, the emphasis has been put on a transmission mechanism that is not functioning properly, especially for small and medium-sized enterprises (SMEs) in peripheral Europe. The ECB has initiated or suggested a number of possible solutions, but the underlying problem remains. While larger firms have significantly increased their recourse to corporate debt markets, SMEs face continuing credit constraints and high borrowing costs.

100 Debt restructuring and outright forgiveness have been part of debt resolution procedure for millennia. See Graeber (2011). Recently, there has been a revival of interest in swapping existing debt for financial assets with equity-like characteristics that allow risks to be more equally shared between creditors and debtors. See the discussion in McKinsey Global Institute (2015), Mian and Sufi (2014), and Goodhart (2015).

101 The regular publication in which these suggestions are brought together is called "Going for Growth."

102 See Brynjolfsson and McAfee (2014) and Field (2003).

103 A combination of higher inflation and administrative controls to keep down debt service costs, so-called financial repression, has in the past helped reduce sovereign debt ratios (as a percentage of GDP) in many countries. See Reinhart and Sbrancia (2011).

The possibility of securitizing such loans has received strong support, but this will take time and substantial interaction with regulatory authorities.

Another approach to improving the effectiveness of monetary stimulus has been preferred in a number of other countries. The basic premise is that, if the monetary signal is not getting through adequately, for whatever reason, then we simply need a stronger signal. This has been the rationale for unconventional policy instruments in the United States, in particular, and for continuing calls for more quantitative easing by the ECB.

The belief that stronger monetary measures will eventually work has also been the basis for a number of other suggestions, not yet implemented. Foremost among these have been the recommendations that central banks should introduce new regimes of price level targeting or nominal income targeting.[104] Both regimes imply that, due to the cumulative effect of economic downturns on actual levels, there will be a wider gap between actual and target levels of output than is currently the case with targets specified in growth rates. It is also contended this will contribute to an expectation of still stronger central bank stimulus and to higher nominal expenditures.

There are grounds to be skeptical about these proposals. One reason is that the link between the new promises made by the central bank, and the instruments needed to deliver on that promise, are by no means obvious.[105] Moreover, in part, the presumed efficacy of these proposals seems to rest on the assumption of the full credibility of the central bank, which has been thrown into much doubt by the crisis itself. A second source of concern is that a still stronger monetary signal might risk still stronger undesirable side effects, not least bubbles in asset prices and exchange rates. Finally, and perhaps most important, a regime shift of the sort proposed must be judged sensible whether the target is being approached from above or below. There would seem ample doubt, if the price level were above target, that it would be politically possible for the central bank to impose outright deflation on the economy to achieve the target. In the real world, these suggested regimes might then prove a recipe for still more inflation over time.

A vigorous debate is also under way as to whether the possible side effects of maintaining an expansionary monetary stance might be adequately mitigated through macroprudential policies. On the one hand, some suggest they could be effective and that policy rates (and other unconventional instruments) could as a result be kept stronger for longer. To the extent that perceived excesses are observed in only a limited number of markets, in particular housing,[106] macroprudential measures might then be better targeted and therefore more effective. On the other hand, others point out that such measures have not been tested in modern markets. While perhaps having near-term benefits, their extended use over time will invite evasion and the migration of lending into less regulated markets. A low interest rate environment, by increasing the demand for credit, could reinforce these tendencies.[107] In addition, because they suppress market mechanisms, they could imply relevant but less visible efficiency losses of the kind higher reserve requirements were always thought to produce. Finally, their effective use will depend on the technical skills of those imposing them. Given the absence of recent policy experience in this area, such skills should not be taken for granted.

Improving the resilience of EMEs

It seems relatively clear that the phase of rising confidence and large-scale capital inflows into EMEs is over. Nevertheless, it seems worth asking (perhaps with an eye to the future) how the EMEs might have protected themselves better from the side effects of

104 See, in particular, Woodford (2012) and Sumner (2012).

105 For an earlier statement of such concerns, but in response to a suggestion that the Bank of Japan should adopt an inflation target, see Yamaguchi (1999).

106 Jorda, Schularick, and Taylor (2014) identify credit-fueled housing cycles as being key to understanding financial crises more generally. While this supports the use of targeted macroprudential measures for crisis prevention, as will be discussed below, it is not clear that the same conclusion applies when easy monetary policies are being used to help resolve a crisis. As noted in Chapter 4, the prices of a wide range of financial assets have also risen to very elevated levels in recent years.

107 Note the fundamental difference between the use of macroprudential policies in the interests of crisis management and crisis prevention. In the former case, monetary policy (easing) and macroprudential policies (tightening) are working at cross-purposes. This is bound to create tensions. In the latter case, where both policies are tightening to resist the excessive growth of credit, this is not the case.

monetary policy in the major AMEs. Unfortunately, there is not yet a consensus on how central banks (or governments) should respond.

To facilitate analysis of the policy options, it is worth recalling the chain of effects linking central bank polices in AMEs to the EMEs.[108] The chain begins in the AMEs with low interest rates (and also unconventional monetary measures) that invite leverage by financial institutions with global reach. This leads to financial flows into EMEs that contribute to domestic credit expansion and the effective importation of a combination of inflationary pressures and imbalances. Letting the exchange rate rise would seem the obvious response to this problem. However, momentum trading (the failure of uncovered interest rate parity to hold except over long periods) implies that free-floating also has its downsides. As for raising EME domestic interest rates to curb domestic credit expansion, this could actually prove counterproductive in that it might invite stronger capital inflows.

The commonly suggested policy responses for EME central banks essentially come down to weakening each link in the chain. Some people (especially in EMEs) suggest that the policies of the AME central banks (the first link) should take EME concerns into consideration.[109] Given the continuing importance of the dollar in the international financial system, this appeal is directed particularly at the Federal Reserve. However, others think this is simply not going to happen, given the domestic nature of the legislative mandate of the Federal Reserve.

The next link suggests using regulatory measures to limit the outflows of capital, whether by leveraged banks with global reach or by asset management companies. However, how this might be done in practice remains unclear. A more traditional response would be to use capital controls to reduce capital inflows.[110] However, capital controls also have well-known downsides. In addition to interfering with market processes and the advantages of globalization, they tend to lose their effectiveness over time. Finally, it has been suggested that macroprudential controls can substitute for the tightening of domestic interest rates. Unfortunately, this just brings us back to the debate about macroprudential instruments discussed above. In addition, all of these policy suggestions for EMEs have a strong flavor of "every man for himself." Even taken collectively, they are far from constituting a systemic response to what seems to be an underlying systemic problem.[111]

Recognizing that spillovers do constitute a problem for EMEs, and that all of the proposed solutions have shortcomings, perhaps a combination of responses would be warranted. In general, there might be a greater willingness to allow exchange rate appreciation, especially by countries running large current surpluses. This could be supplemented by management of the capital account and by macroprudential policies. However, since economies vary widely in their size, openness, and other characteristics, the combinations chosen by the domestic authorities in EMEs would also be likely to vary widely.

There is a broad-based consensus that flexible exchange rates are the best way to minimize the international repercussions of domestic monetary policies.

Of course, if aggregate demand in AMEs were to revive spontaneously and soon, then all these problems of policy tradeoffs and so forth would disappear. However, given the increased headwinds of debt since the crisis began (and other economic and political difficulties), this outcome does not seem likely. In any event, given the extreme starting point for the renormalization of monetary policy, as discussed in Chapter 4, grave dangers would remain even in this

108 See Shin (2011), Rey (2013), and McCauley et al. (2014).

109 The IMF recently seems to have given some support to this suggestion. See International Monetary Fund (2012), especially page 2 of the Executive Summary. Interestingly, the press release for the FOMC meeting of January 2015 suggested that the FOMC would "be mindful of international developments" in making its policy decisions. However, what this might mean remains open to interpretation.

110 Rey (2013) is a recent advocate, going so far as to say, "independent monetary policies are possible if and only if the capital account is managed."

111 An obvious issue, but one too fundamental to treat here, is whether we need to revisit the issue of the International Monetary System, or nonsystem, as some see it. See Volcker (2014), Pringle (2012), and White (2015).

more optimistic scenario. To repeat, using monetary policy as a substitute for government polices to resolve crises of the sort we face today is inherently risky.

LONGER-TERM CRISIS PREVENTION

Let us envision a post-crisis situation in which the debt overhang problem has been dealt with and a lower rate of trend growth prevails. How should monetary policy be best conducted in such an environment? If central banks face potentially conflicting objectives—price stability and financial stability—could they be reconciled through the use of other policy instruments? What does this imply for governance issues and the institutional allocation of responsibilities?

One reservation about suggesting answers to these questions is that it will likely take some years before full renormalization is achieved. Over those years, the global financial and economic system could well have changed materially. Will globalization be extended or rolled back? Will banks become less important and financial markets more important, or the opposite? Will the current problems posed by firms that are too big to fail be resolved by then or not? Finally, will the growth of total factor productivity slow further or speed up?[112] The answers to these questions are not obvious today, but they will be material to policy choices in the future.

How best to conduct monetary policy?

Should a lower rate of trend growth become the norm, it would constitute a new challenge for monetary policy. With a lower rate of growth of nominal income, central bank efforts to lower policy rates to resist recessions would be confronted with the zero lower bound (ZLB) constraint more quickly and more commonly. This has led a number of commentators to suggest two possible changes in future procedures for central banks.

One suggestion is that the inflation target pursued by central banks should be raised from around 2 percent to 4 percent.[113] Evidently this would help deal with the ZLB problem, but it would also aggravate the underlying costs of inflation, as identified earlier. Further, raising the inflation target in this fashion would seriously threaten the stability of inflationary expectations going forward. If four is a better target than two, would not a target of six be even better, and so on? Finally, it must be asked how many more credit imbalances, and potential future crises, might be generated in the process of trying to drive the inflation rate higher.

An alternative suggestion, to deal with the ZLB problem becoming more common, is that central banks should in future downturns be more willing to deploy the nonconventional instruments they have being using recently. Unfortunately, as discussed in Chapter 4, it is too early to conclude that these measures have been successful in restoring sustained growth. Further, the full extent of the difficulties central banks will face in seeking to exit from the use of these unconventional instruments is still unknown. This indicates that the longer-term implications of the use of such polices might not yet be evident.[114]

The above discussion also abstracts from a fundamental false belief laid bare by the crisis. Observed price stability is not a panacea. The observation of low inflation (price stability) is still consistent with the buildup of credit-driven imbalances in various sectors of the economy. Moreover, recent experience suggests that these dangers are increased if the source of the price stability is in positive supply shocks. Deflations driven by positive supply-side developments are fundamentally different from those driven by inadequate demand, and warrant a sharply different policy response.[115]

112 Gordon (2012) suggests the former possibility, while Brynjolfsson and McAfee (2014), along with a number of publications by the McKinsey Global Institute, suggest that the latter outcome is more likely.

113 Blanchard, Dell'Ariccia, and Mauro (2010).

114 Given all these uncertainties about monetary policy in a "new normal" world, perhaps the preferred reaction to downturns should be fiscal expansion. By assumption, sovereign debt levels would by then no longer be a problem. However, there would also have to be a presumption that fiscal policy would be conducted more symmetrically over the business cycle than it has been in the past.

115 The popular view that falling prices will be extrapolated, leading to a self-fulfilling postponement of spending, is false. Atkeson and Kehoe (2004) contend that virtually no periods of falling prices have been accompanied by economic depression. In having such a positive association, the Great Depression in the United States was unique.

Similarly, there are grounds for belief that central banks should pay more attention to the interrelationships between global developments and domestic inflationary developments. These interrelationships run in two directions, and both seem to be evolving rapidly.

On the one hand, global developments increasingly drive domestic inflationary outcomes. The relationship between domestic output gaps and domestic inflation has significantly weakened over the last two decades, reflecting the growing impact of international factors. More trade, more value-added production chains, more migration, and more credible threats of relocation to foreign countries all seem to have had some influence. On the other hand, domestic developments are also driving global inflationary trends in unanticipated ways. The issue of international spillovers was addressed above. Further, it is surely wrong for all central banks to treat global food and energy price increases as exogenous, and irrelevant for the setting of domestic monetary policy, when these prices reflect in large part the collective effect of those same policies. Unfortunately, how these global effects might be internalized in the conduct of domestic monetary policies is beyond the scope of this paper.[116]

Recognizing that credit-driven imbalances in the economy do pose a different set of risks to sustained growth than does inflation, should central banks lean against the wind of such growing imbalances? In some circumstances, there might be no conflict. Laidler (2007, p. 8) notes that, "historically, excessive credit growth generally led simultaneously to an overheated economy, rising inflation and growing imbalances (threats to financial stability)." Nevertheless, with domestic inflation increasingly disconnected from domestic output gaps, the potential for conflicts is rising. If inflation were already in a desired range, tighter monetary policy to combat rising imbalances might push inflation below desired levels. Indeed, concerns about such an outcome were in part responsible for the failure of monetary policy to resist rapid credit growth in the decades preceding the eruption of the crisis.

While macroprudential policies are the preferred choice to address financial stability concerns, there is no consensus as to whether monetary policy should be used to lean against excessive credit expansion and the resulting buildup of (noninflationary) "imbalances" in the economy.

One suggested way to square this circle is to define the objective of price stability over a longer horizon than has been common recently, especially under inflation targeting regimes. A longer horizon would allow the possibility of resisting a boom-bust financial cycle that might result in excessive disinflation or even deflation. Such a model would be similar to the monetary targeting regime of the Bundesbank, before the introduction of the euro, or the model pursued until 1999 by the Swiss National Bank. An undershooting of inflation from desired levels, for some relatively short period, would be tolerated since the economic costs would likely be small. In contrast, avoiding a boom-bust financial cycle would have great benefits since, judging by both recent and historical experiences, its costs could be very large.

One problem with simply lengthening the inflation forecast horizon is that it invites specificity about "how much longer." Unfortunately, given that it is impossible to predict when a credit-driven cycle will turn, this question cannot be answered with any precision. Decisions to tighten policy will then have to be justified totally on the basis of the judgment of the monetary authorities. From a political economy perspective, this will be a very hard sell. This raises the question of whether more objective indicators can be identified to justify changes in the stance of monetary policy. Credit and money have been identified as possible candidates, along with marked deviations of property prices from previous trends.[117] Clearly, this is an area where more research is required, and the implications might well differ across countries.

116 The Committee on International Economic Policy and Reform (2011) has provided some useful insights in this regard.

117 For early work along these lines, see Borio and Lowe (2002). Note as well that, under the countercyclical provisions of Basel III for capital requirements, national supervisors are invited to look at similar indicators.

What is perhaps less controversial is the suggestion that monetary policy should be used more symmetrically than has recently been the case, at least in countries that have already reached price stability. That is, there should be as great a willingness to tighten policy in upswings as there is a willingness to ease policies in downturns. Moreover, such a policy would imply smaller booms and therefore smaller busts. Finally, having tightened more forcefully in the upturn, there would be more room to ease later. That said, more symmetry also implies more moderate swings in policy in downturns. Against the background of the recent crisis, this suggestion implies that the wisdom of systematically deviating from traditional Taylor rules (with lower policy rates than the rule suggests) needs to be reevaluated.

If greater symmetry also implied a greater willingness to tolerate mild recessions, there might be no great harm in this. Slight downturns have the advantage of reducing moral hazard and providing the benefits of creative destruction. Perhaps more important, slight and recurrent downturns reduce the probability of much steeper downturns later. While unpleasant, small economic downturns do not generally have severe social and political implications. However, deep, crisis-related downturns do threaten such outcomes. The global political situation in 2015 might well be indicative of the dangers in this regard. Studies of economic crises in the interwar period are also both instructive and disturbing.[118]

A further question concerning monetary policy is which policy instruments should be used if monetary policy is to lean against the wind of credit excess during economic upturns. Higher policy rates would seem the monetary instrument most likely to be effective. However, one key question is the extent to which the exchange rate might rise to uncomfortable levels. Other monetary instruments might also be suggested. In particular, could some of the unconventional policies used in the downturn be used in the opposite direction during a credit-fueled upturn? It is too early to make an overall judgment about the net benefit provided by these instruments to date, and thus their likely usefulness in the future.

Finally, there is the important question of transparency with respect to objectives. Should a central bank clearly state its firm intention to resist the growth of imbalances in the economy? If credible, this might well reduce the extent of destabilizing speculative behavior, similar to the way that a commitment to price stability in the past seemed to help stabilize inflation expectations. However, given two such commitments, how would central banks actually behave should there be a conflict among them? Further, in a worst-case scenario, it is possible that neither commitment would be believed. In that case, the anchoring aspect of the current commitment to price stability would have been lost.

Could other policy measures support the conduct of monetary policy?

Reconciling the pursuit of price stability with the desire to prevent financial crises presents monetary policy with difficult tradeoffs. To avoid the dangers and possible errors associated with such tradeoffs, central banks should actively encourage the supportive use of other policies to help prevent crises. Microprudential, macroprudential, fiscal, and structural measures could in principle all play a role, although each also has its shortcomings.

Microprudential regulatory measures are time-invariant policies, applied to single institutions, directed to improving the stability of the financial sector. Such policies could in principle be tightened further.[119] Central banks might then worry less about cumulating imbalances in the economy, and might be able to focus more systematically on price stability. But there are downsides as well. Too-tight regulatory constraints can reduce efficiency even as they increase financial stability. Moreover, such regulations could drive financial activity into unregulated sectors, as we saw with the expansion of shadow banking in AMEs prior to the crisis, and in China post-crisis. Further, since the Basel III agreements are of such recent vintage, there would seem to be some merit in sticking with them before embarking upon still further changes. Finally, it needs to be emphasized that

118 A long-neglected classic, written at the time, is Salter (1933).

119 For example, Admati and Hellwig (2013) suggest that the capital requirement for banks should be 20 percent of total assets (unweighted for relative risk). This compares to the 3 percent ratio set by the Basel III agreement, and the only slightly higher ratios set in the US and the UK.

imbalances and risk exposures can still rise steeply even if tighter regulations ensure that the financial system stays healthy.[120] Overindebted corporate and household sectors would still remain a major source of concern.

Macroprudential policies have a role to play in crisis prevention, especially in dealing with credit-supported booms, particularly those in the housing sector.

Macroprudential regulatory measures focus on systemic risks and can change over time. They also could be used to resist the buildup of imbalances of various sorts. As noted above, particularly in the discussion of the use of macroprudential measures to reduce the side effects of current easy monetary policies, there is a vigorous debate taking place about both the effectiveness of such measures and their associated downsides. However, using macroprudential policies to help prevent crises might be subject to fewer objections. Housing, which seems to have played a crucial role in many past crises,[121] would be an obvious candidate for such measures. Nevertheless, monetary authorities should remain vigilant. Should excessive credit growth fail to respond to macroprudential measures, central banks would have to consider turning to more traditional monetary instruments.

Fiscal policy could also support a restrictive monetary policy if it too were applied more symmetrically over the business cycle. Historically, fiscal expansions in downturns have generally been more vigorous than tightening in upturns. This has led to sovereign debt levels ratcheting up as a percentage of GDP over successive cycles, similarly to policy rates ratcheting down. In itself, this suggestion, based on fiscal conservatism and debt sustainability, clearly has great appeal.[122] A further suggestion about the fiscal framework that would make the life of central banks easier would be to reduce the tax deductibility of interest payments. Under normal circumstances, this should reduce the incentive to take on leverage, and would sharpen the impact of interest rate increases on risk taking.

Governance and central bank independence

The above discussions implicitly raise important institutional questions. In effect, there has been a blurring of the boundaries among monetary, fiscal, and prudential policies. This reflects the fact that unconventional monetary policies are effectively fiscal policies, while most macroprudential instruments have traditionally been set by regulators. What then should be the proper relationship between central banks and other arms of government? In other words, what does this mean for central bank independence going forward?

It is important to begin by noting that most central banks have never had an absolute form of independence. In a democratic society, central banks require mandates, powers, and accountability to those elected. In many cases, this means the true measure of independence is the technical power to set instruments to pursue the central banks' mandate without political interference. It seems clear that both recent developments and prospective ones threaten central bank independence even further.

Looking first at the recent past, central banks have, in the process of crisis management, engaged in operations that could entail losses. For example, the value of assets purchased or of collateral accepted could fall over time and thus force central banks to recognize losses. Were recapitalization by the government to be necessary, it is also hard to imagine that certain conditions would not be imposed on how central banks behaved in the future.

Further, many of the actions carried out by central banks in the recent past also have had distributional implications. For example, some issuers of liabilities have benefited from central bank purchases, while

120 Reinhart and Rogoff (2009) note that Canada suffered terribly during the Great Depression, even though the banking system seemed to remain in good health.

121 See Jorda, Schularick, and Taylor (2014); Mian and Sufi (2014); and Adair Turner (2014).

122 Nevertheless, it might exacerbate the tradeoff problem faced by central banks. With fiscal tightening stronger in upturns, policy rates would likely be kept lower. While net there would be no worsening of inflationary pressures, credit growth and other imbalances might actually be encouraged in this environment.

others have not. Some firms have been deemed solvent, others not. Perhaps most important, the broad stance of monetary policy has also had important implications for income distribution. Very low real interest rates constitute a transfer from creditors to debtors. Some would question the basic fairness of such an outcome. Moreover, the associated increase in the price of risky assets has largely benefited the better-off who own such assets. Similarly, very low interest rates on less risky assets erode the income of middle-class people, whose assets tend to be held in such form.[123] Since distributional issues are quintessentially political, it is not surprising that central banks and governments have already begun to work more closely together. This could imply that some central bank independence has already been lost. If so, history suggests that, once lost, it will be hard to get it back again.[124]

Looking forward, it now seems generally accepted that some policy response will be required to restrain the growth of imbalances that could potentially lead to crisis. However, monetary policy tools and macroprudential tools both affect aggregate demand and systemic stability. They do not then satisfy the assumptions required by the Tinbergen principle that allows the allocation of one instrument (in pursuit of price stability) to the central bank and the other instruments (in pursuit of systemic financial stability) to some other agency. Regardless of agreements on who does what, there will also have to be ongoing communication to agree on what needs to be done, how it should be done, when it should be done, and so forth.

Recent developments having to do with the institutional allocation of responsibility for systemic financial stability indicates an enormous variety of responses. While there is clearly no consensus in this area, cross-agency bodies might be the only politically viable way to involve all those agencies with legitimate interests. Clearly, central banks should play an important role in systemic oversight, and the case becomes even stronger if the mandate of central banks is to be extended to leaning against the wind[125] of credit excesses. To the degree that the central bank (or some collective agency) has ultimate responsibility for the use of microprudential tools for macroprudential purposes, the independence of the microprudential agency also becomes an important issue needing attention.[126]

If the central bank must think about systemic issues beyond the near-term stability of consumer prices, issues in which other arms of government have legitimate interests, then it will become more open to political influence. The overriding concern must be that policies are not adopted because of undue emphasis on short-term benefits without taking into account longer-term costs. The principal concern would be the failure to achieve longer-term price stability, either through rising inflation or deflation.

A plausible model would be to continue to define the central banks' mandate in terms of the near-term stability of prices, but to define a broader range of conditions under which the central bank might deviate from that goal. Acceptable reasons might be supply-side developments[127] or longer-term concerns about cumulating imbalances likely to have systemic implications.[128] Another plausible model would be to define the central bank's mandate in terms of long-term price stability (instead of short-term price stability) and leave it up to the central bank to define a strategy that retains flexibility in the short term, while still achieving its longer-term goal of price stability.

To preserve the instrument independence of central banks, independence could be maintained by demanding only a public explanation for noncompliance, with (say) a request from a cross-agency body, rather than compliance itself. Similarly, the central bank would be

123 These effects draw particular attention, because they add to what has been seen as a disquieting trend toward greater inequality in most countries in the world. Consider the recent popular success of a book documenting these trends, Picketty (2014).

124 Consider the treatment of central banks during and after the Great Depression, as described in Chapter 1. See also Capie (2013).

125 For a discussion on this topic, see Gambacorta and Signoretti (2013). The Working Group did not come to a consensus as to whether monetary policy should be used to lean against excessive credit expansion and the resulting buildup of (noninflationary) "imbalances" in the economy.

126 One approach is to say the microprudential agency need not conform to a directive issued by the central bank or some other agency, but it must explain why. Another is to overlay independently assessed microprudential requirements (say, each institution's capital requirement) with a grossing up factor related to an assessment of systemic requirements.

127 In recent decades, central banks have systematically failed to raise rates when supply-side shocks have raised prices. A common rationale was that this was a one-off price-level shift and not an ongoing inflation. The suggestion in the text is to make this exemption symmetrical.

128 This is somewhat reminiscent of the Bundesbank's successful pursuit of monetary targeting a number of years ago. These targets were more often missed than not, but they provided a vehicle for the Bundesbank to explain why it had done what it did.

allowed to adjust the instruments under its control, in the interests of systemic stability, even if the multiagency overseer had not asked for action. In this latter case, a public explanation of the central bank's actions would be even more necessary than usual.

Central banks must be transparent in explaining their policy actions.

A closely associated issue is how to ensure ex-post accountability in a world where the central banks' mandate has become somewhat fuzzier, as suggested above. Looking backward, it is important to note that few (if any) central bankers have in fact been punished for missing even the current narrower mandate of near-term price stability. Apparently, ex-post accountability has not been a high political priority, perhaps because of the inherent difficulty of the task. However, recent developments in the UK, where the Bank of England has been granted a wide range of responsibilities and powers, might still be instructive. The UK parliament is now seeking far more information about internal procedures at the Bank of England and how those powers might be exercised.

Going beyond monetary policy and the issue of systemic oversight, it must also be recognized that many central banks have been assigned other functions as well, whereas other central banks have not. Microprudential banking supervision and conduct of business (ethical banking and consumer protection) are two important areas to consider.

While there is no conventional wisdom, it is the case that a number of AME central banks have been given enhanced or new responsibility for microprudential supervision, post-crisis. Looked at more broadly, a recent IMF survey[129] showed a variety of central bank models that seemed to share only one characteristic—they were all historical accidents.

There are arguments for and against central banks doing microprudential supervision. However, in countries where there is a strong desire to keep the central banks' mandate as simple as possible, it might then be preferable to house such oversight elsewhere.[130] In that case, it is important for the central bank to retain an ongoing understanding of the microprudential landscape in their jurisdiction, so as to effectively carry out their macroprudential financial stability tasks. In countries with only a limited pool of expertise to draw upon, it might be more efficient to centralize both functions in the central bank.

Assignment of responsibility for the consumer protection function is less problematic. This area is so open to political controversy and reputational loss that central banks might generally wish to avoid having such responsibilities assigned to them.

METHODOLOGICAL ISSUES FOR IMPLEMENTING EFFECTIVE CENTRAL BANK POLICIES

As suggested in the introduction to this chapter, the analytical frameworks used by most central banks and the international financial institutions (IMF and OECD) failed to adequately give advance warning of the crisis. Moreover, they also paid scant attention to issues having to do with the sources of economic growth and the role of income distribution in a well-functioning economy. The importance of both these issues, and their interactions with processes leading to crises, is being increasingly recognized. Central banks and academic researchers must therefore embark on a search for a new set of analytical tools to better understand the workings of the economy. While central banks should rely on well-tested, constantly reviewed mathematical and statistical models, constructed in a way that recognizes the possibility of crises, central bankers should also be mindful of the lessons to be drawn from economic history.

What is clear is that credit, and therefore debt creation, in a fiat financial system is at the root of many problems. It can no longer be treated as of only peripheral interest to central bankers and irrelevant to the formal models they use to inform themselves. Financial developments need to be better understood and incorporated into policy making. In this regard,

129 International Monetary Fund (2011).

130 It would be important in this case to ensure that the central bank had access to data relevant to the assessment of systemic stability.

there is merit in revisiting the writings of Wicksel, Hayek, Fisher, Minsky, Koo, and others who have raised such concerns in the past. Thinking based on the assumption that the economy is a complex, adaptive system, evolving continuously without any sense of short-term equilibrium, also seems to have promise and could easily and profitably draw on the work of other disciplines.

It is, of course, too early to make precise analytical recommendations, but some rethinking would seem warranted. A good starting point would be a shift in elements of the culture within some central banks. They need to carefully assess the limitations of their knowledge and to be as open-minded as possible concerning both the usefulness of their models and the range of policy options. While there are some signs of this happening, there are also many signs of resistance to anything like a paradigm shift. Not least, all of the policies followed by central banks since the crisis seem motivated by the old paradigm and extant models. Thomas Kuhn (1962) pointed to ways in which such an existing paradigm or worldview can resist change or stymie new thinking. Moreover, todays central bankers face a particular problem since, in admitting the need for new thinking, they would implicitly be criticizing their own past polices. Understandably, they wish to avoid this. It then becomes all too easy for central banks to blame other involved parties (for example, bankers and their regulators) and to eschew any serious reexamination of their own belief systems. All that can be recommended in this regard is a permanent willingness to learn from past experiences, and an attitude geared to expecting the unexpected.

If Knightian uncertainty is the norm (probability distributions cannot be calculated) rather than risk (where they can), then policy should also give much more importance than it has to avoiding truly bad outcomes. Closely related, it is a simple fact that the real economy and the financial sector are constantly and endogenously changing and adapting to central bank actions and other policies. This implies the need for a constant willingness to update functional relationships and to look for risks in new places. The fact that successive, but ever larger, international debt crises since the 1980s have had their origins in different financial markets is a clear case in point. Finally, pervasive uncertainty and constant structural change must surely have implications for the old rules versus discretion debate, and the newer issue of whether complex systems should be constrained by equally complex policies.[131]

131 Haldane (2012).

Conclusion

The history of central banks and central banking has been and continues to be inextricably linked to the medium-term growth and stability of national economies and the international monetary system. By 2015, central banks were the most prominent players in the global policy arena. They have been charged with different mandates, and have growing responsibilities. However, despite variations in their mandates, and their economic circumstances, they all have confronted common challenges.

At the onset of the 2007–09 economic and financial crisis, the momentum of events pulled central bank actors together, bringing about a convergence of policies and clarifying policy options. Central banks acted singly and collectively, often side by side with governments, to arrest the crisis and restore a degree of calm and a return to financial stability. The policies they adopted in extremis were necessary and appropriate under the circumstances. The steps central banks took were mostly effective. The crisis saw central banks and their leaderships set aside some past beliefs and adopt new or adjusted approaches to crisis management.

This report has identified key principles and observations that must continue to guide central banking policy. The report also suggests where some central banking principles need to be modified. The report also points out potential risks related to the unintended consequences of polices undertaken by central banks in the wake of the crisis. These risks require continued vigilance on the part of central banks.

Central banks alone cannot be relied upon to deliver all the policies necessary to achieve macroeconomic goals. Governments must also act and use the policy-making space provided by conventional and unconventional monetary policy measures. Failure to do so would be a serious error and would risk setting the stage for further economic disturbances and imbalances in the future.

As this report makes clear, central banks and other governmental actors must continuously strive to identify future imbalances, policy weaknesses, and unintended policy outcomes, and be prepared to deal with them as they arise.

Even after the restoration of calm to the real economy and to the international monetary system, central banks and governments should remain vigilant regarding the varied effects of their adjusted responsibilities, policy approaches, and decisions, and remain alert to possible future developing risks and new dangers ahead. Central banks should continue to focus their policies on the attainment in the medium term of price stability and financial stability. The attainment of these objectives is the most efficient way central banks can contribute to sustainable economic growth.

Glossary

Accommodative or expansionary monetary policy: Undertaken by central banks to stimulate growth in the economy by boosting aggregate demand, through reducing policy interest rates, increasing the monetary base, or easing credit conditions.

Aggregate demand: The total amount of goods and services demanded in the economy by consumers, businesses, and governments.

Allocational efficiency: The characteristic of a market in which all productive resources are allocated in a way that is optimal for all participants.

Arbitrage: The simultaneous purchase and sale of equivalent assets or of the same asset in multiple markets in order to exploit a temporary divergence in prices.

Austerity: A set of measures taken by governments to reduce expenditures or raise taxes to shrink the budget deficit or achieve a surplus.

Boom-bust cycle: A credit-driven process leading to unsustainable expansion followed by a subsequent contraction.

Capital controls: Measures taken by a government, central bank, or other regulatory body to limit the flow of capital in and out of the domestic economy.

Carry trade returns: A strategy in which an investor sells a certain currency with a relatively low interest rate and uses the funds to purchase a different currency yielding a higher interest rate. Using this strategy attempts to capture the difference between the rates, which can often be substantial.

Collateralized debt obligations: Structured financial products that repackage cash-flow-generating assets (such as mortgages, auto debt, and credit card debt) so as to make them more attractive for resale in secondary financial markets by creating assets with differential risk profiles in a pool of similar underlying assets.

Conventional monetary policy: The process of central banks changing policy rates either to encourage or discourage aggregate demand, commonly in the pursuit of price stability.

Covenant-lite loans: Loans made to borrowers without imposing the normal restrictions on future behavior, such as maximum loan-to-value ratios, designed to increase the probability of repayment.

Debt deflation: A process through which a decline in the price level makes the burden of debt service (fixed in nominal terms) increasingly onerous.

Debt security: Any debt instrument that can be traded between two parties and has basic defined terms.

Deflation: A sustained and broad-based decrease in the general price level of goods and services.

Deleveraging: A process of decreasing financial leverage by paying off debt.

Disinflation: A decrease in the rate of inflation.

Dual mandate: Refers to the statutorily mandated (or congressionally mandated) objectives of the United States Federal Reserve System to both promote maximum employment and keep prices stable.

Evergreen loans: A loan that does not require the principal amount to be paid off within a specified period of time. Evergreen loans are usually in the form of a short-term line of credit that is routinely renewed, leaving the principal remaining outstanding for the long term.

Fiat money system: A system in which currency is backed only by government regulation or law, not a physical commodity.

Financial rate of interest: A longer-term rate set by the financial system under the influence of the central bank.

Forward guidance: A communication tool used by central banks with the goal of shaping public, market, and investor expectations about the future direction, general timing, and/or magnitude of monetary policy action.

Free-floating: A condition of a country's exchange rate where the market price is based on private supply and demand, allowing it to fluctuate freely relative to other currencies.

Great Moderation: The period of low macroeconomic volatility experienced in most of the advanced economies from the mid-1980s through to the onset of the crisis in 2008.

Great Recession: The period of sharp decline in global economic activity during the late 2000s, which is generally considered the largest downturn since the Great Depression.

Haircuts: The percentage by which an asset's market value is reduced for the purpose of calculating capital requirements, margin, and collateral levels. It can also refer to debt reductions or write-downs imposed in the context of a debt restructuring.

Hyperinflation: An extremely rapid, usually accelerating, rate of inflation.

Imbalances: A variety of credit-driven phenomena where economic variables (asset prices, saving or investment ratios, and so forth) exhibit significant and sustained deviations from historical norms that cannot otherwise be easily explained.

Indicators: Pieces of economic data that can be used by investors to interpret investment opportunities and evaluate the overall health of an economy.

Inflation: A sustained increase in the general price level of goods and services in an economy over a period of time, resulting in a fall in the purchasing value of money.

Inflation targeting: A policy whereby a central bank has an official target (or band) for future inflation and has a strong commitment and incentives (such as mandates, explicit powers, and political accountability) to achieve the target.

Instrument independence: The ability of a central bank to use its policy instruments in pursuit of monetary policy goals without political interference.

Interbank lending market: A market where banks buy or sell funds needed to meet a reserve requirement at the end of the trading day. In this market, banks can sell their excess reserves to other banks with insufficient reserves at the overnight interbank lending rate.

Lender of last resort: Refers to an institution, normally a central bank, which offers loans to authorized institutions that are experiencing short-term liquidity problems or liquidity strains but are otherwise deemed solvent.

Leverage: The amount of debt a company has in proportion to its equity capital.

Long-term refinancing operations (LTROs): Longer-term loans made to Eurozone banks by the European Central Bank to ensure the availability of needed liquidity in times of market stress.

Macroprudential policies: Policies (for example, capital ratio or minimum loan-to-value ratio requirements) directed to improving the systemic stability of the financial system. As the perception of risk changes over time, these policies will tighten or ease in turn.

Market making: A commitment by a financial institution to ensure that trades in a given financial market will always be possible, though not always at previously observed prices.

Microprudential policies: Policies that are directed to improving the safety and soundness of individual financial institutions. They are generally invariant over time.

Middle-income trap: A condition in which, when a country grows to a certain level of per capita GDP, often through urbanization and the import of foreign technology, further gains in per capita income become much more difficult.

Momentum trading: A trading approach that involves buying or selling assets whose value has recently increased or decreased in the belief that these movements will continue for some time in the future.

Monetary targeting: A policy whereby a central bank has an official target for the growth rate of the money supply. The anticipation is that meeting such a target will contribute to longer-term price stability by helping to anchor inflation expectations.

Moral hazard: The risk that an individual or organization will behave recklessly or immorally when protected from the consequences of their own actions.

Multiplier-accelerator mechanism: An initial shock (say, an increase) to national income, which then rises cumulatively as that income is spent (the multiplier) and as investment responds (the accelerator) to prospects of still more spending in the future.

MV = PY: The equation of exchange. M is the quantity of money, P is the price level, Y is real aggregate output, and V is monetary velocity. Monetary velocity is the number of times in a year that a given dollar is used to purchase goods and services. Assuming V and Y remain constant, then the "Quantity Theory of Money" links inflation directly to monetary expansion.

Natural rate of interest: The expected rate of return from an investment in real capital. Over time, barring major changes in the ratio of profits to wage income, the natural rate should approximate the rate of growth of the real economy.

Negative deposit rate: Refers to the situation in a number of European countries where the central bank levies a charge on the reserves held by private banks at the central bank.

Output gap: The difference between the actual output of an economy (determined by aggregate demand) and the output it could achieve (aggregate supply) when it is operating at full capacity.

Outright Monetary Transactions (OMTs): A bond-buying program proposed by the European Central Bank in 2012 to purchase short-term government bonds in the secondary market. The principal aim was to restore confidence in the integrity of the Eurozone and to bring down the market interest rates on sovereign bonds issued by peripheral countries.

Policy rate (overnight rate): The interest rate charged to a depository institution by a central bank (or other [monetary] institution) to borrow money overnight.

Price stability: In principle, a situation in which the general price level in the economy remains constant. In practice, and for various reasons, most central banks equate price stability with an inflation rate of around 2 percent per year.

Qualitative easing: Efforts made by central banks to reduce credit spreads in the economy. The lowering of eligibility criteria (for example, minimum rating requirements) for central bank eligible collateral would be an example of qualitative easing.

Quantitative easing: Refers to efforts made by central banks to reduce long-term interest rates through expanding the size of their balance sheets, either through purchases of assets, providing loans to financial institutions (see also LTROs), or other means.

Recapitalization: The restructuring of an organization's debt and equity structure, either to restore solvency or to make the capital structure more sustainable. This can happen either through injecting additional equity capital or through writing down debt.

Recession: A period of temporary decline in trade and economic activity. More technically, a recession is generally identified by a fall in GDP in two successive quarters.

Repos or repurchase agreements: A repo transaction is a temporary swap of securities against cash. The interest used in a repo transaction is called the repo rate. Repo transactions can be used as monetary policy tools.

Risk premium: The return that an investment is expected to yield in excess of the risk-free rate of return.

Roll-up rate: The rate at which the value of an initial investment compounds over time.

Shadow banking: Credit intermediation involving entities and activities (fully or partially) outside of the regular banking system.

Spillover effects: The external effects of monetary policies and processes upon those (including other countries) who are not directly involved in the policy-making process.

Stimulus: Attempts by governments and central banks to encourage aggregated demand through fiscal and monetary policy, respectively.

Stress test: Exercises that gauge the health of banks by running negative scenarios and seeing if the firms can withstand them.

Substitution effects: Effects that occur when, as the price of a good or service rises, consumers replace the more expensive item with a cheaper alternative.

Systemic risk: The risk that an event in one firm or firms could trigger a loss of economic value or confidence in a substantial portion of the financial system that is serious enough to have significant adverse effects on the real economy.

Taylor rule: A decision-making process that links needed changes in the policy rate to the output gap and deviations of actual and expected inflation from targeted levels.

Time-invariant policies: A system where policies are set to be optimal over time rather than changing in response to changed perceptions about risk.

Tinbergen separation principle: The principle states that for each policy objective there should be a separate, dedicated policy instrument.

Too big to fail: A term used to describe financial firms that would substantially damage the financial system and the rest of the economy should they fail—that is, go bankrupt—encouraging the perception that public authorities will come to their rescue. This is a typical example of moral hazard

Transmission mechanism: A process through which monetary policy affects the economy. (Monetary policy is generally thought to affect the economy only with long and variable time lags.)

Unconventional monetary policy: The various monetary policy measures taken by major central banks in response to the global financial crisis (in contrast to conventional policy, as defined above). The phrase itself is somewhat controversial, with some central bankers contending that some "unconventional" policies were more commonly used in earlier decades.

Uncovered interest rate parity: A condition in which the difference in interest rates between two countries is equal to the expected change in exchange rates between the countries' currencies. This provides an anchor for exchange rate changes. However, momentum trading (see above) implies this condition holds only on average over long periods. Exchange rates can therefore deviate temporarily and cumulatively from levels warranted by fundamentals.

VIX: Ticker symbol for the Chicago Board Options Exchange (CBOE) Volatility Index. It is used as a measure of equity market risk for investors.

Wicksellian framework: A framework for macroeconomic analysis proposed in the late 19th century by Knut Wicksell. Deviations between the natural rate of interest and the financial rate of interest (see above) were thought by Wicksell to drive the price level up or down. Later theorists used this framework to help explain the buildup of economic "imbalances" as well.

Zero lower bound: A situation that occurs when a central bank has lowered nominal short-term interest rates to zero or almost zero. Recently, the zero lower bound has been breached by several European central banks in a highly experimental way. The implications and limitations of such polices remain to be determined.

Zombie bank: A financial institution with a negative net worth.

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