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Introduction

All courses of action are risky, so prudence is not in avoiding danger
but in calculating risk and acting decisively.
—Niccolò Macchiavelli

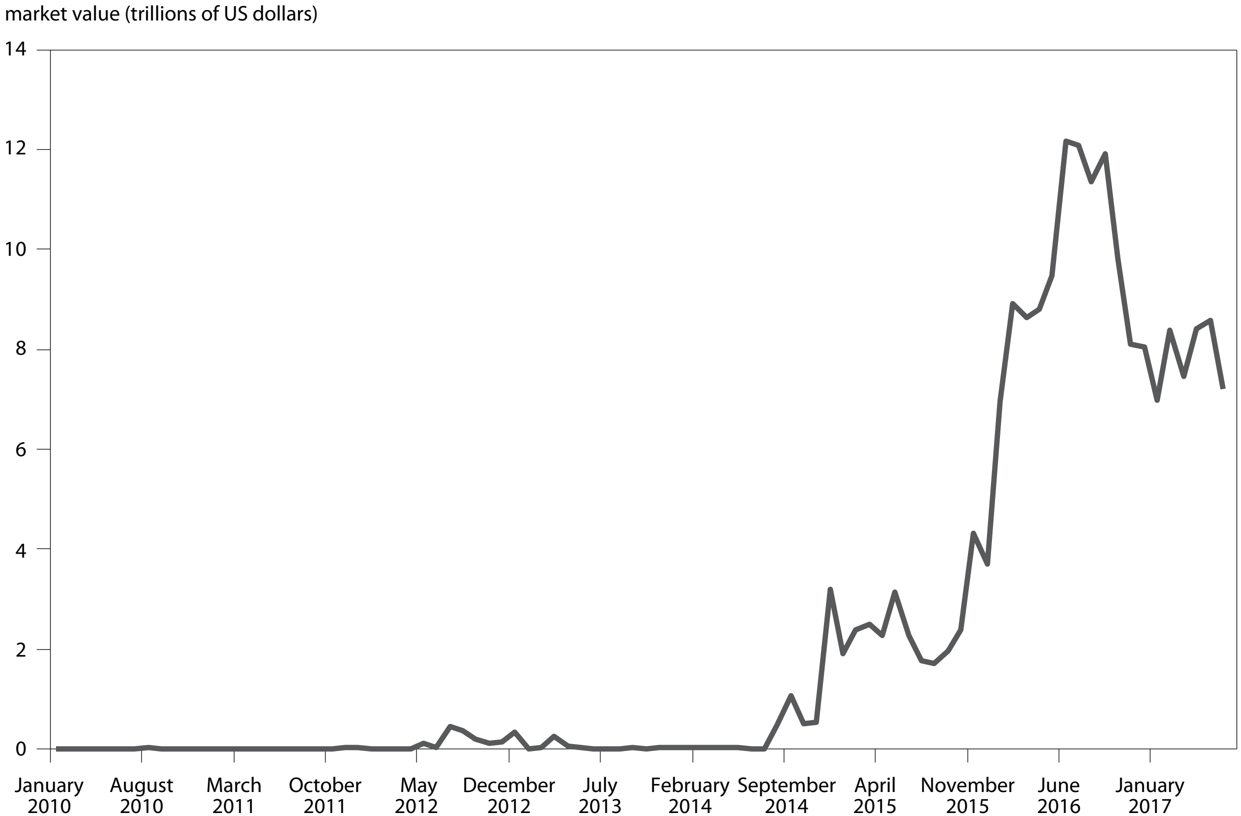
The world crossed a financial Rubicon on March 1, 2016, though few people noticed it. Japan, the most indebted country in the world, with government debt 2.5 times its GDP, was able to borrow money for 10 years at –0.02 percent. Investors were willing to pay for the privilege of lending money to the country with the highest debt-to-GDP ratio ever recorded in modern times outside of war periods.[1]

Japan was not alone. At the peak in mid-2016, more than $10 trillion bonds—more than a third of the world's total—were yielding negative interest rates (figure 1.1). The records piled up. After the United Kingdom voted to exit the European Union, bond yields in the United States and United Kingdom, while still positive, reached all-time lows—lower than during the Great Depression or major wars. For a brief period, the whole yield curve in Switzerland, all the way to the 50-year maturity point, was trading at negative yields. Several major central banks—including the European Central Bank (ECB), Bank of Japan (BoJ), Swiss National Bank (SNB), and Sveriges Riksbank—were charging commercial banks negative interest rates on their cash deposits. It was the world upside down.

It was not supposed to be this way. Before the 2007 financial crisis struck, the overwhelming consensus among economists was that we understood well the dynamics of the economy, that we had been able to domesticate economic fluctuations with economic policies, that we had

1. Debt surpassed 200 percent of GDP in the United Kingdom in the early 1800s and also in both the United Kingdom and France after World War I.

Figure 1.1 Market value of bonds with negative yields, 2010–17



Source: Bloomberg.

tamed the business cycle. We were not humble, and we called the economic period since the mid-1980s "the Great Moderation." We were certain to be able to avoid the policy mistakes that had cost Japan its lost decade of weak growth and very low inflation that followed the burst of its asset bubble in the late 1980s.

We were wrong.

A decade after the financial crisis shook the foundations of the global economy, the world is beginning to climb out of its economic trough. Central banks deployed a massive effort, with the combined balance sheets of the Federal Reserve, ECB, BoJ, Bank of England (BoE), SNB, and People's Bank of China ballooning to more than $18 trillion dollars—equal to more than 20 percent of the world's GDP.

The effort paid off. The feared deflationary spiral did not materialize, the expansion in the United States is already the third longest of the post–World War II period, and some economies are back to near full employment. But, overall, the world struggles to leave what Christine Lagarde, the managing director of the International Monetary Fund (IMF), has christened the "new mediocre." Stock markets and confidence indicators increased after Donald Trump's victory in 2016, celebrating the higher likelihood of fiscal stimulus, and global interest rates increased. Once the smoke cleared, however, little had changed. By mid-2017 interest rates remained very low and still negative in some regions, core inflation was still below target in most developed countries, and global growth expectations had picked up only modestly.

The Paradox of Risk

This book tells the story of how the world got stuck in this environment of low or even negative interest rates through the dialectic of the actions of monetary policy and the reactions of financial markets. It describes how policymakers got trapped in a paradox of risk.

When the crisis erupted and central banks and governments were called to fix it, they hesitated. Their main goal was to minimize the risk they were taking and the possible losses from their actions, rather than maximizing the benefit of their policy decisions. By confusing prudence with avoiding risk, they made the recovery riskier.

How did this paradox of risk happen? The very scary experience of the financial crisis created a sharp increase in risk aversion. Many people had lost their savings and their jobs, many banks and firms had gone under. Fundamental pieces of the financial system that had been taken for granted, such as the availability of liquidity in interbank markets or the ability of firms to issue commercial paper, had temporarily evaporated. It was as if, all of a sudden, water no longer flowed from the taps. Like soldiers returning from the battlefield, households, firms, and financial markets suffered an economic and financial version of posttraumatic stress disorder. Instinctively, people became more risk averse. They looked to the public sector—central banks and governments—for protection, for assurances that everything would turn out all right and that they could go back to their normal lives.

But central bankers and governments were also scared and, to some extent, unprepared. Central bankers had been educated to be conservative, to always aim for lower inflation and less risk. They had earned their credibility fighting the inflation of the 1970s and being vigilant about the risks of financial market exuberance of the 2000s. In Europe they had adopted the additional role of guardians of economic policy rectitude, relentlessly lecturing governments on the need for more fiscal adjustment, structural reforms, and competitiveness gains. Central bankers arrived at the crisis with the conviction that their job was to take the punch bowl away when the party was starting, as the legendary central banker William McChesney Martin quipped. They did not realize that their job now was to spike up the punch to ensure that the party would not end. These mental shackles were often difficult to escape.

The conservative nature of central bankers created a paradox of risk. Faced with a new world of deflationary fears and heightened risk aversion among households, firms, and investors, central bankers had to take risks and provide insurance on the economic outlook, to convince markets that they would do whatever it took to restore growth and inflation. The more insurance central banks provided, the better their policies worked. Yet, concerned about taking too much risk, they often dithered and took only half-measures. Too often, they worried more about when and how to remove the stimulus than about providing the right amount of stimulus, often yielding to political pressures advocating against decisive action.

These political constraints were particularly strong in Europe. For example, the early decision by the ECB to prioritize liquidity provision to banks instead of engaging in large-scale government bond purchases was heavily influenced by strong opposition to asset purchases by German political figures, who cared more about the potential negative impact of asset purchases on fiscal discipline than about supporting the economy with the right amount of stimulus. By the time the ECB finally started buying government bonds, much economic damage had been done.

This widespread hesitation in providing stimulus is largely responsible for the weakness of the global economic recovery. Fed researchers estimate that it accounted for 30 percent of the contraction in GDP in 2009 and an even larger fraction of the slow recovery that followed (Gust et al. 2017).

The recovery saved the world from a second Great Depression, but it was not the recovery that could have been possible had central banks been free of their mental shackles.

The paradox of risk did not apply only to monetary policy. No central bank operates in a vacuum. The consensus narrative of the causes of the crisis was built around the concept that "debt is bad." That notion had two pillars: (1) excessive financial debt led to the financial crisis and (2) excessive fiscal debt led to the euro area crisis and the Greek default. Thus, the consensus argued, debt had to be reduced at all costs. This narrative encouraged private sector deleveraging and fiscal austerity and constituted a strong headwind for monetary policy. After a coordinated, albeit modest and transitory, fiscal expansion in 2009, governments across the globe prematurely declared victory and moved on to fiscal tightening.

The mistaken European strategy of using the threat of sovereign debt defaults as a disciplinary device for the governments of the euro area countries in crisis added to the "debt is bad" narrative, creating an environment in which politicians preferred to cut deficits first and ask questions later, advocating fiscal austerity at all cost to avoid "becoming Greece." Learning from fearful experiences is much faster and creates more persistent effects than other forms of learning (Lo 2017). The fear of default, however irrational, overwhelmed everything.

As it had happened to the central bankers with their anti-inflation worries, this overarching focus on fiscal discipline was based on sound analysis applied to the wrong reality. The mental shackles were at play here as well. Governments and politicians had been educated on a precrisis consensus built on two pillars: (1) fiscal policy should focus on long-term sustainability and leave the management of the business cycle to monetary policy and (2) fiscal contractions were often expansionary, as they lowered interest rates and boosted private sector confidence. This conventional wisdom was correct for a world of small output gaps and positive inflation and interest rates. It was not appropriate for the postcrisis world of very large output gaps, zero interest rates, and very low inflation. In this world, interest rates had little room to decline, and there was no confidence to be gained from austerity. Tightening fiscal policy excessively and prematurely weakened the economy and diminished the effectiveness of monetary policy. Seeking to reduce debt-to-GDP ratios, governments often weakened GDP and increased debt-to-GDP ratios. Like their central banking colleagues, governments and politicians confused prudence with avoiding risks, inadvertently making the environment riskier.

The obstinate focus of the Republican Party on public spending cuts in the United States and the staunch German opposition to a mutualization of euro area fiscal policy that could alleviate deficit reductions in crisis countries are vivid examples of this confusion. It was a textbook case of "motivated reasoning" (Epley and Gilovich 2016), with political goals commanding attention and a selective reading of the evidence guiding reasoning at the expense of accuracy. Retail politics prevailed over economic needs, and fiscal policy became a strong headwind for monetary policy.

This conflict between monetary and fiscal policy is not new. The United States faced the opposite situation in 1981. Two years after Paul A. Volcker, chair of the Federal Reserve in the early years of the Reagan administration, began tightening monetary policy, inflation was proving difficult to tame, because President Reagan was embarking on tax cuts and military spending increases that expanded the fiscal deficit. When Reagan met Volcker for the first time after he became president, he asked him about the rationale for having a Federal Reserve in the first place. Volcker is said to have replied: "We are the only game in town right now fighting inflation. . . . Once the budget gets under control, we'll have a better shot at taking the pressure off of prices" (Mallaby 2016, 263). The political pressure against Volcker's monetary tightening mounted as the recession got deeper. A return to the gold standard was debated.

The lesson was then, and it is now, that it is dangerous for governments to hide behind the central bank and make monetary policy the only game in town. Not surprisingly, governments and politicians ended up disliking the central bank activism they were responsible for.

Of Boring Central Bankers, "NICE" Economies, and the Power of Narratives

Before the crisis there was clear consensus that a "successful central bank should be boring."[2] Yet, since 2007 it has been anything but boring, a reality that is likely to persist for decades.

Central banking was expected to be boring because the economy was enjoying the Great Moderation, the period between the mid-1980s and 2007 that witnessed a dramatic decline in the variability of output and inflation. Back then, with stable inflation, output near potential, and smooth business cycle fluctuations, managing the economy was easy. Simple rules were very good approximations of the process that determined the setting of interest rates, making monetary policy rather predictable. All that central banks had to do was to adjust short-term interest rates in a very gradual manner and wait for the effect to trickle down to the real economy in a predictable way. Back then, cutting rates by 50 basis points was considered "aggressive." Mervyn King, the governor of the BoE, coined an acronym for

2. Mervyn King, "Monetary Policy: Theory in Practice," speech, London, January 7, 2000.

this world: the NICE (noninflationary, consistently expansionary) economy.[3]

That NICE economy is ancient history. The brutality and persistence of the crisis; the unexpected linkages across markets, countries, and financial institutions; and the many policy mistakes along the way have created deep scars that will affect the behavior of economic agents for decades. Old paradigms have been replaced with a web of overlapping and competing narratives that affect the behavior of the private sector, governments, and regulators in a persistent, and sometimes perverse, manner. As Nobel Laureate Robert Shiller said, "We have to consider the possibility that sometimes the dominant reason why a recession is severe is related to the prevalence and vividness of certain stories, not the purely economic feedback or multipliers that economists love to model."[4]

This perversity occurs because narratives drive attention, and elevated attention can easily lead to the misleading impression of causality. In his book *Pre-suasion*: *A Revolutionary Way to Influence and Persuade*, Robert Cialdini, one of the most prominent researchers in the field of psychological influence and persuasion, writes that "what is focal is causal." In experiments in which people were asked to observe conversations between two people that had been carefully scripted so that no one was leading the discussion, observers overwhelmingly concluded that the person whose face was more visible was the leader (Cialdini 2016). People assign causal properties to the narratives that drive the news.

The causal links created by this web of narratives have reduced the effectiveness of monetary policy, in two main ways. First, they have increased risk aversion in a persistent way and across the board. Having missed the crisis and underestimated the severity of its impact, economists, policymakers, and market participants now feel the obligation to consider all possible downside risks. A "not on my watch" narrative has developed. Risk managers must ensure that firms can withstand another shock of the size and persistence of the post-Lehman downturn, however unlikely such a shock may be. Politicians and policymakers must ensure that they are covered against the consensus political narrative of the causes of the crisis: "debt is bad." They thus argue for fiscal discipline and regulatory tightening of the financial sector at all costs, so that another crisis does not happen on their watch. Economists must consider all possible interlinkages and, in case of doubt, always warn about downside risks.

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3. Mervyn King, speech at the East Midlands Development Agency/Bank of England dinner, Leicester, October 14, 2003.

4. Robert J. Shiller, "Narrative Economics," speech at awards ceremony and presidential address hosted by the American Economic Association, Chicago, January 7, 2017.

The failure to predict the crisis had a persistent impact on the way economic expectations are formed, developing an "it looks wise to be gloomy" narrative. Risk management is an exercise in imagination; what cannot be imagined cannot be insured against. The crisis opened the imagination to negative scenarios that had never been considered before, including the breakup of the euro. As a result, in the postcrisis world it looks wise to be gloomy and imagine ever more pessimistic scenarios. Being optimistic and wrong puts one's job at risk; being gloomy and wrong is considered prudent risk management, even if doing so implies missing a large market rally or a business opportunity. There is a bias toward pessimism, the opposite of the exuberant precrisis period. The tone of the economic debate, casting doubt on the future rate of technological progress or suggesting that secular stagnation has set in, reinforces this sober tone. This pessimistic narrative about the future constrains consumption and investment today and significantly dampens present and future economic growth (Blanchard, Lorenzoni, and L'Huillier 2017).

Second, the causal links have reduced confidence in central banks. The stability of the Great Moderation generated the belief that economic outcomes could be forecast with a high degree of precision. Behavioral economists call people's tendency to think they have more control over events than they really do the "illusion of control." A crisis that was "impossible," according to the available economic models and data, crushed this belief. The fact that most central bank forecasts consistently overestimated the speed of the recovery further eroded the confidence in central banks. A "central banks do not get it" narrative developed that dented the credibility of central banks and raised doubts about the effectiveness of their actions.

The challenging politics of bank rescue programs added to the diminished standing of central banks, creating a "central banks help banks, not citizens" narrative. Putting the central bank balance sheet at risk to save banks from their imprudent behavior is a very difficult political proposition but a necessary action when the banking system is at risk, because the alternative is a major economic collapse.

Contrary to conventional wisdom, the decision to bail out a bank should never be measured by the potential losses for the government or the central bank if the bailout does not work but by the potential losses in terms of forgone GDP if the bailout had not happened. However, the large size of the rescue packages, often wrongly identified as the main culprits of the increases in public debt ratios that occurred during the crisis, created a politically toxic environment that cannot be offset with explanations and data. For example, the Troubled Asset Relief Program (TARP) (the package of bank bailouts the United States deployed) generated a net profit for the US government. But it didn't matter. In the political narrative, using taxpayer money to bail out big banks was fundamentally wrong and generated large losses for taxpayers—and central banks were necessary accomplices in the process.

Just Blame the Central Banks

Behavioral research shows that once a narrative sets in, it is hard to dislodge, especially if the narrative is coherent (Kahneman 2005). This web of narratives has made central banks easy targets for ideological criticism and political instrumentalization. The economy was not NICE anymore. The activism central banks deployed to restore growth was often portrayed as wrong, ineffective, or morally questionable. Politicians needed a culprit; hiding behind the central banks and blaming them for all problems yielded solid political dividends.

Some politicians did not mince their words. The governor of Texas, Rick Perry, accused Fed Chair Ben Bernanke of treasonous behavior: "If this guy prints more money between now and the election, I do not know what you would do to him in Iowa, but we would treat him pretty ugly down in Texas. Printing more money to play politics at this particular time in American history is almost treacherous—or treasonous in my opinion."[5] The US Congress has also been active. The "audit the Fed" movement is seeking to severely constrain the Fed's ability to conduct monetary policy by demanding that its policy actions be audited by the comptroller general of the United States. During the 2016 presidential campaign, Donald Trump openly criticized the low level of interest rates and said that he would not reappoint Janet Yellen as chair. In the euro area, suing the ECB before the German Constitutional Court became a habit among German academics and politicians who fundamentally disliked its attempts to ease monetary policy via asset purchases. All of the attempts failed, but they were responsible in large part for the ECB's delay in adopting quantitative easing (QE). Central bank bashing probably reached its peak in April 2016, when German Finance Minister Wolfgang Schäuble blamed the ECB for the rise of anti-euro sentiment in the German political debate.[6] In what may be the ultimate irony, in a country with a political culture built around the strong independence of the Bundesbank, the government has been trying to intimidate its central bank.

5. Chris McGreal, "Rick Perry Attacks Ben Bernanke's 'Treasonous' Federal Reserve Strategy," *Guardian*, August 16, 2011, www.theguardian.com/world/2011/aug/16/rick-perry-ben-bernanke-treasonous (accessed on March 29, 2017).

6. Jeremy Warner, "Europe Doesn't Work for Germany Either, as Schäuble's Faux Pas Demonstrates," *Telegraph*, April 26, 2016, www.telegraph.co.uk/business/2016/04/26/europe-doesnt-work-for-germany-either-as-schubles-faux-pas-demon (accessed on March 29, 2017).

Central banks had been at similar junctures in the past. In September 1979 Fed Chair Arthur Burns delivered a speech entitled "The Anguish of Central Banking," in which he blamed the lack of effective action on inflation on the fact that "the Federal Reserve was itself caught up in the philosophy and political currents that were transforming American life and culture."[7] As Sebastian Mallaby, in his biography of Alan Greenspan, puts it, "Despite the aura of independence that has grown up around central banks, they do not exist in a vacuum. To the contrary, their mandate comes from lawmakers, their legitimacy derives from the climate of expert opinions, and they ultimately depend on the sympathy of voters" (Mallaby 2016, 230). Greenspan was the quintessential political operator; with his shrewd political activity, he managed to keep politicians away from the Fed. Not all central bankers are so politically astute.

Independence and credibility are necessary conditions for the effectiveness of central banks. They have become the object of harsh, repeated, and unfair criticisms—sometimes for doing too much, sometimes for not doing enough. This criticism has diminished the effectiveness of their actions. But when the next recession arrives—and it will likely arrive with interest rates still very low—the world is going to need central bankers to be very active again and at their maximum effectiveness in order to be able to restore growth.

And, then, all those who have opportunistically attacked central banks will lament they did so.

Roadmap of the Book

Against this background, this book has a double objective. First, describe and evaluate the experience with monetary policy in various countries since 2007, extracting best practices and lessons for the future about what worked, what did not, and why. Second, increase the public understanding of how this new multidimensional monetary policy works, in order to help reduce the politicization of monetary policy and the misconceptions about its workings. Some concepts are intellectual zombies that just refuse to die. For example, the argument that increasing the size of the central bank's balance sheet may lead to rampant inflation and currency debasement has survived decades of evidence to the contrary. During the 2016 US presidential election, some candidates used it to argue in favor of a return to the gold standard.

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7. Arthur Burns, "The Anguish of Central Banking," speech at the Per Jacobsson Lecture, Belgrade, September 30, 1979.

The book tells the story from the perspective of an economist, a risk taker in financial markets, and a consumer of central banking. I have never been a central banker, but my background of academic and policy research, experience in public policy, and long tenure in the hedge fund industry have resulted in a decade and a half of watching central banks, translating the intricacies of monetary policy for markets, and opening the eyes of central bankers to the mysteries of markets. A core tenet of my approach is to explore the interlinkages between politics, policies, and markets, from the principle that everything in life is probabilistic and every decision is about evaluating risk and reward. In the spirit of Isaiah Berlin's famous metaphor, it is the approach of the fox, not the hedgehog.[8] Research shows that foxes are better forecasters than hedgehogs (Gardner and Tetlock 2016). The discipline of financial markets requires the fox's eclectic knowledge of sound economic theory, the inefficiencies and behavioral biases of financial markets, and the incentives of politicians, approaching problems with an open mind that straddles disciplines. This book shares the fruits of my experience.

Chapter 2 provides the intellectual and political background that preceded the crisis and created the context in which the monetary authorities had to act. It describes the building blocks of the precrisis economic debate, the consensus about the workings of monetary policy, the specifics about the euro area that would later condition the ECB's monetary policy response, and the mechanics of expectations formation in financial markets. A few important conclusions emerge. Economists had been educated to worry about high inflation and to assume that economic cycles were stable, that economies always returned to equilibrium, and that monetary policy could not affect potential growth. Central bankers were convinced that zero interest rates and the risk of deflation were the result of the failures and mistakes of the Japanese authorities and would not happen in the West. European politicians, governments, and central bankers were obsessed with internal competitiveness as the key to the success of the euro. And markets had learned to live with the "Greenspan put" (the belief that monetary policy would always come to the rescue of markets), smooth and rather predictable monetary policy, and market regularities that guided their behavior. The crisis smashed all of these paradigms and set in motion a volatile learning process.

Several economic concepts appear recurrently in this book that are key to understanding the story of monetary policy since 2007. They are outlined

8. According to Isaiah Berlin, writers and thinkers can be classified into two types: hedgehogs, who know one big thing, and foxes, who know many small things (Berlin 1953). Berlin attributes the concept to the Greek poet Archilochus.

in box 1.1. Building on these concepts, chapter 3 outlines a guiding framework for the analysis of monetary policy in terms of four essential elements:

- the policy goals and the time frame to achieve them,
- the tools to achieve the goals,
- the strategy for using the tools, and
- the communication methods to explain the strategy to the public.

Within this framework, it tells in detail the story of the decisions of the main central banks—the Fed, ECB, BoJ, BoE, and, when relevant, the BoC and SNB—since 2007. It shows that these decisions have affected all four essential elements of the guiding framework. Most central banks have updated or clarified their policy goals and mobilized large-scale asset purchases, liquidity facilities, negative interest rates, and other new tools with the explicit use of forward guidance. And they have sought to elevate the public's understanding of the workings of monetary policy. The monetary policy frameworks of 2017 bear little resemblance to the easy and simple frameworks of 2007. This transformation has been the great experiment in monetary policy.

Did It Work?

Chapter 4 analyzes the impact and effectiveness of monetary policy during this period in terms of whether it affected financial conditions in the desired way; was eased as much as recommended by simple benchmark policy rules; and achieved its objectives in terms of growth and inflation. It also discusses some of the potential costs of monetary policy, including the relationship between money growth and inflation and the impact of monetary policy on financial stability, income inequality, and moral hazard in fiscal policy.

It shows that monetary policy worked—during the crisis and the ensuing recession, monetary policy was effective in restoring market functioning, affecting financial conditions in the desired manner, and boosting growth and inflation—but that it could have done better. In general, central banks delayed action and eased policy less than optimally, struggling at times to maintain price stability and close the output gap.

They were hampered by mistaken, and often contradictory, preconceptions about the potential costs of acting. Some argued that monetary policy would not work and favored structural reforms; others foresaw runaway inflation from zero interest rates and large central bank balance sheets; many feared the distortionary effects of asset purchases. There were worries that QE would lead to fiscal deficits and moral hazard, the

Box 1.1 Some useful concepts

Forward guidance. A strategy in which a central bank provides explicit or implicit guidance about its future policy actions. This guidance can be defined in terms of time or relative to some macroeconomic variables (e.g., stating that interest rates are expected to be on hold for an extended period or until inflation reaches a specific level).

Hysteresis. A process that converts a transitory shock into a permanent one (e.g., when a cyclical increase in unemployment, caused by a recession, becomes a permanent increase in unemployment after people remain unemployed for a very long time and lose the skills and motivation necessary to find jobs). When hysteresis happens, a recession can reduce potential growth. In these cases, a central bank can prevent a deterioration of potential growth by boosting demand.

Knightian uncertainty. Uncertainty that cannot be measured or modeled ex ante because the situation under consideration is unique. Uncertainty is different from risk, which can be measured and modeled ex ante, because there is enough historical data to calculate a probability distribution, and therefore insured against.

Macroprudential policy. Regulatory and supervisory decisions that seek to reduce the macroeconomic financial vulnerability of an economy (e.g., by reducing the maximum loan-to-value ratio allowed in residential mortgages in order to slow the growth of mortgage credit).

Moral hazard. A situation in which economic agents take more risk than they otherwise would because they believe that if something goes wrong someone will come to the rescue to bail them out (e.g., a government running a very large deficit thinking that, if markets punish it and decide to charge a higher interest rate on its debt, the central bank will react and keep interest rates low).

Quantitative easing. A policy in which the central bank purchases assets, public or private, from the market and finances the purchases by issuing money. This process increases the amount of money in circulation; if it lowers interest rates and boosts asset prices, it eases financial conditions.

Reaction function. A quantitative description of the way monetary policy reacts, or is expected to react, to changes in the economic outlook (e.g., how interest rates react to an increase in growth or inflation).

Risk aversion. For economists, risk aversion is a preference parameter in the agent's utility function, invariant over time. Agents are described as *risk neutral* if they are indifferent between options with equal expected payoffs, for example the choice between receiving $100 or a 50 percent chance of receiving $200 and a 50 percent chance of receiving $0. Agents are described as *risk seeking* or *risk averse* if their preferences are not neutral to risk (i.e., if they prefer one of the options described above over the other). However, consumers' risk tolerance can change over time, even if their preferences are unchanged—because, for example, of liquidity or capital restrictions. For ease of language, this book uses the concept of risk aversion to encompass both changes in risk aversion parameters and changes in risk tolerance, though changes in risk tolerance are enough to support most of the conclusions of the book.

debasing of currencies, and competitive devaluations. The evidence shows that none of these fears has materialized and that, if anything, the opposite has been the case—the best example being fiscal policy, which has been too tight, rather than too loose.

Monetary policy when interest rates reached the effective zero lower bound (EZLB)[9] has operated through several channels, including portfolio rebalancing and signaling about the future path of short-term interest rates. Asset purchases have been more effective when they have provided an insurance on the economic outlook, designed in a manner that is both state contingent (that is, explicitly conditional on achieving economic outcomes) and open ended (that is, without a predetermined end date). At the EZLB, with persistent doubts about policy effectiveness and about our collective understanding of the functioning of the economy and markets, the objective of monetary policy must be to restore risk appetite to normal levels and provide markets with an outlook-based framework to appropriately price assets. State-contingent, open-ended polices allow central banks to sell an option on the economic outlook to economic agents and markets, and most central banks have rightly converged toward this model.

Some central banks have been more effective than others. The Fed, after patiently waiting for the output gap to close, has started a gradual tightening cycle, although inflation and inflation expectations are still somewhat below target. In contrast, the ECB is still buying assets in large scale, its deposit rate is still negative, and it is far from achieving its inflation objective. Growth is strong but, given the fragility of inflation expectations and the weakness of wage growth, the ECB would be well advised to design a strategy that allows interest rates to remain as low as needed for as long as needed.

The BoE was also close to declaring mission accomplished, but it was interrupted by the Brexit referendum. The BoE is the only central bank where inflation expectations are well anchored at or above precrisis levels. The BoE's courage in easing policy aggressively during 2009–12 while headline inflation was transitorily very high buttressed its antideflation credibility. The paradox of risk at play. Taking the right amount of risk at the right time pays off.

Finally, the BoJ has shown that, when a central bank is willing to deploy all the necessary ammunition and the government cooperates, it is possible to lift inflation expectations. The BoJ is still far from its 2 percent inflation objective but, if it perseveres, and the Japanese government continues

9. As some central banks have cut rates to negative levels, the concept of "zero lower bound" of interest rates has been replaced by "effective zero lower bound."

to cooperate, Japan has a chance of joining the club of countries with 2 percent inflation.

Have We Learned Anything? An Action Plan

Chapter 5 focuses on the future, concluding that central banks must craft a monetary policy framework for all seasons, robust to fight both inflation and deflation. Its key recommendations are that central banks should

- launch a program of opportunistic reflation;
- adopt dual mandates for monetary policy, de facto or de jure;
- be ready to carry large balance sheets and buy all type of assets;
- adopt a strategy of cyclically adjusted forward guidance; and
- improve their communication about monetary policy, including stopping calling it "unconventional."

The experience of the crisis has shown that central banks need to stress the symmetry of their goals and that their inflation targets are too low. Therefore, after this long period of below-target inflation, central banks should first aim for a period of above-target inflation in order to firmly anchor inflation expectations at current targets. Then, they should engage in a program of "opportunistic reflation", which may last more than one business cycle, aiming at higher inflation targets in the 3 to 4 percent range, to soften the implicit lower bound in real interest rates.[10] This lower bound arises because, with inflation at 2 percent, cutting nominal interest rates to zero reduces real interest rates to only –2 percent, and deep recessions require real interest rates well below that. Banks are being asked to raise capital to be able to withstand much bigger shocks than in the past, and monetary policy should do the same by increasing inflation targets. The alternative would be to prepare for more negative nominal interest rates or flatter yield curves. It is a difficult tradeoff, but the potential cost of higher inflation as an insurance against the EZLB is likely smaller than that of very negative interest rates.

The change in goals has to go beyond opportunistic reflation. In a context of very uncertain demographic and productivity trends, and with hysteresis effects at work, the optimal mandate of monetary policy should be to maximize growth and employment subject to price stability. Therefore, central banks should adopt dual mandates, de facto or de jure, for two reasons: first, with inflation increasingly insensitive to growth, this

10. This program of opportunistic reflation would be the mirror image of the "opportunistic disinflation" strategy adopted by central banks during the 1980s to gradually lower inflation toward the 2 percent objective (Orphanides and Wilcox 2002).

would ensure that monetary policy always tests the limits of growth and economies don't get stuck in a low-growth trap; second, dual mandates would reinforce the democratic credibility of central banks, easing public concerns about its lack of sensitivity toward employment and growth. This does not imply creating an inflationary bias. It is a reminder that the ultimate objective of monetary policy is maximum growth, and that price stability is just a means to an end.

Central banks should retain large balance sheets. A system of excess reserves enhances the stability of the financial system against liquidity shocks, and the payment of interest on excess reserves (IOER) allows central banks to run monetary policy with large balance sheets. And central banks should be ready to use balance sheet policies at all times, including purchases of all types of private assets and lending against all type of assets (properly discounted). Buying risky assets is an efficient way of reducing elevated risk premia, and avoids creating a shortage of safe assets. The "cost" argument against purchases of riskier assets is misguided—central banks should focus on minimizing the economic cost of recessions, not the potential fiscal costs to their balance sheets—but it is politically relevant. Therefore, central banks should improve their institutional arrangements and increase their ability to withstand losses, to be able to be as effective with balance sheet policies as they would be with interest rates.

Forward guidance should be cyclically adjusted, with varying degrees of explicitness depending on the distance of growth and inflation from their targets and on the level of risk aversion. This cyclical adjustment should be symmetric. When risk aversion is too high, forward guidance should be explicit to foster risk taking, and accompanied by asset purchases to bolster credibility; when risk aversion is too low, forward guidance should be minimized to avoid giving markets one-way bets and incentives for excessive risk taking. In most cases, excessive certainty, and not low interest rates, is the main source of carry trades and disruptive search for yield strategies. When risk aversion is within normal ranges, forward guidance should focus on what the central bank can control, describing its reaction function and potential alternative scenarios, and shy away from near-term guidance and explicit interest rate paths that create confusion. Because asset purchases and forward guidance are intended to affect attitudes toward risk, decisions on macroprudential policies should be delegated to central banks to enhance the coordination and cooperation between monetary policy and macroprudential policies. The better the coordination, the more will monetary policy be able to support growth.

Finally, central banks must communicate better. As Ben Bernanke puts it, monetary policy is "98 percent talk, and 2 percent action" (Bernanke 2015a, 498). Central banks need to diversify and expand their channels of communication to better control the narratives and develop positive messages. They should stop using the concepts of "unconventional" policies and "exit." All policies are conventional, and thus there is no exit. There is easing, and there is tightening, of monetary policy. This would eliminate the stigma associated with balance sheet policies, forward guidance, and negative interest rates that reduces their effectiveness.

The Future Is Not What It Used to Be

Sooner or later, another recession will arrive. If it arrives when global interest rates and inflation are low, the best policy response should include strong forward guidance and a large program of asset purchases combined with a credible and well-designed fiscal expansion. In fact, we have already seen the future. As discussed in chapter 6, the new phase of Abenomics in Japan and the easing package that the BoE adopted after the Brexit referendum in 2016 follow some of the suggestions of this book as regards risk taking, communication, and coordination with fiscal policy.

When inflation and interest rates are low, fiscal policy should be more active and better coordinated with monetary policy, so that monetary policy is not the only game in town. A well-designed and active fiscal policy would increase the neutral interest rate, thus making monetary policy more effective, limit the damage to potential growth, and reduce the impact of recessions on income inequality. The key words are "well designed." Fiscal policy should boost growth, not short-term consumption, leading, yes, to higher interest rates. It requires breaking the mental shackle that active fiscal policy, especially if coordinated with monetary policy, is a bad policy. It is not. It is the right policy response when interest rates are low.

Some have gone further, and argued in favor of helicopter money, a fiscal expansion directly financed by central bank money creation that does not generate new debt (Turner 2015). It was Milton Friedman who first suggested in 1969 (however facetiously) that throwing money from a helicopter would boost growth and inflation (Friedman 1969). In 2002, Ben Bernanke, then a member of the Federal Reserve Board, suggested it as a last resort policy option to combat deflation.[11] Some economists have gone even further, arguing in favor of enabling central banks to force the government to run fiscal deficits to reach the inflation target.[12]

11. Ben Bernanke, "Deflation: Making Sure 'It' Doesn't Happen Here," speech before the National Economists Club, Washington, November 21, 2002.

12. Simon Wren-Lewis, "Helicopter Money," Mainly Macro (blog), October 22, 2014, www.mainlymacro.blogspot.com/2014/10/helicopter-money.html (accessed on March 29, 2017).

All this may look right on paper, but the concept of helicopter money carries a stigma, is illegal in several countries, and is a distraction from what really matters, which is to spend money to boost demand.[13] There is no need to go there. In these situations, central banks should demand expansionary fiscal policies, and governments must take responsibility and adopt the right policies. The key is that monetary policy ensures that interest rates do not increase as a result of the fiscal expansion. QE has done precisely that. Helicopters should stay grounded.

Central banking is an exercise in risk management and, to be successful, policymakers, like portfolio managers, must be aware of their behavioral biases (Kahneman 2005). During the crisis, policymakers suffered from the anchoring effect (overweighting the initial pieces of information) when they shifted toward fiscal austerity based mostly on the Greek case. They suffered from the endowment effect (aversion to change by overvaluing what one owns) and loss aversion (holding on to losing positions for too long because of aversion to realizing the loss) when they stuck with the wrong policies for too long (e.g., the ECB's initial opposition to QE, the reluctance by governments to engage in fiscal expansion, central banks' refusal to increase inflation targets). They suffered from overconfidence, by taking the stability of inflation expectations for granted. These biases cannot be eliminated but recognizing them helps reduce their impact.

All strategies entail risks, and central banks must act in a responsible manner. But let's not forget. As Machiavelli told us, irresponsibility is not to take risk. Irresponsibility is to assess a situation and not to take the right amount of risk. Central banks have a symmetric mandate to meet and must do whatever it takes to fulfill it.

13. For example, the Maastricht Treaty prohibits the ECB from engaging in the direct financing of governments, and the Public Finance Act in Japan prohibits the BoJ from directly underwriting Japanese government bonds.