

CENTRAL BANK POLICIES AND THE DEBT TRAP

Athanasios Orphanides

Monetary theory is like a Japanese garden. It has esthetic unity born of variety; an apparent simplicity that conceals a sophisticated reality; a surface view that dissolves in ever deeper perspective. Both can be fully appreciated only if examined from many different angles, only if studied leisurely but in depth.

—Milton Friedman (1969)

The combination of high government debt levels and the unprecedented monetary expansion implemented by central banks around the world since the 2008 financial crisis has raised concerns about the potential for money mischief. Whenever a government faces the prospect of a high debt trap, money printing can be a tempting way out. Relying on inflation to eat away the real value of the debt may be far more appealing politically than raising more taxes to repay it. Since 2008, through quantitative easing policies, central banks in many large economies have been effectively printing money and purchasing government debt with the proceeds.

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Should we worry? While the risk of debt monetization can never be completely dismissed in a monetary economy, a rapid increase in high-powered money is not necessarily a harbinger of inflation. As suggested in the epigraph, taken from the Preface of Milton Friedman's *The Optimum Quantity of Money*, in monetary phenomena surface appearances may be misleading and require deeper analysis from multiple perspectives to appreciate fully.¹

This article delves into an international comparison of central bank policies in relation to government debt dynamics since the crisis. It examines the policies of the Federal Reserve, Bank of Japan (BOJ), and European Central Bank (ECB) and their respective effects on the United States, Japan, Germany, and Italy. Monetary policy and fiscal dynamics are inexorably linked but not only through the potential for debt monetization. Within limits, central banks can allay market concerns about fiscal dynamics without compromising price stability. This can be achieved through policies that promote economic growth, which are crucial when aggregate demand is depressed as was the case in the aftermath of the crisis. It may also be achieved through financial repression, which reduces the real cost of refinancing government debt.² Financial repression is a feature of quantitative easing (QE), and, although it is associated with distortions, it nonetheless deserves attention because it may be preferable to alternative policies with potentially higher economic costs, such as debt monetization through high inflation or debt default.

In the aftermath of the crisis, a crucial challenge faced by the Fed, the BOJ, and the ECB was to provide sufficient accommodation to the economy while facing the zero lower bound (ZLB) on interest rates that constrained conventional monetary policy. All three central banks provided additional accommodation by expanding their balance sheets and engaging in some form of QE. Despite rapid increases in high-powered money, inflation has remained subdued. Indeed, for all three central banks, inflation has been below their respective goals, on average, since the crisis. Moreover, because

¹Friedman (1982) repeated this text in *Money Mischief*, pointing out that his observation about monetary theory also applied to monetary history.

²Reinhart, Kirkegaard, and Sbrancia (2011) offer a concise description of the practices that constitute financial repression and examples of its use since the crisis. They describe financial repression as policies that channel to governments funds that in a deregulated market environment would go elsewhere.

financial repression is a feature of QE policies, balance-sheet expansions also helped improve debt dynamics. However, the effectiveness of these policies varied, as can be seen by comparing Japan and Italy. Whereas BOJ policies have successfully allayed concerns about Japanese government debt dynamics without compromising price stability, ECB policies, which apply to all members of the eurozone, appear to have favored Germany at the expense of Italy, with adverse consequences on market concerns regarding the sustainability of Italian government debt.

With regard to the normalization of the extraordinary accommodative policies adopted since the crisis, the Fed's current experience is compared with that of the QE policies in the 1930s. The historical precedent suggests that policy normalization could be achieved over time without shrinking the Fed's balance sheet. Maintaining the current size of the balance sheet, while nominal GDP grows in line with the economy's potential output growth and 2 percent inflation, would lead to a reduction of the Fed's balance sheet as a percentage of GDP similar to that recorded after the 1930s balance-sheet expansion. If the current size of the balance sheet is maintained, however, a faster pace of increases in short-term interest rates would be required to preserve price stability.

Debt Dynamics and the Debt Trap

To organize the discussion, it is instructive to review some basics of debt dynamics and factors that can contribute to or allay concerns of a government being caught in a debt trap. Equation 1 provides a useful summary of the evolution of debt dynamics for a government that finances shortfalls in its expenditures over revenues (the primary deficit) through the issuance of nominal bonds in local currency:³

$$(1) \Delta b = (r - g)b_{-1} + d$$

The equation shows how the change of the debt-to-GDP ratio from one period to the next, Δb , depends on the previous period's debt-to-GDP ratio, b_{-1} , the primary-deficit-to-GDP ratio, d , the real interest rate, r , and the real growth rate, g .

³More detailed analysis, including complications such as debt denominated in foreign currency, can be found in Annex 1 of the pertinent IMF Staff Note on Public Debt Sustainability, IMF (2013).

A government faces the prospect of being caught in a debt trap if the debt-to-GDP ratio is persistently rising over time, risking reaching levels so high as to question the government's ability to refinance it. Eventually, this raises prospects of defaulting on the debt. High primary deficits for a time (high d) can elevate the debt-to-GDP-ratio, b . Indeed, persistent primary deficits are invariably the root cause of debt problems. However, a more critical factor for debt sustainability is whether the cost of refinancing the debt is expected to be persistently higher or lower than the growth of the economy. To see this consider the case when a state with a positive debt level runs a primary balance, $d = 0$. For this state, government finances will still be in deficit with the total deficit being equal to the interest cost of servicing the existing debt. The total level of debt will be rising over time. But if GDP is rising even faster, the debt-to-GDP ratio will be declining, nonetheless. The key is how r compares with g . If the interest rate on the debt is lower than the growth of the economy, $r < g$, then the debt-to-GDP ratio will be declining over time. Conversely, if $r > g$, the debt-to-GDP ratio will be rising over time, rendering the debt unsustainable.

What can push an economy to the debt trap? First, policies that kill growth. Persistent periods of low or negative growth can create debt problems even if a government is not maintaining primary deficits. Second, for any given level of nominal interest rates, policies that deliver too low inflation or deflation. By raising the real interest rate a government faces to refinance its debt, deflation can render debt dynamics unsustainable. Third, for any given level of risk-free real interest rates, policies that raise the perceived risk characteristics and thus the cost of refinancing the debt. For example, policies that induce fear that a government might be forced to default on its debt obligations in the future raise the risk premium investors demand as compensation for such fears. Such policies therefore raise the real interest rate a government faces to refinance its debt and can render the debt unsustainable. This channel also illustrates how fears of default can be self-fulfilling, reflecting situations where default fears render a given level of debt unsustainable when in their absence debt would be sustainable.

How to avoid a debt trap? First and foremost with sound fiscal policy. Avoiding persistent primary deficits in the first place eradicates high debt levels and maintains the fiscal space needed to pursue countercyclical fiscal expansions in recessions without raising

concerns of debt sustainability. Second, by promoting higher real growth over time. Structural policies that raise potential output growth can have particularly high payoffs in the long run, though they may be unpopular and difficult to implement for political reasons.

Central bank policies also have important implications for debt dynamics. Some policies can unnecessarily worsen debt dynamics. In a recessionary environment (e.g., as experienced in the global economy in the aftermath of the financial crisis) monetary policy that is insufficiently accommodative can induce persistently low inflation, lower than a central bank's definition of price stability, and depress growth. Inappropriately tight monetary policy can create a debt problem for a government even if primary deficits are kept low.

Central banks can also diffuse debt concerns but with potentially undesirable consequences. A classic example of money mischief is debt monetization. Money printing can diffuse an unsustainable debt situation by repaying the nominal value of the debt with freshly printed and increasingly worthless money. High inflation effectively wipes out the real value of existing debt. But it also destabilizes the economy, harming growth over time.

There is, however, another central bank policy option that can reduce, within limits, the risks associated with high debt without compromising price stability: financial repression. The central bank, sometimes in coordinated actions with the government, can induce conditions that reduce the real cost of financing government debt, relative to other assets in the economy. In extreme forms, financial repression can induce the real cost of debt to remain negative for considerable time, with inflation remaining consistent with the central bank's price stability objective.⁴

Both monetary and regulatory policies can be employed to induce financial repression. On the monetary policy side, the outright purchase of long-term government debt, as central banks do when they engage in quantitative easing, reduces the supply of government debt available in the private sector, which in turn reduces long-term term premia. Easing the fiscal burden on government debt is a key feature of quantitative easing. On the regulatory side, policies that require financial institutions to hold government debt, for instance for liquidity purposes or for risk control purposes, create a captive

⁴Reinhart and Sbrancia (2015) document historical episodes where financial repression has successfully liquidated government debt.

market for government debt that reduces its yield relative to that of private debt with similar characteristics.⁵

Financial repression effectively represents a form of tax to the financial system and creates distortions. As with other policy-induced distortions in the economy, financial repression may have detrimental effects to growth over time. However, faced with concerns of a debt trap, financial repression may be the lesser evil among bad alternative policy options. The challenge for an independent central bank that has been dealt a terrible hand is how to select among bad and worse options.

Three Central Banks, Four Countries

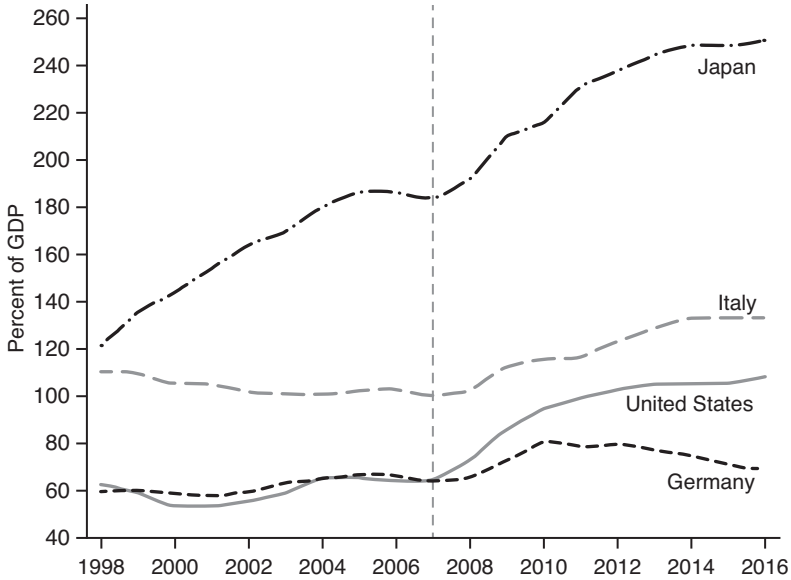
The Great Recession has left visible scars on government finances in most advanced economies. This section briefly compares the experience of three central banks and four economies since the crisis. Special attention is given to factors that influence debt dynamics in the countries for which these central banks are responsible for monetary policy. The comparison illustrates how, for better or for worse, different policy choices by central banks can have dramatic economic consequences.

We focus on the Fed, the BOJ, and the ECB and four countries: the United States, Japan, Germany, and Italy. The correspondence is not one-to-one because the ECB is responsible for monetary policy for the eurozone as a whole, which currently consists of 19 member states. Germany and Italy are the largest and third largest members of the eurozone, respectively, and their inclusion in the comparison highlights differences in economic consequences within a monetary union, in addition to the differences across monetary blocs.

There are commonalities and differences among these four countries and three central banks. All four countries were significantly adversely affected by the 2008 crisis and experienced sharp contractions. All three central banks were constrained by the ZLB in pursuing monetary policy and were forced to resort to quantitative easing. Among the countries, Japan was experiencing mild deflation before the crisis so conditions were less favorable than in the other three

⁵The Liquidity Coverage Ratio that has been added to the Basel framework for bank regulation in the aftermath of the crisis is an example of such regulations and their global appeal. In the United States, the recent restrictions introduced in the money market mutual fund industry are another example.

FIGURE 1
GROSS GOVERNMENT DEBT
(PERCENT OF GDP)



NOTE: Vertical line marks 2007, the year before the crisis.

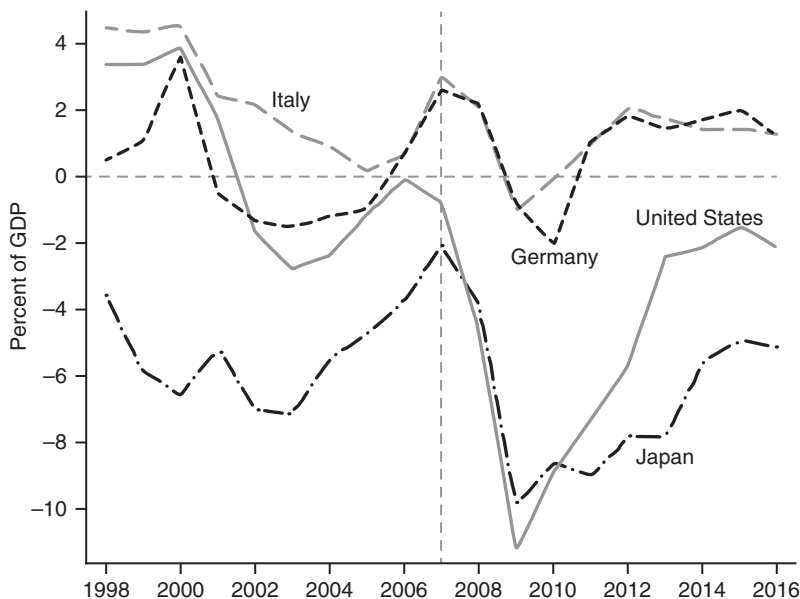
SOURCE: International Monetary Fund.

countries when the crisis hit. Among the central banks, ECB policies were complicated by the euro crisis, in addition to the ZLB challenges that were similar to those faced by the Fed and the BOJ. The differences in the policies adopted by the three central banks, and the implication of these choices for the economies of the four countries, facilitate our understanding of how central banks can diffuse or worsen concerns about government debt.

Figure 1 plots the debt-to-GDP ratio for the four countries as reported by the IMF.⁶ As can be seen, debt ratios rose for all four as a result of the crisis. For the United States, Japan, and Italy, the debt ratios have effectively been on a rising path since 2007 while for Germany the rise was contained and its debt ratio has been declining since 2012. Judging from the trajectory of debt, and the fact that its

⁶Debt, deficit, and GDP data and forecasts shown in the figures are drawn from the database associated with the October 2016 World Economic Outlook (IMF 2016).

FIGURE 2
GOVERNMENT PRIMARY BALANCE
(PERCENT OF GDP)



NOTES: Negative values denote a primary deficit. Vertical line marks 2007, the year before the crisis.

SOURCE: International Monetary Fund.

current debt ratio exceeds 240 percent of GDP, one might consider Japan to be at the greatest risk of a debt trap.⁷ And yet, according to financial market indicators, Italy, with a debt ratio under 140 percent of GDP, is considered to be the greater risk. Spreads on Credit Default Swaps (CDS) on government debt are indicative of market-based assessments. On November 16, 2016, the five-year CDS spreads for the United States, Japan, Germany, and Italy were 24, 33, 23, and 163 basis points respectively.

The apparent puzzle is reinforced when data on primary deficits are compared. Figure 2 plots the primary fiscal balance for the four countries, as reported by the IMF. The primary balance is defined as the negative of the primary deficit, so larger negative values indicate

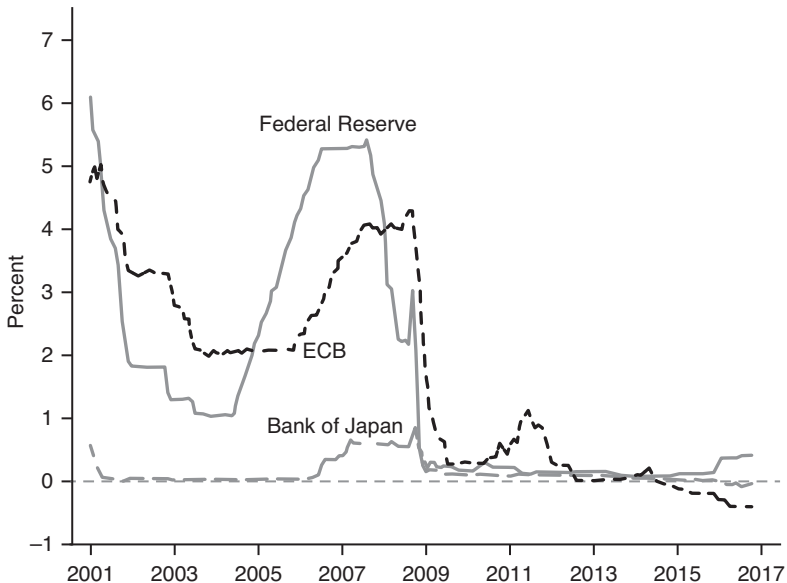
⁷The figures refer to gross government debt. Net government debt figures are lower for all four countries, but their comparison suggests the same ranking and conclusion.

larger deficits and positive values indicate surpluses. As can be seen, Italy's fiscal stance has been considerably more restrained than Japan's and more similar to Germany's.

Comparing Japan and Italy, in particular, against the backdrop of the United States and Germany, is quite instructive for understanding the crucial role central banks play in relation to concerns regarding debt traps. As will be discussed below, the difference in perceptions regarding the riskiness of the debt is intimately related to specific central bank policy choices.

A starting point is the comparison of monetary policy of the three central banks, both conventional interest rate policy and unconventional measures such as quantitative easing. Figure 3 shows the evolution of overnight interest rates (LIBOR) in dollars, euro, and yen, summarizing the interest rate policies of the Fed, ECB, and BOJ, respectively. The chart shows that all three central banks cut interest rates and faced the ZLB after the 2008 crisis. It also shows that the ZLB is not a hard constraint at zero. Slightly negative interest rates can be engineered by central banks, although in the presence of

FIGURE 3
OVERNIGHT INTEREST RATES



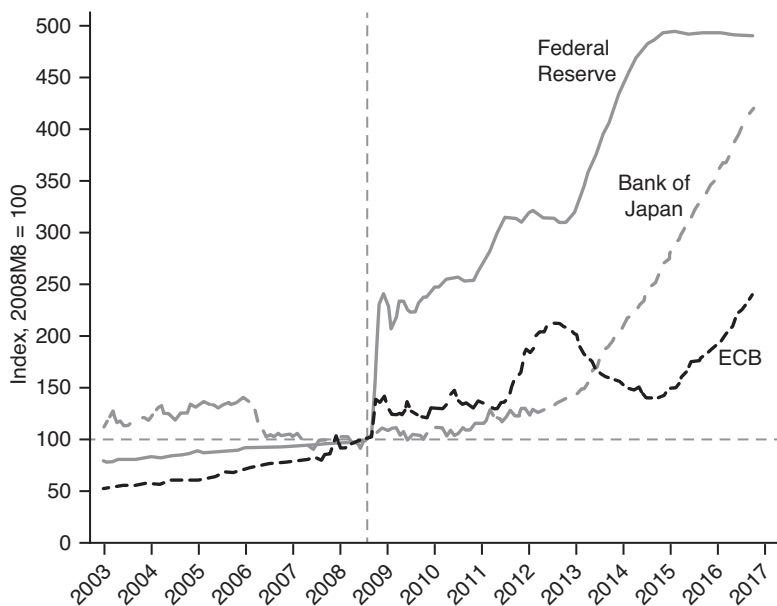
SOURCE: Federal Reserve Bank of St Louis.

currency notes bearing zero interest negative rates may be associated with some unwelcome distortions. While the Fed decided not to push short-term interest rates below zero, the ECB and BOJ have implemented somewhat negative rates since summer 2014 and early 2016 respectively. The Fed is the only central bank among the three that has completed its easing cycle and initiated a normalization with the rate hike evident in the figure at the end of 2015.

In light of the ZLB, conventional monetary policy proved insufficient to counter the recessionary forces following the crisis. All three central banks adopted unconventional easing measures by expanding their balance sheets through the purchase of government bonds and also by other means, such as purchases of nongovernment securities and the provision of liquidity to the financial system that was in turn used for asset purchases, including government debt.

Comparison of unconventional policies identifies important differences among the three central banks. Figure 4 shows the evolution of the size of the balance sheets of the three central banks, indexed

FIGURE 4
SIZE OF CENTRAL BANK BALANCE SHEETS



NOTE: Vertical line marks August 2008.
SOURCE: Federal Reserve Bank of St Louis.

to 100 in the month prior to September 2008. Of the three central banks, the only one with experience with QE in living memory before the crisis was the BOJ. The BOJ had been constrained by the ZLB at the end of the 1990s—the first such episode in global central banking since the Great Depression—and implemented QE to defend against deflation in the early 2000s. However, the BOJ’s QE policies were too timid and failed to reverse the prevailing deflationary environment in a sustained manner.⁸ Following the 2008 crisis, the BOJ once again adopted a rather timid response. Since the appointment of Governor Haruhiko Kuroda in 2013, however, QE has been implemented decisively, as can be seen in the figure. The policy, which will be described in greater detail below, aims to raise inflation to 2 percent and continues to date.

The Fed expanded its balance sheet most aggressively following the collapse of Lehman in September 2008, and further adjusted the pace of increase upward when it deemed that additional accommodation was needed to achieve its 2 percent inflation goal. By the end of 2014, the Fed was the first to assess that monetary conditions had restored economic stability and ended the expansion of its balance sheet. In contrast, the ECB expanded its balance sheet after the crisis but subsequently reversed its policy and contracted its balance sheet from mid-2012 to the end of 2014, causing an unwelcome decline in inflation below its price stability goal. While the ECB subsequently started outright purchases of government debt in early 2015, ECB QE has been insufficient to guide inflation toward 2 percent, as would have been warranted by the ECB’s price stability objective. The ECB’s QE policy has been hampered by implementation issues that reflect the unique challenges it faces in the context of the euro crisis, as will be described below.

While, under ordinary circumstances, the “money printing” associated with large balance sheet expansions would be expected to be inflationary, the calculus is quite different when policy rates are constrained and additional monetary easing is required to guard against deflation.⁹ Expanding the central bank’s balance sheet through

⁸See Orphanides (2004) for a discussion of the BOJ’s experience with the ZLB before the crisis and a comparison with the Fed’s experience in the 1930s.

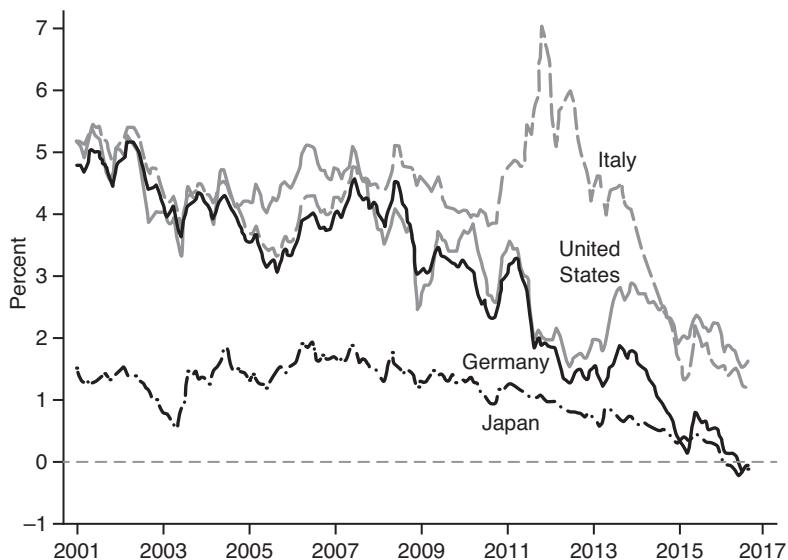
⁹See, for example, Clouse et al. (2003) and Orphanides and Wieland (2000) for a discussion of the ZLB. If interest is paid on reserves, a large balance sheet need not be inflationary.

quantitative easing is the indicated policy at the ZLB when additional monetary accommodation is required to raise inflation in line with a central bank’s objective. Through quantitative easing, the central bank can help restore growth and defend against deflation, which, in turn, improves the profile of government debt dynamics. QE can also directly help a government stay away from the debt trap by reducing the cost of financing government debt. This form of financial repression is a key feature of QE.

The effectiveness of QE at the ZLB depends on the decisiveness with which it is pursued and, as will be highlighted below, on specific implementation characteristics. Judging by outcomes, QE appears to have been effective overall for the Federal Reserve, and somewhat effective but only after a costly delay for the BOJ. For the ECB, policy appears to have been effective for Germany but not for Italy.

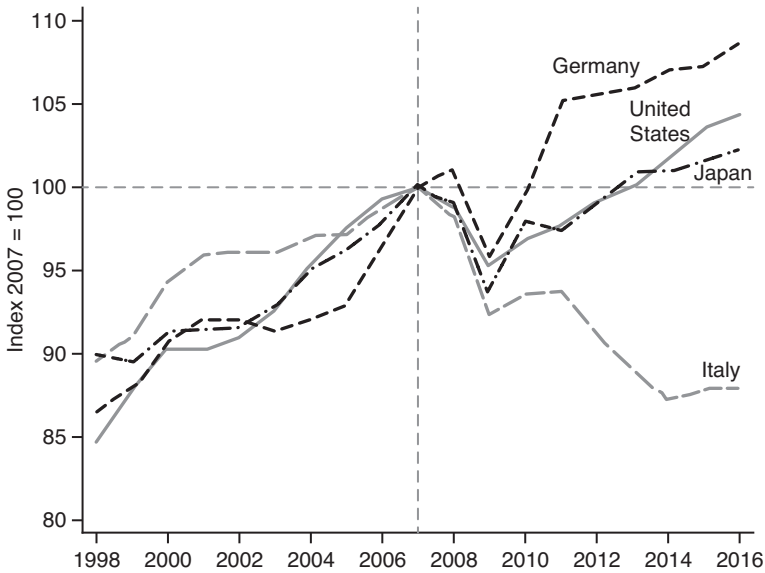
Two pertinent indicators are shown in Figures 5 and 6. Figure 5 compares the nominal interest rate on government securities at long maturities. For all four countries, these have declined in recent years. Two particular elements merit further discussion. The first is the notable decline in the Japanese yields to around zero since the BOJ’s

FIGURE 5
INTEREST RATES ON GOVERNMENT SECURITIES



SOURCE: International Monetary Fund.

FIGURE 6
THE REAL COST OF THE CRISIS: REAL GDP PER PERSON



NOTE: Vertical line marks 2007, the year before the crisis.

SOURCE: International Monetary Fund.

adoption of decisive accommodative policies in 2013, despite the continuing increase in government debt, as shown in Figure 1. In an environment of mildly rising core inflation, the real cost of financing of the government debt in Japan has declined notably since 2013 as a result of the BOJ's policies. The second element is the persistent divergence in German and Italian interest rates in the past few years, given that they are in the same currency and reflect in large part the policies pursued by the ECB. This is a key factor for the perceived riskiness of Italy as the cost of refinancing Italian government debt (both in nominal and in real terms) has been significantly higher than that faced by Japan, despite Italy's lower debt ratios and more restrained fiscal policy. As shown in Figure 2, since the crisis the primary deficit in Italy barely exceeded 1 percent of GDP (in 2009) and registered a small surplus in every year since 2010. By contrast, Japan ran a primary deficit in each of these years. The primary deficit in Japan reached nearly 10 percent of GDP (in 2009) and declined slowly to about 5 percent of GDP in 2015.

The relatively tight monetary conditions reflected in the high cost of financing government debt in Italy—compared to the other countries—has been an important factor in constraining growth. The economic consequences have been dramatic, as shown in Figure 6. Italy is unique among the four countries for the dramatic decline registered in real GDP per person since the crisis. While all four countries started recovering after the 2008 crisis and real GDP per person rose in 2010, a remarkable divergence can be seen in the data since then. Since 2010, Japanese and U.S. real GDP per capita has increased roughly comparably, with the United States growing somewhat faster than Japan. In contrast, German per capita GDP rose much faster than that of Japan and the United States while Italian per capita GDP collapsed.

Comparing the policy decisions taken by the BOJ and the ECB in implementing QE is informative for understanding these differences. We turn to that next.

The BOJ's Unique Challenge

As already mentioned, the BOJ had experience with QE already in the early 2000s, but at that time it had adopted a timid stance that barely contained deflation risks. In the aftermath of the crisis, mild deflation, unfavorable growth and persistent primary deficits contributed to the sustained deterioration of debt dynamics evident in Figure 1. This mix put Japan in a tricky situation raising questions about debt sustainability.

According to IMF projections, as published in the October 2016 World Economic Outlook (IMF 2016), Japan's debt-to-GDP ratio is projected to rise further to 255 percent by 2018, and subsequently decline very gradually. And yet, no discernible concerns of either default or debt monetization through high inflation appear in financial markets.

Looking closely at the policies of the BOJ since 2013 suggests an explanation. Under the direction of Governor Kuroda, the BOJ has embarked on what appears to be the most aggressive QE program ever implemented by a central bank and a powerful demonstration of how financial repression can contain debt sustainability concerns while preserving price stability. The BOJ also provided guidance that it intends to maintain its aggressive policy accommodation until inflation rises satisfactorily in line with the BOJ's price stability definition

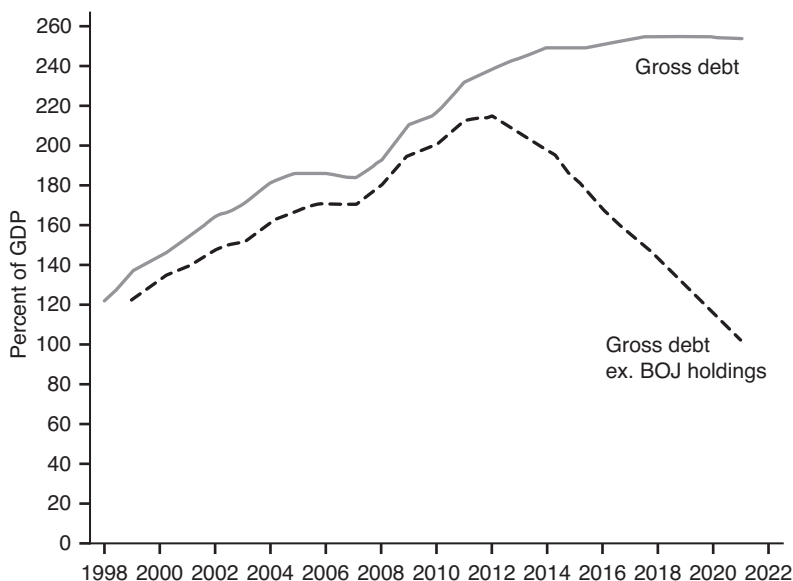
of 2 percent inflation per year. While acknowledging potential risks and distortions from persistently low interest rates, during 2016 the BOJ further adjusted its policy so as to bring the whole term structure of interests lower, significantly reducing the cost of refinancing government debt.

Three phases of the BOJ's QE program can be identified. The first phase, adopted in April 2013, involved maintaining short-term interest rates at zero and was described as "Quantitative and Qualitative Monetary Easing." The second phase, adopted in January 2016, went further by guiding short-term interest rates below zero and was described as "Quantitative and Qualitative Monetary Easing with a Negative Interest Rate." The third phase, which was adopted in September 2016 and remains in effect, went even further. In addition to negative short-term rates, it effectively kept the 10-year government yield close to zero, thereby engineering a negative term structure of interest rates for all maturities up to 10 years, with a slight positive slope. The program was aptly described as "Quantitative and Qualitative Monetary Easing with Yield Curve Control." There are three key elements of the decision, as announced on September 21, 2016: (1) the BOJ confirmed that short-term interest rates would remain negative; (2) it explicitly announced that the 10-year yield would be maintained around zero, while it would continue purchasing government debt; and (3) it committed to continue this policy until inflation was stably established in accordance to its price stability objective (BOJ 2016).

In addition to engineering a negative nominal and real cost of refinancing government debt, the BOJ continued to accumulate its holding of government debt at a fast clip. As a result, government debt not held by the central bank has been declining rapidly. The two debt metrics, projected to 2021 are shown in Figure 7.¹⁰ As can be seen, while the total debt-to-GDP ratio is projected to stay quite high—equal to 254 percent in 2021—when restricting attention to debt not held by the central bank, the ratio is projected to decline to

¹⁰In the figure, the total debt ratio is based on the October 2016 IMF projections while the ratio excluding BOJ holdings is based on available BOJ data and the assumption that the BOJ will continue its current pace of purchases until 2021.

FIGURE 7
 JAPAN'S DEBT: THE POWER OF THE BOJ BALANCE SHEET



NOTE: Gross debt ratio based on IMF (2016) projection. BOJ holdings projected assuming that the current pace of annual increases of 80 trillion yen continues.

SOURCE: International Monetary Fund, Bank of Japan and author calculations.

102 percent in 2021 from a high point of 214 percent, which was reached in 2012, the year before the current aggressive QE policy started.

To be sure, the BOJ cannot ensure that the success of its current policy will be maintained going forward, regardless of government actions. While financial repression significantly reduces the burden of fiscal adjustment that needs to be completed and provides the Japanese government with precious time to complete that adjustment without hampering economic growth, there are limits to the support that can be provided without compromising price stability. Since the current QE program should be expected to be phased out as inflation reaches the 2 percent goal, the Japanese government needs to complete the adjustment required for long-term stability as

suggested, for example, in the comprehensive, coordinated approach advocated in Gaspar, Obstfeld, and Sahay (2016).¹¹

The ECB's Self-Imposed Restriction

In stark contrast to the BOJ's policy that has notably improved the prospects of the Japanese economy and reduced concerns regarding debt sustainability while safeguarding price stability, the ECB has adopted policies with decidedly uneven economic consequences for the economies of eurozone member states. In theory, the ECB is mandated to operate in the best interest of the eurozone as a whole, and is expected to keep the rate of inflation close to but below 2 percent. In practice, however, ECB policies over the past few years appear to have been influenced by political pressure from some euro area member states. ECB policy choices have disproportionately benefited some states at the expense of others. By pursuing a policy that has lowered inflation significantly below its definition of price stability for the eurozone as a whole, the ECB has harmed growth prospects for the eurozone as a whole and unhelpfully raised debt sustainability concerns especially for member states that were most vulnerable in the aftermath of the crisis. But for other member states, the adopted policies have been very favorable. The comparison between Germany and Italy in Figures 5 and 6 is illustrative of the consequences.

To be sure, in the period since the 2008 crisis, the eurozone has experienced additional challenges, in large part because of decisions by eurozone governments which were beyond the control of the ECB.¹² An important aspect of the mismanagement of the euro crisis could be identified with the injection of credit risk in the government debt of euro area countries perceived to be relatively weak, such as Italy.¹³ As a result, if two advanced economies have similar economic fundamentals but one is outside the eurozone while the other is one of the relatively weak states inside the eurozone, the state inside

¹¹While it expands its balance sheet, the BOJ also needs to build up surplus capital which could be used to pay interest on reserves once inflation rises and policy rates need to be lifted. Goodfriend (2014) suggests that this aspect of QE could be understood as a "carry trade."

¹²Wyplosz (2014) describes the situation as a near-perfect case of mismanagement.

¹³The Franco-German agreement in Deauville in October 2010 was a key turning point, leading to the substantial increase in the perceived risk of debt of other states, such as Italy (Orphanides 2014).

the euro area is saddled with an additional premium on its debt that was not present before the crisis.¹⁴ This development has important distributional consequences and benefits states perceived to be relatively strong inside the eurozone. The rationale is straightforward: by injecting risk in euro-denominated debt issued by other governments (debt that was considered safe before the crisis), the beneficiary states managed to divert the global demand for euro-denominated safe assets away from the other member states and toward their debt. The shift in relative demands had a predictable effect on relative prices, inducing a windfall gain in the form of a lower premium on government debt for states such as Germany and an implicit tax in the form of a higher premium on government debt for states such as Italy.¹⁵ However, the size of the implicit subsidy/tax to Germany/Italy, respectively, is not independent of the actions of their common central bank. The large disparity observed partly reflects ECB policy decisions and the ECB's perceived reluctance or unwillingness to support member states similarly to independent central banks of other economies, such as the Federal Reserve and the BOJ.

As already mentioned, similar to the Fed and the BOJ, the ECB has been constrained by the ZLB. Because the ECB serves multiple governments, the natural application of ECB QE would have been to embark on common purchases of government bonds of all member states, proportional to the size of the respective economies. However, this proved politically controversial in some member states, and the ECB became the target of sharp criticism and legal challenges. Despite its legal independence, the ECB got caught up in the politics of the euro crisis. The ECB adopted tighter policy than what would have been in the interest of the eurozone as a whole and implemented its QE program in a manner that has favored states such as Germany at the expense of states such as Italy.¹⁶

Two aspects of ECB QE highlight how its implementation has resulted in higher spreads between the yields of Italian and German government debt and deserve brief mention.¹⁷ First, the ECB decided

¹⁴This issue was highlighted by De Grauwe (2011) with a comparison of Spain and the United Kingdom.

¹⁵Dany, Gropp, and Schweinitz (2015) present estimates of the associated benefits accruing to Germany in the form of a lower cost of refinancing German government debt.

¹⁶For examples of the pressure applied on the ECB, see Orphanides (2016a, 2016b).

¹⁷A more detailed exposition is presented in Orphanides (2017).

against the common purchases of government debt, deviating from the prevailing practice for its common monetary policy operations. Instead, it instructed the national central bank in each state to assume the responsibility for such purchases. Thus, the Bundesbank has purchased German debt and Banca d'Italia has purchased Italian debt under the ECB's QE program. A potential justification for this decision is that it protects the ECB from complications associated with loss-sharing in the event a state is forced to exit the euro area. If the euro breaks up, for example, Banca d'Italia will be holding Italian debt and the Bundesbank will be holding German debt. By implicitly recognizing risk associated with such scenarios—effectively contingency planning for the breakup of the euro—the ECB has made such scenarios more likely and effectively widened the spreads in yields of states considered to be strong versus those considered to be weak. Specifically, the ECB policy decision against common purchases raised the premium on weak states whose currency would be expected to depreciate upon exit, and increased the safe-haven subsidy on states considered stronger whose currency would be expected to appreciate upon exit. Second, the ECB has decided to effectively restrict purchases of government debt to member states that maintain an investment-grade credit rating. Weak states that currently qualify for the QE program but have a rating close to the threshold face the risk of being excluded from the program in the event of an adverse shock. In effect, this self-imposed restriction skews the distribution of future bond purchases away from the government debt of states with lower ratings, which are the ones perceived to be weaker. Both of these effects tend to reinforce monetary conditions that are more accommodative for a state such as Germany and less accommodative for a state such as Italy. This is exactly the opposite of what would have been desirable to promote stability in the euro area and contributes to the widening of spreads seen in Figure 5 and the economic divergence seen in Figure 6.

The Fed's Exit Strategy

Of the three central banks discussed, the Fed is the only one that has completed its accommodation cycle and has taken some steps toward the normalization of its policy stance. This reflects the Fed's early adoption of decisive QE after the 2008 crisis, compared to the BOJ and the ECB. Policy normalization may be pursued both by raising short-term interest rates and by unwinding QE, which would tighten monetary conditions by raising longer-term rates. A pertinent

question is whether and how rapidly it may be necessary to reduce the size of the Fed's balance sheet going forward.

Comparisons of the current environment with the Federal Reserve's earlier experience with QE, from the 1930s, provides useful perspective. To this end, it is important to note that, for comparisons over long periods, the absolute level of the balance sheet is less informative than its size relative to the size of the economy. In a growing economy, the balance-sheet-to-GDP-ratio would be shrinking even if its absolute level were unchanged, similar to the effect of growth on debt ratios. To illustrate the effect of growth, it is instructive to consider the historical experience together with a projection of the size of the balance sheet as a ratio to nominal GDP under the assumption that the absolute size of the balance sheet remains unchanged at its current level.

Figure 8 plots the historical ratio and projection. The history spans the period from the founding of the Federal Reserve right before World War I until 2015, using data provided by the Federal Reserve Bank of St Louis. From 2016 on, the series plots a projection that shows how the ratio declines if the size of the balance sheet is maintained at its current level and nominal GDP rises according to the October 2016 IMF projection of GDP for the U.S. economy until 2021 and a constant 4 percent annual growth rate thereafter. The 4 percent growth for nominal GDP is consistent with a 2 percent inflation rate, reflecting the Fed's price stability goal, and a 2 percent growth rate for potential real GDP, in line with recent estimates.

Two points are noteworthy. First, while the expansion of the balance sheet pursued by the Federal Reserve from 2008 until 2014 appears unprecedented when compared to recent history, it was not in fact dramatically different (in relative magnitude) to that pursued in the 1930s. An important difference is that in the 1930s the Fed failed to provide the required accommodation promptly after the 1929 crash, with very costly consequences for the economy. This accounts for the steeper slope evident in the figure for the current episode. The second point is that a gradual normalization of the balance sheet, similar to the one experienced after the 1930s balance sheet expansion, can be achieved with reasonable GDP growth even if the current size of the balance sheet is maintained, in absolute terms. This offers historical precedent for a policy of

FIGURE 8
HISTORY AND PROJECTION OF FED BALANCE SHEET



NOTE: Projection assumes the level of the Fed's balance sheet remains unchanged and nominal GDP grows as projected by IMF until 2021 and 4 percent per year thereafter. Vertical line indicates start of projection in 2016.

SOURCE: Federal Reserve Bank of St Louis, International Monetary Fund, and author calculations.

maintaining the current absolute level of the balance sheet and pursuing policy normalization by adjusting the short-term interest rate instead.

The alternative normalization options entail tradeoffs. In the current environment, delaying the normalization of the balance sheet would require a faster pace of increases in policy rates. Reducing the level of the balance sheet would reduce the distortions associated with the financial repression feature of QE. On the other hand, shrinking the balance sheet would raise the premium embedded in long-term debt and increase the real cost of refinancing of government debt.

Conclusion

Unsound fiscal policy overburdens central banks. The limited fiscal space observed in many economies in the aftermath of the crisis was in part due to high debt levels accumulated before the crisis. When an economy faces the prospect of being caught in a debt trap, the consequences of central bank policies on debt dynamics become particularly important. Monetary policy and fiscal dynamics are inexorably linked. Debt monetization through high inflation may be feared. The challenge for an independent central bank is to identify the extent to which it can adopt policies that allay debt concerns without compromising price stability. One option is financial repression. Despite associated distortions, financial repression can create fiscal space while preserving price stability.

In the aftermath of the crisis, the Fed, the ECB, and the BOJ faced an additional difficulty. The ZLB constrained the monetary accommodation that could be provided by lowering policy rates. As financial repression is a feature of QE, effective implementation of QE, as observed in the United States and since 2013 in Japan, provided more fiscal space for the governments of these countries. However, the effectiveness of QE policies has varied across countries, reflecting central bank decisions. For example, while Italy has a considerably lower debt-to-GDP ratio than Japan and has been running primary surpluses virtually consistently since the crisis while Japan has been registering substantial primary deficits, financial markets suggest considerably greater concerns about the sustainability of Italian debt. ECB policy decisions have been a factor for this difference as they have kept the real cost of financing of Italian government debt significantly higher than that of Japan while reducing the cost of financing of German government debt to be about the same as that of Japan.

The experience since the crisis confirmed that decisive QE provides an effective policy response at the ZLB. With regard to the normalization of the balance sheet, the historical experience of the Fed, following the QE policies of the 1930s, suggests that normalization could be achieved without necessarily shrinking the level of its balance sheet. The Fed's balance sheet as a ratio to GDP has been declining since the end of 2014 and will continue to decline gradually as nominal GDP grows in line with potential GDP.

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