

Unconventional Monetary Policy: The International Experience with Central Bank Asset Purchases

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- Evidence suggests that the implementation of unconventional monetary policy during the recent financial crisis, via credit easing and asset purchases, succeeded in reducing credit spreads and yields, thereby providing further easing of financial and monetary conditions and fostering aggregate demand.
- These policy measures are most effective when targeted to specific market failures, sufficiently large relative to the targeted market, and clearly communicated.
- The evidence must be treated with appropriate caution, since the evaluation of the effectiveness of unconventional monetary policy is subject to problems of identification.
- The ongoing fiscal retrenchment will affect the outlook and therefore the timing of the withdrawal of monetary stimulus.
- Central banks should account for the potential negative externalities of unconventional monetary policies, which are often neglected in the analysis of their effectiveness.

The financial and economic crisis of 2007–09 witnessed unprecedented policy responses from central banks. As the first responders, central banks acted aggressively, lowering policy interest rates and introducing extraordinary measures to provide liquidity to short-term funding markets. The intensification of the crisis in the autumn of 2008 and the collapse of real economic activity prompted many central banks to further lower policy rates, although their ability to continue to do so became constrained as short-term interest rates approached zero.¹ Consequently, numerous unconventional monetary policy tools were introduced to provide additional monetary easing.² These included new or expanded credit facilities, as well as large-scale purchases of government securities (often referred to as quantitative easing, QE).³

The unconventional monetary policy actions were, by definition, unusual in both size and scope, and there was little guidance from previous experience that could be used to judge their expected impact.⁴ Initial assessments and subsequent research have led to an emerging consensus that many of these policies were effective—but a vigorous debate continues.

This article examines the effectiveness of unconventional monetary policies implemented during the

¹ The effective lower bound (ELB) for monetary policy rates is typically a small positive number because of institutional characteristics and financial market frictions.

² Some of these tools—particularly those that focused on restoring market functioning—may also be referred to as financial stability policies.

³ Concurrently, fiscal and supervisory authorities enacted measures to stabilize the financial system, including injecting capital into the banking system, guaranteeing deposits and bank debt, and implementing fiscal stimulus.

⁴ The literature has found that the Japanese experience with QE from 2001–06 was rather unsuccessful. However, the circumstances under which QE was implemented, as well as the modalities and implementation of the program, were quite different from those of the current episode.

crisis, focusing on asset purchases.⁵ The existing literature concludes that, on average, asset purchases were effective, since they improved market functioning, lowered interest rates, and helped to spur economic activity. These policies were most effective when they were targeted to address specific market failures, were sufficiently large relative to the targeted market, and were clearly communicated with respect to their purpose (i.e., as part of the effort to achieve the central bank's policy objective).

Nevertheless, gauging the impact of these measures is not straightforward: views differ with respect to the appropriate metrics of success, and the evaluation of program effects is subject to several identification problems. Moreover, most studies tend not to discuss the possible negative externalities arising from these measures, including potential financial market distortions, issues related to balance sheet management and, ultimately, concerns with respect to central bank credibility and independence. Thus, conclusions drawn from studying the effects of unconventional monetary policies must be treated with appropriate caution.

This article first defines and documents these unconventional measures, focusing on central bank asset purchases and the impact of these purchases on central bank balance sheets. It then discusses the challenges in identifying the effects of central bank asset purchases. Given these caveats, the existing evidence of the effectiveness of central bank asset purchases on financial and economic outcomes is examined. Strategies for exiting from the measures are then explored, followed by an analysis of the potential costs of these measures and the broader implications for monetary policy frameworks.

Types of Central Bank Asset Purchases

Central banks in major countries typically conduct monetary policy by setting a target for the overnight interest rate in the interbank money market. During the recent crisis, however, as financial instability intensified and policy rates approached their ELBs, central banks turned to asset purchases as an additional means to ease financial and monetary conditions. For the purposes of this article, asset

purchases are separated into *credit facilities*—purchases of private sector assets designed primarily to ease financial stress—and *quantitative easing*—measures by which the central bank holdings of government debt were expanded to provide additional monetary ease.⁶ This section reviews such policies as conducted by major central banks, including the U.S. Federal Reserve, the European Central Bank (ECB), the Bank of England and the Bank of Japan.⁷

Credit facilities

With the intensification of the financial crisis in 2008, central banks implemented various types of credit facilities to ease credit conditions and, in some cases, directly acted as an intermediary in dysfunctional markets.⁸ Under these programs, central banks purchased private sector assets in certain credit markets that were impaired. The goals of these facilities were to i) improve market liquidity in important segments of the market for private debt securities; ii) further reduce market interest rates; and iii) ease funding conditions for firms and financial institutions, with banks then expanding their lending to the private sector (Beirne et al. 2011).

The Federal Reserve purchased private sector assets directly and provided financing to financial institutions to facilitate their purchase of private sector assets.⁹ The Bank of England and the Bank of Japan introduced outright purchases of private sector instruments, such as commercial paper and corporate bonds, while the ECB purchased a limited amount of covered bonds.¹⁰ Importantly, the various credit facilities were typically introduced when the policy rate was above the ELB.

⁵ Note that the term “unconventional monetary policy” encompasses other types of unconventional policies, such as conditional statements, which are not covered here.

⁶ Purchases of Government-Sponsored-Enterprise (GSE) debt and GSE-backed mortgage-backed securities by the U.S. Federal Reserve are included with government debt.

⁷ This article does not address unconventional policy measures implemented by the Bank of Canada. For the Canadian experience, please refer to Lavoie, Sebastian and Tractlet 2011; Zorn, Wilkins and Engert 2009; Selody and Wilkins 2010; and Longworth 2010.

⁸ Such policies are often referred to as credit easing (Bank of Canada 2009).

⁹ The U.S. Federal Reserve purchased commercial paper under the Commercial Paper Funding Facility (CPFF), set up two facilities to facilitate funding of money market mutual funds, and implemented the Term Asset-Backed Securities Loan Facility (TALF), a lending facility to support the market for asset-backed securities.

¹⁰ In the case of the Bank of England, such purchases were initially funded by the issuance of Treasury Bills, rather than by central bank money, and thus did not increase the central bank's balance sheet. But since quantitative easing began in the United Kingdom, these purchases have been financed by central bank reserves and have expanded the monetary base.

Quantitative easing

In late 2008, as the financial crisis spilled over into the real economy, major central banks found themselves constrained by the ELB. To further ease monetary conditions, they turned to large-scale purchases of government debt. The idea behind such large-scale asset purchases (LSAPs) is that they would put direct upward pressure on the price of the targeted assets (typically longer-dated government debt instruments), thereby lowering their yields. Purchases could affect the economy through a variety of channels:

- i. Encouraging investors to rebalance their portfolios in the direction of riskier higher-return assets (by reducing yields on government debt), thus exerting upward pressure on their prices and resulting in lower interest rates;
- ii. Creating positive wealth effects through higher asset prices, which supports consumption;
- iii. Stimulating consumption and investment by lowering debt-service costs on existing debt;
- iv. Exerting downward pressure on the exchange rate (although central banks did not officially mention this channel as their objective) in order to favour domestic demand;
- v. Placing upward pressure on inflation by raising domestic demand and increasing the domestic price of imports (through the exchange rate channel);
- vi. Supporting confidence by demonstrating that the central bank would do whatever necessary to meet its economic objectives;
- vii. Anchoring inflation expectations, thereby holding down real interest rates; and
- viii. Increasing the effectiveness of fiscal expansion, by reducing long-term interest rates and thus mitigating the crowding out of investment and consumption (Kohn 2009).

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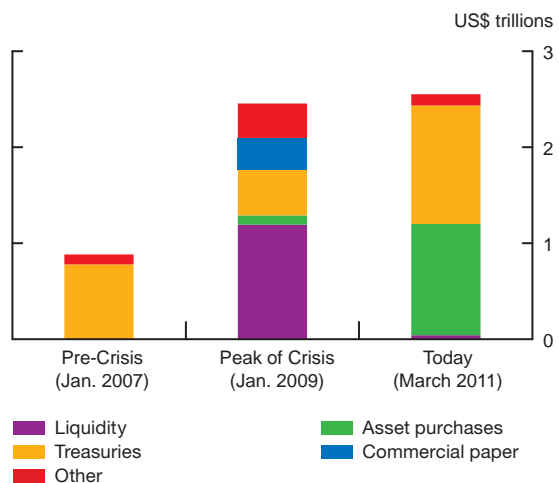
Several central banks purchased government debt in their efforts to provide further monetary ease. In addition to purchases of U.S. Treasury securities, the Federal Reserve also acquired large amounts of

mortgage-backed securities (MBS) backed by the government-sponsored enterprises (GSEs) Fannie Mae, Freddie Mac and Ginnie Mae. These purchases were critical for reinvigorating the market for MBS, helping to increase the availability of credit for the purchase of houses, lowering mortgage rates and supporting the housing market and financial markets more generally.

The size of the purchases varied according to circumstances. The Federal Reserve and the Bank of England conducted sizable asset purchases, totaling close to 18 and 12 per cent of GDP, respectively, and leading to a dramatic expansion of their balance sheets (**Chart 1**).¹¹ The Bank of Japan and the ECB implemented more modest purchase programs, with the ECB's Securities Markets Programme focused more narrowly on stabilizing securities markets, as opposed to quantitative easing.¹² Except for the ECB, the purchases of financial assets through the creation of central bank reserves were unsterilized.¹³ Interestingly, the Bank of England chose to explicitly refer to its purchase program as quantitative easing, since it sought to influence the quantity of money in the economy more broadly.

Chart 1: Central bank balance sheets (assets)

a. U.S. Federal Reserve



Note: Liquidity is the sum of currency swaps, TAF, MMLF, primary dealer and other broker-dealer credit, AMLF, other credit extensions and loans, credit extended to AIG, and TALF.

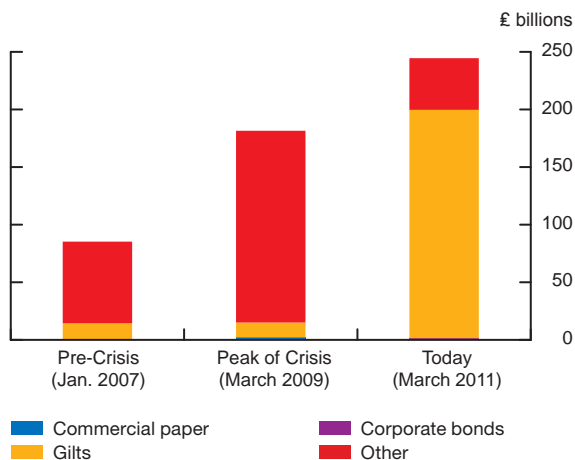
¹¹ Overall, the U.S. Federal Reserve will have purchased a total of about US\$2.265 trillion of long-term assets by the end of the second quarter of 2011. The Bank of England decided to purchase a total of £200 billion under its Asset Purchase Facility, mainly concentrating on government securities, i.e., gilts.

¹² The program was launched in May 2010 at the start of the sovereign debt crisis which first emerged in Greece.

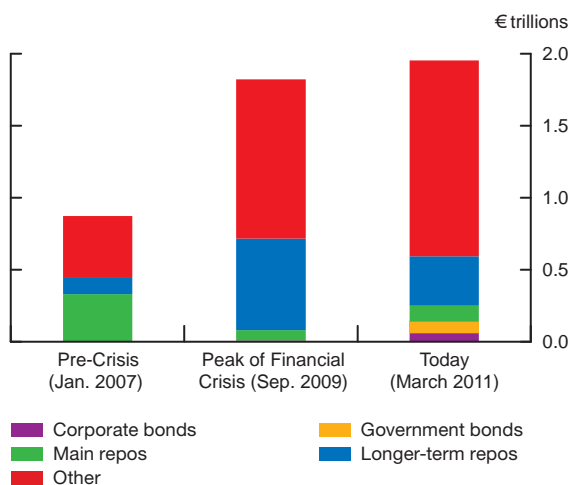
¹³ This means that purchases were financed through an expansion of settlement balances.

Chart 1 (cont'd): Central bank balance sheets (assets)

b. Bank of England

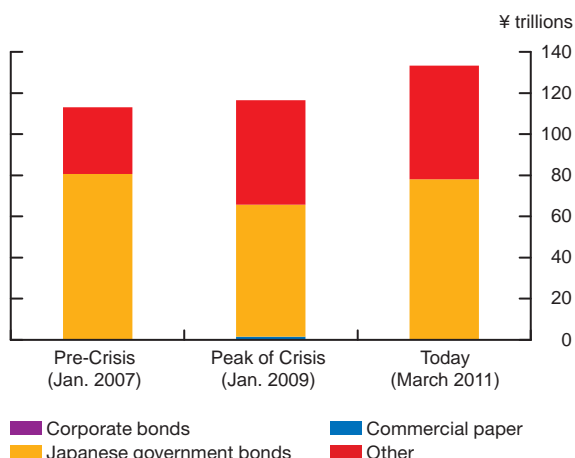


c. European Central Bank



Note: Corporate bonds refer to the Covered Bond Purchase Programme. Government Bonds refer to the Securities Market Programme.

d. Bank of Japan



Source: Individual central banks

The Evaluation Problem

Assessing the effectiveness of the various central bank measures is complicated by many conceptual and empirical hurdles. The primary objectives of the various initiatives differed greatly: credit facilities were often aimed at resolving a specific market failure, while LSAPs were motivated by a desire to lower interest rates, boost asset prices, and stimulate real economic activity. In addition, many of the initiatives had benefits beyond their primary objectives. Consequently, the metrics of success are open to debate. But this is not the only concern: gauging the effectiveness of individual measures is complicated by numerous identification issues.

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Contemporaneous measures and effects

Given the nature of the crisis, central banks and fiscal authorities in many countries were simultaneously announcing and undertaking various new policy initiatives. The impact of asset purchases on interest rates, for example, would be difficult to estimate, since rates would be simultaneously influenced by other central bank initiatives, macroeconomic developments (including dramatic increases in government deficits and debt, new information on recent economic activity and the outlook for growth), changes in inflation expectations, and evolving risk appetite. The simultaneity issue is further complicated when examining the ultimate effects of asset purchases on economic activity and inflation, since measures of macroeconomic activity are infrequent and lumpy (monthly or quarterly), published with a lag, and often revised.

Policy lags

Potentially long and variable lags between financial developments, macroeconomic activity and inflation complicate the assessment. In the case of unconventional monetary policies during crisis periods, this challenge is exacerbated because, by reducing uncertainty and increasing confidence, these policies may have more immediate effects through the expectations channels in addition to effects through the standard channels of transmission.

Ongoing nature of the crisis

An important aspect of the financial and economic crisis has been its protracted nature. Given the impaired state of the global banking system, and the critical interrelationships between the financial sector and real economic activity (which led to a negative feedback loop), determining what the evolution of economic and financial conditions would have been in the absence of policy responses becomes particularly difficult.

Spillovers

While each policy initiative may have been designed primarily to mitigate a specific challenge, they would all have had broader spillover effects across markets. For example, large-scale purchases of MBS by the Federal Reserve might not only improve the functioning of that market, but could also affect the pricing of other securities through changes in perceived risk, which could lead to reallocations of private sector portfolios that raise the demand for other assets. Similarly, policies enacted in one country could have spillover effects in other countries.¹⁴

Fiscal policy

In addition to the simultaneity of the announcements and the implementation of fiscal stimulus with unconventional monetary policy measures, the response of financial markets to fiscal action varied over time, further clouding any assessment. In particular, in the early stages of the crisis, fiscal stimulus was seen as a stabilizing force, because it helped provide reassurance that policy-makers were doing what they could to avoid an even worse recession. At that stage, fiscal stimulus (and the associated increase in debt and deficits) helped stabilize financial markets. As the crisis faded, however, concerns related to sovereign indebtedness in some regions caused country risk premiums to rise, complicating the assessment of policy effectiveness.

Prices versus quantities

Expectations and confidence can respond very quickly to announcements of policy initiatives, leading to swift reactions in asset prices. On the one hand, such observations might be taken as evidence of policy effectiveness. On the other hand, if credit conditions remained sufficiently tight that essentially no new borrowing was occurring, then the repricing of

existing assets could provide a misleading signal of overall policy effectiveness with respect to financial conditions and economic activity.

Macrofinancial and macroeconomic environment (crisis versus non-crisis)

The effectiveness of policies is influenced by the broader economic environment. For instance, policies that are seen as particularly effective in crisis periods, owing to their ability to reduce uncertainty and improve confidence, may not be very effective in more typical non-crisis periods. Similarly, policies that prove to be effective at stimulating demand and production by reducing borrowing costs may be ineffective in periods of extremely tight credit. Such non-linearities can make it difficult to determine a baseline for evaluating or estimating the effectiveness of various initiatives.

Selection bias

The countries that undertook asset purchases were generally those that were the most adversely affected by the crisis. The impact of the measures taken may therefore have been affected by the degree of impairment of the financial markets in these countries.

Taken together, these concerns present a significant hurdle when trying to assess the effectiveness of the respective policy measures. These evaluation exercises should therefore be approached with an appropriate degree of caution.

The Evidence

The effectiveness of unconventional policy measures is, not surprisingly, the subject of ongoing debate and research interest. Keeping in mind the caveats mentioned above, the overall evidence to date suggests that unconventional monetary policy initiatives contributed to the functioning of financial markets and were successful in providing additional stimulus through easier monetary and financial conditions.¹⁵

Evidence on the effectiveness of credit facilities

Overall, the credit facilities implemented by major central banks appear to have made a positive

¹⁴ Studies of the effects of fiscal stimulus suggest important international spillovers (de Resende, Lalonde and Snudden 2010).

¹⁵ The literature has evaluated the impact of asset purchases by analyzing their effect on prices (spreads and yields), quantities (i.e., turnover in specific markets and/or the supply of credit) and, ultimately, their impact on the real economy. Methodologies include event studies, reduced-form models and theoretically founded models.

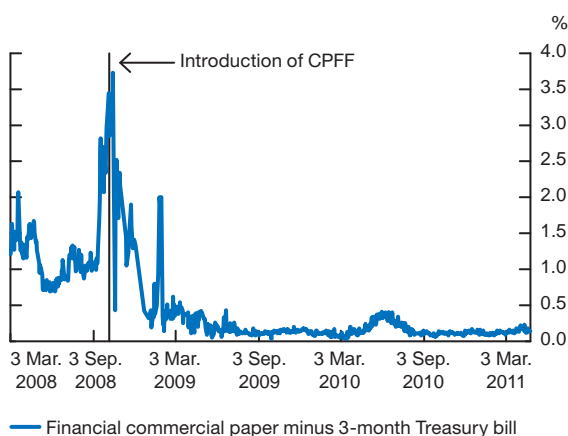
contribution to the functioning of the targeted markets (**Table 1**). Both the Federal Reserve's Commercial Paper Funding Facility (CPFF) and the Bank of England's Commercial Paper Facility seem to have reduced market illiquidity, lowered spreads, and increased issuance (**Chart 2**) (Dale 2009). Such facilities may also have had important confidence effects in signalling that the central bank would be willing to act as a backstop purchaser/seller.¹⁶ In turn, although the amount of funds provided by the TALF was relatively small, it also appeared to revive the issuance of asset-backed securities, and their spreads narrowed considerably.

The ECB's Covered Bond Purchase Programme seems to have stabilized the covered bond market and contributed to a tightening of spreads on covered bonds of different maturities and in different jurisdictions (IMF 2010). Moreover, the program may have led to an increase in the issuance of bonds and facilitated the issuance of longer-dated bonds, thereby easing funding conditions for banks (Beirne et al. 2011). The Bank of Japan's credit-easing facilities appear to have been partially successful in reducing stress in targeted markets. On the one hand, initial outright purchases of commercial paper triggered a fall in the yields for these instruments, with some estimating a cumulative effect on the commercial paper issue rate of 39 basis points (Hirose and Ohyama 2009). On the other hand, the Bank of Japan's outright purchases of corporate bonds may have had a lesser impact, since the rounds of purchases were substantially undersubscribed, perhaps reflecting a mismatch between the types of bonds that banks and brokerages wanted to sell and the instruments that the central bank was willing to buy.¹⁷

Evidence on the effectiveness of LSAPs

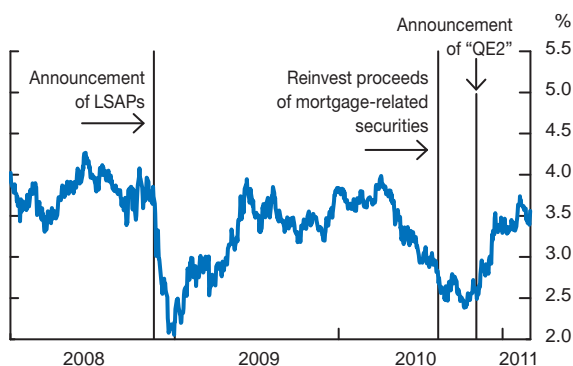
Several recent studies have attempted to estimate the quantitative effect of LSAPs, with most studies focusing on the Federal Reserve's programs (often referred to as QE1 and QE2) (**Table 1**). Overall, these studies suggest that LSAPs had a significant impact on financial markets and likely provided stimulus to the overall economy. In particular, a consensus has emerged that the first phase of the Federal Reserve's LSAPs probably lowered the yield on the 10-year

Chart 2: Daily spreads in the U.S. commercial paper market



Source: DataStream

Chart 3: Yield on 10-year U.S. Treasury bills



Source: Bloomberg

Treasury note, as well as on high-grade corporate bonds, by about 50 basis points. This is consistent with the observed drop in yields that occurred on the announcement of the purchases (**Chart 3**). Nevertheless, considerable uncertainty surrounds these estimates.

Studies estimating the impact of LSAPs on the macro-economy have generally concluded that they seem to have had sizable impacts on GDP growth (**Table 2**). The most important caveat to such studies is that they employ models tuned to non-crisis periods to assess the macro implications of the financial responses to policy actions. As discussed earlier, traditional real-financial transmission channels may not have been functioning normally during the financial crisis.

The Federal Reserve's purchases of GSE-guaranteed MBS appear to have eased mortgage-market conditions. The 30-year conforming mortgage rate declined by more than one percentage point following the

¹⁶ Bean (2011) argues that a credible statement in this respect may have been enough to restore normal market functioning.

¹⁷ The Bank of Japan (2009) nevertheless argues that the compression in spreads on corporate bonds in fiscal year 2009 may be attributed partly to the measures taken by the central bank and the government to facilitate corporate financing.

Table 1: Impact of credit easing and LSAPs on financial markets

Authors	Policy	Financial market impact
Adrian et al. (2010)	CPFF	Expansion of the CPFF was accompanied by the narrowing of the spreads on commercial paper
Agarwal et al. (2010)	TALF	Program offered a liquidity backstop, helped to reduce spreads in core ABS classes, and funding new issuance
D'Amico and King (2010)	QE1	Reduction by 30 to 50 bps across the yield curve
Doh (2010)	QE1	Regression analysis: 39 bps
Gagnon et al. (2010)	QE1	Purchases reduced 10-year term premium by 30 to 100 bps, with most estimates in the lower and middle thirds of this range.
Neely (2010)	QE1	Portfolio model: 88 bps for U.S. Treasuries, 57 to 76 bps for other countries. Event study: 107 bps (U.S. Treasuries)
Krishnamurthy and Vissing-Jorgensen (2011)	QE1	Event Study: Treasuries fall by a cumulative 107 bps. Regression analysis: Baa-Aaa spread reduced by 4 to 61 bps
	QE2	Event Study: Treasuries fall by a cumulative 30 bps. Regression analysis: Baa-Aaa spread reduced by 7 to 21 bps
Macroeconomic Advisers (2010)	QE1	Initial impact: 100 bps, lasting impact: 50-60 bps
Hamilton (2010)	QE2	About 11 bps at the 10-year yield, effect not significant
Swanson (2011)	Operation Twist and QE2	Operation Twist and QE2 are roughly similar in size, so that the predicted effect for QE2 is 15 bps
Joyce et al. (2010)	QE (U.K.)	Event study: 100 bps. Econometric analysis: 30 to 85 bps
Fuster and Willen (2010)	MBS purchases	Wide dispersion in the rate changes, reductions of up to 40 bps
Hancock and Passmore (2011)	MBS purchases	Announcement effect: reduced mortgage rates by about 85 bps. Actual purchasing of MBS decreased abnormal risk premiums by roughly 50 bps.
Stroebel and Taylor (2009)	MBS purchases	MBS program has no significant effect (movements in prepayment risk and default risk explain movements in mortgage spreads)
Kozicki, Santor and Suchanek (forthcoming)	QE1	Increase in Treasury holdings was associated with a decrease of 1.08 percentage points in long-term forward rates

Note: bps stands for basis points

Table 2: Evidence on the macroeconomic impact of LSAPs

Authors	Policy	Treasury yield	GDP	Unemployment	Inflation
Baumeister and Benati (2010)	QE (U.S.)	Rely on estimates of Gagnon et al. and Bean	Without QE, real growth would have been 4 pps lower in 2009Q1	-	Without QE, inflation would have been 0.4 pp lower in 2009Q2
	QE (U.K.)		Without QE, real growth would have been 4 pps lower in 2009Q1	-	Without QE, inflation would have been 4 pps lower in 2009Q1
Chung et al. (2011)	QE1	Term premium 50 bps lower	Without QE, level of real GDP almost 2% lower by early 2012	Without QE, unemployment would be 1 pp higher by 2012	Without QE, inflation would be 0.7 pp lower by 2011
	QE2	Additional 20 bps	Without QE, level of GDP would be lower by an additional 1%	Without QE, unemployment would be higher by an additional 0.5 pp by 2012	Without QE, inflation would be lower by an additional 0.3 pp
Deutsche Bank (2010)	QE2	Assumption: QE2 = \$1 tr leads to 50 bps fall	Level of real GDP 0.7% higher over 2 years	0.2% lower after one year and 0.5% lower after 2 years	0.1-0.2 pp higher
Macroeconomic Advisers (2011)	QE2	Assumption: QE2 lowers 10-year yield by 20 bps	Level of real GDP after eight quarters increases by 0.4%	Unemployment falls by 0.1 pp in year 1 and 0.2 pp in year 2	0.1 pp higher over next 2 years

Notes: bps stands for basis points, pp[s] for percentage point[s]

announcement of this program and continued to decline after its expansion (**Chart 4**). The purchases also assured a steady demand for these securities at a time of strained market conditions. The purchases reduced abnormal risk premiums embedded in mortgage rates by roughly 50 basis points (Hancock and Passmore 2011; Gagnon et al. 2010).¹⁸

The effectiveness of LSAPs appears to depend crucially on underlying financial and economic conditions

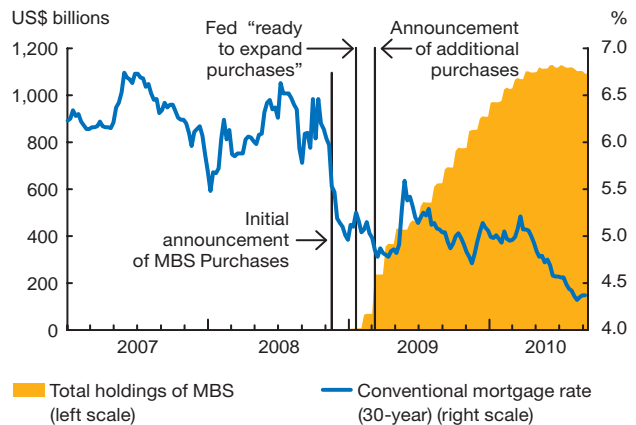
The effectiveness of LSAPs appears to depend crucially on underlying financial and economic conditions. The magnitude of the effects of the Federal Reserve’s second round of purchases (dubbed QE2) seems to have been more modest than the first round of purchases (**Tables 1 and 2**).¹⁹ Importantly, the first round of LSAPs was implemented at a time of considerable strain in financial markets, severely weakened macroeconomic conditions, and low confidence. The overall financial and economic environment subsequently improved, implying that there were fewer distortions for the interventions to mitigate.

Purchases of government debt by the Bank of England (QE) also appear to have had a significant effect: on the announcement of quantitative easing, yields on gilts of maturities ranging from 5 to 25 years that were eligible for purchase fell by about 40 to 90 basis points. Joyce et al. (2010) estimate that the overall impact on gilt yields was roughly 100 basis points. Moreover, QE appears to have had wider effects, such as lowering corporate yields, helping to restore market liquidity and confidence, and stimulating nominal spending (Dale 2009). The ECB’s purchases of government bonds, although small and sterilized, appeared to temporarily calm markets and reduce spreads on the sovereign debt of peripheral European economies. But these spreads have widened again and remain elevated, indicating renewed stress. Finally, the market reaction to the Bank of Japan’s announcements to increase the size of its government bond purchases has been relatively muted, perhaps because

¹⁸ The effect may have been partly temporary because, even in the absence of action by the U.S. Federal Reserve, spreads would have come down eventually as the financial crisis passed and the economy began to recover. The simultaneous decline in prepayment risk and default risk may also account for the reduction in mortgage spreads (Strobel and Taylor 2009).

¹⁹ Nevertheless, several Federal Reserve officials judge that QE2 has been effective (Bernanke 2011; Bullard 2011; Rosengren 2010; and Yellen 2011).

Chart 4: MBS holdings and mortgage rate



Source: Bloomberg

purchases have been too small compared with the size of the market to have a measureable impact.

Under what circumstances were policies effective?

The effectiveness of unconventional monetary policy measures depends on several factors. Measures appear to have been effective (i) when targeted to address a specific market failure, focusing on market segments that were important to the overall economy; (ii) when they were large in terms of total stock purchased relative to the size of the target market; and (iii) when enhanced by clear communication regarding the objectives of the facility. More broadly, unconventional measures also appear to have been effective because of acute financial market stress, low confidence and a weak economic environment. Indeed, recent evidence suggests that the benefits of asset purchases are substantial only at times of unusual financial distress (Curdia and Woodford 2010).

Given these observations, it follows that unconventional monetary policies that were appropriate in one country may not necessarily be effective in other countries. The effectiveness of the policies depends on country-specific characteristics, including institutional features.²⁰ Consequently, overall evidence of effectiveness may not be generalized across countries, or even across time as the economic environment changes.

²⁰ Bini Smaghi (2009) argues that because euro area countries primarily rely on bank-based financial systems, whereas the financial system in the United States is market based, different policy responses are required.

Exiting from Unconventional Monetary Policies

The implementation of extraordinary policies is only one challenge—the eventual exit from such measures must also be considered. The decision of when and how fast to exit from unconventional monetary policies must balance the risk of an overly aggressive exit, particularly in the face of fiscal retrenchment, against the risk of an excessively delayed exit. In the former case, aggressive tightening could risk pushing economies back into recession, while in the latter case, the failure to unwind programs could lead to excess liquidity and contribute to rising inflationary pressures.

Exit strategies should be specified, even if not needed immediately

To keep inflation expectations well anchored, central bank exit strategies should be specified, even if not needed immediately. Given the wide range of policy interventions that have been implemented by central banks, exit strategies will necessarily depend on facility- and country-specific circumstances. Nevertheless, the following principles should help guide the exit from unconventional monetary policies:

1. Monetary policy should be guided by objectives for inflation or price stability.
2. Monetary policy should be conditioned on information regarding the economic outlook, including fiscal paths. In this context, fiscal authorities need to plan and communicate their intentions to the public. This would allow central banks to condition monetary policy on the fiscal outlook and help reinforce central bank credibility.
3. Policy authorities need to understand how the monetary transmission mechanism may have changed.
4. Policy credibility and central bank independence must be maintained to ensure the effectiveness of future policy.
5. Communication regarding exit strategies should be clear and should include timely reporting of balance sheet developments.

Whereas the use of credit facilities naturally declines as they become less attractive, QE will require a more “active” exit approach, since it represents a more permanent addition to the central bank’s balance sheet (often because of the longer duration of the assets acquired). An active exit from asset-purchase

programs involves decisions related to the total value of purchases. Central banks may simply allow these assets to mature or, in the case of MBS, not replace decreased holdings resulting from prepayments. Central banks will also want to consider decreasing their holdings through explicit sales, although other options to drain reserves are possible, such as conducting reverse repos with financial market participants, offering term deposits to banks, or issuing central bank marketable securities.

The ability of central banks to pay interest on reserves is a key element of any exit strategy, since it allows them to raise policy rates despite having large balance sheets and thus provides additional flexibility in formulating exit strategies.²¹ The basic intuition is that raising the rate paid on reserve balances reduces the opportunity cost of excess reserves, and as such, banks will not want to lend out their reserves at rates below what they can earn at the central bank. Thus, the interest rate paid by the central bank should tend to put a floor under the target for the overnight policy rate. Central banks can thus tighten monetary policy by raising the target for the overnight policy rate at the same time that they raise the rate paid on reserve balances. This allows central banks to raise interest rates before, or at the same time as, reserves are drained, and before all LSAPs made during the crisis are reversed. Additional flexibility may be available through policy decisions related to the corridor.²²

Several concerns arise when considering the exit from unconventional monetary policy. First, policy-makers need to allow for the possibility that concurrently raising policy rates and draining reserves might alter the usual transmission mechanism. For example, a typical policy-rate increase could prove less contractionary than usual in the presence of substantial excess liquidity. Second, in the current environment, it is crucial to understand whether the standard transmission mechanism of accommodative policy in the form of a low policy rate is different from that related to the creation of reserves and the size of the central bank balance sheet. Finally,

²¹ This flexibility is important in the current environment. The presidents of some Federal Reserve Banks have hinted that leaving rates “too low for too long” may create an environment conducive to the emergence of asset bubbles (Hoenig 2010; Dudley 2010; Fisher 2010; and Plosser 2010).

²² The upper limit of the corridor usually represents the level of the standing liquidity facility at which banks can obtain base money from central banks, whereas the lower limit represents the interest rate that banks can obtain on deposits at the central bank. Goodhart (2009) has recently suggested that in the early state of the recovery, margins may be allowed to be biased “downwards,” i.e., a relatively low deposit rate, with lending rates relatively inexpensive (close to the official rate), penalizing reserve buildup and encouraging borrowing from the central bank. Once the recovery has become firmly established, central banks may, as part of their exit strategy, want to tilt the margins “upwards,” i.e., holding banks’ deposit rates close to the official rate, while at the same time making additional borrowing from the central bank expensive.

an important headwind for consideration in the current environment is the end of the fiscal stimulus enacted in response to the crisis, as well as the additional fiscal restraint necessitated by the high levels of debt in many countries. There is heightened uncertainty in the fiscal outlook relative to historical experience. The need for considerable fiscal consolidation in many countries means that central banks will not only need to take account of uncertain fiscal paths domestically, but will also need to be mindful of the spillover effects of fiscal consolidation elsewhere.²³

Policy Considerations

The use of unconventional monetary policy has sparked discussion of how such measures could affect the conduct of monetary policy, and their potential costs. In this section, we discuss some of these issues.

Unconventional monetary policy and the ELB

An ongoing subject of debate regarding monetary policy, in the context of inflation targeting, is the appropriate target rate of inflation. When the inflation target is relatively low, the probability that the target for the policy rate will approach or hit the ELB will be higher. This concern has prompted some observers to note that inflation targets should not be lower than the current convention of 2 per cent.²⁴ But if unconventional tools are effective, this concern may be alleviated, thus reassuring those who would advocate lower inflation targets. The current evidence with respect to the effectiveness of unconventional monetary policy, however, is drawn primarily from the use of these measures during crisis periods. Thus, the effectiveness of such measures under more “normal” circumstances remains an open question, and the ELB could be a binding constraint.

Potential costs of unconventional monetary policy

The use of unconventional monetary policy, both in crises and as part of an established monetary policy toolkit, may also have unintended consequences that should be considered when such measures are undertaken. In fact, studies of the effectiveness of

unconventional measures seldom (if at all) attempt to quantify any potential negative externalities. Potential costs include:

Financial market distortion

Unconventional monetary policy measures could distort financial markets. Asset purchases, particularly those of longer-dated government securities, may suppress long-term interest rates, affecting investors, such as pension funds, that need to match long-term liabilities to long-term assets and potentially encouraging excessive leverage and risk taking, posing financial stability concerns (Carney 2010). On a different note, in countries where the stock of debt is relatively small, asset purchases may also distort the yield curve, since such purchases would reduce the supply of liquid securities (i.e., government debt). Moreover, if asset purchases account for a large portion of the outstanding stock of government debt, the central bank could become a dominant market player, affecting the behaviour of other market participants. Lastly, purchases of private sector assets (such as commercial paper or asset-backed securities) may involve picking “winners” and “losers,” which raises issues of political economy.

Additional challenges of balance sheet management

Asset purchases can lead to a large expansion, as well as a change in the composition, of the central bank’s balance sheet. Exiting from an expanded balance sheet may complicate the conduct of monetary policy. For example, failure to adequately manage the balance sheet could lead to monetary conditions that are not consistent with the central banks’ policy objectives. In addition, the purchase of risky assets may expose the central bank to credit risk, market risk and, thus, capital losses. The management of balance sheet risk also raises issues of the extent to which, and the means by which, the central bank should be held accountable. These issues underline the importance of ensuring that proper accountability and governance mechanisms are in place when considering the use of unconventional policy measures.

Potential loss of central bank independence and credibility

Some observers have raised the concern that LSAPs could undermine the independence and credibility of the central bank, particularly if purchases of sovereign debt are viewed primarily as a means of facilitating fiscal deficits or if purchases of risky assets lead to capital losses. In such circumstances, unconventional policy could undermine the central bank’s goals, since

²³ See also Clinton and Zelmer (1997) on the challenges of conducting monetary policy in an environment where there are concerns about rising government debt.

²⁴ In light of the recent constraints of the ELB on monetary policy, Blanchard, Dell’Ariccia and Mauro (2010) have suggested consideration of higher inflation targets.

a perceived loss of independence and credibility can lead to a de-anchoring of inflation expectations. Central banks need to be mindful of such concerns and must be sure to “firewall” their monetary policy actions from the fiscal authority.

Conflict with financial stability responsibilities

Asset purchases could potentially conflict with the central bank’s responsibilities for financial stability. Should lower long-term interest rates caused by LSAPs encourage excessive leverage and risk taking, central banks may find that their monetary policy objectives are in conflict with their financial stability objectives. As central banks expand their mandates in this regard, due attention should be paid to ensuring that proper accountability and governance mechanisms are in place.

Delay of necessary macroeconomic adjustments

Lower long-term interest rates may have broader unintended macroeconomic consequences (Carney 2010). First, by suppressing debt-service payments, low interest rates may allow sovereigns to delay necessary fiscal consolidation. Second, low rates for an extended period may induce banks to roll over non-viable loans; thereby delaying necessary restructuring of industry, such as happened in Japan in the 1990s. Last, low long-term interest rates may encourage households to take on excessive debt or to delay adjustments necessary to reduce their indebtedness.

Conclusion

As part of the policy response to the financial crisis of 2007–09, central banks embarked upon a series of unprecedented policy interventions. The evidence

to date suggests that these measures were effective, helping to mitigate the worst aspects of the crisis and to strengthen the recovery. Nevertheless, the evaluation of unconventional monetary policy has not yet adequately assessed the costs of such measures and how they “fit” into the overall monetary policy framework of the central bank. As time allows for a more thorough and seasoned assessment, further research on these issues should be duly considered, including:

- How is the transmission mechanism affected by unconventional monetary policy?
- How do investors reallocate portfolios in crisis versus non-crisis times?
- How is the formation of expectations affected by the use of unconventional policy measures?
- What are the implications of implementing asset purchases and managing associated risks for central bank governance and accountability?

More broadly, future research should address the question of how unconventional monetary policy contributes to the respective monetary policy and financial stability functions of the central bank. Whereas the existing literature has measured the financial market impact of unconventional policies, a more thorough analysis is warranted to understand to what extent such policies have helped the central bank achieve its monetary policy objective. Moreover, while unconventional monetary policies to restore financial market functioning appear to have been successful in their immediate objective, their broader implications for financial stability have yet to be assessed.

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