

Box 5

BROAD MONEY AND LENDING IN THE UNITED STATES DURING THE IMPLEMENTATION OF THE FEDERAL RESERVE'S LARGE-SCALE ASSET PURCHASE PROGRAMMES

The Federal Reserve System embarked on a series of large-scale asset purchase programmes soon after the bankruptcy of Lehman brothers. These quantitative easing programmes (commonly referred to as QE1, QE2 and QE3¹) quickly replaced the use of the lending facilities, which had constituted the Federal Reserve's first reaction to the financial turbulence experienced from late 2007. The last of these large-scale purchase programmes ended in October 2014. This box reviews the evolution of four US money and lending-related variables during the implementation of these programmes: base money, broad money, lending to non-financial corporations and credit standards applied by banks when granting loans. US broad money (M2) growth returned to pre-crisis levels during the implementation of QE2, outpacing the growth of nominal GDP. The US QE period as a whole also saw a sustained easing in bank credit standards and a subsequent recovery in corporate bank lending. The corresponding euro area variables are presented for comparison.

Table A summarises each phase of asset purchasing in the United States in terms of timing, composition and size, as well as the changes in the Federal Reserve's lending facilities and in base money.

Table A Timing, composition and size of the Federal Reserve's large-scale asset purchase programmes

Programme phases	Purchases (in USD bn, as per changes in the Fed's SOMA portfolio)			Change in Fed's lending facilities ¹ (in USD bn)	Change in base money		
	Treasury securities	Agency-guaranteed MBS and federal agency securities	Total		Change in stock (in USD bn)	as percentage of broad money stock at the beginning of each phase	as percentage of nominal GDP at the beginning of each phase
2008Q4 - 2010Q1 (QE1)	301	1,228	1,529	-405	1,170	15	8
2010Q4 - 2011Q2 (QE2)	809	-209	601	-69	687	8	5
2012Q4 - 2014Q4 (QE3)	807	857	1,664	-1	1,340	14	8
<i>2008Q4 - 2014Q4</i>	<i>1,975</i>	<i>1,766</i>	<i>3,741</i>	<i>-586</i>	<i>3,025</i>	<i>39</i>	<i>20</i>

Sources: Federal Reserve, OECD, and ECB calculations.

Notes: Quarterly data. MBS = mortgage-backed securities. SOMA = System Open Market Account.

1) This includes lending to depository and other financial institutions, lending through other credit facilities and support for specific institutions.

US base money is a useful indicator of the timing, pace and net size of the Federal Reserve's policy interventions (see Chart A). By construction, central bank asset purchase programmes, as well as lending operations to commercial banks, result in commensurate

1 Between September 2011 and end-2012, the Federal Reserve also engaged in the maturity extension programme (commonly referred to as MEP). This programme led to an extension of the average maturity of the securities in the securities portfolio of the Federal Reserve, which prolonged the impact of the previous purchases, but did not imply an additional increase in the Federal Reserve's balance sheet or in the aggregate amount of central bank reserves held by US banks. For the exact dates of the various non-standard measures implemented by the Federal Reserve, as well as their impact on bond markets, see Altavilla, C. and Giannone, D., "The effectiveness of non-standard monetary policy measures from survey data", *CEPR Discussion Papers*, No 10001, 2014.

increases in banks' reserves held with the central bank, and thus in base money.² Indeed, the overall increase in base money throughout the implementation of each of the Federal Reserve's purchase programmes broadly corresponds to the observed variation in the SOMA holdings plus the change in the use of the lending facilities (see Table A)³, and it provides concise information about the timing, pace and net size of each of the Federal Reserve's policy interventions.

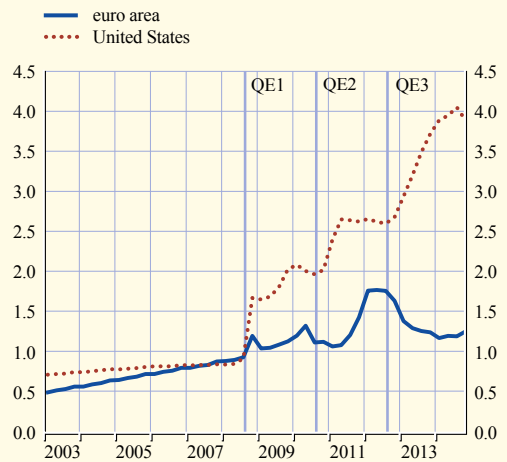
There is no one-to-one relationship between base money and broad money.

Purchases of securities by the central bank affect broad money both via a mechanic, direct effect and via a subsequent rebalancing of sellers' portfolios. The direct impact on broad money depends on the sector to which the ultimate sellers belong. For instance, in the case of the euro area, purchases will result in an initial one-to-one increase in M3 if the sellers belong to the money holding sector (e.g. if the sellers are households, non-financial corporations, financial intermediaries other than monetary financial institutions (MFIs) or government entities other than central government). If the sellers are MFIs or non-euro area residents, broad money is not affected as their deposit holdings are not included in M3. The direct effect constitutes, however, only a first, instantaneous impact. After selling, most sellers will start rebalancing their portfolios. Some of the rebalancing transactions will result in a contraction in broad money (e.g. when a resident non-MFI entity uses the proceeds of its sales to acquire foreign assets or invests its proceeds in long-term debt securities issued by a resident MFI). Other rebalancing transactions will lead to an increase in broad money (e.g. when a non-resident entity acquires equity or bonds issued by a resident non-financial corporation). In addition, and more generally, the overall broad money balance in the economy is determined by many other concomitant interactions. Among these, economic activity and bank lending, as the main sources of endogenous money creation, play a crucial role.

US broad money (M2) growth returned to pre-crisis levels only during the implementation of QE2 in 2011. Based on the considerations of the previous paragraph, an increase in base money does not necessarily result in a rise in broad money. In fact, during QE1 from 2008-10 there was a sharp drop in broad money growth in spite of the rise in base money. First, this occurred in a deeply recessionary environment that led to a drastic contraction in bank lending (see Chart E). Second,

Chart A Base money

(in trillions of the respective currency; quarterly data)



Sources: ECB and Federal Reserve.

Notes: The latest observations are for December 2014. The vertical lines mark the beginning of the quarter in which each quantitative easing programme phase starts. For the United States, base money comprises currency in circulation and deposits held by banks and other depository institutions in their accounts with the Federal Reserve. For the euro area, base money comprises banknotes and MFIs' current account and deposit facility balances.

2 This is because the central bank pays for its asset purchases by crediting the reserve accounts of its counterparties, which may act either as ultimate sellers or as settlement agents of another ultimate seller. In the United States, base money is defined as bank reserves with the central bank plus currency in circulation. For simplicity, this box uses "banks" or "commercial banks" as generic terminology to refer to depository institutions in the case of the United States and credit institutions in the case of the euro area.

3 The System Open Market Account (SOMA), managed by the Federal Reserve Bank of New York, contains dollar-denominated assets acquired via open market operations. The aggregated balance of the various facilities lending to US residents peaked at USD 1.05 trillion at end-December 2008.

the bulk of the QE1 purchases consisted of mortgage-backed securities (MBS). Most of these securities were held by banks⁴, which reduced the direct impact of the purchases on broad money. Broad money growth recovered, however, during the implementation of QE2 in 2011 and remained at high rates throughout QE3 from 2012-14 (see Chart B). Looking at the period from September 2012 onwards, US M2 growth registered an annual rate of between 6% and 7%. By comparison, since the Lehman collapse euro area annual M3 growth has remained significantly below its pre-crisis level, despite a significant recovery in recent quarters.

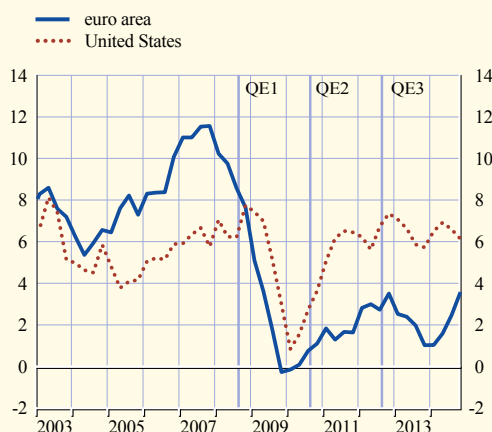
US broad money growth outpaced that of nominal GDP for most of the QE period.

It can be argued that the observed increase in broad money and loans could reflect a normal, endogenous reaction to the recovery in economic activity⁵. Indeed, in contrast with the euro area, real GDP in the United States has been steadily growing since the 2009 recession. Therefore, it is worth observing the evolution of the ratio of broad money to nominal GDP. This ratio shows that, in contrast with the period 2003-07, US broad money growth systematically exceeded that of nominal GDP for most of the QE period and particularly after the implementation of QE2 (see Chart C).

As regards the impact on lending to the economy, US banks began to ease the standards applied to loans to non-financial corporations from mid-QE1 onwards, possibly reflecting the Federal Reserve's MBS purchases. Like euro area banks, US banks tightened their credit standards for loans to non-financial corporations in the aftermath of the financial tensions in 2007, and markedly so at the time of the bankruptcy of Lehman Brothers. By late 2009, however,

Chart B Broad money

(annual percentage changes; quarterly data)



Sources: ECB, Federal Reserve and ECB calculations.

Notes: The latest observations are for December 2014. The vertical lines mark the beginning of the quarter in which each quantitative easing programme phase starts. Broad money corresponds to M2 for the United States and M3 for the euro area. US M2 has been adjusted for a number of significant breaks in the data series documented in Federal Reserve press releases between 2008 and 2012, as well as for the estimated impact of a change in Federal Deposit Insurance Corporation policy in 2011.

Chart C Broad money relative to GDP

(ratio; quarterly data)



Sources: ECB, Federal Reserve, OECD and ECB calculations.

Notes: The latest observations are for December 2014. The vertical lines mark the beginning of the quarter in which each quantitative easing programme phase starts. See Chart B for specifications regarding broad money.

4 This is also the interpretation in Ennis, H.M. and Wolman, A.L., "Large excess reserves in the U.S.: a view from the cross-section of banks", Working Paper 12-05, Federal Reserve Bank of Richmond, 2012.

5 Estimates of the peak impact of a normalised USD 1 trillion asset purchase programme on real GDP range from 0.2% to 1.5%. See, for instance, Baumeister, C. and Benati, L., "Unconventional Monetary Policy and the Great Recession: Estimating the Macroeconomic Effects of a Spread Compression at the Zero Lower Bound", *International Journal of Central Banking*, Vol. 9(2), pp. 165-212, June 2013; and Chen, H., Cúrdia, V. and Ferrero, A., "The Macroeconomic Effects of Large-Scale Asset Purchase Programs", *The Economic Journal*, Vol. 122, Issue 564, 2012.

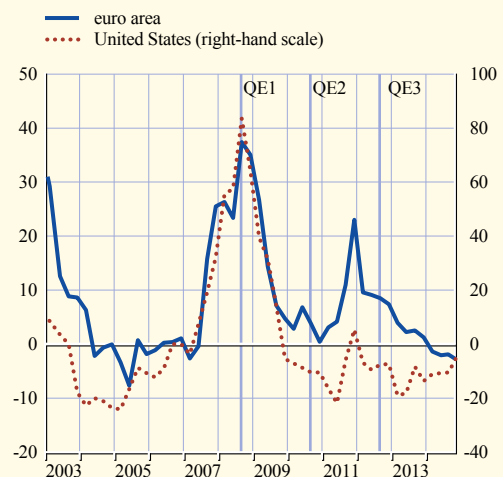
not only had the tightening phase in the United States abated, but banks had begun to report a moderate easing of their credit standards. US banks continued to ease credit standards on loans to non-financial corporations thereafter, with the exception of the fourth quarter of 2011 (see Chart D). It is possible that the strong weighting of MBS in the Federal Reserve's purchases (about 80% in QE1 and 50% in QE3) favoured this development by facilitating banks' balance sheet adjustment. By comparison, euro area banks continued to tighten their credit standards until the end of 2013, although to a lesser extent than in the period 2007-09.

The annual rate of change in bank lending to non-financial corporations returned to positive territory in late 2011 in the United States, following the easing in credit standards. Bank lending to US companies, which had been growing at rates similar to those observed in the euro area before the crisis, declined strongly during and after the 2009 recession. Its annual rate of change has improved continuously to recover from that trough. It became positive in the second half of 2011, and stood at 7.7% in December 2014. Although with smaller amplitude, total borrowing by US non-financial corporations shows a similar pattern (see Chart E). With some lag, the positive evolution of US lending to non-financial corporations mirrors the easing of banks' credit standards. As regards the euro area, the decline in lending to non-financial corporations bottomed out in early 2014 and the annual growth rate is approaching zero, in parallel with the easing of credit standards reported by euro area banks.

The growth of US lending to non-financial corporations has outpaced that of nominal GDP since late 2013. Of all the variables under consideration, the improvement in lending to non-financial corporations in the United States (measured as either bank lending or total borrowing), in particular the return to positive growth rates, occurred

Chart D Credit standards on loans to large and medium-sized enterprises

(net percentage of banks reporting a tightening of credit standards; quarterly data)

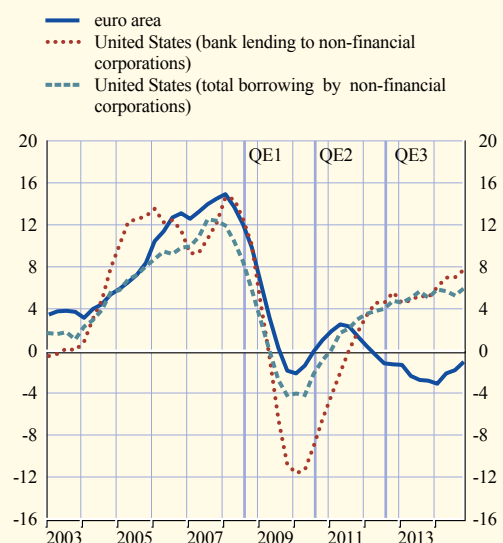


Sources: ECB (euro area bank lending survey) and Federal Reserve (Senior Loan Officer Survey on Bank Lending Practices: Measures of Supply and Demand for Commercial and Industrial Loans).

Notes: The latest observations are for December 2014. The vertical lines mark the beginning of the quarter in which each quantitative easing programme phase starts.

Chart E Lending to non-financial corporations

(annual percentage changes; quarterly data)



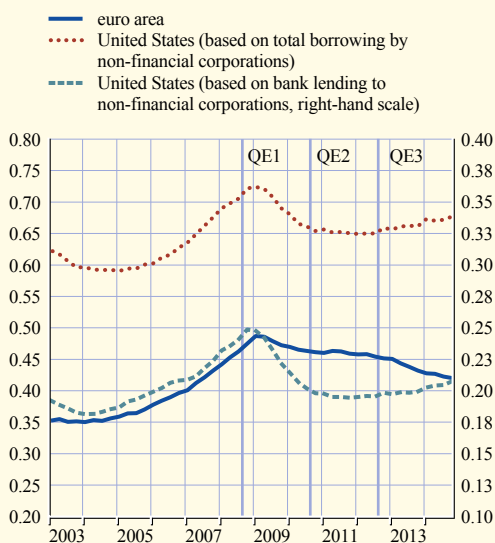
Sources: ECB (MFI loans adjusted for sales and securitisation) and Federal Reserve (US financial accounts).

Notes: The latest observations are for December 2014. The vertical lines mark the beginning of the quarter in which each quantitative easing programme phase starts.

with the largest delay after the start of QE. This lag is likely to have reflected not only typical cyclical patterns, but also the evolution of the banking crisis. Lending flows gathered pace following QE2; this was likely to reflect not only the recovery in demand and improved bank balance sheets, but also lower funding costs for banks resulting from the Federal Reserve's asset purchases. US bank loans to non-financial corporations have grown at a strong pace since 2012, eventually outpacing, as in the case of broad money, the growth of nominal GDP (see Chart F). In the euro area, MFI loans to non-financial corporations have started to recover in recent quarters but their rate of change has consistently fallen behind that of nominal GDP since 2009.

Chart F Lending to non-financial corporations relative to GDP

(ratio; quarterly data)



Sources: ECB (MFI loans adjusted for sales and securitisation), Federal Reserve (US financial accounts), OECD and ECB calculations.

Notes: The latest observations are for December 2014. The vertical lines mark the beginning of the quarter in which each quantitative easing programme phase starts.