

Qualitative Easing in Support of a Tumbling Financial System: A Recent Look at the Eurosystem's Recent Balance Sheet Policies

Philipp Bagus and David Howden¹

Abstract:

Recently, attention has been drawn to compositional changes in the Federal Reserve System's asset holdings. While much attention has been drawn to the deterioration of the balance sheet of the Fed in the face of the current crisis, an analysis of the balance sheet policies of the Eurosystem is still missing. In this article we fill this gap by analysing the Eurosystem's balance sheet during the recent sub-prime crisis. Specifically, the share of the position "Euro area claims in foreign currency" of foreign currency claims containing currency swaps climbed from 2.2 % to 7.8 %, while securities held (i.e., marketable securities, which may potentially be used for monetary policy operations) almost doubled from 7.9 % to 15.7 %. Simultaneously, the share of gold reserves fell from 15.3 % to 11.9 %. The calculation of certain balance sheet ratios supports the assessment that a significant decrease in the *quality* of money has occurred.

JEL-Classifications: E31, E52, E58, E59, M40

Keywords: *Central Banks Balance Sheet, Quality of Money, Balance Sheet Analysis, Monetary Policy, Subprime Crisis.*

Introduction

The development of the balance sheet of the Federal Reserve System during the present financial crisis has recently gained attention (Bernanke, Reinhart and Sack 2004, Cecchetti 2009, Bagus and

¹ Acknowledgments to be added later...

Schiml 2009a, Brunnermeier 2009).² While voices have warned of the deterioration in the balance sheet of the Fed while facing the current crisis, an analysis of the balance sheet policies of the Eurosystem and its effect on the quality of the Euro has been neglected. This article fills this gap by analysing the balance sheet of the Eurosystem during the subprime crisis between June 2007 and March 2009.

During the financial crisis the European Central Bank (ECB) acted as a “lender of last resort” to an unprecedented degree. This dimension of the new monetary policies manifests itself in the consolidated balance sheet of the Eurosystem, i.e., the balance sheet of the ECB and member states' central banks. Comparing the asset side of the balance sheet from June 2007 before the crisis broke out with the more recent position of March 2009, important changes are discerned.

Most importantly, a dramatic expansion on the asset side occurred with the relative proportions of the different holdings changing substantially. While the first group of alterations have been amply assessed as “quantitative easing,” the second group, which we refer to as “qualitative easing”, has gone relatively unnoticed.³

While the changes in the Eurosystem's balance sheet are dramatic, they beg the question as to what their true relevance is. In this article, we answer this question by pointing out that these qualitative effects on both currency prices and volatilities have been widely neglected in the recent literature on the financial crisis. This paper brings forth new-found evidence that these considerations serve an integral part in understanding the ancillary effects reverberating through the financial system today.

² McKean (1949) provides an early exposition of the need to delve into the compositional holdings affecting the liquidity positions on central bank balance sheets. Mishkin (1978) and Kiyotaki and Moore (2002) have provided more recent evidence that financial calamities are propagated and transmitted through balance sheet compositional shifts.

³ Bagus and Schiml (2008, 2009a) have introduced the term “qualitative easing” to refer to the balance sheet policies that deteriorate the average quality of central bank assets. Qualitative easing refers, thus, to those effects stemming from compositional changes in a central bank's balance sheet holdings. An exception to the neglect of qualitative easing is found in Buiters (2009a; 2009b), and Bagus and Schiml (2009b). Buiters, however, defines the term somewhat differently as “a shift in the *composition* of the assets of the central bank (i.e., the Bank of England) towards less liquid and riskier assets, holding constant the size of the balance sheet.” In his analysis Buiters concentrates on the policies of the Bank of England.

The economic significance of central banks' balance sheets

The analysis of balance sheets and balance sheet policies is an established research field in business studies. While the theory of balance sheet analysis in *business* is well developed, the analysis of *central banks'* balance sheets has been widely neglected. The theory of balance sheet analysis developed for the business community is helpful for analysing the Eurosystem's actions during the financial crisis. Specifically, the connection between the qualitative aspects of balance sheet analysis with the quality theory of money proves useful.

The quality theory of money claims that the demand for money is determined by qualitative considerations. Consequently, the quantity of money is merely *one of several* factors that influences the quality of money.⁴ The quality of money can be defined as the capacity of a good, subjectively perceived by an actor, to fulfil money's main functions, i.e., to serve as a medium of exchange, a store of value and as a unit of account.⁵

Some of the factors that affect the function of money as a store of value are recorded in the central bank's balance sheet.⁶ Therefore, the evolution of the balance sheet of the central bank is important in understanding shifts in the *perceived* quality of money – particularly through changes on the asset side. Assets represent the means that the central bank may use to defend the value of its currency internally and externally by selling them against their liabilities, i.e., the monetary base. When the central bank uses its assets to defend its currency, this procedure represents a *de facto* redemption.

The holders of the currency “redeem“ it against the sold assets. The higher quality, or more liquid,

⁴ The quality of money enjoyed a respected existence prior to the introduction of the more modern version of the “quantity theory of money” by Fisher (1911). See Mariana (1609), Menger (1871), and Beckhart (1940) for early explorations in the quality theory of money. More recent examples can be found in Hazlitt (1978) and Cunningham (1992).

⁵ This definition does not touch upon the important difference that Shostak (2000) makes between claim and credit transactions. For Shostak, claims transactions entail a claim to money and form part of the money supply. Credit transactions do not form part of the money supply as there is no immediate claim on money.

⁶ For an intensive account on the quality of money and balance sheets, see Bagus and Schiml (2008). For a case study concerning the quality of money during late 19th century America, see Bagus (2008).

are the assets that a central bank owns, the better it can guarantee the long-term value of its currency and its function as a store of value.⁷ Moreover, in the extreme case of a monetary reform, the assets a central bank owns can be used in order to sustain confidence back a new currency. Hence, the evolution of the assets of a central bank plays a pivotal role in determining the quality of a currency and, consequently, its purchasing power.

Thus, the analysis of central bank balance sheets is very important for the evaluation of a currency's quality. In fact, it is possible that the balance sheet total as well as specific monetary aggregates do not change, while its composition deteriorates substantially. Even in the face of quantitatively similar situations, qualitative changes can cause remarkable differences in the overall value of a currency.

Deterioration in the quality of central bank assets may foreshadow future developments of monetary aggregates. It is possible to discern from the balance sheet the limits for swaps of good assets (i.e., highly liquid) against bad assets (i.e., illiquid) necessary to stabilise the banking system. When the amount of liquid assets shrinks, it becomes at some point necessary to expand the balance sheet to lend additional support to the banking system. This expansion can subsequently influence monetary aggregates. Furthermore, a deterioration in assets' quality can indicate an imminent recapitalisation of the central bank by the government. Consequently, as recapitalisation entails the possibility of increases in the quantity of money to finance it, the quality of money will be negatively affected.

An historical account of the current crisis as reflected in the Eurosystem's balance sheet policies

The theoretical foundation we developed in the last section is especially useful in times when

⁷ It is important to note that there is a distinction between merely saying that the cash position (sometime called liquidity position) of a central bank is lower, and that the quality of assets held has fallen. The former implies a move from cash (money) to bonds (not money), the latter concentrates on a move from safe bonds to risky ones.

traditional tools to analyse monetary policy are limited. In fact, central banks of the world are reaching what economists call “the zero-bound” of interest rates. The Fed has already reached the zero-bound while the Eurosystem is quickly approaching this point.⁸ This makes an analysis of the central bank’s balance sheet increasingly important to aid future monetary policy as both qualitative and quantitative changes become the only policy tools available to the central banker to fight recession.

Eggertsson and Woodford (2004) demonstrate that liquidity traps obtain only at the zero-bound, as interest rate policy becomes ineffective. In response, alternative policy measures must be implemented. However, while central bank communications are widely seen as increasingly effective policy response in the face of the zero-bound (Bernanke, Reinhart and Sack 2004, Graynak, Sack and Swanson 2005, and Rosa and Verga 2008), the *credibility* of these statements adds an instrumental component.⁹ The quality of a central bank's reserve assets, as recorded on its balance sheet, gains increased importance as these represent the credibility that the communicated policies will actually come to fruition.

In the following we analyse the balance sheet of the Fed during the subprime crisis from June 2007 to December 2008 drawing on tools developed in Bagus and Schiml (2008).

⁸ The Bank of Japan has meandered along the zero-bound since February 1999. More recently, the Bank of Canada and the Swiss National Bank have also succumbed to the limitations the zero-bound imposes.

⁹ The past 20 years have seen a veritable explosion in research concerning what constitutes appropriate and effective central bank communication. For brevity, the reader is referred to Blinder et al. (2008) for a summary of these developments.

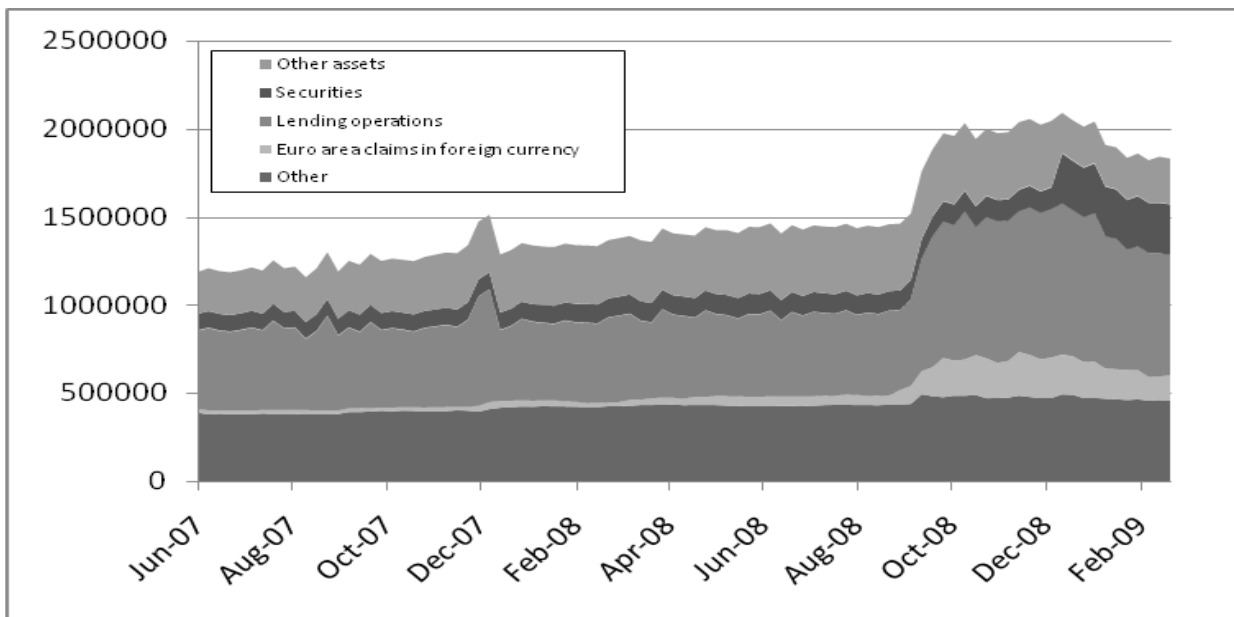


Figure 1: Quantitative Easing: Asset side of the ECB balance sheet from 06/2007 to 03/2009
(weekly, millions Euros)

Source: ECB (2009).

Looking at developments on the asset side of the ECB's balance sheet in figure 1 four stages can be identified. During the first stage of the crisis from June 2007 to December 2007 the size of the balance sheet increased under high volatility. This stage also involved a moderate change in the composition of the balance sheet as portrayed in figure 2 which shows the development of the asset side in percentage terms.

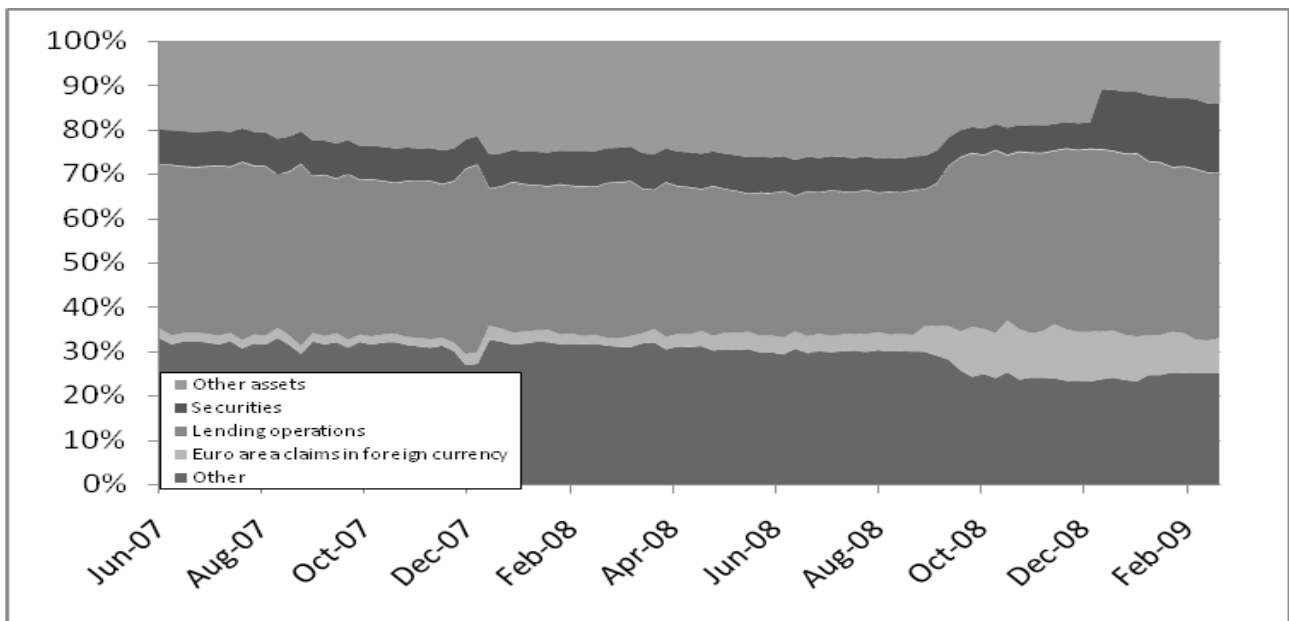


Figure 2: Qualitative Easing: Asset side of the Eurosystem balance sheet from 06/2007 to 03/2009 (weekly, %)

Source: ECB (2009)

In December 2007 the second stage started, marked by a steady increase in the size of the balance sheet. In September 2008 the compositional changes accelerated and were accompanied by a significant quantitative expansion until December 2008. During the fourth stage from January to March 2009 part of the former expansion and compositional changes were reversed. In the following, we will delve more closely on the monetary policy decisions of the Eurosystem that brought about these particular changes. We will also see that a purely numerical consideration of the balance sheet is insufficient to account for qualitative changes that are not so easily measurable.

Stage 1

During the first stage from June 2007 and December 2008 the balance sheet total increased under considerable volatility, with simultaneous compositional changes, as depicted in figure 3.

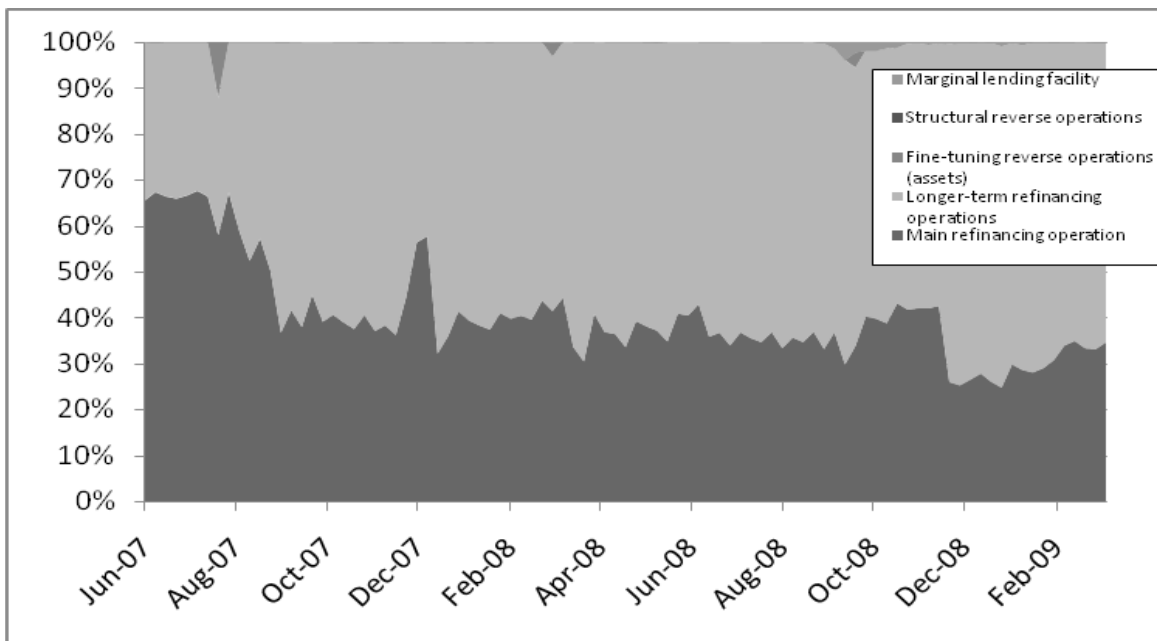


Figure 3: Lending operations to Euro area credit operation from 06/2007 to 03/2009 (in %, weekly)

Source: ECB (2009)

While the proportion of the longer-term refinancing operations of three-month maturity increased, the proportion of the main refinancing operations of two-week maturity decreased. The decline of the more liquid main refinancing operations and the increase in the less liquid longer-term refinancing caused the average liquidity of the assets of the Eurosystem to deteriorate considerably. A gold sale of 42 tonnes on November 30th also served to negatively affect the bank's liquidity position.

These measures of increasing longer-term financing proved the willingness of the Eurosystem to counter the tensions in the economic system with novel, and untested, monetary policies.

Moreover, the position "other assets" and "securities" increased markedly. The position "securities" entails marketable securities, which may potentially be used for monetary policy operations. Thus, this position can entail a very broad range of potentially low quality securities. The position "other

assets” fails to provide additional transparency. According to the ECB glossary it entails items used in the course of settlement: member state coins and other financial assets such as equity shares, participating interests, investment portfolios related to central banks' own funds, pension funds and severance schemes or securities held due to statutory requirements. This position also contains tangible and intangible fixed assets, revaluation differences of off-balance sheet instruments as well as accruals and deferred expenditures. Thus, these two positions lack transparency and *may* contain relatively low quality assets. The sum of these positions increased throughout the crisis, adding to uncertainty concerning the quality of the ECB's asset holdings. In general, the Eurosystem's policies lack transparency, which increases the uncertainty concerning the quality of the assets backing its currency and contradicts a basic principle of accountability.¹⁰ The transparency of the assets backing a currency is also important for the currency's quality. The lower the transparency the higher is the risk that the currency is backed by low quality (i.e., illiquid) assets.

Stage 2

In December 2007 the crisis gained momentum. Citigroup was forced to support its off-balance entities (i.e., structured investment vehicles – SIVs). As a consequence, credit markets, especially those denominated in US dollars seized up. In a common effort central banks around the world tried to improve dollar liquidity and instituted swap lines with the Federal Reserve. Thus, credit institutions in the Euro area commenced borrowing dollars from the Eurosystem against Eurosystem-eligible collateral, resulting in an increase in the position “Euro area claims in foreign currency”. The swap lines were increased in January and again in March 2008 when Bear Stearns found itself in refinancing problems. Consequently, the uncertainty in the markets again increased and credit markets seized up. Concurrent with the increase in swap lines the Eurosystem introduced two additional three-month longer-term refinancing operations of €50 billion each and for the first

¹⁰ Hayek (1925) criticized accounting practices of the Fed regarding their transparency as early as 1924. Rothbard (2000) advances a similar critique concerning the accounting practices at the Fed during the Hoover administration. The accounting practices of the Eurosystem have continued this trend of poor transparency, adversely affecting the currency's quality through increased uncertainty concerning its backing assets.

time a duo of six-month longer-term refinancing operations of €25 billion each. As a result, the trend towards longer-term assets on the Eurosystem balance sheet accelerated. In addition, the Eurosystem again sold highly liquid short-term assets of zero maturity, namely 30 tonnes of gold on June 30th 2008.

It is noteworthy that in the first two stages of the crisis from June 2007 to September 2008 the balance sheet total expanded substantially by 21.4 %. While the balance sheet total increased, the quality of the balance sheet and, consequently, the quality of the currency deteriorated considerably. The amount of high-quality and very liquid assets remained either constant (i.e., in the case of government debts) or was reduced (i.e., in the case of gold). In contrast, the amount of longer-term, and thus lower quality, assets increased by augmenting the longer-term refinancing operations and by increasing the non-transparent position of “Other Assets” and “Securities”.

On September 4th 2008 the Eurosystem announced a measure in order to improve the collateral against which it was lending and thereby increase the quality of its currency. The Eurosystem's rules on collateral were more flexible than those of other major central banks. Specifically, they allowed asset backed securities to be used as collateral dependent on a rating of at least “A-”. Due to this flexibility, the Eurosystem, did not have to introduce new facilities to allow for new types of collateral. The existing facilities were sufficient and adequately flexible to satisfy the liquidity needs of European financial institutions. Moreover, the eligible counter-parties (i.e., all banks holding minimum reserves with the relevant national central bank) were relatively broad, especially compared to the Fed, which had a more restricted number of counter-parties. The danger for the Eurosystem was, however, that during the financial crisis banks with international subsidiaries would use the relatively less strict rules and use their lower quality collateral to secure financing by the Eurosystem.¹¹ As a result, the Eurosystem announced on September 4th 2009 that it would

¹¹ It has been argued that foreign banks designed asset-backed securities (ABS) in order to get financing from the Eurosystem (Cochrane 2008).

strengthen its rules concerning collateral-backed financing for financial intermediaries, coming into effect the 1st of February, 2009. Thus, asset-backed securities not denominated in Euros were disallowed in order to prevent the shifting of low quality assets on a world-wide scale by international banks to the Eurosystem.

Stage 3

The third stage of the crisis was initiated by the bankruptcy of the investment bank Lehman Brothers on September 15th, 2008. In order to support credit markets, the Eurosystem increased its lending operations considerably. In particular a special term refinancing operation was allotted on September 29th. Furthermore, the long-term refinancing operations were increased and a six month supplementary long-term refinancing operation of €50 billion (an increase of €25 billion from the previous announcement) was announced on the 7th of October to take effect the following day. On October 15th additional longer-term refinancing operations of three and six month durations were announced. The swap lines and dollar lending facilities were extended sharply in September from \$50 billion to \$240 Billion. Moreover, in October additional long-term (7-day, 28-day, and 84-day) US dollar financing options were introduced.

Perhaps most detrimentally, the non-transparent positions of “Securities” and “Other assets” increased commensurately. These policies made the balance sheet total increase by more than 1/3 in a period of only one month from the 22th of September to the 27th of October 2008. This expansion of the balance sheet on the asset side was matched by the increase of fresh bank reserves on the liability side.

During the third stage, the average quality of assets backing the Euro was reduced. This qualitative easing was shown by the increase in the relative positions of “lending operations”, “Claims on non-euro area residents denominated in foreign currency” (i.e., currency swaps), “other assets” and “securities” while the relative weightings of gold and government debt decreased. Not only did the

average quality of the Eurosystem's assets deteriorate by the quantitative expansion, but quality further deteriorated by changes in the collateral rules and eligible counter-parties. On October 13th the Eurosystem announced U.S. dollar funding at 7-day, 28-day and 84-day maturities at fixed interest rates for full allotment which effectively meant that there was no limit on the amount of dollars available to be used in swap lines. On October 15th 2008 the list of assets eligible for credit operations was increased. Most importantly for the quality of the assets on its balance sheet, the Eurosystem announced that it would lower the credit threshold for marketable and non-marketable assets from A- to BBB-, with the exception of asset-backed securities (ABS).

We cannot know which positions of the Eurosystem's balance sheet exactly began to be backed by up to BBB- collateral during this 3rd stage. Nevertheless, the incentives for the banking system were to become more aligned with the increasingly lenient rules. The average quality of the Eurosystem's assets was further reduced by the introduction of swap lines with central banks whose currencies were depreciating (i.e., Hungary and Poland). The Eurosystem also established a swap line with the Danish central bank exposing it to further currency and credit risks.

In sum, the average quality of the assets of the Eurosystem and thus, the backing assets of the Euro, diminished through a tendency towards longer-term, less liquid assets, and by accepting a broader range of lower quality collateral. Increasing the range of eligible counter-parties caused detrimental non-quantitative deductions in the quality of the assets backing the currency.

Stage 4

In stage 4 from January to March 2009, pressure was relieved slightly from the credit markets. As a consequence, the previous qualitative easing was partially unwound. This “qualitative tightening” can be expressed by several measures. First, the balance sheet of the Eurosystem contracted as the amount of lending operations and especially longer-term refinancing operations were reduced as

some operations were not rolled-over. Additionally the amount of outstanding currency swaps declined. However, the amount of the non-transparent and potentially most problematic positions of “Securities” and “Other assets” remained approximately the same.

Second, the Eurosystem announced a further tightening of the standards for the collateral accepted by its credit operations. Thus, the Eurosystem requires a rating of AAA/Aaa as an additional eligibility criterion for all asset-backed securities issued after March 1st, 2009. The future use of uncovered bank bonds as collateral has also been restricted. However, the changes made on October 15th broadening the accepted collateral will stay into effect until the end of 2009 which means that the announced tightening will become relevant only later, in 2010. Rather, the Eurosystem seems to be preparing for the post-financial crisis period by ensuring it holds higher quality assets.

An analysis of the Eurosystem´s balance sheet ratios

The changes in the balance sheet can also be analysed by calculating certain central bank balance sheet ratios as developed in Bagus and Schiml (2008). One of these ratios is the “defense ratio” which proxies the capacity of a central bank to defend its own currency in international currency markets by selling foreign reserves (i.e., a ratio of foreign reserves to total assets). The evolution of the defense ratio is depicted in figure 4:

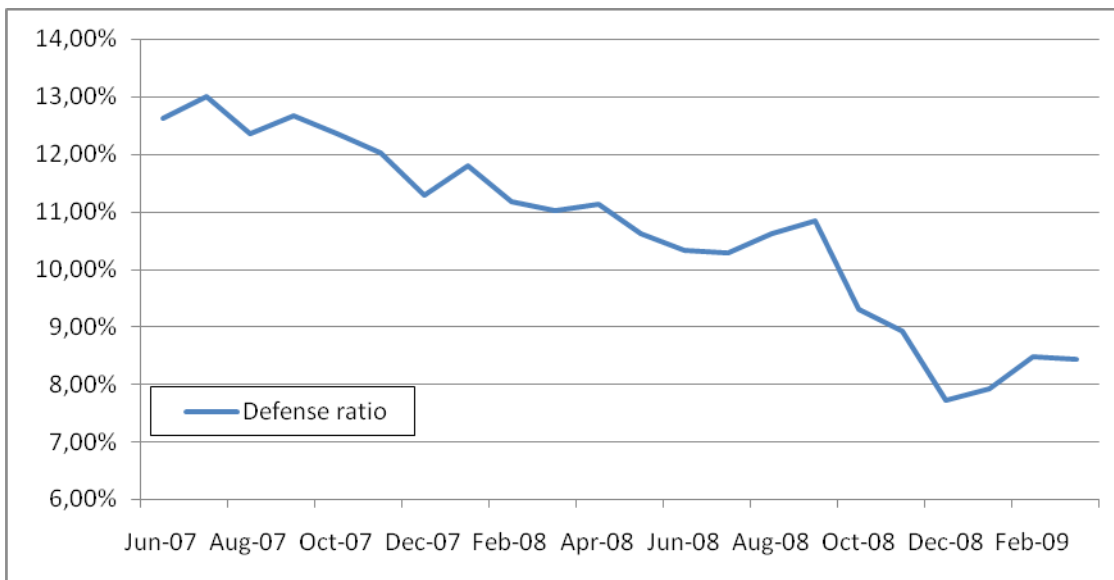


Figure 4: Defense ratio
(June 2007 to March 2009, monthly)

Source: ECB (2009).

The defense ratio has continued to decline during the financial crisis, falling from over 12% to approximately 8.5%. Consequently, it became more difficult for the Eurosystem to support its currency by intervening in the foreign exchange markets.

Finally, the equity ratio indicates the leverage employed. Its importance lies in the function of equity to cushion losses. When the central bank suffers losses on its assets, equity serves to absorb and offset them. A low or negative equity ratio makes a recapitalisation by the government likely. This recapitalisation leads to an increase in the government deficit and enhances the probability of the monetisation of this debt. The monetisation of government debts increases the quantity of money and, thereby, negatively affects the quality of money.

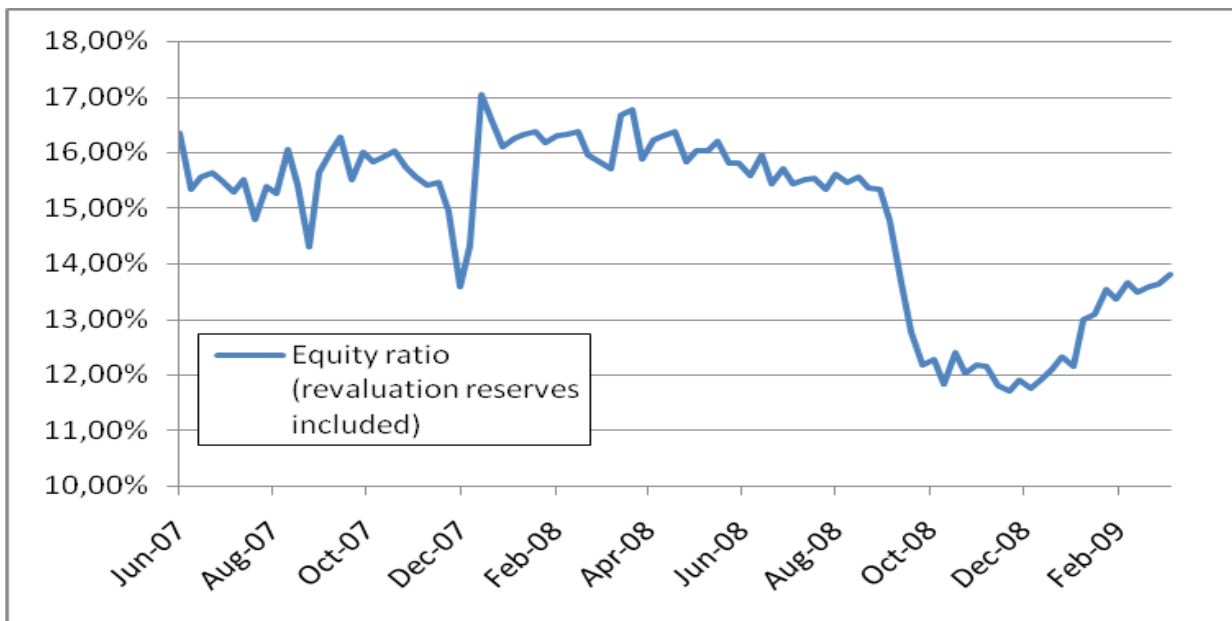


Figure 5: Adjusted equity ratio of the Eurosystem during the subprime crisis (6/2007-03/2009)

Source: Eurosystem (2009)

As shown in figure 5, the (adjusted) equity ratio of the Eurosystem fluctuated under high volatility in the first two stages of the crisis. In the third stage from September through October 2008 the equity ratio fell to 12% due to the sharp expansion of the balance sheet. If the Eurosystem suffers losses of 14% of its assets, a recapitalisation will become necessary.¹²

The Eurosystem faces a significant political problem when it comes to recapitalisation. There is a sharing rule among the 16 national central banks (that, together with the ECB make up the Eurosystem) concerning the sharing of losses incurred in the conduct of the common monetary and liquidity management policy. This sharing rule affects only the distribution and not the total amount of capital within the Eurosystem. In contrast to other central banks, it is unclear how the Eurosystem would be recapitalised should the need arise. Therefore, the development of the equity ratio is problematic in relation to the value and trust in the Euro.

¹² On the possibility of insolvency of central banks see Buiter (2008).

Concluding remarks

Recent developments in monetary policy make the qualitative analysis of central banks' balance sheets important. New analytical tools are necessary for the evaluation of unconventional monetary policies. One such tool is balance sheet analysis, as is undertaken in this article. While the Fed's balance sheet analysis has received more attention, an analysis of the Eurosystem's balance sheet has been neglected. Our analysis of the balance sheet of the Eurosystem from the beginning of the crisis in June 2007 to March 2008 has filled this gap and provided important insights pertaining to the quality of the Euro. While the Fed's balance sheet policies certainly have been radical, the Eurosystem's changes are no less so, even though this might initially seem the case if attention is focused solely on the quantitative expansion of the balance sheet's assets. These changes are most clearly manifested in compositional changes in the balance sheet. Thus, the share of the position "Euro area claims in foreign currency" containing currency swaps climbed from 2.2 % to 7.8 % while "Securities" almost doubled from 7.9 % to 15.7 %. At the same time the share of gold reserves fell from 15.3 % to 11.9 %. The shift from high to relatively lower assets becomes apparent with detrimental implications for the value of the Euro.

We have assessed the current financial crisis, and the Eurosystem's response to it, as occurring in four distinct stages.

During the first two stages the Eurosystem limited its balance sheet policies to slight increases in its size and changes in its composition by taking on relatively more illiquid and riskier assets and selling gold. New longer-term credit programs appeared in order to support the banking system. As a consequence, private financial intermediaries' balance sheets improved and the ECB's balance sheet deteriorated.

The average quality of the assets backing the Euro also deteriorated during the third stage of the

credit crisis. Particularly, the accepted range of collateral (except for asset-backed securities) in credit operations was broadened from A- to BBB-. This was accompanied by a substantial expansion of the balance sheet and an increase in the monetary base (i.e., quantitative easing). The defense and equity ratios deteriorated considerably. As a strong central bank balance sheet is essential for the maintained quality of a currency, the quality of the Euro has been reduced.

Two balance sheet ratios have been discussed pointing to the qualitative deterioration in the Eurosystem's assets. First, the defense ratio – that which proxys the ECB's ability to defend the Euro's value in the foreign exchange markets – fell over one-third, to 4.5%. Despite showing recent improvement, the equity ratio – that which illustrates the leverage employed by the ECB – fell from 17% to 12% last year. The implication today is that a loss of 14% on Eurosystem assets will bring the necessity of recapitalising the central bank – political issues surrounding this eventuality have been discussed.

During the first two stages, when the qualitative easing had not yet accelerated, the Euro appreciated against the dollar. Yet shortly thereafter, from September to December 2008 the Euro's value actually depreciated. This development might have been caused by a repatriation of foreign investments into the United States and a flight to secure U.S. government bonds. Another possible explanation is that the Eurosystem has deteriorated the quality of its currency faster than the Fed. In fact, the acceptance in October 2008 of a much broader range of collateral assets by the Eurosystem points towards this possibility. Previously, Bagus and Schiml (2009a) outlined specific deteriorations that have occurred through Fed policies in combating this crisis. We leave the answer as to which set of policies has led to more detrimental results concerning currency valuation to future research.

References

Bagus, Ph. (2008) Deflation, Growth and the Quality of Money – a revealing Chapter of

- Monetary History from 1865 to 1896, *German Review of New Austrian Economics*, 2(2).
- Bagus, Ph. and M. H. Schiml. (2008) Bilanzpolitik und –analyse von Notenbanken im Kontext der Qualitätstheorie des Geldes, *German Review of New Austrian Economics*, 2 (3).
- Bagus, Ph. and M. H. Schiml. (2009a). New Modes of Monetary Policy: Qualitative Easing by the Fed. *Economic Affairs*, 29 (2) pp. 46-49.
- Bagus, Ph. And M. H. Schiml. (2009b). *The Insolvency of the Fed*. Mises Institute Daily Article, 5th February. Available at: <http://mises.org/story/3281>. Accessed: 11.06.2009
- Beckhart, Benjamin Haggott. (1940). Monetary Policy and Commercial Bank Portfolios. *The American Economic Review*, 30(1-2), Papers and Proceedings: 17-26.
- Bernanke, B. S., V. Reinhart, and B. P. Sack. (2004). Monetary Policy Alternatives at the Zero Bound: An Empirical Assessment. *Finance and Economics Discussion Series, Divisions of Research & Statistics and Monetary Affairs*. Federal Reserve Board, Washington D. C.: Staff Working Paper 2004-48.
- Blinder, Alan S., Michael Ehrmann, Marcel Fratzscher, Jakob De Hann, and David-Jan Jansen. (2008). Central Bank Communication and Monetary Policy. *Journal of Economic Literature*, 46(4), pp. 910-945.
- Brunnermeier, Markus K. (2009). Deciphering the Liquidity and Credit Crunch 2007-2008. *The Journal of Economic Perspectives*, 23(1): 77-100.
- Buiter, W. (2008) Can Central Banks Go Broke?, *Policy Insight No. 24*, Centre for Economic Policy Research.
- Buiter, W. (2009a) *Quantitative and Qualitative Easing Again*. Financial Times Maverecon Blog. 11th January 2009. Available at: <http://blogs.ft.com/maverecon/2009/01/quantitative-and-qualitative-easing-again/>. Accessed: 10.06.2009.
- Buiter, W. (2009b) *Regulating the new Financial Sector*. Voxeu.org 09.03.2009 <http://www.voxeu.org/index.php?q=node/3232> Accessed: 10.06.2009.
- Cecchetti, Stephen G. 2009. Crisis and Responses: The Federal Reserve in the Early Stages of the Financial Crisis. *Journal of Economic Perspectives*. 23 (1), pp. 51-75.
- Cochrane, Laura. (2008) Macquarie Asks ECB for Repo Eligibility on Asset-Backed Bonds. Bloomberg: <http://www.bloomberg.com/apps/newspid=20601080&sid=aIUR12i67Jy4&refer=asia> Accessed: 29.03.2009
- Cunningham, Th. J. (1992) Some *Real* Evidence on the *Real Bills* Doctrins versus the Quantity Theory, *Economic Inquiry*, 30 (2), pp. 371-83.
- ECB. (2008) REGULATION (EC) No 1053/2008 OF THE EUROPEAN CENTRAL BANK of 23 October 2008 on temporary changes to the rules relating to eligibility of collateral (Eurosistem/2008/11) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:282:0017:0018:EN:PDF> Accessed: 29.03.2009
- ECB. (2009) Consolidated financial statement of the Eurosystem. <http://sdw.ecb.europa.eu/reports.do?node=100000129> Accessed: 29.03.2009
- Eggertsson, G. B., and M. Woodford. (2004). Policy Options in a Liquidity Trap. *American Economic Review*, 94(2), Papers and Proceedings: 76-79.
- Federal Reserve. (2009) *Federal Reserve Statistical Release H.4.1.: Factors Affecting Reserve Balance*. <http://www.Federalreserve.gov/releases/h41/> Accessed: 04.03.2009
- Fisher, I. (1911). *The Purchasing Power of Money: Its Determination and Relation to Credit*,

Interest, and Crises. New York: MacMillan.

Gürkaynak, R. S., B. Sack, and E. T. Swanson. (2005). Do Actions Speak Louder Than Words? The Response of Asset Prices to Monetary Policy Actions and Statements. *International Journal of Central Banking* 1(1):55-93.

Hayek, F. A. v. (1925) Die Währungskrise der Vereinigten Staaten seit der Überwindung der Krise von 1920, *Zeitschrift für Volkswirtschaft und Sozialpolitik*, **5**, pp. 25-63 and pp. 254-317.

Hazlitt, H. (1978) *The Inflation Crisis, and How to Resolve It*. New Rochelle, NY: Arlington House.

Kiyotaki, Nobuhiro, and John Moore. (2002). Balance-Sheet Contagion. *The American Economic Review* 92(2), Papers and Proceedings: 46-50.

Mariana, J. de. [1609] (1994) *De Monetae Mutatione*. Edited by Josef Falzberger. Heidelberg: Manutius Verlag.

McKean, Roland N. 1949. Liquidity and a National Balance Sheet. *The Journal of Political Economy*, 57(6): 506-522.

Menger, C. [1871] 2007. *Principles of Economics*, (trans.) J. Dingwall and B. F. Hoselitz. Auburn, Al: Ludwig von Mises Institute.

Mishkin, Frederic S. (1978). The Household Balance Sheet and the Great Depression. *The Journal of Economic History* 38(4): 918-937.

Rosa, Carlo, and Giovanni Verga. (2008). The Impact of Central Bank Announcements on Asset Prices in Real Time. *International Journal of Central Banking*, 4(2): 175-217.

Rothbard, M. N. (2000) *America's Great Depression*, 5th ed. Auburn, Ala.: Ludwig von Mises Institute.

Shostak, Frank. (2000). The Mystery of the Money Supply Definition. *Quarterly Journal of Austrian Economics* 3(4): 69-76.