

## **Central Banks' Response to the Current Financial Crisis – Between Costs and Benefits**

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**ABSTRACT:** Our study is inserted in the thematic area dedicated, during recent years, to the research on central banks' response to financial crisis. The global financial crisis has outlined a series of weaknesses located at regulatory and supervisory activities' level, causing major central banks to face a new operating environment, in which traditional monetary policy tools are ineffective (key interest rate close to zero) in restoring the financial markets' proper functioning. The unconventional monetary policy measures, the dramatic fall of the key interest rate, the balance sheet structure modification and extension of collateral accepted by central banks are the main issues on which we focused our attention, to highlight the costs and benefits recorded by these institutions. All major central banks have implemented highly innovative, flexible facilities and the main beneficiaries have been the banking systems in their entirety.

**Keywords:** Financial crisis; Central banks; Unconventional monetary policy

**JEL Classifications:** E58; G01

### **1. INTRODUCTION**

The global financial crisis, by its severity and huge costs entailed, emphasized the inadequacy of traditional monetary policy instruments and the fact that good macroeconomic fundamentals, such as sustained economic growth, low inflation and unemployment rates, aren't a guarantee for future financial stability. In response to the financial crisis, which had negative repercussions on macroeconomic environment and the real sector, central banks have resorted, primarily, to an aggressive reduction of monetary policy interest rates, in order to relax monetary policy and increase the banking system's liquidity. Since the key interest rate approached zero in some countries, major central banks such as Bank of England, Bank of Japan, the Federal Reserve and the European Central Bank have decided to shift from interest rate targeting to the growth rate of broad money targeting, injecting cash directly into the economy, through non-standard monetary operations.

One main feature of unconventional monetary policy measures is the active use of central banks' balance sheet, in order to re-establish the proper functioning of the credit markets, by restoring investors' confidence and liquidity positions (Barbu and Boitan, 2012). Borio (2009) found that, on the background of recent financial turmoil, it became clear that monetary policy can influence economic activity not only by using interest rate policy, but also through an active and explicit use of the central banks' balance sheet policy.

These measures were justified by two main reasons: first, to maintain price stability, which would not have been possible only by reducing monetary policy interest rates, and secondly, to demonstrate the role of lender of last resort, through which funds were provided to those institutions that recorded short term liquidity deficits. Relative to this subject, it is important to mention that the role of lender of last resort has acquired a new dimension, in that liquidity has been provided for the entire financial

market, and not isolatedly, only to few deposit institutions. It can be appreciated, therefore, that through the measures adopted, central banks have restored trust in the financial system.

According to Buitert and Sibert (2007), the flexible innovative nature of central banks arises from supplementing the traditional function of lender-of-last-resort with the market-maker-of-last-resort one, which refers to central banks' direct intervention on financial instruments markets such as covered bonds, credit default swaps and mortgage-backed securities. This function can be exercised in two ways: either through direct purchases or sales of securities issued by private sector, whose market has become illiquid, or by their inclusion in the collateral accepted for collateralized loans or repurchase agreements.

Another aspect that emerges from the central banks intervention is the conclusion that the key interest rate close to zero is not the only solution that can be adopted in the crisis. Practicing a close to zero monetary policy rate, during long periods of time, creates instability and distortions on financial markets because persistent liquidity can lead to inflationary pressures.

These exceptional monetary policy measures significantly changed the *risk profile, size and composition* of central banks' balance sheets. According to Meier (2009), the reputational risk at which central banks are exposed to could be amplified by the possible criticism related to public money waste. Loss-making operations, undertaken by the central banks, could weaken the political support for independence and would erode the legitimacy of his mandate.

The unconventional monetary policy measures have been classified in three main categories: direct quantitative easing; direct credit easing and indirect (endogenous) credit or quantitative easing. The first two are related to a direct purchase of public or private assets by the central bank, while the latter consists in central bank lending to banks, at different maturities, against extended range of eligible collateral, which is represented by assets whose markets are temporarily impaired or illiquid.

When implementing quantitative easing measures, central banks focus mainly on increasing their *liability side* of the balance sheet, particularly the banks' reserve accounts at central bank. Hence, central banks' quantitative easing policies are designed to *expand the size* of the balance sheet. At the core of these policies lies the acquisition of government bonds, which doesn't change significantly either the central banks' balance sheet composition or their risk profile. Consequently, central banks aren't exposed to the counterparty risk because the state never defaults, but are exposed to the interest rate risk, as, with the time passing, if their strategy of lowering long term interest rates succeeds, sovereign yields will decrease. Meier (2009) adds that, in times of high debt deficits, the outright buying of government bonds exposes the central bank to a possible perception of capture by the fiscal authority.

The use of credit easing measures, from a balance sheet standpoint, allows central banks to change *the composition* of the *asset side*, by buying different classes of financial assets, the final purpose being the revival of markets for those assets and the private sector's direct financing. Also, the balance sheet composition can be altered by shifting from shorter to longer term securities. However, Smaghi (2009) warned that this type of purchases needs to be carefully planned, so as to avoid allocative distortions at industries, firms or regions level.

The third type of measures, known as indirect credit easing programs, aimed to support sound financial institutions in having access to short-term liquidity. Central banks' balance sheet *size* has been rapidly expanded, the increase being determined endogenously by the banking system, based on banks' individual preference for liquidity.

In the following, we have depicted the major central banks' interventions, representative for the novelty of the measures adopted and the effects generated in the banking system. Thus, the analysis has been customized for the European Central Bank and the Federal Reserve, showing the ways they have adapted the traditional monetary policy instruments, in terms of eligible collateral, maturity and amount of operations. Also, in order to make assessments on how the balance sheet size has evolved, on the composition of the asset and liability side, on the extent to which the risk exposure has increased, but also the effect on their profitability, we analyzed the accounting information taken from annual reports during 2007-2009.

## 2. MEASURES OF LIQUIDITY SUPPLY ADOPTED BY FED

Fed interventions aimed to increase liquidity in the financial system and, at the same time, help banks to borrow in the interbank market. From 2007 until March 2008, the Fed has conducted six operations to reduce the key interest rate, from which two in January, at a difference of just eight days. However, the reduction from 1% to 0.25% was one of the most significant operations of this kind conducted in the history of the institution.

Making a parallel between Fed's actions and the ones of other major central banks in Europe, it can be noted that the Fed has developed and implemented the most extensive range of unconventional monetary programs, known as *credit easing*. These consisted in the implementation of four facilities, designed to ease the direct purchase of illiquid assets such as commercial paper, asset-backed commercial paper (ABCP), money market instruments and asset-backed securities, in order to provide liquidity to each of these markets (commercial paper market, asset-backed securities market and money market funds), in addition to the interbank market, and improve their functioning.

Fed's efforts to revive the main credit markets, heavily threatened by the risk of financial institutions' insolvency, liquidity risk and credit risk, have resulted in the following strategies:

➤ **Asset Backed Commercial Paper (ABCP) Money Market Mutual Fund (MMMF) Liquidity Facility (AMLF)** – consists in lending to financial institutions (eligible borrowers were deposit banks and bank holding companies) against asset-backed commercial paper (ABCP) collateral. It is noteworthy that only ABCPs purchased from a money market mutual fund (MMMF) since September 19, 2008 (the program launching date) are accepted as eligible collateral. The program is designed to assist money market mutual funds that hold such securities in order to meet investors' redemption requests and improve liquidity on the ABCP market and money markets in general.

The Federal Reserve Bank of Boston has been authorized to manage the facility, with any eligible counterparty, in any of the twelve Federal Reserve districts. Last access to this program took place on May 8, 2009. The program expired on February 1, 2010, accumulating a total of 217,349.83758 million dollars.

➤ **Commercial Paper Funding Facility (CPFF)** was developed in order to acquire, through a special purpose vehicle funded by the Fed, trade securities with a maturity of three months, expressed in dollars, secured and unsecured, issued by U.S. issuers. Federal Reserve Bank of New York was authorized to lend the SPV, so that the latter has become a financial institution to facilitate the issuance of securities by eligible issuers. The last purchase of securities took place on January 25, 2010, and the total value of the program amounted to 738,262.5 million dollars.

➤ **Term Asset-Backed Securities Loan Facility (TALF)**. Traditionally, the U.S. Asset-Backed Securities (ABS) market provided substantial funding for loans to households and businesses. As the credit markets' liquidity impaired and investors' risk aversion rapidly increased, ABS market has been blocked. This means that financial institutions could no longer issue ABS on loans to existing customers, and therefore cannot finance new loans, because there was no demand for such securities. To facilitate the issuance of ABS, the New York Fed authorized the TALF program, to provide loans with a maturity of three or five years, guaranteed by newly issued ABS (the condition was that they have been issued after January 1, 2009) and commercial mortgage-backed securities issued before January 1, 2009. Through the TALF program it was intended to grant loans of about \$ 200 billion. The last access to this facility took place on June 9, 2009. The total value of loans granted was of 71,085.7 million.

➤ **Large-scale asset purchases** were another monetary policy instrument aimed at supporting the functioning of credit markets. In addition, to reduce indebtedness costs and stimulate mortgage loans and housing markets, the Fed expanded the range of assets it planned to buy. Thus, it has focused on the acquisition of debt instruments issued by government sponsored entities (GSEs: Fannie Mae, Freddie Mac and Federal Home Loan Banks), totaling 175 billion dollars. Also, to further stimulate the housing markets, the Fed proceeded to purchase mortgage-backed securities guaranteed by GSEs, the total amount sought being of 1,250 billion dollars. Currently, this program has already completed acquisition on 31 March 2010, but will continue to settle transactions. Following the public launchment of these programs, the targeted markets have promptly reacted and mortgage interest rates have dropped significantly.

Also, in order to supplement the financial system liquidity, the Fed implemented a series of *indirect credit easing* programs, to ensure that sound financial institutions have adequate access to liquidity in the short term. These consisted of a series of new credit facilities:

➤ **Term Discount Window Program** was a temporary program that introduced several changes in the credit facility offered by the Fed (known as the Fed's primary credit discount window facility). It has provided long-term loans to deposit institutions, in return for a wide range of eligible collateral. The maximum maturity of loans has increased from overnight to 30 days on August 17, 2007, and then to 90 days on March 16, 2008.

➤ **Term Auction Facility (TAF)** aimed to stimulate the unsecured interbank market by providing liquidity to deposit institutions, in exchange of a wider range of collateral than the open-market operations allow. All deposit institutions that are considered to be financially sound and are eligible to borrow under the Fed's primary credit discount window facility, are also eligible to participate in TAF auctions. Auctions with a fixed amount extended their maturity from 28 to 84 days. The last auction had been held on March 11, 2010. The total value of loans through the TAF is of 3,818,411 million dollars.

➤ **Term Securities Lending Facility (TSLF)**, through which the Fed has lent Treasury securities to primary dealers, represented by banks and securities broker-dealers, accepting as collateral investment-grade privately-issued securities. As Kuttner (2008) explained, by increasing the supply of good collateral in the financial system, Fed has facilitated the credit extension of lenders who do have funds available, but are unwilling to accept risky securities as collateral.

Because at the core of this transaction lies a simple exchange of securities, it has no impact on the amount of bank reserves, being equivalent with a transaction in which the Fed offers a collateralized loan, lending funds against privately-issued collateral, and simultaneously sterilizes the reserves' increase through a sale of Treasury securities. This facility expired on February 1, 2010.

➤ **Primary Dealer Credit Facility (PDCF)** consisted in overnight loans granted to primary dealers, in exchange of investment-grade securities collateral, having as purpose the improvement of their ability to provide financing. This provision of credit was designed to ease liquidity pressures in the broader repo market, a secured funding market where primary dealers obtain the main part of their financing for the securities holdings (Tobias, Burke, McAndrews 2009, p.1). As primary dealers had no access to the Fed's lender-of-last-resort facility, but were heavily exposed to liquidity risk, because they used to fund long term assets on the short term repo markets, the PDCF program has been designed in order to offer an alternative to the Federal Reserve's discount window. The eligible borrowers were only primary dealers of the New York Fed, through their clearing banks. At present, this facility has expired since February 1, 2010, accumulating a total of 8,950,991.6 million dollars.

➤ **Swap lines agreements** have been approved by Fed in order to ease US dollars funding pressures in offshore markets. These bilateral agreements have been established with 14 central banks, including the Bank of England, the European Central Bank, the Bank of Japan, the Bank of Korea, Monetary Authority of Singapore, and the Swiss National Bank. The swap agreements have allowed foreign central banks to purchase U.S. dollars from the Federal Reserve and to further lend them to domestic banks in their jurisdictions.

Since the establishment of the central banks swaps arrangements in December 2007, the Fed has acted as a global lender of last resort for dollars. It subcontracted its LLR function (along with its monopoly on money creation) to a selected set of foreign central banks (Obstfeld 2009, p.45).

Obstfeld *et al* (2009, p.7) argued that the implementation of this facility is one of the most notable examples of central bank cooperation in history. Also, it was deemed to be a significant driving factor for the major central banks' balance sheet expansion in the latter half of 2008 (Borio and Disyatat 2009, p.12).

The magnitude of Fed's large-scale intervention in credit markets can be observed from its balance sheet size. At December 31, 2008 compared with December 31, 2007 total assets increased with more than 145%, while at end 2009 it contracted with only 0.48% from previous year. Table 1 provides a snapshot of the evolution recorded by some components of the asset and liability side.

**Table 1. Fed's financial statement (selective)**

	2010	2009	2008	2007
Total assets (millions \$)	2,427,844	2,235,047	2,245,728	914,776
Loans to depository institutions	221	96,618	544,010	48,636
Other loans	-	69,433	100,082	-
U.S. Treasury securities	1,066,952	805,972	481,449	730,329
Government-sponsored enterprise debt securities	152,972	167,362	20,740	15,300
Federal agency and government-sponsored enterprise mortgage-backed securities	1,004,695	918,927	-	-
Central bank liquidity swaps	75	10,272	553,728	24,000
Total liabilities (millions \$)	2,374,796	2,183,767	2,203,576	877,876
Securities sold under repurchase agreement	59,703	77,732	88,352	43,985
Depository institutions' deposits	968,052	976,988	860,000	20,767
US Treasury, general account	140,773	186,632	106,123	16,120

Source: the Federal Reserve Banks Combined Statements of Condition

As table 1 show, on the assets side, at end-2008, Fed's actions had been directed towards restoring credit markets' functioning, by providing plentiful liquidity. Hence, loans to depository institutions, US Treasury securities and central bank swaps reached a share of over 70% in total assets. During 2009 and 2010, the focus shifted towards purchasing impaired, illiquid private sector assets, so as to clean financial institutions' portfolios and provide them good collateral.

From Kuttner's (2008) viewpoint, the composition of Fed's portfolio changed beyond recognition. If, at end 2006, the US Treasury securities/total assets ratio was of 89.72%, one year later, it comprised 79.83 percent of total assets. In 2008, the ratio had fallen sharply to 21.44 percent, so as to accommodate the increase in credit facilities granted through unconventional liquidity programs. At end 2009, following the large-scale asset purchase program announcement, the share of total securities held by Fed (US Treasury securities, GSE securities, MBS) in total assets reached 84.66%, while at December 31, 2010 it raised at 91.63%.

Related to the Federal Reserve's liabilities side operations, the amount of currency in circulation has continued to rise at a slow pace, with only 6.89% in 2008 compared with 2007 and with 5.45% et end 2009 compared with 2008. Deposits held by depository institutions at Fed's reserve accounts have recorded a sharp increase during 2008, at about 39% of total liabilities, relative to the moment prior to the financial crisis onset, when they counted for only 2.36% in total liabilities. This upward trend continued in 2009 and 2010, at year-end reaching 44.74% of total liabilities, respectively 40.76% (Barbu, Boitan 2012).

The impact of the Fed's unconventional strategies can be analyzed in terms of costs and risk taking, on the one hand, and profits, on the other hand. The new size and composition of Fed's balance sheet has determined that the share of capital in total assets, known as the equity ratio, fall from 4.5% to 2%, which means a leverage increase from 22 to 50 (Bagus and Schiml 2009). Consequently, the doubtful quality of Fed's balance sheet raised the problem of insolvency. Some solutions have been proposed to overcome the central bank insolvency:

- recapitalisation, that could be achieved by two ways: financing from public funds or by monetization of government debt;

- revaluation of gold reserves (according to the authors mentioned above, a revaluation of gold reserves at market price of \$ 810 an ounce, in January 2009, would have increased the capital / assets ratio at 12.35%).

In terms of costs and benefits it can be concluded that Fed has fulfilled its role of lender of last resort, by implementing several programs that have required considerable financial resources and have generated significant positive effects on the liquidity level. Thus, the cost of intervention has resulted in the risks incurred, as a consequence of acquiring certain impaired assets held by banks, but also in the cost of resources procurement.

In terms of profit, we emphasize the reaffirmation of central banks' authority and role, and the gains obtained due to the difference between interest charged from the banks benefiting from credit facilities and interest paid for deposits from banks in the system. Regarding this aspect, more than 7,000 financial institutions keep their deposits at Fed. Before the onset of the crisis, the value of these deposits represented 12 billion dollars daily. The significant increase of these deposits is explained by the fact that before the crisis, the Fed does not pay interest on excess reserves. During the crisis, the Fed provided significant liquidity in the banking system, and some of them have become excess reserves (estimated at over one trillion dollars in the year 2009). Fed's net profit in 2008 compared to 2007 increased by over 14%, while in 2009 compared to 2008 increased by 21.65%.

### 3. MEASURES OF LIQUIDITY SUPPLY ADOPTED BY ECB

The non-standard monetary measures implemented by the ECB can be classified into two broad categories: operations that concern the direct purchase of assets issued by private sector and operations of lending to euro area credit institutions (known as *enhanced credit support*), characterised by an extended maturity and collateralised with asset-backed securities whose markets are temporarily disrupted or illiquid (Barbu, Boitan 2012).

The firm position of the European Central Bank of not being involved in the direct purchase of debt instruments issued by the State members makes it the only central bank which intends to buy only securities issued by private sector and not government bonds on the domestic market (euro area). The ECB's hesitancy to buy government bonds must be seen in the light of its unique position, as a supra-national central bank, which has not one but sixteen fiscal authority counterparts (Meier, 2009, p. 40).

The risk that the ECB becomes a market maker for public debt can be interpreted as being against the Treaty that prohibits monetary financing (Smaghi 2009), the Eurosystem having to decide on the distribution and purchase of government bonds in the euro area countries, so as to avoid providing privileged access to certain countries.

Hence, the measures adopted by ECB consisted in the direct purchase program for euro-denominated covered bonds (debt securities issued by banks), announced by the Governing Council on 4 June 2009. The total amount desired was established at EUR 60 billion, the acquisitions starting in July 2009 and being expected to be fully implemented until the end of June 2010. It was agreed that the technical modalities imply direct purchases in both primary and secondary markets.

The ECB's engagement in outright purchases of covered bonds had been correlated with the aim of reviving the covered bonds market, from the standpoint of liquidity, spreads, issuance frequency and volume. In addition, the covered bonds purchases involved very low credit risk.

ECB's reluctance in directly purchasing private assets can be justified by its desire to exit quickly and smoothly from the framework imposed on by unconventional methods. Heavily reliance on reversible open market operations, such as repos, is a good reason from this standpoint. In the case of buying assets, it may raise the question of whether to keep the security until maturity, or to sell it.

For the euro area, Trichet (2009) has consecrated the term *enhanced credit support* to designate the ECB's policy toolkit through which monetary policymakers aim to fully accommodate banks' liquidity needs. He defined it as being special measures, focused primarily to banks, which have been taken in order to stronger enhance the flow of credit that it could be achieved through key interest rate reductions alone. ECB's unconventional measures targeted mainly the euro area banks, representing recognition of their role as the main source of financing in the euro area economy.

a) The traditional *refinancing operations* conducted by ECB have been the subject of a refinement, so as to offer an alternative for the credit institutions, at a time when the cost of borrowing on interbank market became abnormally high.

Since September 2007, ECB has allowed the provision of liquidity through longer-term refinancing operations, at variable rate tender procedure with full allotment and extended maturities of three or six months. Also, ECB publicly announced the temporary expansion of the collateral pool, until the end of 2009. Reclassification of collateral was conducted so as to facilitate the supply of

liquidity. The list of assets eligible as collateral in ECB's credit operations has been filled with: marketable debt instruments issued by central government, central banks, local and regional government; euro-denominated syndicated credit claims governed by UK law; debt instruments issued by credit institutions, which are traded on the accepted non-regulated markets; subordinated debt instruments when they are protected by an acceptable guarantee; the credit threshold for marketable and non-marketable assets has been lowered from A- to BBB-.

Also, it has decided to expand the available range of maturities, so as to conduct longer-term refinancing operations at fixed rate tender procedures with full allotment and a maturity of one year.

This new change in the characteristics of longer-term refinancing operations was meant to solve the discrepancy between the investment and financing side from banks' balance sheet, at low indebtedness costs. Thus, the liquidity planning horizon becomes broader and less uncertain, encouraging lending (Trichet, 2009). The unlimited refinancing offered by ECB in exchange for a wide range of eligible collateral and extended maturities had been maintained until the end of October 2010.

b) To avoid foreign currency liquidity shortages in euro area, the Governing Council of the ECB decided to reactivate, on 11 May 2010, the temporary *liquidity swap lines* with the Federal Reserve. The US dollar liquidity provision will take the form of repurchase operations against ECB-eligible collateral and will be carried out as fixed rate tenders with full allotment, at maturities of 7 and 84 days.

Below we have summarized the impact of unconventional instruments implemented by the ECB on the structure of balance sheet items and their modification. At December 31, 2008 compared with December 31, 2007 ECB's total assets (expressed in millions euro) sharply increased with over 204%. Table 2 provides an overview of the evolution recorded by some components of the asset and liability side.

**Table 2. ECB's financial statement (selective)**

	2010	2009	2008	2007
Total assets (millions euro)	163,523	137,997	383,903	126,028
Claims on non-euro area residents denominated in foreign currency	39,713	35,455	41,610	29,170
Claims on euro area residents denominated in foreign currency	4,326	3,293	22,225	3,868
Intra-Eurosystem claims	67,176	70,873	295,117	71,371
Securities of euro area residents denominated in euro	17,925	2,181	0	0
Total liabilities (millions euro)	133,201	116,645	363,048	113,039
Liabilities to non-euro area residents denominated in euro	1,201	9,515	253,930	14,571
Liabilities to non-euro area residents denominated in foreign currency	478	18	1,444	667
Liabilities to euro area residents denominated in foreign currency	0	0	272	0
Intra-Eurosystem liabilities	61,429	40,204	40,149	40,041

**Source:** Data collected from ECB annual reports as of 31 December 2008, 31 December 2009 and 31 December 2010

Almost 77% of this substantial increase was due to intra-Eurosystem claims, which augmented three times than the value recorded at 2007 year-end. As table 2 depicts, at end 2009 the value of this item returned to approximately the same value as of end 2007. The explanation for this sudden, high increase during 2008 consists in several US dollar bilateral swap transactions with some national central banks in euro area.

The item security of euro area residents, which appears only in the financial statements for 2009 and 2010, consists in the euro-denominated covered bonds, issued in the euro area which has been acquired by the ECB, for monetary policy purposes. The claims on non-euro area residents denominated in foreign currency represent the transactions between ECB and the central banks in EU, which are not members of the euro zone. Their value increased in 2008, relative to end 2007 with over 42%, mainly due to foreign currency swap transactions between ECB and Denmark's National bank, respective with Swiss National Bank.

The reason for which ECB's balance sheet size sharply contracted with about 64.05% at 2009 year-end and with 57.4% in 2010 relative to end 2008, lies in the strategy of monetary easing implemented by the central bank. It relied mainly on operations whereby the ECB purchases or sells assets under a repurchase agreement, purchases/sells euro/foreign currency under bilateral swap arrangements or offers credit against temporary extended range of collateral, through full-allotment refinancing operations. As they are reverse transactions, at maturity they simply disappear from ECB's balance sheet. In addition, the smooth, gradual exit from these non-standard measures, as they simply mature, has been considered by ECB's officials as a major advantage.

On the liabilities side, liabilities to non-euro area residents, denominated in euro, accounted at end 2008 for near 70% of total liabilities. This sharp increase was mainly due to a liability to the Federal Reserve amounting to €4.5 billion in 2009 and €219.7 billion in 2008, resulted from the temporary swap line that provided US dollar liquidity to ECB, which further directed it to national central banks in EU, in the form of reverse and swap agreements. The 2009 ECB annual report mentions also another liability amounting to €1.8 billion in 2009 and €18.4 billion in 2008. "Swiss francs were provided by the Swiss National Bank by means of a swap arrangement with the aim of offering short-term Swiss franc funding to Eurosystem counterparties" (ECB annual report, 2009, p.214). The contraction with 96% in the value of the above liabilities at end 2009 illustrates a decline in non-euro area residents' demand for US dollar and Swiss franc liquidity.

In 2008, the total net revenues of the ECB have registered a substantial increase of 343.77%, compared with 2007, following the extensive program of liquidity granting in the euro area, through refinancing operations. In 2009, compared to 2008, they increased by 55.23%. The profit for the financial year 2007 was of zero euro, while in 2009 compared to 2008 it saw an increase of 70.4%.

#### **4. CONCLUDING REMARKS**

Several studies have outlined the need that the specific unconventional measures implemented by the major central banks be adapted to the structural characteristics of the economy and, in particular, to the manner companies and individuals obtain financing. Smaghi (2009) stated that, given the importance of credit institutions in providing financing to the economy, unconventional measures that would best suit the euro area may differ in purpose and scale of the U.S. and other advanced economies, where the financial system is market-based. In addition, the unique institutional framework of the euro area had been a supplementary challenge in implementing non-standard measures.

Comparing the scope and nature of unconventional facilities implemented by the Fed and the ECB, it can be noted that, in the case of Federal Reserve, the comprehensive programs designed to unfreeze interbank markets have been just as important as those who have sought to stimulate key credit markets, while ECB adopted a conservative attitude. Morgan (2009) justified this prudent attitude by the fact that ECB "made modest steps toward unconventionality" of monetary policy measures. Borio and Disyatat (2009) argued that the ECB has put a greater emphasis on supporting banks in the euro area because of the region's dependence on bank intermediation, while Fed's intervention, mainly on non-bank credit markets in the U.S. is in full compliance with its market-based financial system.

From Meier's (2009) standpoint, the program adopted by the Fed is the most ambitious in terms of volume and performance, especially with regard to large scale purchases of private, public and quasi-public securities. On the other hand, purchases of assets made by the ECB are relatively low in volume.

Non-standard measures taken by both central banks have had an impact on both sides of the balance sheet; therefore it is difficult to assess the monetary policy orientation and summarize it into a single indicator.

Minegishi and Cournède (2010) have a proposal in this regard, namely the use of monetary base as a proxy indicator of unconventional monetary policy actions, as it reflects changes on both sides of the balance sheet.

Comparing the growth of monetary base in late 2009 and late 2007, the year of the financial crisis onset, it differs significantly between the two monetary authorities. For the Fed, it rose during that period more than 137.62%, while the ECB's monetary policy actions have resulted in an increase of over 55%. In the U.S., during 2009, the substantial increase in the monetary base was due largely to substantial asset purchase programs, while in 2008 it was caused by liquidity facilities. For the ECB, the monetary base growth was due, mainly, by the provision of liquidity support to the banking sector rather than by direct intervention in the market through direct purchases of covered bonds.

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