ECB Three-Year Long Term Refinancing Operations

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Abstract

The announcement of the three-year Long-Term Refinancing Operations (LTROs) by the ECB on December 8, 2011 signaled the beginning of the largest ECB market liquidity programs to date. Continued and increasing liquidity related pressures in the form of ballooning financial market CDS spreads, Euro-area volatility, and interbank lending rates prompted a much more forceful ECB response than what had been done previously. The LTROs, using a repurchase (repo) agreement auction mechanism, allowed any Eurozone financial institution to tap essentially unlimited funding at a fixed rate of just one percent. Because the three-year LTROs were so similar to their shorter-maturity counterparts, the types of eligible collateral were almost identical, though the three-year operations were slightly less strict with the types of asset-backed securities (ABS), loans, and debts that could be pledged. The first operation, conducted on December 22, 2011 saw 523 banks draw €489.2 billion in funding, and the second operation, finalized on February 29, 2012 saw 800 banks draw €529.5 billion. Much of the liquidity, rather than being put into private credit markets, was placed at the ECB deposit facility to supplement the interbank lending market. Banks that were more vulnerable to a credit crunch, often located in peripheral countries such as Spain and Italy, tended to use the facility more, and also drove the increase in the supply of private credit. Less at-risk institutions tended to engage in "reach-for-yield" strategies with debt from riskier sovereigns. Post-crisis evaluations were mixed, but analysts tend to agree that the facilities helped ease the initial shock in the Euro-area money market and reduce the impact of the credit crunch on the broader economy.

Keywords: European Central Bank, ECB, Long Term Refinancing Operations, LTRO, Market Liquidity Programs, Market Liquidity, Wholesale Funding, Credit Markets, Repurchase Agreements, Repos

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At a Glance

Despite the acute pressures of the global Financial Crisis having passed, conditions in European interbank lending and money markets continued to deteriorate through 2011. This was apparent in ballooning financial market CDS spreads, interbank lending rates, and money market volatility. Increasing liquidity pressures prompted the European Central Bank (ECB) to respond more forcefully with the announcement of two three-year Long-Term Refinancing Operations (LTROs) on December 8, 2011. Previously, the ECB had conducted LTROs and other refinancing operations to support monetary policy goals and address liquidity pressures. But the earlier LTROs had maturity horizons of no more than one year.

Summary of Key Terms	
Purpose: To address intense liquidity-related pressures in Euro-area money markets to avoid a credit crunch.	
Announcement Date	December 8, 2011
Operational Date	1st: December 21, 2011 2nd: February 28, 2012
Date of First Issuance	1st: December 22, 2011 2nd: March 1, 2012
Final Repayment Date	1st: January 29, 2015 2nd: February 26, 2015
Program Size	Unlimited; Unspecified.
Usage	1st: €489.2 billion by 523 banks. 2nd: €529.5 billion by 800 banks.
Outcomes	Approximately €1.02 trillion drawn on by at least 800 banks.

The three-year LTROs were conducted via an auction mechanism. These auctions allowed European financial institution to bid for funding in the form of repurchase (repo) agreements, with the ECB as the counterparty. European financial institutions with eligible collateral could bid on essentially unlimited amounts of funding, as the ECB did not specify a hard cap. The repos were auctioned at a fixed rate of one percent.

Eligible collateral was expanded from previous operations to include asset-backed securities (ABS) with a second-best rating of at least "single-A" at issuance that would continue to hold that rating; assets made up of loans to small and medium-sized enterprises (SMEs); and government-guaranteed liabilities. Banks that participated in the ECB's earlier one-year LTRO in October of 2011 were also given an option to lengthen the maturity of repo agreements obtained there to three years on December 22, 2011, the day of the first auction. The first operation saw 523 banks draw €489.2 billion in funding, and the second operation, finalized on February 29, 2012 saw 800 banks draw €529.5 billion for a grand total of approximately €1.02 trillion.

Summary Evaluation

The three-year LTRO program was the ECB's largest market liquidity programs ever. It received mixed reviews. The ECB argued that the program had eased strains in European money markets and helped to prevent a Euro-wide credit crunch. Lenders who were most vulnerable to the credit crunch, often in peripheral countries like Italy and Spain tended to use the facility more and were the main drivers of private credit growth. While credit growth contracted, one analysis concluded that it would have contracted more if the LTROs had not been in place. Many lenders, particularly those that were less vulnerable, opted to use the cheap financing to invest in high-yield government bonds. Conversely, much of the funding was deposited at the ECB deposit facility, suggesting that the ECB became a large substitute in the interbank lending market.

Contents

I. Overview

Background

Despite numerous conventional and unconventional interventions by the ECB and various national governments to alleviate stresses brought on by the Global Financial Crisis, the Eurozone was still in a shaky position at the start of 2011. A blooming sovereign debt crisis, catalyzed by the downgrading of Greek debt by ratings agencies and upwards revisions by the Greek government their total indebtedness, sent European markets back into turmoil.

Financial institutions became more and more liquidity constrained as conditions worsened. European money markets chilled, with liquidity concerns morphing into solvency ones as financing became more expensive. EURIBOR-OIS spreads rose to over 100 basis points in July 2011. Volatility also rose sharply. Despite being a few years removed from the Global Financial Crisis, CDS spreads for financial institutions rose to over 350 basis points in mid-2011, almost 200 basis points higher than spreads of non-financials ("Impact of the Two Three-Year Longer-Term Refinancing Operations").

Several countries on the Eurozone periphery found themselves in increasingly precarious financial positions. Sovereign CDS spreads and sovereign debt yields for Italy and Spain rose precipitously, indicating that investors were wary about sovereign debt.

Program Description

To remedy these conditions, the ECB announced on December 8, 2011 that it would conduct two three-year Long-Term Refinancing Operations (LTROs) in December of 2011 and February of 2012. Previously, the ECB had conducted Long Term Refinancing Operations (LTROs) and Main Refinancing Operations (MROs) that had maturities of up to one year. This announcement marked the first time the ECB would issue such long-term funding. This decision was unprecedented, though not surprising given the conditions of European financial markets at the time.

The actual mechanism for conducting these operations was through repurchase (repo) auctions held by the ECB. Repo agreements, which are just forms of collateralized lending for normally short terms, were how the ECB conducted earlier LTROs and MROs. Financial institutions with eligible collateral could bid and, in effect, purchase ECB funding at a rate comparable to, or often much cheaper than, rates in private markets. These institutions could then use the new financing to lend to nonfinancial firms that were also experiencing the effects of a credit crunch and thus alleviate those liquidity-related pressures. In the case of the Eurozone, the money obtained via the LTROs could also be used to buy sovereign debt of peripheral countries like Italy and Spain, some of which was trading several hundred basis points higher than core countries. These governments, who were experiencing extreme difficulty in selling their sovereign debt, were thus able to indirectly access ECB funding while simultaneously allowing banks to get rid of toxic assets on their balance sheets. The primary objective of the program, therefore, was to improve short-term financing conditions for European financial institutions so that the effects of a continent-wide credit crunch wouldn't be felt by the real economy.

For the two three-year LTROs, auctions were held on December 21, 2011 and February 29, 2012, with maturity dates of January 29, 2015 and February 26, 2015, respectively. The funding obtained at these auctions could be repaid early after one year either in full or by the week The ECB also permitted any banks that were counterparties to earlier one-year LTROs that were settled in October of 2011 to extend their maturity to three years, so long as they notified their respective national central banks (NCBs) by December 19, 2011. €45.7 billion of €56.9 billion, or just over 80%, was converted this way ("Impact of the two three-year Longer-Term Refinancing Operations").

Financial institutions could bid on as much long-term funding as they felt they needed, provided they had the appropriate collateral. Additionally, the rates paid for the funding, at just one percent, were much lower than what private markets were offering. This was primarily true for banks on the Eurozone periphery, who were seen as less credit-worthy than their Eurozone core counterparts. Thus, banks in the periphery could lock in unlimited amounts of low-cost, long-term funding while cleaning up their balance sheet.

Despite being extremely similar in structure to their previous LTROs, the ECB added several additional stipulations to expand the range of eligible collateral, incorporating loans to SMEs and additional mortgage-related assets ("ECB announces measures to support bank lending and money market activity"). In the case of asset backed securities, only the most senior tranches were eligible ("FAQs on the measures to support bank lending and money market activity.").

Finally, government-guaranteed debt was also eligible, which, in some cases, made banks self-select into government guarantee programs.[2] This gave institutions the option to use this guaranteed debt as collateral in the LTROs to obtain low-rate ECB financing, which they would then invest in higher-yield government debt, usually from peripheral countries.

Outcomes

When the last auction settled at the end of February 2012, over 1 trillion euros in repo agreements had been issued, making the three-year LTROs the largest Eurosystem market liquidity programs ever. The first LTRO, settled on December 21, 2011, was widely seen as more important for severely liquidity-restrained institutions, and totaled €489.2 billion for 523 banks. The second, which settled on February 29, 2012 and had a much wider participation, totaled €529.5 billion for 800 banks. Liquidity appeared to return following the announcement and settlement of both operations. CDS spreads, particularly financial CDS, declined nearly 150 basis points from their 350 basis point peak. Interbank lending rates and Eurosystem money market volatility also fell ("Impact of the two three-year Longer-Term Refinancing Operations").

[2] See Evaluation section for further discussion.

As mentioned earlier, banks in Italy and Spain were particularly vulnerable in 2011. They accounted for approximately two-thirds of the total amount issued under the three-year LTRO (Carpinelli and Crosignani, 2017). Overall LTRO activity peaked while the three-year LTRO was in place, nearly doubling from its previous peak of about €896 billion during the Global Financial Crisis.[3] Additionally, the balance sheet of the ECB grew significantly, rising almost to the size of the Fed's and the Bank of England's by 2012 (Pisani-Ferry and Wolff, 2012). The driving force behind this expansion was the huge increase in repo transactions conducted by the ECB during both the Global Financial Crisis and the sovereign debt crisis. From February 2007 to February 2012, 64% of the growth in the ECB's balance sheet came from an increase in repo agreements.[4]

Banks in southern Europe made up 70% of medium and long-term refinancing operations (Pisani-Ferry and Wolff, 2012). Core Eurozone countries also were much more likely to repay any three-year LTRO funding early, with German banks reducing LTRO funding reliance by 80% from 2012 to 2013. In contrast, Italian banks only repaid 20% of funds and Spanish banks 45% by 2013 (Daetz et al. 2018). Many banks that used the program also opted to place much of the liquidity at the ECB deposit facility, although it paid interest of only 25 basis points interest, compared to the 100 basis point fee that financial institutions paid at the auctions. The amount outstanding in the deposit facility nearly doubled following the two operations. After the first three-year LTRO on December 2011, the amount outstanding shot up to €411.8 billion from €214.1 billion, a 92% increase. The second three-year LTRO yielded an even larger rise: from €477.3 billion to €820.8 billion, an increase of 72% and the highest recorded during the crisis.[5] While the portion of these funds that came from the three-year LTROs is unknown, the dramatic increases following the allotments certainly suggests that some European financial institutions opted to place their money in the deposit facility. The deposits held at the ECB would hover at over €700 billion until July of 2012, when the ECB lowered the deposit facility rate to 0% ("Key ECB interest rates").

Early repayment was a key feature of these Operations, as it meant that the pair of three year LTROs were effectively two one-year LTROs with an up to three-year maturity extension option. Participants were eligible to return funds from the first and second LTROs on January 25, 2013 and February 22, 2013, respectively. From January 25, 2013 to June 27, 2013, approximately €205.8 billion and €101.7 billion were repaid from the first and second LTROs, respectively ("Early Repayments of Funds Raised Through Three-Year Longer-Term Refinancing Operations: Developments Since February 2013"). This suggested that the adverse pressure felt by many European financial institutions at the onset of the programs had lessened dramatically. However, other factors, such as a general return to more "stable" sources of funding, widespread balance sheet adjustments, and signaling effects, also have played roles in the amounts repaid ("Early Repayment of Funds Raised Through Three-Year

[3] This was as of the week of June 19, 2009.
[4] See *Figure 1* for more information.
[5] See *Figure 2* for more information. Deposit facility funds during this period peaked on February 27, 2012, at just over €820 billion.

Longer-Term Refinancing Operations: Economic Rationale and Impact on the Money Market.”).

Following the operations, there was a dramatic increase in excess liquidity in the system, rising from €258.1 billion to €775.6 billion between the maintenance periods of November 2011 and March 2012 (“Early Repayments of Funds Raised Through Three-Year Longer-Term Refinancing Operations: Developments Since February 2013.”). Initially, European banks repaid their funds faster than markets anticipated, and expected EONIA rates rose, indicating that markets believed that reliance on LTRO funding would taper off quicker than expected. However, early repayment amounts quickly flattened, and became relatively steady following the large initial burst of early repayments. As a result, short-term money market rates tended to stay just above the deposit rate.

II. Key Design Decisions

1. **The three-year Long Term Refinancing Operations were designed to provide liquidity to European financial institutions to lend on private wholesale funding markets during a period of persistent and growing market tension.**

The financing itself took the form of longer-term repo agreements, with maturities of three years. Not unlike other, more standard refinancing operations, the ECB conducted an auction for each of the two LTROs in which financial institutions could pledge collateral in exchange for long-term, wholesale funding.

2. **Legal authority for the operations came from Article 18.1 of the ESCB Treaty.**

Article 18.1 specifically gives the ECB the authority to engage in repo agreements, which were the types of funding used for the three-year LTROs (“Institutional Provisions”). The article specifically states that “…the ECB and the national central banks may:

> “1) operate in the financial markets by buying and selling outright (spot and forward) or under repurchase agreement and by lending or borrowing claims and marketable instruments, whether in euro or other currencies, as well as precious metals;
>
> “2) conduct credit operations with credit institutions and other market participants, with lending being based on adequate collateral.”

3. **The program was administered by the respective national central banks (NCBs) that each participating financial institution was located in.**

In order to perform an early repayment, lenders had to (i) notify their respective National Central Bank (NCB) at least one week in advance with the intent to repay early and (ii) repay on the next settlement day of any of the ECB’s regularly scheduled Main Refinancing Operations (MROs).

NCBs also had some discretion when it came to eligibility of collateral, and could accept "additional performing credit claims that satisfy specific eligibility criteria", provided that they take responsibility for, or bear the risk for, credit claims that are accepted this way.

4. **The ECB did not place an explicit cap on the amount of funding auctioned.**

At the conclusion of the second auction, the total amount of three-year LTROs outstanding was over €1 trillion. The first LTRO had €489.2 billion auctioned to 523 banks, and the second €529.5 billion to 800 banks. A number of sources specifically cite the potential level of funding as unlimited.[6]

5. **All Euro-area banks were eligible to participate in the program.**

523 and 800 banks from 19 different countries participated in the first and second LTROs, respectively. Additionally, institutions in the southern periphery of the Eurozone had considerably more activity, accounting for over 70% of medium to long-term refinancing operation funding as the crisis intensified (Pisani-Ferry and Wolff, 2012). Specifically, banks in Spain and Italy were very active, accounting for approximately two-thirds of the total amount issued (Carpinelli and Crosignani, 2017).

6. **Sovereign debt, government guaranteed securities, and senior ABS tranches were eligible, with some caveats.**

All of the usual collateral accepted in normal refinancing operations was eligible. Additional securities were also included, such as:

(i) "ABS having a second-best rating of at least 'single-A' in the Eurosystem's harmonized credit scale at issuance, at all times subsequently."

(ii) "The underlying assets of which comprise residential mortgages and loans to SMEs."

(iii) Government-guaranteed debt.

In addition to the eligibility criteria listed above, the ECB required the following:

(i) All cash-flow generating assets used as collateral had to be of the same class.

(ii) Non-performing, structured, syndicated, or leveraged loans were ineligible.

(iii) Any institution that was a counterparty or a "close third-party" to ABS used as collateral could not act as interest rate swap providers

(iv) All documentation was required to have servicing continuity provisions.

[6] See Carpinelli and Crosignani, 2017; Andrade et al. 2017; Daetz et al. 2018.

7. **The LTROs had three year terms, with an option of early repayment after one year.**

This was the first time that three-year LTROs had been issued. Prior to these, only LTROs with terms of one year or less had been issued. The new agreements could also be repaid early after one year as well, either all at once or on a weekly basis so long as the early repayment day was the same as the settlement day for an MRO ("Early Repayment of Funds Raised Through Three-Year Longer-Term Refinancing Operations: Economic Rationale and Impact on the Money Market"). Participating institutions only had to give their respective NCB a one week's notice of their intent to repay prematurely. Additionally, the ECB allowed banks that had tapped financing from the one-year LTRO in October of 2011 to refinance these operations into three-year LTROs as a part of the first allotment in December.

8. **There does not appear to have been a cap on banks' participation, and there were no minimum amounts required.**

9. **The rates for the LTRO auctions were a flat one percent.**

This rate was the average of the ECB's main refinancing operations (MROs) over the course of the operation, which were variable rate. At the time of the auction ECB repo rates were one percent. EONIA swaps, which were a proxy for future MRO rate levels, indicated that they would likely stay low (Andrade et al. 2017).

10. **Two auctions were held for the two operations: the first on December 22, 2011, and the second on February 29, 2012.**

Both auctions, however, were announced on December 8, 2011. The ECB continued to conduct its weekly auctions for main refinancing operations (MROs) and shorter-term LOTRs for three month, six month, and one year maturities. These operations did not cease despite adverse market conditions.

III. Evaluation

Due to the massive size of the program, the three-year LTROs have been quite heavily scrutinized by academics, journalists, and politicians alike. Generally speaking, institutions that were most acutely distressed during the sovereign debt crisis tended to use the facilities the most. The ECB stated that banks that were more risky tended to bid more at the LTROs, and that even if private markets were able to provide some funding to banks, there was still a heavy incentive to borrow from the facility. However, they stated that, "by improving funding conditions, the ECB may have prevented the disorderly shedding of assets, which would have placed certain financial market sectors under pressure" as well as emphasizing a belief that the introduction of these programs contained spillover effects to larger markets ("Impact of the Two Three-Year Longer-Term Refinancing Operations").

This rationale was very clear because, while there was not significant growth in private credit or bank lending relative to the size of the program, it was effective in halting the freefall and ultimately stabilizing these two channels. Additionally, spillover effects from the financial sector to the real economy, which was one of the ECB's chief concerns when designing the program, appeared to have been significantly lessened due to the increase in system-wide liquidity.

One study by the National Bank of Belgium estimated that Euro-area output and inflation were significantly impacted, and would have been more than one percent lower without the operations (Boeckx et al. 2017). Demand for sovereign debt was also positively impacted, despite not being a primary objective of the program. In Spain, Italy, and Ireland, sovereign debt yields decreased around the time of the announcement, with the largest decrease being 51 basis points for Spanish two-year bonds (Krishnamurthy et al. 2017).

Despite the seemingly robust impact on sovereign debt markets and macroeconomic aggregates, the results were mixed for bank lending, which was the primary area the ECB was trying to affect. In a paper published in November of 2018, Stine Louise Daetz and her coauthors emphasized that, while these programs appeared to have halted the decline in corporate investment, there was no significant increase in lending, either. Distressed lenders did not lend more heavily. However, companies that were able to obtain new loans from lenders who received LTRO financing increased their investment. Finally, the authors provided an interesting counterfactual analysis, explaining that non-Eurozone companies that did not have direct access to LTRO financing decreased their investment more than those in the Eurozone (Daetz et al. 2018).

Some analysts argued that the LTROs did not adequately address their primary goals. Italian and Spanish bond yields, while positively impacted by the first round of three-year LTROs, still continued to increase in the later parts of 2012. Spain specifically saw a precipitous increase in its 10-year bond yield from 5% to 7.6% from March 2012 to July 2012 ("Re-visiting the ECB's 3-year Long Term Refinancing Operations."). The deteriorating quality of some sovereign debt was also an issue both at the ECB and in periphery banks, who had bought the debt in bulk. For the ECB, a default by any of these periphery countries, however unlikely, would seriously damage the quality of some of the assets on the ECB's balance sheet. For periphery banks, Sia Partners used Fitch downgrading Santander and BBVA to BBB+ shortly after doing the same to Spain's credit rating a week prior as an example, suggesting that many of these banks were now tightly tied to their sovereigns. The Economist echoed similar sentiment, arguing that the austerity measures that Spain had instituted were actually harming its return to economic growth, and that the acute phase of the crisis was still quite close ("Draghi strikes back II").

One evaluation written by Jean Pisani-Ferry and Guntram Wolff called these operations the Eurozone equivalent of QE, but that it did not have the same impact as its sister program. The was predicated on the fact that approximately €700 billion that was put into the ECB deposit facility rather than lent out, suggesting that the ECB had become a large substitute in the interbank lending market.[7] Additionally, the authors mentioned significant asymmetry in the behavior of banks in the northern part of the Eurozone versus the southern part, explaining that southern European banks are much more heavily reliant on refinancing

[7] See Figure 2 for more information.

operations and still have decreased the amount of lending done, contrary to institutions in northern Europe. This asymmetry also extended to the behavior of highly-rated (AAA) issuers, who saw a minimal impact on the yield curve, compared to financially constrained issuers. The authors finished by discussing that the lack of a banking and fiscal union and substantial differences amongst Euro members contributed to massive monetary policy instruments like the LTROs not being as effective (Pisani-Ferry and Wolff, 2012).

In an analysis of the French banking sector, the Bank of France explained that most of the monetary policy transmission that one would expect from such a substantial operation happened after the first LTRO auction in December. The impact of the second was much more muted. Demand for the facility was highest in banks that were more liquidity constrained, and large, corporate borrowers tended to benefit the most from participating. Additionally, firms that had a previous history of strong profitability saw a positive impact on their supply of credit from lenders, suggesting that the policies did not lead to "zombie lending." Smaller firms, which were more reliant on bank funding and consequently more vulnerable to a credit crunch, saw a positive effect, but not to the same degree that large and "intermediate" borrowers did. The top one percent of borrowers had an increased credit supply that was 63% larger than the average firm used in the 24 bank sample. The most important finding to come out of this study was that, according to the authors' base estimate, every €1 billion in liquidity borrowed from the facility is associated with a credit increase of only €186 million (Andrade et al. 2017).

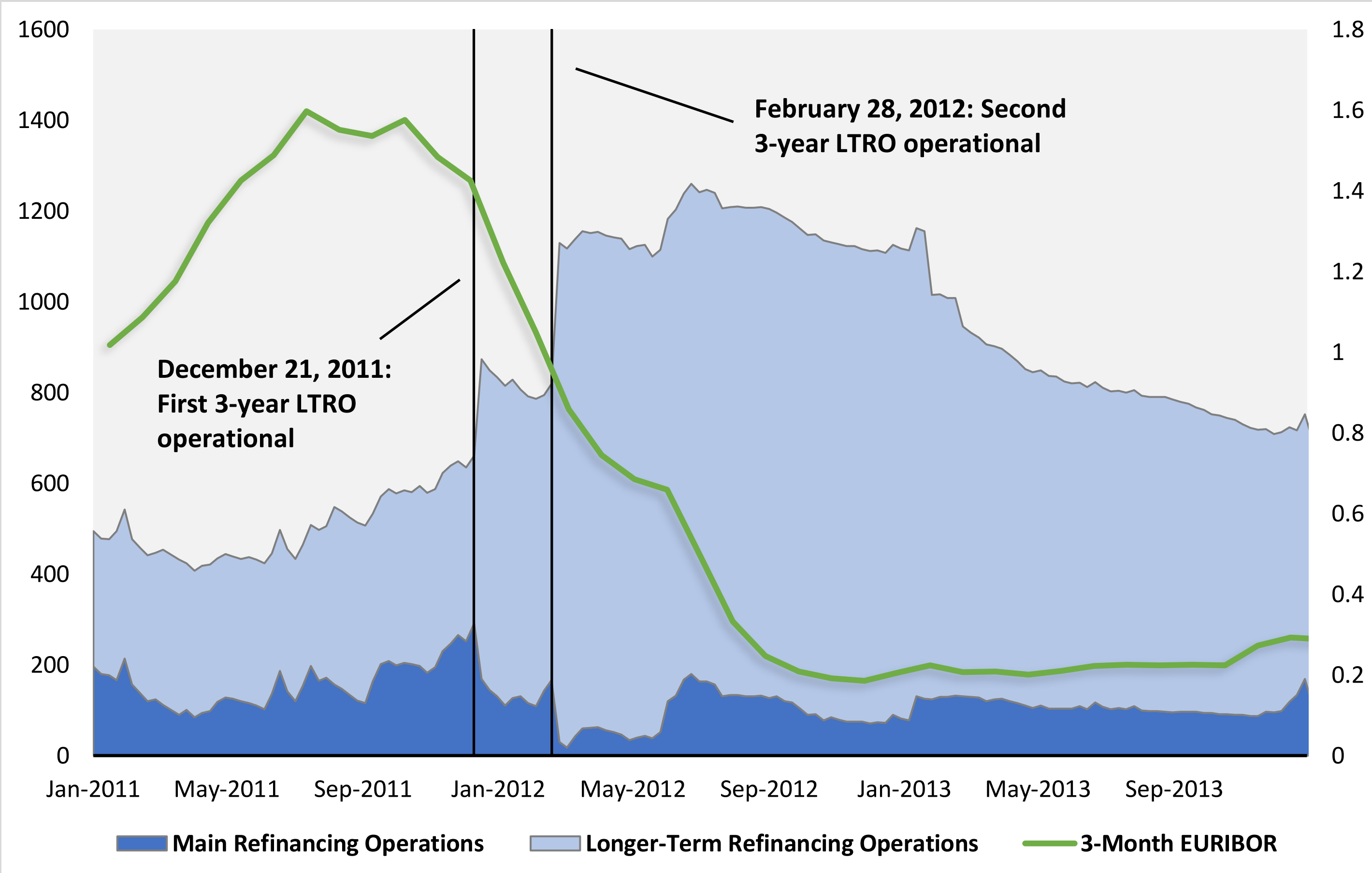
The Federal Reserve's analysis of the operations found that private credit absent the LTROs would have contracted two percent more, at 5.6% compared to 3.6% with the facilities. This result and the subsequent restoration of private credit was driven by lenders that were more exposed to the credit crunch. On the other hand, less exposed lenders tended to use the attractive, low-rate funding to purchase higher yield sovereign bonds, often from peripheral countries. In the case of Italy, which had established a government guarantee program, the authors found that many banks, regardless of the extent of their exposure, would self-select into the government guarantee program and then pledge those same securities as collateral. While more liquidity-constrained banks used the guarantee more, larger, less affected banks more regularly exhibited the "reach-for-yield" behaviors described above. Specifically, the Fed found that, for every Euro borrowed, exposed and less exposed banks invested €0.44 and €0.83 in government bonds, respectively. More exposed banks invested €0.13 of every Euro in private credit (See Carpinelli and Crosignani, 2017).

One finding that appears to be mostly constant throughout various analyses of the program is that more liquidity-constrained and stressed institutions, often located in "riskier" peripheral countries, use the facilities disproportionately more. Miguel García-Posada and Marcos Marchetti discussed the bank lending channel of the monetary policy transmission of LTROs extensively, saying that the operations had, "a positive, moderate-sized effect" on the supply of bank credit to firms. They estimated that annual credit growth directly attributable to the LTROs ranged from 0.8% to 1%, and that SME's benefitted more from this credit growth because they had less options to raise funding that larger firms could tap. Large firms, especially those with strong lending relationships with financial institutions, were not significantly affected at all because, as the authors explain, "relationship lending is a more stable source of credit than transaction lending" (García-Posada and Marchetti, 2016).

Thus, the evaluations suggested that the three-year LTROs had a mixed impact. This was due in large part to many institutions opting to keep substantial amounts of borrowed funds at the ECB, a lack of significant upward movement in major macroeconomic fundamentals, and other non-economic factors, such as the structure of the Eurozone itself. Despite these endogenous and exogenous weaknesses, the most favorable finding was that the hit that funding markets had taken as a result of the stress induced by the sovereign debt crisis had been weathered. The precipitous falls in various macroeconomic and financial aggregates slowed, though their recovery would be slow despite continued ECB intervention.

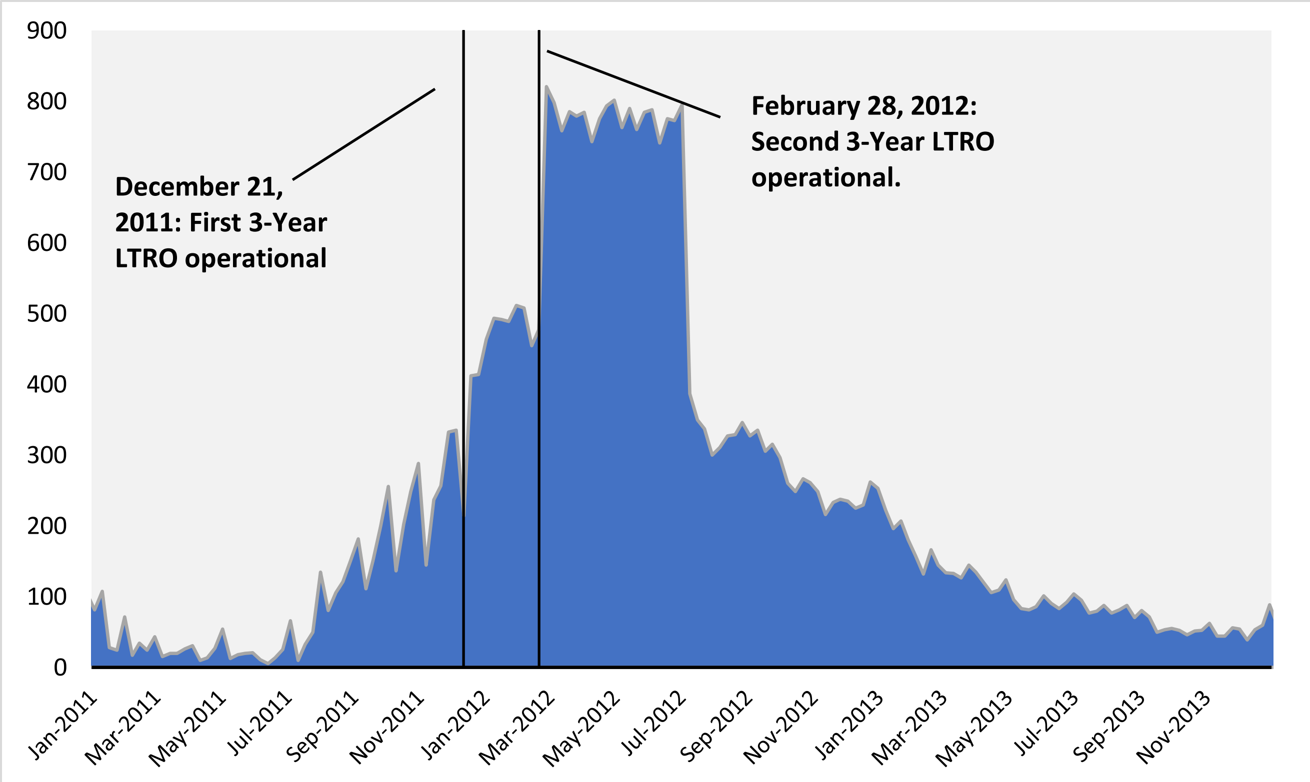
Banks that were hit the hardest by the credit crunch tended to use the facility the most, and their less affected counterparts by the credit crunch still used the facilities, but did little to drive the restoration of private credit. Less-exposed lenders opted instead to invest cheap central bank financing in high-yield sovereign bonds. The overall effect on the bank lending channel and, specifically, private credit, was relatively small compared to the size of the program. However, the facilities appeared to halt or considerably dampen the freezing of the Euro-area money market, and prevent a credit crunch from leaking into the real economy. In a press release following the allotment of the first three-year LTRO, Mario Draghi stated that, "…we do think that this decision has at least prevented a credit contraction that would have been more serious, far more serious (Draghi and Constâncio, 2012)."

Figure 1: Volume of ECB Refinancing Operations (€Billion, left axis) and 3-month EURIBOR rate (monthly, right axis)



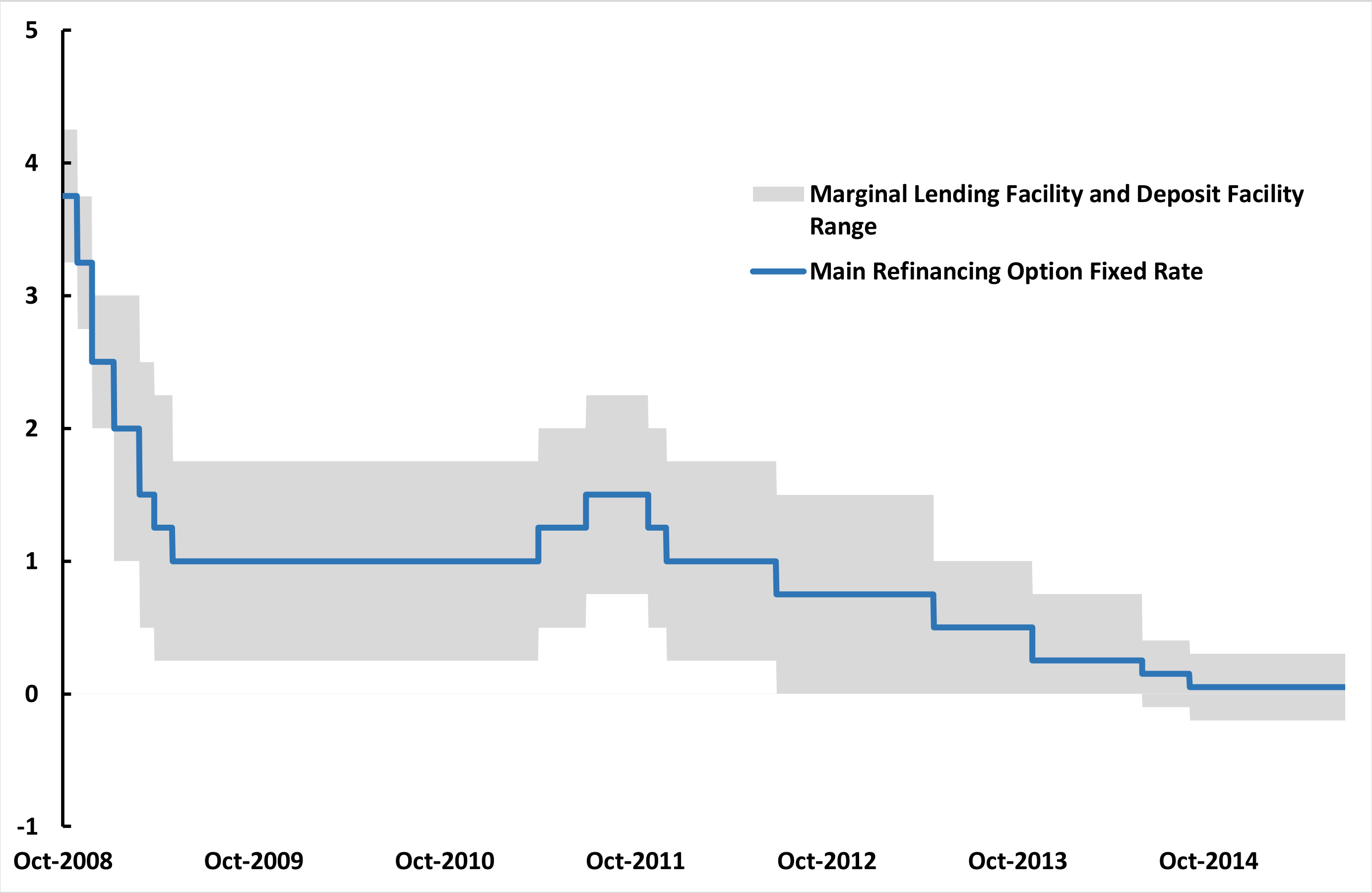
Source: ECB Statistical Data Warehouse

Figure 2: ECB Deposit Facility amount outstanding (weekly, €billion)



Source: ECB Statistical Data Warehouse

Figure 3 - Key ECB Interest Rates (%)



Source: ECB Statistical Data Warehouse

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