LUISS

Degree Program in Economics and Business

Course of Finance

The Transmission of Monetary Policy: Analyzing the Functioning and Effectiveness of TLTRO

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Academic Year 2022/2023

Abstract

In this thesis, we provide a concise overview of the key findings and highlights from our comprehensive study on the functioning and effectiveness of TLTRO.

We gathered information and data directly provided by the ECB Statistical Office and accessed from the ECB website to comprehensively understand the functioning of TLTRO and to visualize the trends associated with TLTRO not only at the aggregate level but also across specific countries. TLTROs of the European Central Bank have a wide-ranging impact on banking operations and balance sheets, as explored in two separate studies that make up this research. TLTROs and bank lending practices are examined in the first study, which reveals convincing empirical results. Loan supply is boosted through TLTROs, which become important factors in influencing lending behavior. The analysis also finds important indirect impacts, showing that TLTROs increase lending availability even among non-participating banks, favoring those with smaller market shares in particular. This highlights the critical importance of competition. The analysis also always worries about banks taking on more risky activities. The second study examines how TLTRO III has affected the balance sheets of Spanish financial institutions. The report, which focuses on four essential tactics including real economy lending, shows how crucial TLTRO III was in sustaining credit in the face of the pandemic's uncertainty. Participating Spanish banks often achieved or even exceeded their net lending goals, maintaining a steady stream of credit to the actual economy. State guarantee programs concurrently promoted lending even further. TLTRO III also significantly increased reserves held at the Banco de Espana by Spanish credit institutions, while it is important to note that other variables, such as the ECB's asset purchase programs, also had an impact. It's interesting to note that TLTRO III had little impact on the issuance or ownership of public debt by Spanish financial institutions, with a comparable rise in public debt to market circumstances. A modest decrease in bank debt issuance was caused by factors like rising deposits and higher issuance costs that were related to the COVID-19 issue. These studies shed important light on the intricate dynamics underlying the impact of TLTROs on lending practices and balance sheets. These findings will be important for understanding the complex interaction between unconventional monetary policy measures and the dynamics of the banking system for policymakers, financial institutions, and economists.

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Introduction

To affect economic activity and preserve financial stability, the transmission of monetary policy through financial intermediaries is crucial. This thesis examines the efficiency of monetary policy tools and the operation of financial markets, more specifically on the Targeted Long-Term Refinancing Operations. The study starts by analyzing the complex interactions that exist between central banks, financial intermediaries, and the larger economy. To illustrate the intricate web of interactions between monetary policy and financial intermediaries, emphasis is placed on the effects of interest rate fluctuations, loan availability, financial stability, asset prices, and general economic growth. The thesis then goes into greater detail about how the TLTRO functions as an unconventional monetary policy tool used by central banks. The historical context and implementation of the TLTRO are carefully examined through a thorough analysis of the literature. This study aims to shed light on the crucial role that TLTROs play in supplying commercial banks with long-term liquidity, reducing financing pressures, and encouraging lending to important economic sectors. Additionally, actual data is provided to assess how well TLTROs work at influencing loan flows and boosting economic activity. The paper provides helpful insights into the actual impact of TLTROs by studying data from different economic cycles and nations. The thesis also critically evaluates the obstacles and constraints that financial intermediaries must overcome to properly convey monetary policy impulses. The study will evaluate the results and offer perceptive suggestions regarding the success of the Targeted Long-Term Refinancing Operations. We want to determine the genuine impact of this on overall economic activity, to do this, we thoroughly assess the data and evidence.

Chapter 1 serves as our foundational exploration of the intricate relationships between central banks and financial intermediaries, as well as their profound impact on the broader economy. In our quest to provide a comprehensive understanding of the Targeted Long-Term Refinancing Operations, we rely on a wealth of authoritative sources, particularly the meticulous analysis of articles generated by the Governing Council of the European Central Bank (ECB). These articles, of a legal nature, are officially published on the ECB website and represent a vital cornerstone in our examination. We delve into the operational calendars, issuance mechanisms, and various facets of TLTROs by drawing upon the insights derived from these authoritative and extensively analyzed sources. Through this comprehensive

approach, we aim to elucidate the intricate web of interactions between monetary policy and financial intermediaries, providing valuable insights into the TLTRO framework.

In our exploration of the intricate landscape of monetary policy tools and financial markets, Chapter 2 delves into the causal relationships between TLTRO and banks' lending policies. This examination is conducted with a specific emphasis on the controversial effects of TLTRO I on the banking loan sector. Our insights in this chapter stem from a meticulous examination of the literature, with a particular focus on the research conducted by Desislava C. Andreeva and Miguel García-Posada in their article “The impact of the ECB’s targeted long-term refinancing operations on banks’ lending policies: the role of competition”.

This in-depth analysis enables us to unravel the complexities surrounding the impact of TLTROs on the lending behavior of financial institutions.

As we embark on our comprehensive examination of monetary policy tools and their repercussions on financial institutions, Chapter 3 directs its attention to Spanish credit institutions. Specifically, this chapter meticulously investigates the impact of TLTRO III on the balance sheets of these institutions. Our insights into this realm are grounded in a methodical examination of the literature, with a particular emphasis on the research conducted by M.a Carmen Castillo Lozoya, Enrique Esteban García-Escudero, and M.a Luisa Pérez Ortiz in their seminal work titled "The effect of TLTRO III on Spanish credit institutions’ balance sheets." This authoritative source provides us with valuable insights into the nuances of TLTRO III's influence on the financial stability and operational dynamics of Spanish credit institutions. In the conclusion, TLTROs have had a significant, varied influence on the Eurozone banking system, as shown by in-depth study and statistics from the statistical office of the European Central Bank. These unconventional monetary policies, especially TLTRO III, had a significant impact on bank balance sheets and holdings of public debt by assuring credit flow to the actual economy during the COVID-19 pandemic. This analysis emphasizes how crucial it is to comprehend the intricate dynamics of TLTROs in order to make wise choices about monetary policy and financial stability.

CHAPTER 1: Exploring the Dynamic Interplay Between Central Banks and Financial Intermediaries

1.1 Monetary Policy

To govern the money supply, interest rates, and credit conditions in the economy and achieve certain macroeconomic goals, a nation's central bank (or monetary authority) implements a set of acts and policies known collectively as monetary policy. These goals frequently include encouraging economic growth, maintaining financial stability, and maintaining price stability (managing inflation). The European Central Bank (ECB) is in charge of implementing monetary policy and maintaining price stability within the currency union. It serves as the central bank of the Eurozone. The ECB, which was founded in 1998 and has its headquarters in Frankfurt, Germany, is a key player in determining the economic and financial landscape of the 19 countries that make up the Eurozone.According to the Treaty on the Functioning of the European Union (TFEU), the ECB's fundamental goal is to ensure price stability. The ECB's specific target for inflation over the medium term is a rate that is close to 2%. This goal is essential for sustaining long-term economic growth, increasing trust in the euro as a trustworthy and stable currency, and preserving consumer and business purchasing power.

Beyond its primary goal of maintaining price stability, the ECB also supports more general economic goals within the Eurozone. It endorses the overall economic policies of the European Union to foster social progress, full employment, and balanced economic growth among all parties. According to the Treaty on the Functioning of the European Union (TFEU), maintaining price stability is the ECB's key goal. The ECB's target inflation rate for the medium term is specifically close to 2%. This goal is essential for encouraging sustainable economic growth, increasing trust in the euro as a trustworthy and stable currency, and protecting the purchasing power of individuals and businesses.

The ECB supports larger economic goals inside the Eurozone in addition to its primary goal of maintaining price stability. To encourage balanced economic growth, full employment, and social advancement for all participants, it supports the main economic policies of the European Union. Together with the national central banks of the participating nations, the ECB, which serves as the Eurozone's central bank, forms the ESCB. Together, they seek to uphold financial stability, monitor payment systems, and support the efficient operation of the financial markets in the euro region.

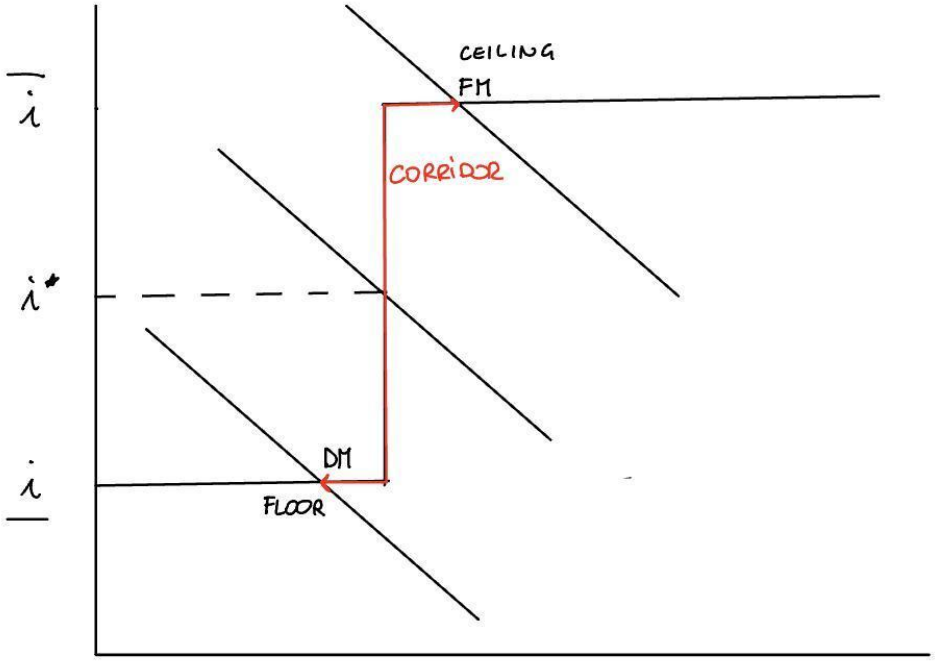
1.1.1 Conventional Instruments

I. Interest Rates

Because they have power over the monetary base and the money supply, central banks can affect short-term interest rates. They can alter borrowing costs for consumers and businesses by raising or lowering interest rates, which has an impact on spending and investment decisions.The central bank's key interest is the "policy rate," "refinancing rate," or "overnight rate" which is the term used to describe the principal interest rate established by the central bank. It shows how quickly commercial banks can get short-term loans from the central bank to meet their immediate liquidity needs or reserve requirements. The interest rate that the central bank pays commercial banks on their surplus reserves kept by the central bank is known as the deposit facility rate. It represents the interest rate that banks can receive on their central bank deposits. The central bank can encourage banks to keep more or less excess reserves by changing the deposit facility rate, which can have an impact on the money supply and general credit conditions in the economy. The interest rate at which commercial banks can borrow money directly from the central bank in times of need or when there is a shortfall in liquidity is known as the marginal lending rate. This rate, which is often higher than the policy interest rate, gives banks that may have run out of alternative funding options a short-term source of cash. A group of crucial policy rates known as the policy interest rate, deposit facility rate, and marginal lending rate collectively establish the range of short-term interest rates that can change. The crucial instrument that central banks utilize to direct short-term interest rates within the economy is the interest rate corridor. The policy rate, the deposit rate, and the lending rate are its three main components. The policy rate, which stands for the central bank's target rate for short-term interest rates, is the fundamental component of this system. Based on its monetary policy goals, which include preserving price stability and fostering economic growth, the central bank determines this rate. The central bank can alter the cost of borrowing and lending in the financial system and thus affect economic activity by affecting the policy rate. The deposit rate serves as the short-term interest rate floor and is set at a lower rate than the policy rate. The central bank will accept excess reserves from commercial banks in exchange for this interest. Banks may choose to deposit their excess cash with the central bank rather than lending to other banks at lower rates when short-term interest rates on the interbank market fall below the deposit rate. As a result, the interbank market's liquidity becomes less abundant due to the increasing demand for central bank deposits,

pushing short-term interest rates up. This approach aids in bringing interbank interest rates closer to the target rate set by the central bank. The lending rate, on the other hand, acts as the ceiling on short-term interest rates and It's set higher than the policy rate. Commercial banks have the option to borrow money from the central bank at this rate when there is a lack of liquidity. Banks may find it more advantageous to borrow from the central bank rather than from other banks when short-term interest rates in the interbank market increase above the lending rate. As a result, the central bank boosts the banking system's liquidity, easing upward pressure on interbank interest rates and directing them in the direction of the target rate. The middle of the corridor is made up of the interbank market, where banks lend and borrow from one another. Short-term interest rates in this range fluctuate depending on supply and demand factors, which reflect the liquidity requirements of different institutions. The interest rate corridor gives the central bank a flexible and reliable tool to steer short-term interest rates in the direction of its policy goals. In summary, the deposit rate acts as the floor, the lending rate acts as the ceiling, and overall, the interest rate corridor represents a dynamic interaction between the policy rate of the central bank. The central bank may impact borrowing rates, credit availability, and general economic activity thanks to this multidimensional framework, furthering its goal of promoting price stability and long-term economic growth. The central bank's decisions about these interest rates have a significant impact on how much it costs for individuals, companies, and other financial institutions to borrow money.

Figure 1 **INTEREST RATE CORRIDOR GRAPH**



II. Open Market Operations (OMO)

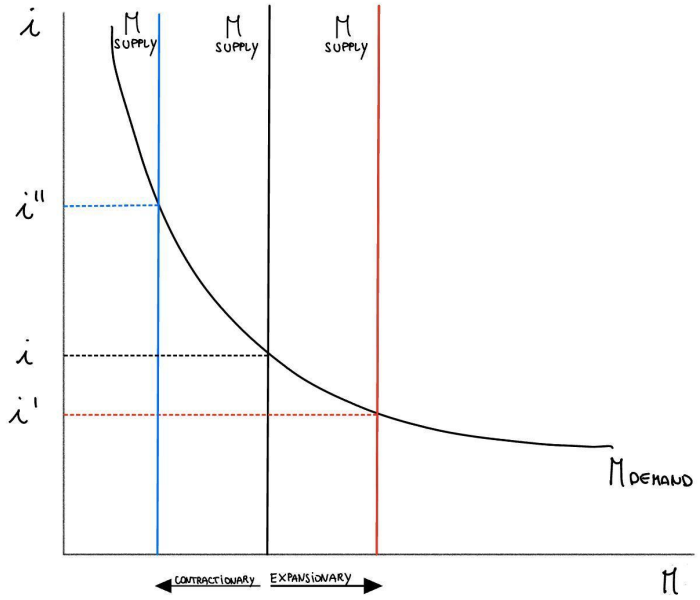
Open market operations are a mechanism that central banks use to control the quantity of money that is in circulation in the economy. This entails the central bank purchasing or disposing of securities issued by the government. The central bank purchases these assets to boost the amount of money accessible, which stimulates the economy. On the other hand, it sells these assets if it wants to decrease the money supply.

The central bank purchases government securities from individuals and companies during an open market transaction. This frequently occurs through banks or auctions. These securities are purchased by the central bank with newly produced funds, which later enter the money supply. The public and financial entities may buy government securities directly from the central bank or through auctions. These securities are purchased with money that buyers have on deposit with the central bank. As a result of these funds being used to purchase the securities, the banking system eventually has less money available.

Open market operations, or this strategy, are a critical instrument for central banks to manage the money supply and have an impact on the larger economy. Central banks have the power to

carefully control the financial currents of the economy by choosing when to buy or sell government assets.

Figure 2 **OPEN MARKET OPERATIONS GRAPH**



III. Reserve Requirements

Reserve requirements are put in place to make sure banks keep a particular amount of financial stability and liquidity to fulfill their responsibilities and safeguard depositors. The central bank can affect the process of creating money and, as a result, the overall money supply in the economy by regulating the amount of money that banks must hold in reserve. Banks are forced to maintain a bigger portion of their deposits as reserves when the reserve ratio is high, which reduces the amount of money they have available for lending and investing. As a result, there may be less money available, more expensive borrowing, and perhaps slower economic growth. A low reserve ratio, on the other hand, allows banks to maintain fewer reserves, which frees up more funds for lending and investment. The money supply may increase as a result, borrowing costs may decrease, and economic activity may be stimulated.

Changes in reserve requirements do not immediately affect lending, but rather over time. When borrowers receive loans from banks, the money is spent and eventually returns to the banking system as deposits. Banks use these fresh deposits as a foundation for future lending and deposit growth. To accomplish certain economic objectives, central banks employ modifications to reserve requirements as part of a larger monetary policy approach. Central banks may reduce reserve requirements during times of economic expansion or promote borrowing and investment, allowing banks to make and lend out more money. On the other hand, central banks may increase reserve requirements in times of inflationary pressures or excessive credit expansion to restrict lending and manage the money supply.

Capital requirements embody a risk-centered approach based on the concept of Total Risk Exposure Amount (TREA). This is outlined by Article 92 of the Capital Requirements Regulation (CRR), which establishes the foundation for determining the minimum capital obligations of financial institutions, contingent on their aggregate exposure to risk.

Article 92 of the CRR delineates a nuanced framework where distinct capital thresholds are correlated to the Total Risk Exposure Amount. This approach unfolds across three tiers:

Starting with Common Equity Tier 1 (CET1) Capital, institutions are required to maintain capital equivalent to 4.5% of their Total Risk Exposure Amount. This stratum constitutes a foundational layer of capital, forming 56% of the stipulated minimum Total Capital requirement. Advancing to Tier 1 Capital (T1), a supplementary layer of capital is established at 6% of the Total Risk Exposure Amount. This tier equates to 75% of the minimum Total Capital requirement, functioning as a supplementary buffer against risk.

Finally, at the apex lies Total Capital (TC), encompassing 8% of the Total Risk Exposure Amount. This comprehensive tier represents the entirety of an institution's funds, serving as the backbone of its financial stability. It precisely mirrors the stipulated minimum Total Capital requirement. This risk-centric capital requirements framework harmonizes capital obligations with an institution's risk profile, shaping a calibrated response to risk exposure. The tiered structure articulated in Article 92 of the CRR underpins sound risk management practices, ensuring institutions are equipped to navigate risk, sustain financial stability, and safeguard the interests of stakeholders.

1.1.2 Unconventional Instruments

I. Asset Purchase Programs (APP)

In response to difficult economic challenges, central banks have turned to APP), a strategic and unconventional monetary policy tool that aims to influence financial markets and influence economic outcomes. As part of an APP, central banks make sizable purchases of a variety of financial instruments, frequently including government bonds and other securities. This intentional infusion of capital into the market increases market liquidity and has an impact on interest rates, which in turn affects how much it costs for consumers and businesses to borrow money.

One of their main goals is to boost economic activity during recessions and other economic downturns. These purchases may result in a rise in demand that will spread across the economy, boosting investment and consumption. An APP can also assist in lowering longer-term interest rates, facilitating borrowing for both people and businesses. This can encourage spending and investment, which will boost growth.

Additionally, asset purchase programs may affect currency exchange rates, which may have an impact on how competitively priced imports and exports are on the global market. The devaluation of the currency that results from central banks' increased purchasing of domestic assets may make exports more desirable while raising the price of imports. Asset Purchase Programs are not without difficulties; they may give rise to worries about market distortion and asset price inflation in particular asset classes. To avoid abrupt disruptions in the financial markets, central banks must also plan their ultimate exit from these initiatives.

Asset Purchase Programs are a prime example of the creative approaches used by central banks to guide countries through complex economic environments to promote stability, spurring growth, and influencing financial conditions in a complex and interrelated way. In contrast to TLTROs, which focus on lending to particular industries or uses, APPs have a significant impact on all financial markets. Reduced yields on the assets that are bought characterize their impact, which in turn has an impact on interest rates for a variety of financial goods and investments.

When attempting to identify the specific effects of TLTROs, the simultaneous deployment of APPs and TLTROs, together with other monetary policy measures, provides a considerable hurdle. To influence financial markets and economic situations, these numerous techniques work together. It is challenging to solely link certain outcomes to TLTROs because of the interconnectivity of different policy instruments. The time component also adds another level

of intricacy. The results of monetary policy actions, such as APPs and TLTROs, may take some time to become apparent. Disentangling the immediate effects of TLTROs from the larger policy landscape is made more difficult by the impact's temporal delay.

Although TLTROs and APPs have different goals in the context of monetary policy, distinguishing their unique effects is made more difficult by their simultaneous use with a variety of other policy tools. This intricacy is a challenge for academics and decision-makers who want to comprehend the complex effects of TLTROs on the economy and financial stability.

II. Quantitative Easing (QE)

Quantitative Easing (QE) is an unorthodox instrument for monetary policy that central banks employ to alter how monetary policy is transmitted and to address particular economic issues, notably in times of economic crisis or when more traditional approaches are ineffective.

The main function of QE in the transmission of monetary policy is to increase financial market liquidity, which in turn boosts economic activity. When the central bank conducts quantitative easing, it buys substantial amounts of financial assets from financial institutions and other market participants, such as mortgage-backed securities or government bonds. This significant infusion of funds into the financial system, which increases the money supply, results from the large-scale asset purchase. By engaging in quantitative easing (QE), the central bank can control the market's supply of long-term bonds and other assets. The central bank's increasing demand for these assets drives up their prices while lowering their yields (interest rates). Long-term interest rates consequently decrease, lowering the cost of borrowing for both families and businesses. Because of the decreased interest rates, more people are borrowing, investing, and spending more money, boosting the economy.

One of the main objectives of QE is to increase bank reserves and improve financial institution liquidity to improve loan availability. Bank reserves are increased as a result of the central bank purchasing their assets. Banks are more eager and able to lend to consumers and businesses when their reserves are bigger. This causes the supply of credit to expand, making it easier for productive economic activity to get finance.

QE can affect investor behavior by promoting a switch from safer assets like corporate bonds or stocks to those the central bank has bought (such as government bonds). This "portfolio rebalancing effect" has the potential to reduce returns and boost the cost of riskier assets while

also increasing demand for them. As a result, this promotes equity markets, helps businesses access capital, and promotes economic growth.

Effects on Exchange Rates: QE programs can also affect exchange rates. The domestic currency may lose value to other currencies as the central bank purchases domestic assets and injects cash into the economy. A depreciated currency can increase export competitiveness and aid in the rehabilitation of the economy.

But even though WE can have a big impact on the economy and financial markets, how well it transmits monetary policy will depend on the state of the economy at the time, as well as how confident and ready market participants are to react to the central bank's moves. As a result, QE is crucial in the transmission of monetary policy since it increases financial system liquidity, lowers long-term interest rates, expands credit availability, and supports economic growth in times of economic stress or uncertainty.

III. LTRO

Long-Term Refinancing Operations is a crucial tool that central banks created to give commercial banks long-term liquidity. It is an unconventional monetary policy tool made to solve certain economic issues and enhance the financial system's credit conditions.

The central bank extends its lending terms to commercial banks during LTROs, often from several months to several years. Especially in times of economic stress or instability, these actions seek to maintain the stability and efficient operation of the banking system.

The efficiency of LTROs is influenced by several variables, including the current state of the economy, banks' borrowing appetite, and the total level of credit demand. We will go deeper into LTROs throughout this thesis, examining their effects on credit transmission mechanisms, financial intermediaries, and the overall execution of monetary policy. By exploring these facets, we hope to get a thorough knowledge of the operation and efficiency of LTROs as a crucial instrument in the toolbox of the central bank for controlling liquidity and fostering economic stability.The detailed analysis and discussion of LTROs, however, will be presented in later sections of the thesis since this is only an introduction. In those sections, we will examine particular case studies, and official data, and perform a thorough assessment of their effects on the financial system and the overall economy.

1.2 Financial intermediaries

By bridging the gap between individuals with surplus funds and those in need of financial resources, financial intermediaries play a critical role in the modern economy. By facilitating a range of financial transactions and services, these organizations serve as conduits for the efficient transfer of cash from savers to borrowers. Commercial banks are among the most well-known varieties of financial intermediaries. By taking deposits, these banks act as safe custodians for extra cash owned by people and companies. These deposits then serve as the funding source for the banks' loan and credit programs for borrowers like small enterprises, homebuyers, and entrepreneurs. Banks help the economy expand and stay stable by efficiently transferring money from savers to borrowers.

Another essential category of financial intermediary is investment banks. In the financial markets, they have a more specialized role, offering assistance to businesses and governments looking to generate funds. Investment banks offer a range of financial services, including financial advice services, merger and acquisition facilitation, and underwriting the issue of securities like stocks and bonds. Their knowledge is crucial in assisting businesses in obtaining the capital they want to grow their business or fund important initiatives.

On the other side, mutual funds serve as collective investment vehicles that combine money from many different individual investors and can create diversified portfolios of assets, which may include stocks, bonds, and other financial instruments, by combining these funds.

This diversity reduces risk and gives individual investors access to a variety of investment possibilities that they otherwise might not have, people can invest in the financial markets using this well-liked and convenient method without having to be specialists themselves.

Another essential type of financial intermediaries is insurance businesses, which offer risk management services and sell insurance plans to help people and organizations safeguard themselves against unanticipated occurrences. Regular premium payments are sent by policyholders to the insurance provider, who then gathers and pools these monies, and then the insurance provider reimburses the policyholders in the event of covered losses, offering assistance when circumstances are tough. Therefore, insurance encourages resilience and stability in both personal and commercial finances.

Pension funds are financial middlemen committed to ensuring people's financial security during their retirement years, over time, money is added to pension accounts by employers, governments, or private individuals, to generate returns and increase the pension pot, these funds are subsequently invested in a variety of securities, including equities, bonds, and real

estate. To ensure financial security and a constant income throughout retirement, people can access their accumulated assets when they retire in the form of regular pension payments.

Financial intermediaries facilitate the effective distribution of cash between surplus units and deficit units, which is a crucial role they play in contemporary economies. These intermediaries support economic growth, financial stability, and the well-being of both individuals and businesses through a wide range of financial operations, such as receiving deposits, making loans, and offering risk management and investment services; they make it possible for savings to be mobilized and investments to be facilitated, ensuring that money is directed to the areas where it is most needed and can be used most efficiently.

1.3 Links between Monetary Policy and Financial Intermediaries

The complex interplay that exists between monetary policy and financial intermediaries has repercussions for how the overall economy operates on many different levels. These financial intermediaries, which include commercial banks, act as crucial conduits for the distribution of monetary policy changes to different economic sectors. The intricate dynamics of interest rates, credit availability, financial stability, asset values, and ultimately economic growth are shaped by this dynamic interaction between central bank policies and the activities of financial intermediaries. The transmission of interest rates lies at the heart of this connection. The lending and borrowing rates provided by financial intermediaries are affected when central banks change their policy rates. By making credit more accessible and inexpensive, lowering policy rates can encourage borrowing and promote economic growth. On the other hand, raising rates can be used as a tool to moderate borrowing and expenditure, thus limiting economic growth. However, monetary policy has an impact that goes beyond only interest rates. The liquidity and lending capability of financial intermediaries may be significantly impacted by central banks' actions, such as altering reserve requirements or conducting open market operations. Financial intermediaries may tighten their lending conditions in response to contractionary monetary policy, which will reduce the amount of credit available. However, an expansionary policy might provide intermediaries with the liquidity they need to increase the supply of credit, potentially boosting economic activity. It's critical to understand how this relationship affects the stability of financial intermediaries. These intermediaries may have ripple effects from changes in monetary policy, which could jeopardize their stability. For instance, a sharp and unexpected rise in interest rates could make it difficult for borrowers to make their loan payments. This could therefore affect the banks' asset quality and help financial instability to develop. There is also the matter of how monetary policy and asset prices are related. Financial intermediaries' investment portfolios and strategies can be greatly impacted, especially in the context of unorthodox measures like quantitative easing. As a result, the application of such rules may influence changes in stock and bond prices, which may have an impact on market dynamics. Furthermore, financial intermediaries must play a part in enabling the flow of money throughout the economy. Their ability to obtain finance and liquidity has a significant impact on how consumers and businesses behave, which in turn affects investment and spending habits. These trends in turn directly affect the trajectory of economic growth as a whole. Policymakers must understand the intricacy and relationships within this relationship. Understanding how changes in policy rates and measures are

reflected through financial intermediaries is crucial for administering monetary policy and achieving macroeconomic goals. This relationship is crucial to how monetary policy translates into actual economic results; it goes beyond simple technicalities. The intricate dance between policy decisions and their effects on the larger economy is highlighted by the connection between central banks and financial intermediaries, underlining the necessity for a thorough understanding to successfully manage the complexities of contemporary economic systems. Now that the foundation has been established for comprehending the complex interplay between central banks and financial intermediaries, it is essential to delve into the fundamental mechanisms that support this interaction. The Long-Term Refinancing Operations (LTRO), one unorthodox tool in the arsenal of instruments available to central banks, becomes the focus of analysis. We can understand how the LTRO operates within the larger framework we've defined by closely examining it, providing light on both its intended impact and the complex dynamics it sets off across the financial ecosystem. We'll reveal the LTRO's historical backdrop, operational nuances, and the reverberations it has on loan availability, economic growth, and financial stability as we go deeper into the topic. This investigation improves our understanding of LTRO while also serving as a microcosm for comprehending the larger relationship between central banks and financial intermediaries.

CHAPTER 2: LTRO to TLTRO:
Unraveling the ECB's Strategic Shift in Monetary Policy Tools

2.1 The introduction of LTRO

LTRO, as previously announced, is a key unconventional monetary policy tool introduced by the European Central Bank in response to the Eurozone debt crisis that emerged in 2011. To understand LTRO deeply, we need to delve into its historical context and the rationale behind its implementation. The Eurozone debt crisis began in late 2009 when concerns arose about the sustainability of sovereign debt in several Eurozone countries, particularly Greece, Portugal, Ireland, Spain, and Italy. These countries faced escalating borrowing costs as investors grew worried about their ability to repay their debts. The crisis led to significant financial instability and threatened the stability of the entire Eurozone.

At the time, the ECB's conventional monetary policy tools, like interest rate cuts, were constrained due to low policy rates and the urgency of the situation. The traditional transmission mechanism of monetary policy through the banking system was disrupted, with banks becoming increasingly risk-averse and reluctant to lend to one another and businesses and consumers. The process of LTRO starts with the ECB announcing the operation dates and terms, to provide transparency and predictability for banks. Eurozone banks are invited to participate in the LTRO, and they submit bids to the ECB indicating the amount of funds they wish to borrow and the interest rate they are willing to pay. The ECB reviews the submitted bids and decides on the total amount of liquidity to be provided based on its assessment of the prevailing market conditions and its policy objectives. The ECB aims to ensure that banks have access to ample funds to meet their funding needs and support credit provision to businesses and consumers.One notable feature of LTRO is the full allotment policy. This means that the ECB provides all the funds that banks demand at the policy rate, ensuring that banks have sufficient access to liquidity. The full allotment policy aims to prevent a situation where banks face liquidity shortages, which could exacerbate financial instability.

Moreover, LTROs offer long-term funding, typically with a maturity of three years. This extended period of access to liquidity gives banks more time to manage their balance sheets and engage in longer-term lending activities. By providing long-term funding, the ECB aims to alleviate the short-term funding pressures on banks and encourage them to use the funds to support economic activity through increased lending.

The ECB also ensures that LTROs are conducted with strict collateral standards. To participate in the LTRO, banks must pledge eligible collateral to the ECB. This requirement protects the central bank's balance sheet and limits potential losses. During the eurozone debt crisis, when concerns arose about the quality of sovereign bonds issued by some member countries, the ECB adjusted its collateral eligibility criteria to ensure that banks could access funding without facing undue obstacles.

Additionally, the interest rate on LTROs is fixed and kept at a relatively low level. This low rate makes it attractive for banks to participate and borrow funds from the ECB. Targeted Longer-Term Refinancing Operations (TLTROs) are tools used by central banks, like the European Central Bank (ECB), to provide funds to commercial banks. These funds aim to enhance liquidity, support lending, and ensure the stability of the financial system. Even though those funds cannot be directly lent to customers they are used to comply with Reserve Requirements, TLTRO funds are offered at favorable interest rates, making them a cost-effective source for banks to meet their reserve obligations. One of the main reasons why this instrument has been created is to ensure borrowing rates that are lower than those between banks. In summary, TLTROs help banks maintain liquidity, meet reserve requirements, and contribute to financial stability. Although TLTRO funds can't be lent directly, their availability supports banks in fulfilling their critical functions.

Overall, the LTRO has been a crucial tool in the ECB's toolkit, helping to restore confidence in the eurozone financial system, ease funding pressures on banks, and support credit provision during times of economic challenges. Its functioning exemplifies the ECB's proactive approach to using unconventional measures to address financial instability and support economic recovery within the eurozone.

2.2 Rationale behind TLTRO (Reverse transaction)

Reserves from reverse transactions involve the central bank lending newly created reserves against eligible assets. A reverse transaction encompasses operations where the central bank buys or sells assets under repurchase agreements or conducts credit operations with collateral. This approach allows banks to maintain the eligible asset on their balance sheet while receiving reserves from the central bank, which will include both the principal amount and an interest payment upon maturity.

From an accounting perspective, the eligible asset remains on the bank's balance sheet in both sell-and-buy-back transactions and credit operations, and the central bank doesn't physically hold the asset. In cases where the cost of borrowing money is positive, the inflow of reserves (principal and interest) will exceed the outflow (principal) in any standalone reverse transaction. Reverse transactions are the underlying procedure for standard refinancing operations and TLTROs.

Collateral plays a pivotal role in reverse transactions since it enables banks to borrow reserves. Initially, the central bank issues reserves to Bank 1, which borrows them. In return, Bank 1 uses its assets as collateral and incurs a debt toward the central bank. The second stage involves Bank 1 paying back plus interest to the central bank upon maturity.

In a scenario where reserves were borrowed to meet minimum reserve requirements, Bank 1 would hold them until the maturity of the reverse transaction and then renew the operation. However, if the purpose was to settle debt with another Bank 2, Bank 1 transfers reserves to Bank 2.

In this economy, two forms of money exist MB1 and RCB. MB1 is inside money backed by DH1 (a liability of Household 1), while RCB is backed by D issued by B1 and held by CB (a liability of Bank 1). Whether RCB is considered inside or outside money depends on the effective nature of DCBB1 as a liability.

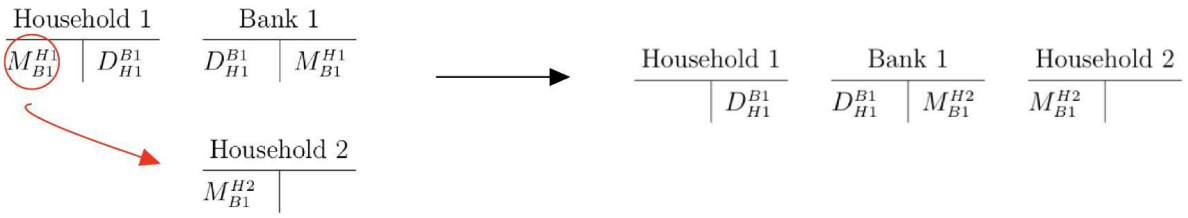
The likelihood of Bank 1 defaulting due to a lack of reserves is minimal since it can receive reserves from other banks when customers deposit funds. Bank 1 can also access various refinancing operations as long as it holds eligible assets. Default becomes more plausible if Bank 1 faces insolvency due to asset quality issues. Therefore, liabilities toward the central bank are effective, despite appearances during normal times.

Bank 1 has two choices to address its obligation either delivering an equivalent amount of reserves or defaulting. Default leads to Bank 1 disappearing, and the collateral (DH1) moves to the central bank's asset side but we are not going to discuss the scenario of defaulting.

CIRCULATION OF BANK MONEY

Let's say that H1 transfers the deposit to H2, which has a clean balance sheet to begin with. H2 has a positive net financial position after receiving M, whereas H1 has a negative net financial position as a result of its bank loan. In the end, the debt owed by H1, the original borrower, serves as security for the sum of money held by H2. Financial institutions act as an intermediary between lenders and borrowers in this respect.

Figure 3

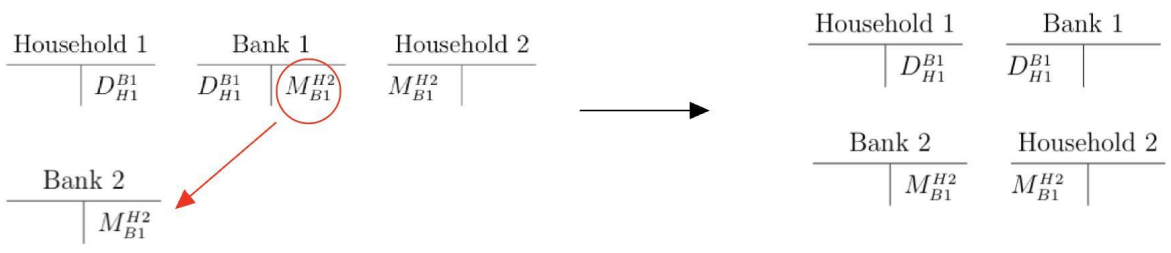


Source: Money in the field of Finance article by Professor Ugo Zannini

A RATIONALE FOR RESERVES

Let's assume that Household 1 initially transferred its deposit to Household 2 with a current account at Bank 2 to explain the need for reserves. Incentives for the transfer of a liability are different from those for the transfer of an asset. Nobody, including Bank 2 in Figure 4, would agree to take on a liability for nothing.

Figure 4



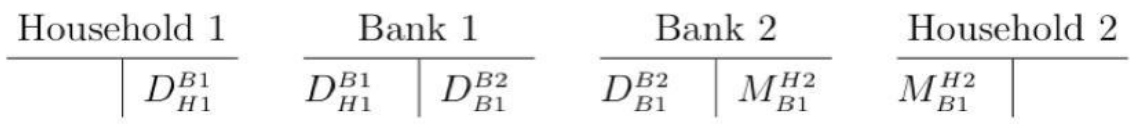
Source: Money in the field of Finance article by Professor Ugo Zannini

The distinguishing trait of the banking industry is, in fact, the acceptance of the liabilities of other banks. The banking system ensures that the general public will take its money by taking

up liabilities from other banks. The initial asset (loan) that generated the liability remains on the balance sheet of the originator bank when a bank accepts a liability issued by another bank, as In our case, the balance sheet of Bank 1 still shows the debt that H1 issued, and that B1 holds. Therefore, Bank 2 must receive a claim on B1's asset in exchange for assuming the liability MB1 that Bank 1 initially issued. Therefore, MB1's transfer entails a credit/debt relation similar to the one shown in Figure 5.

CREDIT/DEBIT

Figure 5

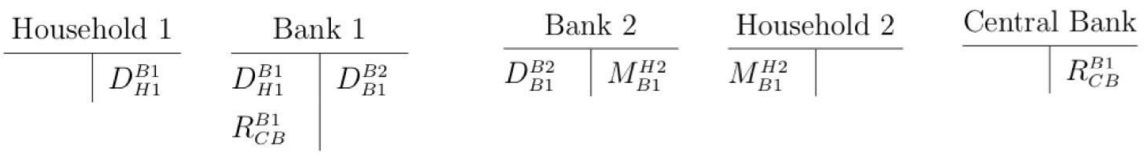


Source: Money in the field of Finance article by Professor Ugo Zannini

With Bank 1's obligation to migrate to other banks, Bank 1 could give unstable borrowers more and more purchasing power. The banking industry uses central bank reserves to satisfy debts to punish Bank 1 and prevent the accumulation of its claims. Assume, then, that there are reserves on the asset side of Bank 1 and the liability side of the central bank, as shown in Figure 6, without explaining where they originate from.

RESERVES

Figure 6

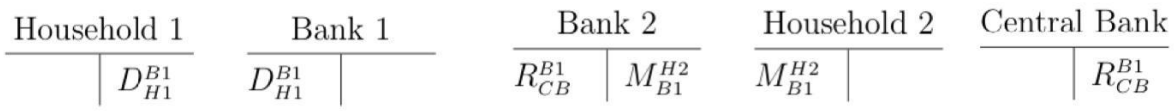


Source: Money in the field of Finance article by Professor Ugo Zannini

Figure 7 illustrates how Bank 1 settles its obligation with Bank 2, which now has a claim against the central bank, using reserves provided by the CB and held by B1.

SETTLEMENT

Figure 7



Source: Money in the field of Finance article by Professor Ugo Zannini

RESERVES FROM REVERSE TRANSACTION

A reverse trade involves the central bank lending recently produced reserves in exchange for acceptable assets. An operation in which the CB purchases or sells assets under a buyback agreement or carries out credit operations using collateral is referred to as a reverse transaction. The qualifying asset, as far as accounting is concerned, remains on the bank's balance sheet whether it was sold in the sell-and-buy-back transaction or posted as collateral during the credit operation. In other words, the qualified asset is not held by the central bank. In both operations, the central bank obtains the initial reserve amount plus interest at maturity. Therefore, when the cost of money is positive, the inflow of reserves (principal and interest) will be greater than the outflow (principal) in an isolated operation. Standard refinancing operations (weekly frequency and one-month maturity), longer-term refinancing operations (monthly frequency and three-month maturity), and non-standard longer-term refinancing operations (such as the targeted longer-term refinancing operations, or TLTROs, with irregular frequency and three-year maturity) are all issued using the reverse transaction. Collateral, which includes both the asset sold and the bank's collateral, is a crucial component of reverse transactions because it allows for the borrowing of reserves. Figure 6 illustrates the beginning phase of a reverse transaction. R represents the amount of reserves that the central bank has issued and that Bank 1 has borrowed, and D represents the matching debt that Bank 1 has issued and held by the CB. D is also used by B1 as a collateral.

STAGE 1

Figure 8

Household 1		Bank 1		Central Bank		Bank 2		Household 2	
	D_{H1}^{B1}	D_{H1}^{B1}	D_{B1}^{B2}	D_{B1}^{CB}	R_{CB}^{B1}	D_{B1}^{B2}	M_{B1}^{H2}	M_{B1}^{H2}	
		R_{CB}^{B1}	D_{B1}^{CB}						

Source: Money in the field of Finance article by Professor Ugo Zannini

STAGE 2

To complete the second stage of the reverse transaction, Bank 1 must pay the central bank the Reserves plus the interest (which we assume to be zero) at maturity. If reserves were borrowed to meet the minimum reserve requirement, Bank 1 would hold onto them until the maturity of the reverse transaction, at which point the transaction would be rolled over. The reason for borrowing reserves in this instance was to settle a debt that was issued by B1 and held by B2 with B2. As shown in Figure 7, let's say Bank 1 transfers R to Bank 2.

Figure 9

Household 1		Bank 1		Central Bank		Bank 2		Household 2	
	D_{H1}^{B1}	D_{H1}^{B1}	D_{B1}^{CB}	D_{B1}^{CB}	R_{CB}^{B2}	R_{CB}^{B2}	M_{B1}^{H2}	M_{B1}^{H2}	

Source: Money in the field of Finance article by Professor Ugo Zannini

2.3 From LTRO to TLTRO

A major shift in the ECB's approach to supplying liquidity to banks occurred with the switch from LTRO to TLTROs. While LTROs were more comprehensive in scope and designed to maintain overall market stability, TLTROs were introduced as a more focused tool to encourage lending to particular economic sectors. This change reflected the ECB's desire to increase the efficiency of its monetary policy by enticing banks to provide direct funding to consumers and businesses, which would promote economic growth. TLTROs encouraged banks to actively participate in financing initiatives that were in line with the ECB's economic objectives by offering banks favorable interest rates based on their lending performance. They also encouraged a more targeted and flexible allocation of liquidity to support a long-term economic recovery. Eight TLTROs were executed by the Eurosystem for the first series of TLTROs, all of which had a defined maturity (See Figure 8; 8.1; 8.2) and were created as liquidity-providing reverse operations, indicating that they were meant to inject liquidity into the financial system. The National Central Banks (NCBs) were in charge of TLTRO execution, which was decentralized and carried out through competitive procedures for banks to obtain funds from the Eurosystem known as standard tenders. Unless otherwise indicated in this Decision, the standard conditions governing the NCBs' willingness to engage in credit operations will apply to TLTROs. TLTROs were performed using fixed-rate tender procedures, assuring a predetermined interest rate for the operations. This comprised guidelines for open market operations, standards for the eligibility of counterparties and collateral, and sanctions for breaching counterparty duties. These requirements are consistent with the broad and temporary legal frameworks for refinancing activities as implemented in the national contractual and regulatory frameworks of NCBs. Banks may participate in TLTROs in one of two ways: individually, but they may not simultaneously participate as a member of a group; or collectively, albeit group participation is subject to certain restrictions. A bank within a TLTRO group cannot participate individually, only the lead bank of the group may engage in TLTRO tender procedures, and with some exceptions, the group's composition and lead bank stay the same for all eight TLTROs. Group participation in the program requires that they fulfill certain requirements, maintain a close bond among themselves, and maintain the necessary reserves. A lead bank must be chosen as a result, and it must also be eligible to participate in Eurosystem operations. Each member of the group must meet the requirements and be a credit institution with its headquarters in a member state of the euro area. The lead bank starts the procedure to request group membership by applying to its

National Central Bank (NCB). This application includes in-depth group information, descriptions of tight links, and associations with reserve holdings. Each participant's official decision to join the group is thereafter approved. The NCB confirms the group's recognition after evaluation. Under some conditions, the makeup of the group may change. A member may be terminated if they no longer satisfy the conditions or the requirements of the lending institution. The lead bank's loss of eligibility has an impact on the group's standing. Changes involving close ties or reserve holding requirements demand NCB clearance. Following approval of a change, the lead bank has six weeks to incorporate the new group into a TLTRO. Any individual participation or joining of another group by an excluded bank requires a fresh application. While largely unchanging, these guidelines may be altered under exceptional circumstances with the Governing Council's consent. Notably, the lead bank's proposal and subsequent review may be among the factors that affect how a recognized group is composed by the NCB.

2.4 TLTRO Operational framework

2.4.1 Calculation of Borrowing Limits

The information provided in the subsequent sections is derived from Decision (EU) 2015/299 of the European Central Bank, dated 10 February 2015. This decision amends Decision ECB/2014/34 and pertains to measures related to targeted longer-term refinancing operations (ECB/2015/5). These amendments reflect the evolving nature of monetary policy measures employed by the European Central Bank to address changing economic conditions and financial stability within the Eurozone.

The determination of borrowing limits is a crucial aspect of participating in a TLTRO. These limits are established for participants, whether they are individual banks or acting as the lead institution within a TLTRO group. The calculated borrowing limits are adjusted to the nearest multiple of EUR 10,000. For individual participants, the borrowing limits, along with any potential mandatory early repayment requirements, are derived from the outstanding loan amounts and net lending extended by the participant to euro-area non-financial corporations and households. It's important to note that loans to households for housing purchases are excluded from this calculation.

In the case of the lead institution of a TLTRO group, the borrowing limits, along with any potential mandatory early repayment considerations, are based on the cumulative outstanding eligible loans and eligible net lending provided by all members of the TLTRO group as a whole. This process ensures that borrowing limits are intricately tied to the lending activities of participants and their contributions to supporting economic sectors. The rounding up of borrowing limits to the nearest EUR 10,000 multiple facilitates precise determinations within the TLTRO framework. The initial borrowing allowance (IA) for a participant in TLTRO k (where k = 1,…,8) is calculated as IA = 0.07 * OL. Here, OL represents the amount outstanding on April 30, 2014, of eligible loans granted by the participant. In the first two TLTROs, the constraint C1 + C2 ≤ IA must be satisfied. This ensures that the total borrowing in the first two TLTROs does not exceed the initial borrowing allowance. NLM represents the eligible net lending of a participant in calendar month m. NL represents the average eligible net lending of this participant from May 2013 to April 2014, calculated as the sum of monthly eligible net lending divided by 12. For TLTROs conducted between March 2015 and June 2016 (k = 3,…,8), the benchmark (BEk) for a participant is determined based on their average eligible net lending (NL) from May 2013 to April 2014, as well as a parameter nk. The benchmark helps establish a standardized measure for determining borrowing limits, ensuring

fairness and consistency across different participating banks. If NL is non-negative (greater than or equal to zero) or if the participant was established after May 1, 2013, then the benchmark BEk for TLTROs between March 2015 and June 2016 is set to zero for all TLTROs in that period. If NL is negative (less than zero), then the benchmark BEk for TLTROs between March 2015 and June 2016 is calculated as

BEk= NL x nk, where nk is defined as follows:

k	3	4	5	6	7	8
Month of TLTRO	Mar. 2015	Jun. 2015	Sept. 2015	Dec. 2015	Mar. 2016	Jun. 2016
Allotment reference month (1)	Jan. 2015	Apr. 2015	Jul. 2015	Oct. 2015	Jan. 2016	Apr. 2016
n_k	9	12	12	12	12	12

This means that the benchmark for each TLTRO allotment reference month will be equal to the average monthly eligible net lending achieved in the 12 months to 30 April 2014 (NL), multiplied by the number of months elapsed between 30 April 2014 and the end of the allotment reference month. This, however, will only apply for allotment reference months up to and including April 2015. Thereafter, the benchmark will remain unchanged at the value reached in April 2015.

The basis for calculating the additional borrowing allowance for a participant in TLTRO k is: AAk = 3 × (CNLk – BEk), where CNLk (cumulative net lending) is defined as follows:

'k	Month of TLTRO	Allotment reference month	CNL_k
3	Mar. 2015	Jan. 2015	$NL_{May2014} + NL_{June2014} + \ldots + NL_{Jan2015}$
4	June 2015	Apr. 2015	$NL_{May2014} + NL_{June2014} + \ldots + NL_{Apr2015}$
5	Sept. 2015	July 2015	$NL_{May2014} + NL_{June2014} + \ldots + NL_{Jul2015}$
6	Dec. 2015	Oct. 2015	$NL_{May2014} + NL_{June2014} + \ldots + NL_{Oct2015}$
7	Mar. 2016	Jan. 2016	$NL_{May2014} + NL_{June2014} + \ldots + NL_{Jan2016}$
8	June 2016	Apr. 2016	$NL_{May2014} + NL_{June2014} + \ldots + NL_{Apr2016}$'

For the last six TLTROs k = 3,…,8 (i.e. for all TLTROs in which additional allowances can be claimed), the following constraint must be respected:

$$C_k \leq \max\left\{0, AA_k - \sum_{j=3}^{k-1} C_j\right\}$$

This means that in each TLTRO k, the participant cannot borrow more than three times the amount by which its eligible net lending was granted between 30 April 2014 and the respective allotment reference month (CNLk) exceeds its benchmark in that allotment reference month (BEk), less any amounts previously borrowed in TLTROs that take place in the period from March 2015.

Calculation of mandatory early repayments Participants who have borrowed in the TLTROs but whose eligible net lending in the period from 1 May 2014 to 30 April 2016 is below the benchmark will be required to pay back their borrowing in September 2016. The mandatory early repayment in September 2016 of a participant is:

$$MR = \sum^{8} C_k, \text{ if } BE_8 > CNL_8$$

This means that if the total eligible net lending granted by the participant in the period from 1 May 2014 to 30 April 2016 is lower than the benchmark for the allotment reference month of April 2016, then the full amount of borrowing in all TLTROs must be repaid in September 2016. if BE8 ≤ CNL8 but

$\sum_{j=3}^{8} C_j > AA_8$, then in September 2016 the participant must repay $(\sum_{j=3}^{8} C_j) - AA_8$ from the last six TLTROs. In other words, if a participant's total borrowing in the TLTROs conducted from March 2015 to June 2016 $\left(\sum_{j=3}^{8} C_j\right)$ exceeds the basis for the calculation of the additional allowance for the allotment reference month of April 2016 (AA8), then the amount of this excess must be repaid in September 2016. For individual participants the borrowing limit is determined based on the outstanding amounts of eligible loans and eligible net lending of that participant, for lead institutions of TLTRO groups the borrowing limit is calculated by aggregating the loan data of all members of the TLTRO group and in case of changes in TLTRO group composition, subsequent borrowing limit calculations are based on the new group's balance sheet data.

2.4.2 Interest, Early Repayment, Reporting, and Non-Compliance in TLTROs

Interest Rate

The main refinancing operations rate at the time of the relevant TLTRO tender announcement, plus a fixed spread of 10 basis points, establishes the interest rate for TLTROs, which is fixed during the life of the operation. Upon operation maturity or early repayment, interest is paid in arrears. Starting 24 months after each operation, participants have the option to reduce or cancel TLTROs. Voluntary early repayments take place on particular six-month intervals that coincide with settlement days for Eurosystem's main refinancing operations. Participants must contact the appropriate NCB at least one week before the early payback deadline to avoid financial penalties for missing the repayment date. Participants must repay all initial and further TLTRO borrowings in full by September 29, 2016, even if their cumulative eligible net lending from May 1, 2014, to April 30, 2016, fell below their benchmark. A participant must also pay the excess if their supplementary allowance is exceeded. Banks are required to use certain templates and submit accurate reports to their NCB on time. The templates adhere to the standards outlined in the regulations. Banks that borrowed money through the TLTRO are required to continue reporting until September 2018 or risk having to pay back the entire amount. A bank may be forced to repay the entire amount borrowed or have its borrowing limits cut if it doesn't abide by the reporting regulations. If circumstances beyond their control prevented banks from reporting, they can explain why. The Eurosystem may investigate any errors in the reports and order the bank to make the money back sooner. This decision took effect upon its publication on July 29, 2014, in Frankfurt am Main.

TLTRO I CALENDAR

Figure 10

	First TLTRO	Second TLTRO
Lead institutions apply to their respective home NCB for TLTRO group treatment	By 8 Aug 2014, 3.30 p.m.[1] (application must be based on the most up-to-date data on close links and indirect reserve holdings as at 31 July 2014)	
NCBs provide confirmation to lead institutions regarding TLTRO group treatment	On 25 Aug 2014, by 3.30 p.m. at the latest	
Counterparties interested in participating and those that participated in previous TLTROs send completed reporting templates to NCBs	By 28 Aug 2014, 3.30 p.m. Reporting period: 1 May 2013 to 30 April 2014 Data vintage used for BSI transmission with July 2014 as the reference month	By 20 Nov 2014, 3.30 p.m. Reporting period: 1 May 2014 to 31 October 2014[2] Data vintage used for BSI transmission with October 2014 as the reference month
NCBs inform counterparties about their borrowing limits	On 11 Sept 2014, by 3.30 p.m. at the latest	On 4 Dec 2014, by 3.30 p.m. at the latest
Announcement of the TLTRO	16 Sep 2014 (3.30 p.m.)	9 Dec 2014 (3.30 p.m.)
Deadline for counterparties to submit bids to NCBs	17 Sept 2014 (9.30 a.m.)	10 Dec 2014 (9.30 a.m.)
Allotment	18 Sept 2014 (11.15 a.m.)	11 Dec 2014 (11.15 a.m.)
Settlement	24 Sept 2014	17 Dec 2014
Settlement of first voluntary early repayment	29 June 2016	
Counterparties send updated reporting templates (for calculating mandatory early repayments) to NCBs	By 3.30 p.m. on 17 August 2016 Reporting period: 1 May 2014 to 30 April 2016 (Data vintage will be published later)	
NCBs inform counterparties about mandatory early repayments	On 31 Aug 2016, by 3.30 p.m. at the latest	
Settlement of mandatory early repayments	28 Sept 2016	
Settlement of second voluntary early repayment	28 Sept 2016	21 Dec 2016
Maturity	26 Sept 2018	

Source: ECB website

Figure 10.1

	TLTR0-3	TLTR0-4	TLTR0-5	TLTR0-6
Deadline for sending reporting templates (15:30)[1]	26/02/2015 **Reporting period:** 1 November 2014 to 31 January2015 **Data vintage** used for BSI transmission with **January 2015** as the reference month	28/05/2015 **Reporting period:** 1 February 2015 to 30 April2015 **Data vintage** used for BSI transmission with **April 2015** as the reference month	03/09/2015 **Reporting period:** 1 May2015 to 31 July 2015 **Data vintage** used for BSI transmission with **July 2015** as the reference month	23/11/2015 **Reporting period:** 1 August 2015 to 31 October 2015 **Data vintage** used for BSI transmission with **October 2015** as the reference month
NCBs inform counterparties about borrowing limits (by 15:30 at the latest)	12/03/2015	11/06/2015	17/09/2015	07/12/2015
Announcement (15:30)	17/03/2015	16/06/2015	22/09/2015	09/12/2015
Deadline counterparties for submitting bids (09:30)	18/03/2015	17/06/2015	23/09/2015	10/12/2015
Deadline NCBs submission of bid schedules to ECB (10:00)	19/03/2015	18/06/2015	24/09/2015	11/12/2015
Allotment (11:15)	19/03/2015	18/06/2015	24/09/2015	11/12/2015
Settlement	25/03/2015	24/06/2015	30/09/2015	16/12/2015
Settlement of first voluntary repayments	29/06/2016			
Counterparties send updated reporting templates (for calculating mandatory early repayments) to NCBs (15:30)	17/08/2016 Updated templates relating to reporting periods from 1 May 2014 to 30 April 2016 (Data vintage will be published later)			
NCBs inform counterparties about mandatory early repayments (15:30 at the latest)	31/08/2016			
Settlement of mandatory early repayments	28/09/2016			
Settlement of second voluntary repayments repayments	29/03/2017	28/06/2017	27/09/2017	20/12/2017
Maturity	26/09/2018			

Source: ECB website

Figure 10.2

	TLTRO-7	TLTRO-8
Deadline for sending reporting templates (15:30)[1]	Thu 03/03/2016 **Reporting period:** 1 November 2015 to 31 January 2016 **Data vintage** used for BSI transmission with January 2016 as the reference month	Thu 02/06/2016 **Reporting period:** 1 February 2016 to 30 April 2016 **Data vintage** used for BSI transmission with April 2016 as the reference month
NCBs inform counterparties about borrowing limits (by 15:30 at the latest)	Thu 17/03/2016	Thu 16/06/2016
Announcement (15:30)	Tue 22/03/2016	Tue 21/06/2016
Deadline counterparties for submitting bids (09:30)	Wed 23/03/2016	Wed 22/06/2016
Deadline NCBs submission of bid schedules to ECB (10:00)	Thu 24/03/2016	Thu 23/06/2016
Allotment (11:15)	Thu 24/03/2016	Thu 23/06/2016
Settlement	Wed 30/03/2016	Wed 29/06/2016
Settlement of first voluntary repayments	Wed 29/06/2016	Wed 27/06/2018
Counterparties send updated reporting templates (for calculating mandatory early repayments) to NCBs (15:30)	Wed 17/08/2016 Updated templates relating to reporting periods from 1 May 2014 to 30 April 2016. **Data vintage** used for BSI transmission with **June 2016** as the reference month	
NCBs inform counterparties about mandatory early repayments (15:30 at the latest)	Wed 31/08/2016	
Settlement of mandatory early repayments	Wed 28/09/2016	
Settlement of second voluntary repayments	Wed 28/03/2018	
Maturity	Wed 26/09/2018	

Source: ECB website

2.5 Causal Relationships Between ECB's Targeted Long-Term Refinancing Operations and Banks' Lending Policies: Analyzing the Influence of Market Competition

2.5.1 The controversial effect of TLTRO I on the banking loan sector

Particular focus on the research conducted by Desislava C. Andreeva and Miguel García-Posada in their article "The impact of the ECB's targeted long-term refinancing operations on banks' lending policies: the role of competition". This article explores the complex effects of TLTRO on several facets of the banking industry, putting light on both its predicted advantages and probable disadvantages.

The ECB's report offers a perceptive examination of how the TLTRO, as a novel monetary policy tool, has sparked debates among economists, decision-makers, and financial specialists. It explores the intricate workings of the tool and its expected effects on the dynamics of bank loan supply in the Eurozone.

The essay also carefully explores the TLTRO's potential benefits, including its ability to increase bank liquidity levels and encourage lending to individuals and companies. It emphasizes the crucial role TLTRO has played in easing banks' short-term financing strains, supporting financial stability, and the recovery of the economy in the process.

The piece, however, does not hold back when discussing the controversial elements of TLTRO. It describes how the implementation of TLTRO could unintentionally have negative effects. It is investigated whether TLTRO has the potential to stifle competition within the banking industry and affect banks' lending practices. The question of whether the TLTRO might tilt the playing field by giving some banks access to more favorable funding circumstances is examined in the paper.

Through an analysis of the model's premises and dynamics, the complexity of TLTRO's impacts is further clarified. The essay offers a thorough analysis of how TLTRO interacts with various banks, including safe and risky ones, and takes into account their various responses to the tool's adoption. The study emphasizes the difficult balance that TLTRO aims to achieve between boosting credit provision and upholding a level playing field for competitors by assessing these possible outcomes.

The post on the ECB website clarifies the multifaceted nature of TLTRO and its influence on the bank loan industry at its conclusion. It provides readers with a thorough comprehension of the tool's potential advantages and disadvantages, developing a deeper knowledge of the

complex function that TLTRO plays within the larger context of monetary policy and financial stability.

This study's main objective is to thoroughly assess the effect of the TLTROs of the Eurosystem on the lending practices of euro-area banks. To increase bank lending activity and promote economic growth in the wake of the global financial crisis, these TLTROs were launched as a component of unconventional monetary measures. Due to the euro area's slow economic expansion, reduced inflation expectations, and muted credit dynamics, these policies were especially crucial.

The study uses a multidimensional methodology that takes into account both direct and indirect effects on the lending practices of banks to evaluate the impact of TLTROs. The study develops a theoretical model based on the Monti-Klein model of oligopolistic rivalry within the banking industry to aid in the empirical examination. Although simplified for clarity's sake, this model includes two important banks—one classified as risky and the other as safe—that compete in the credit and deposit markets. This model's distinctive feature is the existence of a funding impairment, which leads to greater financing costs for the riskier bank than the safer one. This configuration serves as the starting point for research on TLTROs' direct and indirect effects. Banks that actively participate in the TLTROs show direct effects on their behavior. In particular, the TLTROs cause these banks to have lower funding costs, which causes their loan supply to increase. This characteristic is mainly seen in the context of relatively safe borrowers, where participating banks relax the margins on loans, hence facilitating greater borrower access. As a result, the TLTROs show that they can function as a channel for communicating monetary policy directly to bank lending practices.

On the other hand, indirect effects manifest themselves through complex adjustments to the credit and deposit markets' competitive environment. In this ecosystem, the arrival of TLTROs sets off a chain of events. Notably, the TLTROs reduce the riskier bank's marginal funding costs, increasing competition in the credit market. A reduction in the availability of credit from the safe bank results from the risky bank's increased aggressive competition for market share in the loan market as a result of this renewed competitive strength. The deposit market, on the other hand, experiences a different effect as the riskier bank reduces its reliance on deposits and instead turns to TLTROs for funding. Due to this change, there is less of a demand for deposits, which lowers deposit rates. The decline in deposit rates consequently has a double impact on the safe bank, lowering both its deposit costs and the marginal cost of its loans. As a result, the safe bank is well-positioned to increase its lending portfolio.

In summary, the impact of these direct and indirect consequences when combined paints a complex picture of how TLTROs affect banks' lending practices. The study makes use of private comments from 130 banks spread over 13 countries in the euro area, combining this information with detailed bank balance sheet data and secret records outlining banks' participation in central bank lending operations. The first set of TLTROs, also known as TLTRO-I, which were announced in June 2014 are the focus of this empirical investigation. The research, meanwhile, has trouble separating TLTROs' causal effects from other factors. Because banks' participation in TLTROs was optional, there is a chance that they were not chosen at random. To address this, the researchers use an allocation mechanism that permits banks to borrow a portion of their eligible loans from the central bank to create an instrumental variable to account for TLTRO uptake. Because this regulation precedes the policy announcement and applies to all banks, it produces an appropriate instrument. The empirical results of the research highlight the important part played by TLTROs in influencing bank lending practices. These data specifically support the idea that the TLTROs have a direct effect on the supply of loans, with participating banks seeing margin changes that make loans to riskier borrowers more readily available. The study also reveals significant indirect effects of TLTROs on credit standards, emphasizing how they increase lending availability for banks that are not participating in the program. This effect is stronger for banks with smaller market shares, highlighting how important competition is as a deciding factor. Importantly, there's no significant evidence to suggest that TLTROs result in increased risk-taking behavior among banks.

In conclusion, our analysis offers an important new understanding of the complex dynamics behind the influence of TLTROs on bank lending practices. The paper analyzes the direct and indirect effects of TLTROs on many aspects of lending strategies using a thorough methodology that integrates theoretical modeling and empirical data. Policy-makers, financial institutions, and economists interested in learning more about the complex interactions between unconventional monetary policy measures and the overall dynamics of the banking sector would find the findings of this study to be important.

2.5.2 Theoretical framework

Deposits $r_D(D^S+D^R)$ are characterized by the following functions:

$r_L(L^S+L^R) = a - (L^S+L^R)$

$r_D(D^S+D^R) = c + (D^S+D^R)$

We also need the balance sheet identity to hold, which means that banks must fund their portfolios with deposits:

$L^i = D^i$ for i = S,R

The market clearing conditions in the model economy require that:

$L^* = L^S+L^R$, where L* is the aggregate loan supply in the economy

$D^* = D^S+D^R$, where D* is the aggregate deposit funding

$L^* = D^*$

We should first analyze the symmetric case in which the safe bank and the risky one are identical.

Safe Bank's profit maximization problem is the following:

$$\max_{L^S, D^S} \Pi^S = (a - (L^S+L^R)) L^S - (c + (D^S+D^R)) D^S$$

$$s.t. : L^S = D^S$$

The solution to the maximization problem, combined with $L^R = D^R$, yields the safe bank's reaction function to the risky bank's loan supply decision $L^S(L^R)$:

$$L^S = \frac{a-(a+c)/2}{2} - \frac{1}{2} L^R$$

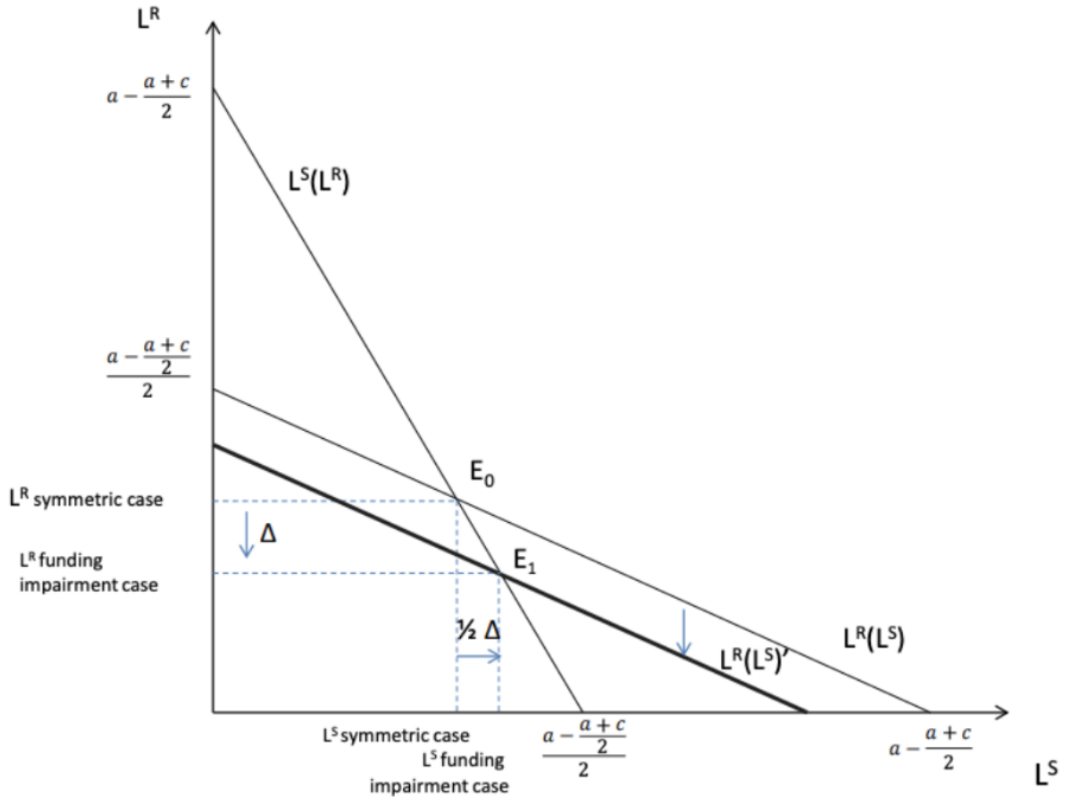
since the maximization is symmetric for the risky bank, the reaction function $L^R(L^S)$ is the following:

$$L^R = \frac{a-(a+c)/2}{2} - \frac{1}{2} L^S$$

Those reaction functions are illustrated by the lines in Chart 1. The intersection between those lines represents the Nash equilibrium E_0. Due to the oligopolistic setting, the overall quantity of both deposits and loans will be lower concerning the perfect competition allowing banks to extract some consumer surplus.

Loan supply reaction functions in the symmetric case and the presence of funding impairments

Chart 1: Loan supply reaction functions in the symmetric case and in the presence of funding impairments



Source: Article on ECB website by Desislava C. Andreeva and Miguel García-Posada "The impact of the ECB's targeted long-term refinancing operations on banks'

We analyze now the asymmetric case assuming that depositors for compensating the extra risk on R require an extra recompense (α) to fund R. The premium (α) considers the higher risk of default of R.

RIsky Bank's profit maximization problem:

$$\max_{L^R, D^R} \Pi^R = (a - (L^S+L^R)) L^R - (c + (D^S+D^R)) D^R$$

s.t. : $L^R = D^R$

The solution of the above maximization program, combined with the balance sheet identity for the safe bank $L^S = D^S$ yields bank R's reaction function to bank S's loan supply decision $L^R(L^S)$' in the case of funding impairment:

$$L^R = \frac{a}{2} - \frac{\frac{a+c}{1+(1+\alpha)}}{2}$$

Regardless of the volume of loans offered by its rival S, bank R's overall loan supply decreases as a result of the higher marginal funding costs caused by the risk premium demanded by investors. The thick line in Chart 1 shows how this causes a corresponding downward shift in the bank's R reaction function. The point where the new response function for bank R, $L^R(L^S)$' and the reaction function $L^S(L^R)$ represents the new Nash Equilibrium E_1. The two equilibria E_0 and E_1 are compared, and the results provide two key insights. The hazardous bank's supply of bank loans first declined as a result of its funding impairment. Second, the overall credit supply is also smaller because the safe bank's loan supply only makes up for half of the lending that its rival is missing (look at $L^S = \frac{a-(a+c)/2}{2} - \frac{1}{2} L^R$).

We now discuss how TLTROs affect the stability of the lending market. We will demonstrate how the TLTROs' introduction affects both banks' loan supply, even if only one of them participates in the auction. The TLTROs have both direct and indirect consequences. For instance, consider the possibility that banks could use TLTROs to fund a portion of their loan portfolio (**β**) at an exogenous interest rate (i).

Assumedly, the central bank sets ii to the rate of interest on deposits that the safe bank pays. Furthermore, we presumptively assume that TLTRO bidding implies additional, minor fixed administrative costs. In this scenario, the safe bank won't participate in the bidding process because it doesn't save money on funding and doesn't have to pay administrative expenses. By contrast, given the price attractiveness of the TLTRO funding, the risky bank will exhaust its borrowing limit, so that TLTRO = **β** L^R. The balance sheet identity of the risky bank includes now TLTROs in addition to deposit funding: $L^R = D^R +$ TLTRO. The combination of these two equations creates the new constraint, (1 - **β**) $L^R = D^R$, which shows that the Risky bank funds only a part corresponding to (1 - **β**) of their loan portfolio with deposits. The new maximization problem of the risky bank is the following:

$$\max_{L^R, D^R} \Pi^R = (a - (L^S+L^R)) L^R - (1+\alpha) (c + (D^S+D^R)) D^R - i \text{ TLTRO}$$

s.t. : (1 - **β**) $L^R = D^R$ and TLTRO = **β** L^R

The solution of the above maximization program, combined with the balance sheet identity of the safe bank $L^S = D^S$ yields bank R's reaction function in the case of funding impairments after the introduction of TLTROs $L^R(L^S)$'':

$$L^R = \frac{\varepsilon}{2} - \left(\frac{1}{2} + \frac{1}{2} \frac{\beta(1-\beta)}{\frac{1}{1+\alpha} + (1+\beta)^2} \right) L^S$$

where $\varepsilon = a - i\beta - \frac{1-\beta}{\frac{1}{1+\alpha} + (1-\beta)^2} (a + c) + \frac{\beta(1-\beta)}{\frac{1}{1+\alpha} + (1-\beta)^2} (a + i(1 - \beta))$

Finally, take note that the TLTRO has had no impact on the safe bank's maximization problem. The marginal costs of deposit funding in our example, however, modify the safe bank's shadow cost of extending an extra unit of loans. Since the risky bank replaces deposits with TLTROs, there is less competition in the deposit market, which increases the safe bank's ability to lend. Mechanically, this effect is accounted for by taking into account the risky bank's altered balance sheet identity (1 - **β**) $L^R = D^R$ when obtaining a safe bank's loans supply reaction function. The new reaction function of the safe bank is the following:

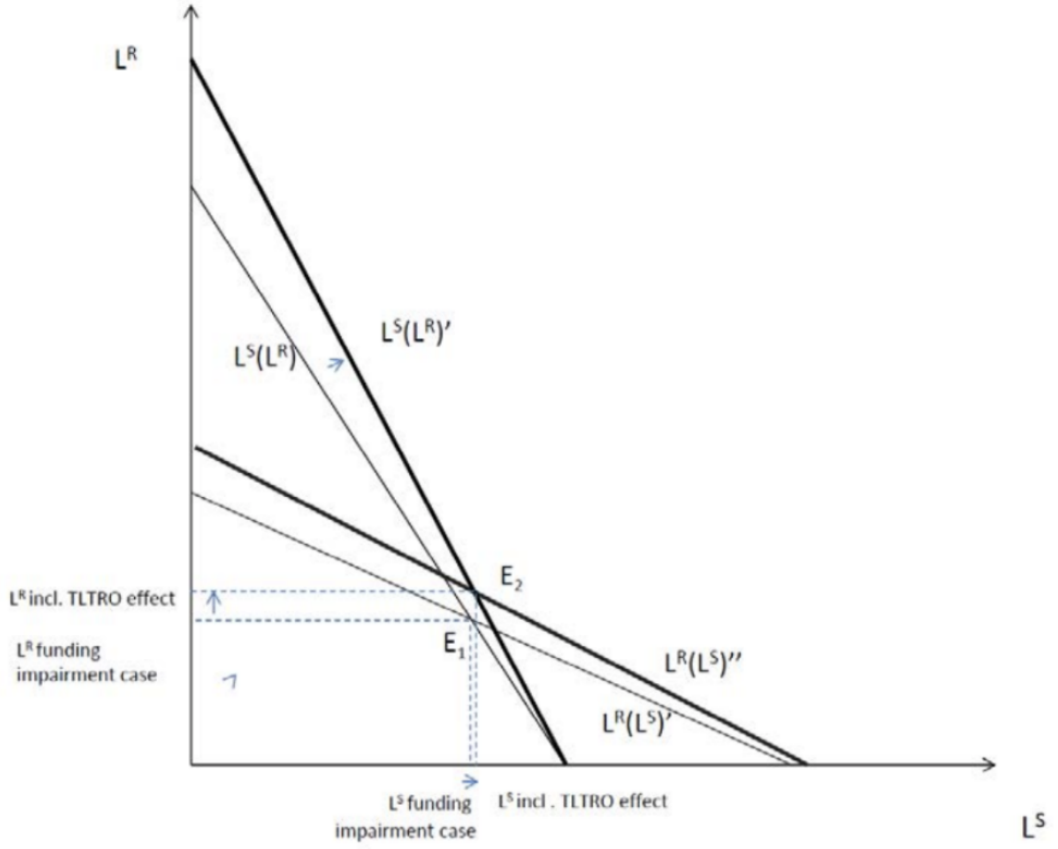
$$L^S = \frac{a - \frac{a+c}{2}}{2} - \left(\frac{1}{2} - \frac{1}{4}\beta \right) L^R$$

The comparison of $L^R = \frac{a - (a+c)/2}{2} - \frac{1}{2} L^S$ and $L^S = \frac{a - \frac{a+c}{2}}{2} - \left(\frac{1}{2} - \frac{1}{4}\beta \right) L^R$ reveals that the safe bank's loan supply is now less sensitive to changes in the supply of loans by the risky bank. This is demonstrated in Chart 2, which shows the loan market's equilibria before the introduction of the TLTROs (E_1) and after their implementation (E_2). Both banks' reaction mechanisms change. The safe bank's reaction function steepens but the intercept with the horizontal L^S axis stays constant. Due to the risky bank's large reduction in funding costs as a result of the TLTROs, its supply of loans rises for any given value of loans made by the safe bank, causing both the slope and the intercept to change in the case of the risky bank.

The illustration's new Nash equilibrium is E_2, which in this example has a larger loan supply from both institutions. Although lending by the risky bank always rises in equilibrium, lending by the safe bank greatly depends on the precise parameter values, particularly on the

shape of the loan demand and deposit supply functions (a and c), the percentage of bank loans that can be financed with TLTROs (β), and the precise TLTRO rate (i).

Chart 2: Loan supply reaction functions in the presence of funding impairments before and after the introduction of TLTRO



Source: Article on ECB website by Desislava C. Andreeva and Miguel García-Posada "The impact of the ECB's targeted long-term refinancing operations on banks'

The loan supply's effect on the safe bank is quite ambiguous since two opposite effects. On the one hand, the TLTROs lower the riskier bank's marginal costs, increasing the amount of loans it can offer. The TLTROs thereby encourage greater competitiveness in the lending sector. Loan quantities are strategic equivalents because the banks compete à la Cournot, which means that an increase in the loan supply of the risky bank results in a decrease in the loan supply of the safe bank. On the other hand, the riskier bank faces less competition in the deposit market as a result of the TLTROs. The rivalry in the deposit market declines as the risky bank replaces deposits with TLTROs, which results in lower marginal financing costs for the safe bank and an increase in its loan supply. The theoretical discussion concludes that the TLTROs may have significant indirect effects on non-participating banks' ability to extend

credit, as determined empirically by credit criteria and loan margins. The TLTROs, in particular, may have significant funding externalities on non-bidding banks that are not always limited to retail funding. For instance, the TLTROs may reduce the amount of bank bonds available in the market because they enable participating banks to borrow from the central bank instead of using market-based bank funding. Lower yields on bank bonds, including those issued by intermediaries not taking part in the TLTROs, should result from the lack of bank bond supply. Additionally, by lowering the marginal funding costs of participating banks and enabling them to increase their credit supply, TLTROs may promote competitiveness in the credit market. Depending on whether the effect predominates, nonparticipating banks may respond by either expanding or reducing the amount of loans they offer. The TLTROs can improve competitors' market positions in one of two ways either by lowering their direct funding costs, which allows them to (re-)take market share away from non-participants; or by lowering their indirect funding costs, which benefits both bidders and non-bidders and supports the availability of bank loans for both. This makes the overall effect of TLTROs on non-participating banks a priori uncertain and subject to empirical evaluation.

CHAPTER 3
TLTRO II and TLTRO III: Assessing their Impact on Financial Stability and Economic Growth

3.1 The launch of TLTRO II

The information presented in subsequent sections is sourced from Decision (EU) 2016/1974 of the European Central Bank, dated 31 October 2016, which amends Decision (EU) 2016/810 (ECB/2016/10) related to a second series of targeted longer-term refinancing operations (ECB/2016/30). This amendment underscores the central role of the European Central Bank in shaping and implementing monetary policy measures aimed at supporting the Eurozone's financial stability and economic well-being.

The European Central Bank's Governing Council launched a series of targeted longer-term refinancing operations from 2014 to 2016. To maintain price stability, the Governing Council launched TLTROs-II, a new series of four TLTROs, on March 10 (See Figure 11). To improve the efficiency of monetary policy, TLTRO-IIs were designed to make it simpler for the private sector, particularly non-financial entities like individuals and businesses inside Eurozone member states, to acquire credit. It's vital to note that this effort still did not provide funding for loans for the purchase of residential property. The goal was to support unconventional policies and aid in the medium-term reduction of inflation rates to just under 2%. Similar to the first TLTRO series, institutions with a group structure that borrowed from the Eurosystem for administrative purposes were permitted to take part in TLTROs-II as a group as long as there was a sound institutional foundation for such treatment. A designated group member was to take the lead throughout this group activity while following predetermined guidelines. Additionally, all members had to formally acknowledge their participation in writing in situations where groups were created based on intimate links between members. Groups acknowledged in the first TLTRO series were qualified to participate in TLTRO-II as TLTRO-II groups by adhering to specific notification and acknowledgment processes. According to each participant's outstanding eligible loans to the non-financial private sector as of January 31, 2016, minus any sums borrowed during the first two TLTROs held in September and December 2014, the total borrowing capacity for all TLTROs-II operations would be established. Each TLTRO-II's interest rate would be established by the participant's

lending history between February 1, 2016, and January 31, 2018. Participants had the opportunity to repay assigned sums quarterly through specified processes beginning two years following each TLTRO-II settlement.

Institutions that were interested in participating in TLTROs-II have to meet certain reporting requirements. The information provided would be used to establish borrowing allowances, calculate relevant benchmarks, assess participants' performance about their benchmarks, and carry out other analytical tasks connected to Eurosystem duties.

To be eligible for a lower interest rate on their TLTRO-II borrowing, a participant had to reach the benchmark net loan amount between February 1, 2016, and January 31, 2018. The 'first reference period' encompassed the time from February 1, 2015, to January 31, 2016, and the 'second reference period,' from February 1, 2016, to January 31, 2018.

The Eurosystem intended to execute four TLTROs-II, each maturing four years following the corresponding settlement date, which also happened to be the settlement date for a key refinancing operation of the Eurosystem. The National Central Banks (NCBs) were to carry out these TLTROs-II through decentralized liquidity-providing reverse transactions, using conventional tender procedures including fixed-rate transactions.

Except in unusual situations, the standard terms for undertaking credit operations applicable to TLTROs-II. These requirements included open market operation guidelines, collateral qualifying standards, and penalties for non-compliance. These requirements were made and put into practice under the NCBs' regulatory frameworks, which are generic and transitory legal frameworks that apply to refinancing operations.

Individual eligible institutions could take part in TLTROs-II. They could also form a TLTRO-II group and participate together. A single university was only permitted to participate in one TLTRO-II group. An institution couldn't take part in a TLTRO-II group separately.

The TLTRO-II tender procedures only saw participation from the group's principal institution. Certain requirements, including tight ties between group members and holding necessary reserves with the Eurosystem through another member, had to be met for participation through a TLTRO-II group. One member of the group had to be chosen as the lead institution, and it had to be qualified to participate in open market operations under the Eurosystem's monetary policy. Each group participant is required to be a credit institution from a Member State using the euro and meet certain requirements.

Under certain conditions, TLTRO-II group composition may change.

Changes could take place if new close linkages or indirect reserve holdings were created, even if a member didn't satisfy the prerequisites indicated above. In these situations, the lead institution would submit an application to its NCB with the relevant supporting documentation, and the NCB of the lead institution would subsequently certify the modified group composition. Changes were also permitted under specific circumstances when mergers, acquisitions, or divisions did not affect eligible loans.

An individual participant's borrowing allowance would be established by the amount of outstanding eligible loans. The borrowing allowance for participants leading a TLTRO-II group would be determined using an average of all group members' loans. Each participant's borrowing allowance would be 30% of eligible loans that were still outstanding as of January 31, 2016, less any prior outstanding sums borrowed under the first two TLTROs in September and December 2014. This computation would take into account enforceable notices of early repayment. If a TLTRO group member chose to withdraw, the lead institution's September and December 2014 TLTRO amounts outstanding on the TLTRO-II settlement date would be used to determine their individual TLTRO-II borrowing allocation. The TLTRO-II borrowing allowance for the group would be reduced by this sum. Each participant's bid limit would be equal to its borrowing authorization minus any prior TLTROs-II borrowings. A participant's benchmark net lending was calculated using data from the first reference period. Participants with positive or negative eligible net lending would have zero benchmark net lending. The benchmark net lending would be the same as the negative net lending for participants who had negative qualifying net lending.

The qualified loans outstanding as of January 31, 2016, plus benchmark net lending, would make up the benchmark outstanding amount.

The primary refinancing operation rate for the applicable TLTRO-II tender allotment would be the interest on TLTRO-II borrowings. A participant's interest rate would be linked to the deposit facility rate during the applicable TLTRO-II allotment if their eligible net lending in the second reference period surpassed benchmark net lending. Before the first early repayment date in June 2018, the rate would be disclosed. Upon TLTRO-II maturity or early repayment, interest would be paid in arrears.

The principal refinancing operation rate for the relevant TLTRO-II allotment would be the interest rate if a participant had to repay TLTRO-II sums before the communicated interest rate as a result of remedies used by an NCB.

Starting 24 months following settlement, participants had the option to stop or reduce TLTRO-II payments every quarter. Early payback dates would coincide with the settlement

dates of the primary refinancing operation of the Eurosystem. Participants have to give the relevant NCB at least a week's notice of their intention to make an early repayment. A financial penalty could be assessed if you don't complete your repayment in full or in part by the deadline. The penalty calculation would be the same as that employed for failure to comply with responsibilities related to reverse transactions.

TLTRO II CALENDAR

Figure 11

	TLTRO-II.1	TLTRO-II.2	TLTRO-II.3	TLTRO-II.4
Lead institutions apply to their home NCB for TLTRO-II group treatment or changes to TLTRO-II group compositions (15:30)[2]	Thu, 19/05/2016 (application must be based on the most up-to-date data on close links and indirect reserve holdings as at 30 April 2016)	Mon, 22/08/2016 (application must be based on the most up-to-date data on close links and indirect reserve holdings as at 31 July 2016)	Mon, 14/11/2016 (application must be based on the most up-to-date data on close links and indirect reserve holdings as at 31 October 2016)	Mon, 20/02/2017 (application must be based on the most up-to-date data on close links and indirect reserve holdings as at 31 January 2017)
NCBs provide confirmation to lead institution on TLTRO-II group treatment/changes to group compositions (15:30)[2]	Mon, 30/05/2016	Wed, 31/08/2016	Wed, 23/11/2016	Wed, 01/03/2017
Deadline for the first report applicable to counterparties or groups participating for the first time[3] or revised report as a result of data revisions, corporate reorganizations or changes in TLTRO-II groups (15:30)[2]	Thu, 02/06/2016 **Reporting period:** 1 February 2015 to 31 January 2016 Data vintage used for BSI transmission with April 2016 as the reference month	Mon, 05/09/2016 **Reporting period:** 1 February 2015 to 31 January 2016 Data vintage used for BSI transmission with July 2016 as the reference month	Mon, 28/11/2016 **Reporting period:** 1 February 2015 to 31 January 2016 Data vintage used for BSI transmission with October 2016 as the reference month	Mon, 06/03/2017 **Reporting period:** 1 February 2015 to 31 January 2016 Data vintage used for BSI transmission with January 2017 as the reference month
NCBs inform counterparties about bid limits (by 15:30 at the latest)	Thu, 16/06/2016	Mon, 19/09/2016	Mon, 12/12/2016	Mon, 20/03/2017
Announcement	Wed, 22/06/2016 (13:30)	Tue, 20/09/2016 (15:30)	Tue, 13/12/2016 (15:30)	Tue, 21/03/2017 (15:30)
Deadline for counterparties to submit bids (09:30)	Thu, 23/06/2016	Wed, 21/09/2016	Wed, 14/12/2016	Wed, 22/03/2017
Publication of allotment results (11:30)	Fri, 24/06/2016	Thu, 22/09/2016	Thu, 15/12/2016	Thu, 23/03/2017
Settlement	Wed, 29/06/2016	Wed, 28/09/2016	Wed, 21/12/2016	Wed, 29/03/2017
Deadline for the second report, and the result of the auditor's evaluation with reference to both reports (15:30)[2]	Tue, 15/05/2018 **Reporting period:** 1 February 2016 to 31 January 2018 **Data vintage** used for BSI transmission with March 2018 as the reference month			
NCBs inform counterparties about final interest rate	Tue, 05/06/2018			
Settlement of first early voluntary repayment	Wed, 27/06/2018	Wed, 26/09/2018	Wed, 19/12/2018	Wed, 27/03/2019
Maturity date	Wed 24/06/2020	Wed, 30/09/2020	Wed, 16/12/2020	Wed, 24/03/2021

Source: ECB website

3.2 The launch of TLTRO III

The information provided in subsequent sections originates from Decision (EU) 2019/1311 of the European Central Bank, dated 22 July 2019, which pertains to the establishment of a third series of targeted longer-term refinancing operations (ECB/2019/21). This directive was issued by the Governing Council of the European Central Bank, underscoring its authority and role in shaping monetary policy and financial stability within the Eurozone.
The third TLTRO program consists of a series of ten targeted longer-term refinancing operations, each with a maturity of three years (See Figure 12). These activities were planned to run from September 2019 to December 2024. The TLTROs-III's main goals were to promote lending to the non-financial private sector (still apart from consumer loans for home purchases) and help achieve inflation rates close to 2% over the medium run.
The judgment also dealt with the participation of organizations that borrow money from the Eurosystem through collective agreements. Institutions may take part collectively in specific circumstances, streamlining their participation in TLTROs-III.
Based on an institution's outstanding qualified loans to the non-financial private sector as of February 28, 2019, borrowing allowances under TLTROs-III were computed. The decision also took into account any outstanding borrowings by the institution under TLTROs-II. Borrowing allowances could also take into account eligible self-securitized loans. Maximum bid limits were applied to TLTROs-III operations to avoid an excessive concentration of bids. Based on an institution's lending history from 1 April 2019 to 31 March 2021, the interest rates for each TLTRO-III operation were calculated. According to the indicative calendar for TLTROs-III, each TLTRO-III will mature three years after the respective settlement date, on a day that also happens to be the settlement date of a Eurosystem main refinancing operation. Participants initially had no choice but to repay the assigned amounts early, but thanks to an amendment early repayment has been permitted, starting 24 months after the settlement of each TLTRO-III, every quarter. Early repayment dates correlate with the Eurosystem-specified settlement date of a large refinancing operation. Participants who want to take advantage of the early repayment procedure must notify the relevant NCB of at least one prior specific reporting requirement applied to institutions taking part in TLTROs-III. The supplied data was utilized for a variety of purposes, such as calculating borrowing allowances and comparing performance to benchmarks. For the appropriate implementation of TLTRO-III and analytical purposes, national central banks within the eurozone could exchange reported data as needed. This move, which was intended to go into effect right

away, aimed to provide institutions enough time to get ready before the start of TLTRO-III activities.

TLTRO III CALENDAR

Figure 12

	TLTRO-III.1	TLTRO-III.2	TLTRO-III.3	TLTRO-III.4	TLTRO-III.5	TLTRO-III.6	TLTRO-III.7
Lead institutions apply to their home NCB for TLTRO-III group treatment or changes to TLTRO-III group compositions (18:00)[2]	Wed, 14/08/2019 (application must be based on the most up-to-date data on close links and indirect reserve holdings as at 31 July 2019)	Mon, 04/11/2019 (application must be based on the most up-to-date data on close links and indirect reserve holdings as at 31 October 2019)	Mon, 10/02/2020 (application must be based on the most up-to-date data on close links and indirect reserve holdings as at 31 January 2020)	Mon, 11/05/2020 (application must be based on the most up-to-date data on close links and indirect reserve holdings as at 30 April 2020)	Mon, 17/08/2020 (application must be based on the most up-to-date data on close links and indirect reserve holdings as at 31 July 2020)	Mon, 02/11/2020 (application must be based on the most up-to-date data on close links and indirect reserve holdings as at 31 October 2020)	Mon, 15/02/2021 (application must be based on the most up-to-date data on close links and indirect reserve holdings as at 31 January 2021)
NCBs provide confirmation to lead institution on TLTRO-III group treatment/changes to group compositions (15:30)[2]	Fri, 23/08/2019	Thu, 14/11/2019	Thu, 20/02/2020	Thu, 21/05/2020	Thu, 27/08/2020	Thu, 12/11/2020	Thu, 18/02/2021
Deadline for the first report applicable to counterparties or groups participating for the first time or revised report as a result of data revisions, corporate reorganisations or changes in TLTRO-III groups (18:00)[2,3]	Tue, 27/08/2019 **Reporting period:** Sun, 01/04/2018 to Sun, 31/03/2019 Data vintage used for BSI transmission with June 2019 as the reference month	Mon, 18/11/2019 **Reporting period:** Sun, 01/04/2018 to Sun, 31/03/2019 Data vintage used for BSI transmission with September 2019 as the reference month	Mon, 24/02/2020 **Reporting period:** Sun, 01/04/2018 to Sun, 31/03/2019 Data vintage used for BSI transmission with December 2019 as the reference month	Mon, 25/05/2020 **Reporting period:** Sun, 01/04/2018 to Sun, 31/03/2019 Data vintage used for BSI transmission with March 2020 as the reference month	Mon, 31/08/2020 **Reporting period:** Sun, 01/04/2018 to Sun, 31/03/2019 Data vintage used for BSI transmission with June 2020 as the reference month	Mon, 16/11/2020 **Reporting period:** Sun, 01/04/2018 to Sun, 31/03/2019 Data vintage used for BSI transmission with September 2020 as the reference month	Mon, 22/02/2021 **Reporting period:** Sun, 01/04/2018 to Sun, 31/03/2019 Data vintage used for BSI transmission with December 2020 as the reference month
	Borrowing allowance calculated on the basis of eligible loans outstanding as at 28.02.2019						
Deadline for the reporting of self-securitised loans together with its auditor's evaluation (18:00)[2,3]	Mon, 24/02/2020			Mon, 25/05/2020	Mon, 31/08/2020	Mon, 16/11/2020	Mon, 22/02/2021
NCBs inform counterparties about bid limits and borrowing allowances (by 15:30 at the latest)[2]	Mon, 16/09/2019	Mon, 09/12/2019	Mon, 16/03/2020	Mon, 15/06/2020	Mon, 21/09/2020	Mon, 07/12/2020	Mon, 15/03/2021
Announcement (15:40)	Tue, 17/09/2019	Tue, 10/12/2019	Tue, 17/03/2020	Tue, 16/06/2020	Tue, 22/09/2020	Tue, 08/12/2020	Tue, 16/03/2021
Deadline for counterparties to submit bids (09:30)	Wed, 18/09/2019	Wed, 11/12/2019	Wed, 18/03/2020	Wed, 17/06/2020	Wed, 23/09/2020	Wed, 09/12/2020	Wed, 17/03/2021
Publication of allotment results (11:30)	Thu, 19/09/2019	Thu, 12/12/2019	Thu, 19/03/2020	Thu, 18/06/2020	Thu, 24/09/2020	Thu, 10/12/2020	Thu, 18/03/2021
Settlement	Wed, 25/09/2019	Wed, 18/12/2019	Wed, 25/03/2020	Wed, 24/06/2020	Wed, 30/09/2020	Wed, 16/12/2020	Wed, 24/03/2021
Deadline for the result of the auditor's evaluation of the first report (23:59)[2]	Thu, 21/01/2021			Fri, 16/07/2021[4]			
Deadline for the resubmission of the auditor's evaluation for a first report (23:59)[2]	Revised first report due to a change in TLTRO-III group composition or corporate reorganisation occurring before 1 April 2021: Fri, 30/07/2021 Revised first report due to a change in TLTRO-III group composition or corporate reorganisation occurring between 1 April 2021 and 31 December 2021: Wed, 06/04/2022						
Deadline for the second report (including the special reference period), and the result of the auditor's evaluation of the second report (23:59)[2]	Tue, 17/08/2021 **Reporting period:** 01/04/2019 to 31/03/2021 (also for the optional special reference period: 01/03/2020 to 31/03/2021) **Data vintage** used for BSI transmission with May 2021 as the reference month						
NCBs inform counterparties about their interest rate related data based on the second and special reference periods (15:30)[2]	Fri, 10/09/2021						
Deadline for counterparties to notify NCBs of first voluntary early repayment request (17:00)	Wed, 15/09/2021	Wed, 15/09/2021	Wed, 15/09/2021	Wed, 15/09/2021	Wed, 15/09/2021	Wed, 8/12/2021	Wed, 16/03/2022
Settlement of first voluntary early repayment	Wed, 29/09/2021	Wed, 29/09/2021	Wed, 29/09/2021	Wed, 29/09/2021	Wed, 29/09/2021	Wed, 22/12/2021	Wed, 30/03/2022
Deadline for the third report (additional special reference period) and the result of the auditor's evaluation of the third report (23:59)[2]	Tue, 17/05/2022 **Reporting period:** 01/10/2020 to 31/12/2021 **Data vintage** used for BSI transmission with February 2022 as the reference month						
NCBs inform counterparties about their interest rate related data based on the additional special reference period (15:30)[2]	Fri, 10/06/2022						
First repayment date when all rates can be applied (including additional special interest rate)	Wed, 29/06/2022						
NCBs inform counterparties about final interest rates (15:30)[2]	Fri, 23/09/2022	Fri, 16/12/2022	Fri, 24/03/2023	Fri, 23/06/2023	Fri, 22/09/2023	Fri, 15/12/2023	Fri, 22/03/2024
Maturity date	Wed, 28/09/2022	Wed, 21/12/2022	Wed, 29/03/2023	Wed, 28/06/2023	Wed, 27/09/2023	Wed, 20/12/2023	Wed, 27/03/2024

Source: ECB website

Figure 12.1

	TLTRO-III.8	TLTRO-III.9	TLTRO-III.10
Lead institutions apply to their home NCB for TLTRO-III group treatment or changes to TLTRO-III group compositions (18:00)[2]	Mon, 10/05/2021 (application must be based on the most up-to-date data on close links and indirect reserve holdings as at 30 April 2021)	Mon, 16/08/2021 (application must be based on the most up-to-date data on close links and indirect reserve holdings as at 31 July 2021)	Mon, 08/11/2021 (application must be based on the most up-to-date data on close links and indirect reserve holdings as at 31 October 2021)
NCBs provide confirmation to lead institution on TLTRO-III group treatment/changes to group compositions (15:30)[2]	Thu, 20/05/2021	Thu, 26/08/2021	Thu, 18/11/2021
Deadline for the first report applicable to counterparties or groups participating for the first time or revised report as a result of data revisions, corporate reorganisations or changes in TLTRO-III groups (18:00)[2,3]	Tue, 25/05/2021 **Reporting period:** Sun, 01/04/2018 to Sun, 31/03/2019 Data vintage used for BSI transmission with March 2021 as the reference month	Mon, 30/08/2021 **Reporting period:** Sun, 01/04/2018 to Sun, 31/03/2019 Data vintage used for BSI transmission with June 2021 as the reference month	Mon, 22/11/2021 **Reporting period:** Sun, 01/04/2018 to Sun, 31/03/2019 Data vintage used for BSI transmission with September 2021 as the reference month
	Borrowing allowance calculated on the basis of eligible loans outstanding as at 28.02.2019		
Deadline for the reporting of self-securitised loans together with its auditor's evaluation (18:00)[2]	Tue, 25/05/2021	Mon, 30/08/2021	Mon, 22/11/2021
NCBs inform counterparties about bid limits and borrowing allowances (by 15:30 at the latest)[2]	Mon, 14/06/2021	Mon, 20/09/2021	Mon, 13/12/2021
Announcement (15:40)	Tue, 15/06/2021	Tue, 21/09/2021	Tue, 14/12/2021
Deadline for counterparties to submit bids (09:30)	Wed, 16/06/2021	Wed, 22/09/2021	Wed, 15/12/2021
Publication of allotment results (11:30)	Thu, 17/06/2021	Thu, 23/09/2021	Thu, 16/12/2021
Settlement	Thu, 24/06/2021	Wed, 29/09/2021	Wed, 22/12/2021
Deadline for the result of the auditor's evaluation of the first report and for resubmission in case of corporate reorganisations or changes to TLTRO-III group composition occurring between 1 April 2021 and 31 December 2021 (23:59)[2]	Wed, 06/04/2022		
Deadline for the third report and the result of the auditor's evaluation of the third report (23:59)[2]	Tue, 17/05/2022 **Reporting period:** 01/10/2020 to 31/12/2021 **Data vintage** used for BSI transmission with February 2022 as the reference month		
NCBs inform counterparties about their interest rate related data based on the additional special reference period (15:30)[2]	Fri, 10/06/2022		
Deadline for counterparties to notify NCBs of first voluntary early repayment request (17:00)	Wed, 15/06/2022		
Settlement of first voluntary early repayment	Wed, 29/06/2022		
NCBs inform counterparties about final interest rates (15:30)[2]	Fri, 21/06/2024	Fri, 20/09/2024	Fri, 13/12/2024
Maturity date	Wed, 26/06/2024	Wed, 25/09/2024	Wed, 18/12/2024

Source: ECB website

3.3 Casting Light on TLTRO Trends: A Comprehensive Analysis Across Nations and Years

Overall, the institution's total assets have grown over time, rising from about €2.2 trillion in 2014 to almost €7.95 trillion in 2022. This shows that the institution has been expanding its operations and possibly its size. There are some variations in the TLTRO quantities. Between 2014 and 2016, they stayed within a fairly narrow range of €473 billion to €556 billion. The amount of TLTRO funding acquired in 2017 increased significantly, hitting €760 billion. This might point to the need for more liquidity that year. Even though total assets increased in 2018 and 2019, the TLTRO amounts remained quite large. This could indicate that the organization kept using TLTRO funding to sustain its operations and lending activities. According to the figures, TLTRO funds acquired in 2020 increased significantly, reaching €1.79 trillion. This rise could be attributed to central banks providing additional liquidity to stabilize financial markets in response to the economic difficulties brought on by the COVID-19 epidemic. It's vital to note that TLTRO III was the final series of TLTRO, and commercial banks are currently repaying it, which is why TLTRO amounts will be falling in 2021 and 2022. This explains the recent decline in TLTRO numbers.

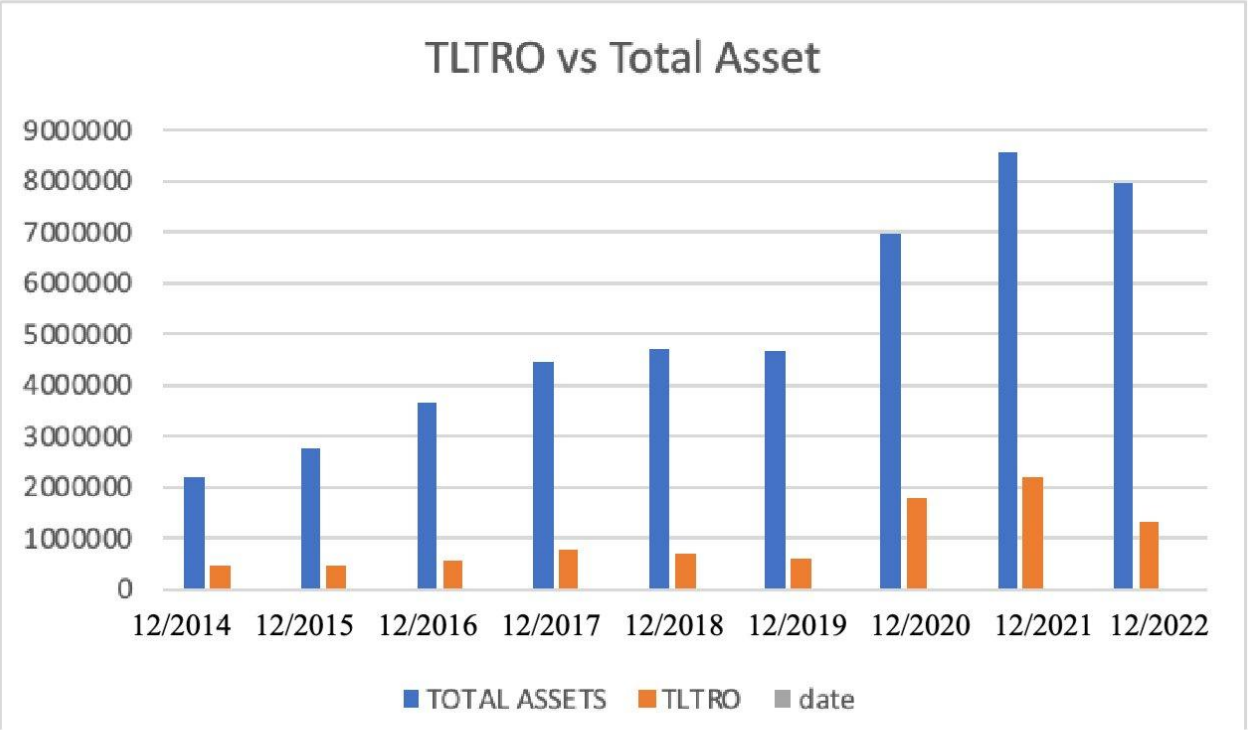
The data shows how the financial environment is evolving and how the institution has responded to different economic situations and legislative changes, notably about TLTRO funding. The declining TLTRO sums in 2021 and 2022 are explained by the fact that TLTRO III is being reimbursed by commercial banks. This repayment shows that the banks can pay back the money, which may signal increased financial stability and less reliance on central bank support.

Total Assets: After each year, this column shows the institution's total assets. All of the institution's holdings, including its physical currency, domestic government securities, loans to commercial banks, gold reserves, and other financial assets, are included in its total assets.
TLTRO: This shows how much money the ECB provides at the end of each year through TLTRO activities.

COMPARISON BETWEEN TLTRO AND TOTAL ASSETS HELD BY ECB

Figure 13

(EUR millions)



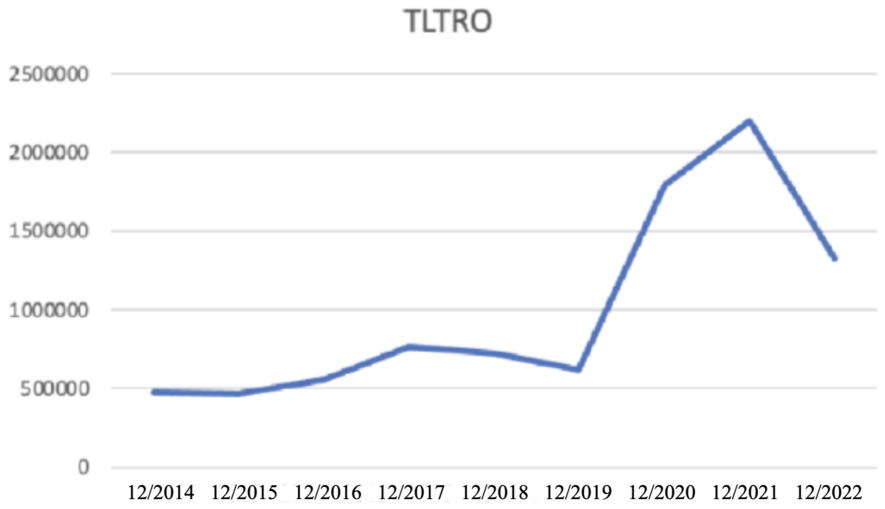
Source: ECB Statistical Office

TOTAL AMOUNT OF TLTRO BETWEEN 2014 AND 2022

The graph provided below showcases the total value of TLTRO, taken individually, after each year, spanning from 2014 to 2022. This visual representation offers a comprehensive view of the cumulative TLTRO funds remaining within the financial system at the end of each calendar year during this timeframe.

Figure 14

(EUR millions)



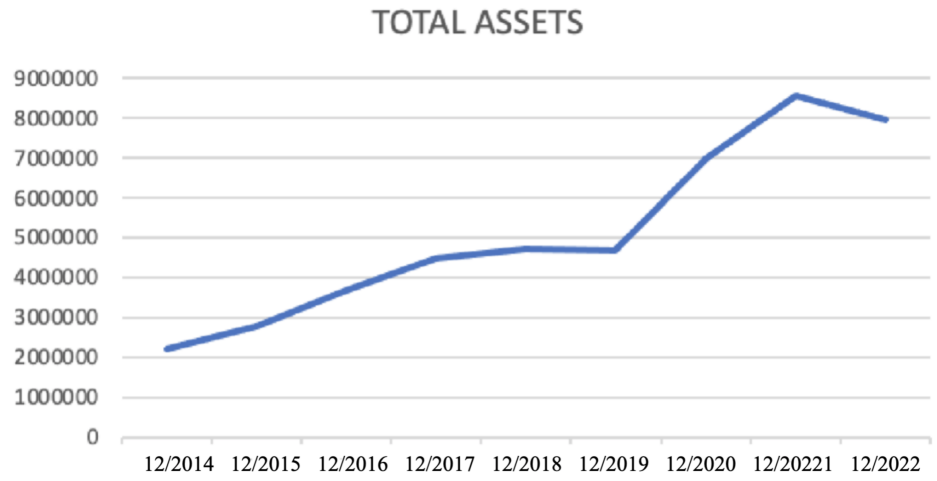
Source: ECB Statistical Office

TOTAL AMOUNT OF ASSETS HELD BY ECB BETWEEN 2014 AND 2022

The graph provided below showcases the total value of assets, held by ECB, after each year, spanning from 2014 to 2022. This visual representation offers a comprehensive view of the cumulative amount of assets remaining within the financial system at the end of each calendar year during this timeframe.

Figure 15

(EUR millions)



Source: ECB Statistical Office

The amount of TLTRO money allocated has steadily increased over the course of several years for the Eurosystem and also for the five countries taken into consideration according to the information shown in Figures 14 and 15, which are graphic representations based on data openly provided by the European Central Bank's statistical office. This recurring trend illustrates the European Central Bank’s unwavering dedication to providing crucial monetary support and ensuring the smooth flow of liquidity within the complex framework of the financial system and underlying the fact that TLTRO as an unconventional and new instrument has done its job.

Interestingly, Spain and Italy have outperformed France and Germany, as we can see from Figure 16, which initially did not participate as much as other countries in the TLTRO project, but going forward in time accumulated high TLTRO amounts. In the case of France and Germany, those funds were taken for stability reasons rather than financing and boosting the economy. Examining the nuanced details of their distinct financial ecosystems, lending patterns, and varying levels of reliance on the resolute support mechanisms of the ECB can help explain this fact. On one hand, France and Germany have carried the stability of their banking system with impressive constancy in the time continuum. Such stability frequently serves as a barometer for the banking industry's resilience in these two economic giants and permitted those two to receive higher TLTRO amounts over time conferring even higher levels of stability. On the other hand, Italy and Spain responded well to the TLTRO funding and the steadily increasing amount of TLTRO received over the years is an important signal of growing and more stable economies.

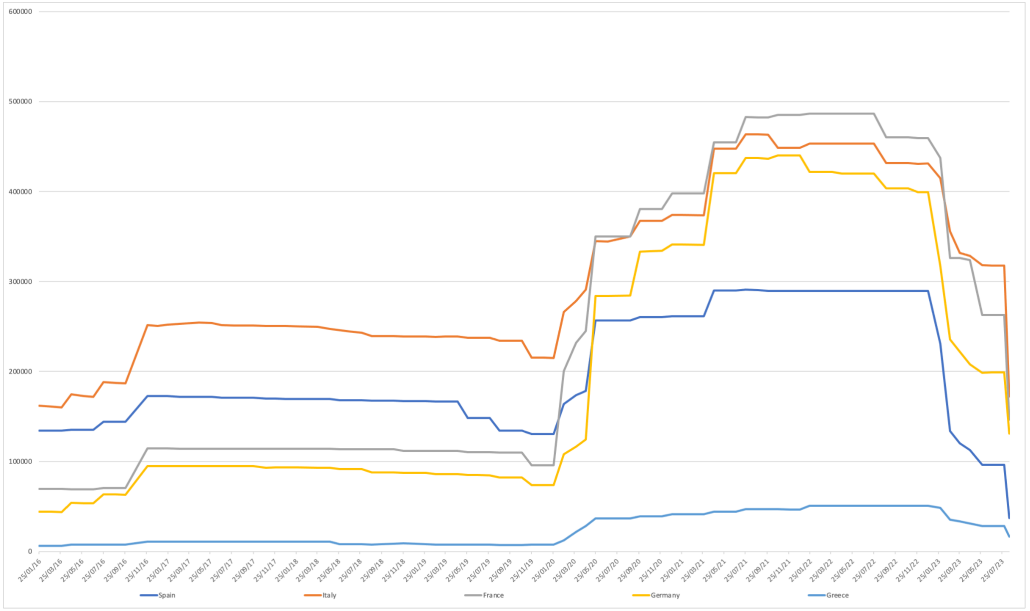
There have undoubtedly been noticeable shifts and changes in TLTRO quantities across all countries, with the years 2016 and 2018 standing out in particular. The rollout of the second tranche of TLTRO operations is inextricably related to these swaying developments. Furthermore, it is critical to highlight the ECB's outstanding reactivity due to the COVID-19 pandemic in 2020. All five countries saw a noticeable and exponential increase in TLTRO quantities throughout this turbulent year. The ECB's aggressive effort to lessen the negative economic effects of the global epidemic may be observed in this monetary surge.

Greece, in contrast, has consistently been positioned at the bottom of the TLTRO quantities range among the five countries, which is a reflection of the numerous issues that plague its banking industry and, consequently, its broader economic environment. TLTRO’s effects are difficult to define properly, so we will use a case study done by Banco de Espana to acquire a thorough understanding of how these operations affect the balance sheets of the banks.

AGGREGATED AMOUNT OF TLTRO FOR EACH SELECTED COUNTRY

Figure 16

(EUR millions)



Source: ECB Statistical Office

AGGREGATE AMOUNT OF TLTRO FOR ALL EUROSYSTEM

Figure 17

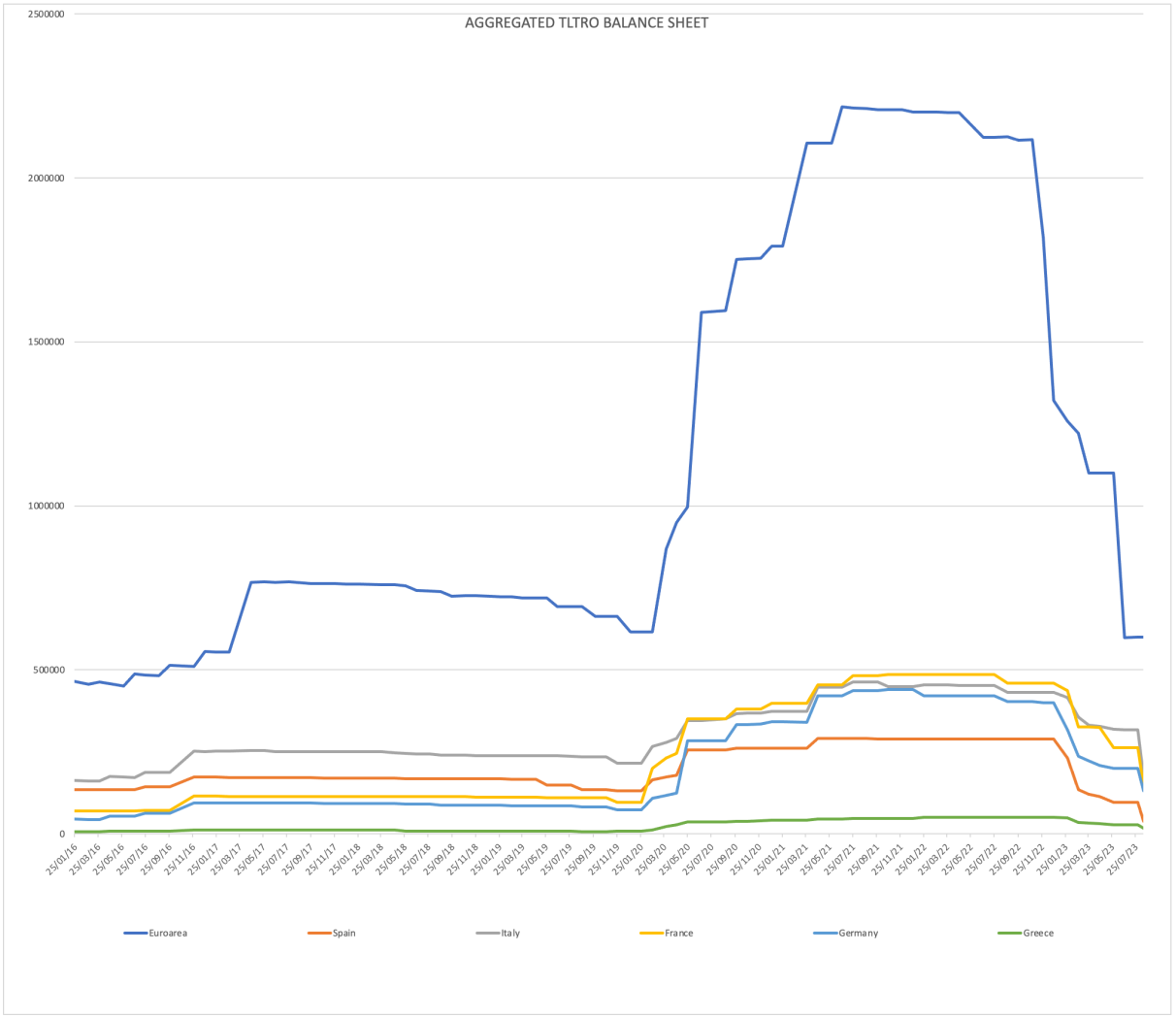
(EUR millions)

Source: ECB Statistical Office

AGGREGATE AMOUNT OF TLTRO FOR EACH SELECTED COUNTRY
VS, AGGREGATED AMOUNT OF TLTRO FOR ALL EUROSYSTEM

The graph in Figure 15 highlights how little money was given to Greece, Italy, Spain, Germany, and France in proportion to the overall amount of TLTRO cash that was spread throughout the entire European Union. It draws attention to how these countries' TLTRO sums fit into the overall scheme of the EU's financial activities.

Figure 18



Source: ECB Statistical Office

3.4 Analyzing the Impact of TLTRO III on the Balance Sheets of Spanish Credit Institutions

The following chapter of this thesis delves into a thorough examination of the research done by Ms. Luisa Pérez Ortiz, Enrique Esteban Garca-Escudero, and Carmen Castillo Lozoya. This study makes a substantial contribution to our knowledge of the subject under investigation and offers insightful information that enhances the conclusions made in this thesis. We will provide a thorough review of their work and its implications in the context of our research on TLTRO by reporting on their techniques, key findings, and interpretations.

With the onset of the COVID-19 pandemic in Europe in March 2020, the Eurosystem faced a crisis which, being exogenous to the previous economic situation and owing to the huge uncertainty it generated, was not comparable with any previous ones. There was no easy answer to the questions as to the possible course of the pandemic, the duration of the lockdown measures, or the severity of the impact of the crisis on economic growth worldwide. As the situation worsened, the need arose to guarantee the supply of liquidity to agents in the real economy (non-financial corporations and households), and TLTROs were deemed to be the monetary policy instrument that specifically fulfilled that objective. However, one singular characteristic of this crisis was that the euro area banking sector was enjoying good health, underpinned by highly favorable market funding conditions, against a backdrop of abundant liquidity. In consequence, to transform TLTRO III (which had been designed pre-pandemic as a prolongation of previous programs) into refinancing operations that would prove sufficiently attractive to the banking sector in this new setting, some of its parameters had to be recalibrated, to ensure a high level of take-up that would make it an efficient instrument to support the flow of credit to the real economy. The key change made to attract banks was the enhanced cost of the refinancing operations, enabling participating banks to obtain funding at an interest rate of -1%, that is, 50 bp below the deposit facility rate at that time. Never before had a funding rate been below the DF rate. This has enabled participating banks to obtain funds at a lower interest rate than that paid on their excess reserves (understood as the liquidity that Eurosystem credit institutions hold in their accounts at their central banks, in the case of Spanish banks, at the Banco de España), provided they meet their eligible net lending targets as previously said. In addition, to encourage greater

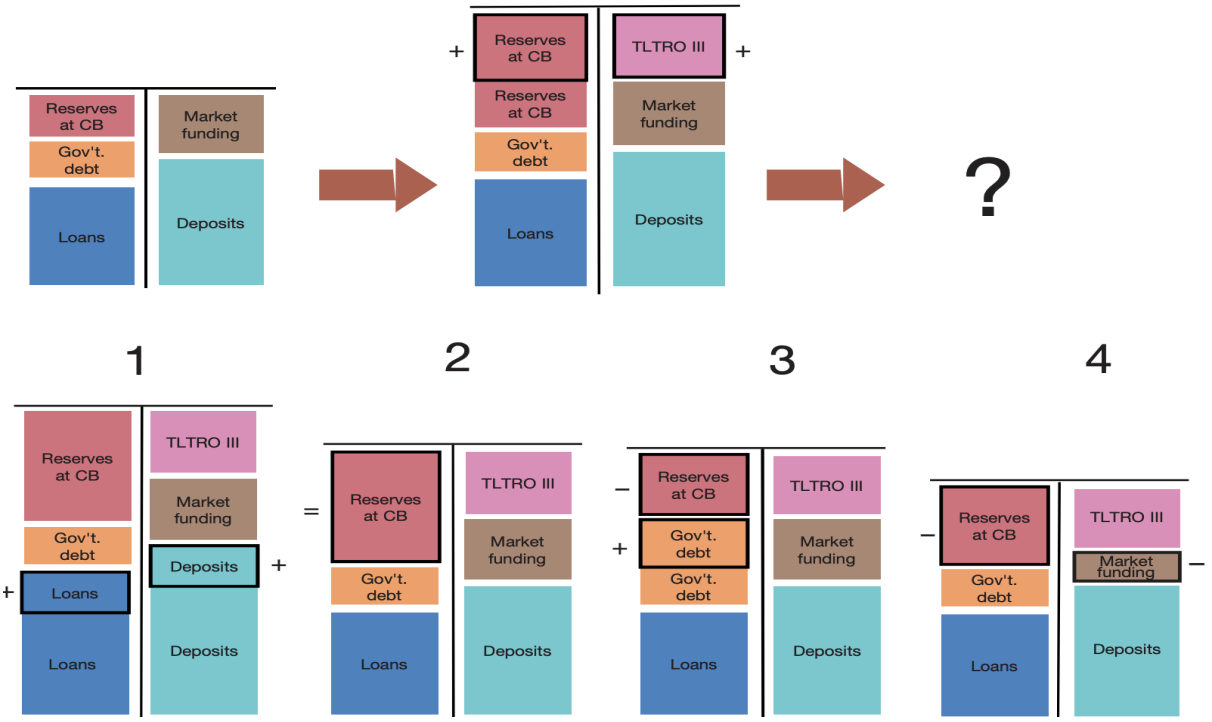
take-up, the total limit that each participating bank could apply for was almost doubled and the collateral framework was temporarily eased. Given the favorable conditions, no possible stigma could be associated with a bank's participation in this type of operations, and there was an unprecedented level of participation in the June 2020 and following Eurosystem TLTRO III operations. This high take-up has had significant effects on the balance sheets of the participating credit institutions. For this purpose, the relationship between TLTRO III funding and other possible funding strategies available to banks has been studied, using data taken from several Eurosystem internal sources, over the period running from 28 February 2020 to 31 March 2021. The Spanish banks included in the sample account for 99.9% of the total increase in the amount of TLTRO funding in Spain over that period.

Now the possible effects of TLTRO III on banks' balance sheets are identified, analyzing the balance sheets at the aggregate level for Spanish banks. There follows a study of each of the strategies identified, using individual balance sheet data.

Upon receiving TLTRO III funding, the bank's balance sheet experienced an initial expansion. This is manifested by the inclusion of the acquired loan as a liability and the addition of reserved funds at the central bank on the assets side. Subsequent outcomes are contingent on the strategies pursued by the bank, encompassing:

- Lending: The expansion of the bank's balance sheet from TLTRO III funding can lead to increased lending activities.
- Reserve Holdings at the Central Bank: The received funds might be retained as reserves at the central bank, affecting the bank's liquidity position.
- Government Debt Purchase: The bank could opt to invest in government debt using the acquired funds.
- Substitution for Market Funding: Alternatively, the TLTRO III funds might replace existing market-based funding sources.

The chosen strategy among these options will dictate the direction of subsequent effects on the bank's financial position and operations.

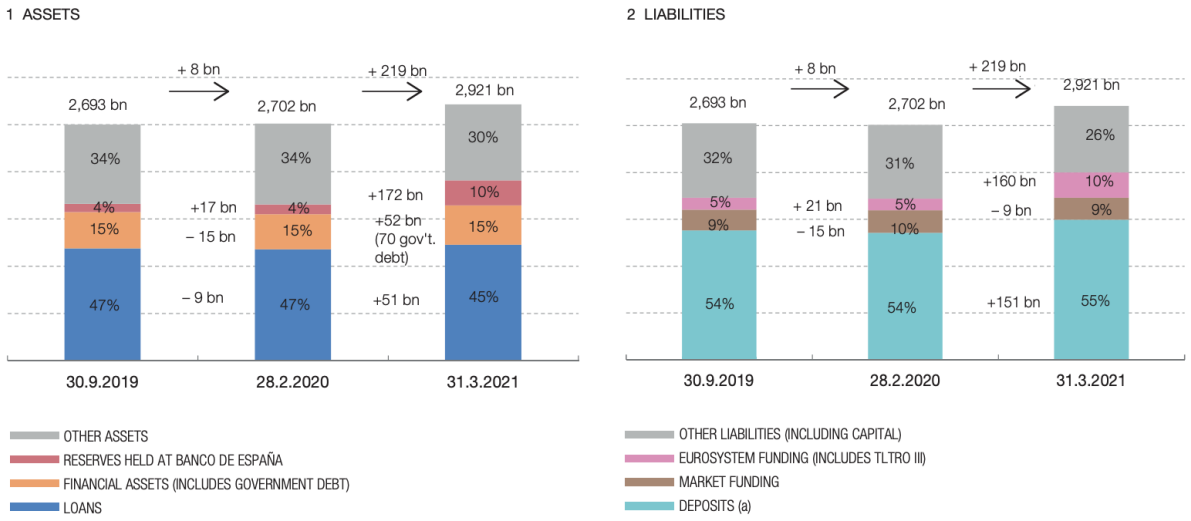


Source: ECB website from an article by M.a Carmen Castillo Lozoya, Enrique Esteban García-Escudero, and M.a Luisa Pérez Ortiz titled "The effect of TLTRO III on Spanish credit institutions' balance sheets."

I. AGGREGATED BALANCE SHEET OF SPANISH CREDIT INSTITUTIONS

Because of TLTRO III and asset purchase programs, the Eurosystem's funding increased significantly during the period under study, and reserves also increased significantly. On the other hand, market-based funding saw a minor decline while loans and holdings of government debt increased. It is vital to keep in mind, nevertheless, that due to offsetting effects among institutions, certain nuances and crucial features may be hidden when studying this data in aggregate. We continue with a more in-depth investigation to address this constraint and acquire a deeper understanding. Data taken from the individual balance sheets of the participating banks is used to examine each of the techniques that have been discovered. By using this method, the effects of these measures on banks may be evaluated more thoroughly.

CHART1



Source: ECB website from an article by M.a Carmen Castillo Lozoya, Enrique Esteban García-Escudero, and M.a Luisa Pérez Ortiz titled "The effect of TLTRO III on Spanish credit institutions' balance sheets."

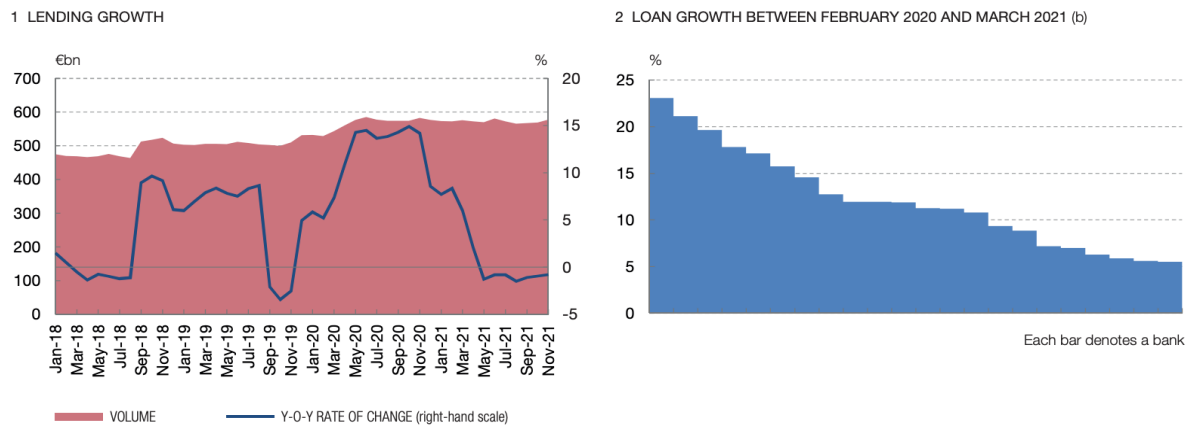
II. LENDING GROWTH

The amount of loans increased noticeably during the period under consideration, with each participating Spanish bank contributing to this rise in line with TLTRO III's goals. Loans made to non-financial firms and loans to families (except those for home purchases) are two important areas in which TLTRO III is explicitly intended to promote and sustain bank lending. As shown in Chart 2.1, the outstanding balance of qualifying loans made available by Spanish banks was largely steady in 2019. It had a minor decline between September and November but recovered strongly by December. However, banks saw a considerable increase in eligible net lending in 2020, notwithstanding the uncertainties brought on by the epidemic. This increase peaked from March to June and then continued steadily. The astounding €66 billion increase in qualifying loans during the studied period was a growth rate that was approximately ten times greater than that seen during the period from April 2019 to the end of February 2020.

As shown in Chart 2.2, each Spanish bank experienced significant growth in the volume of its eligible loans during the course of the analysis time frame, easily exceeding its eligible net lending targets. This growth exceeded 10%, and it was consistently impressive. It is noteworthy that while both lending groups showed signs of development, the non-financial corporate lending segment showed the strongest signs of growth. This greater expansion is consistent with the rise in liquidity needs that occur during economic downturns and the

increased unpredictability brought on by the pandemic's peak. Furthermore, the existence of public guarantee programs had an impact. (For more information, see Chart 2.2)

CHART 2

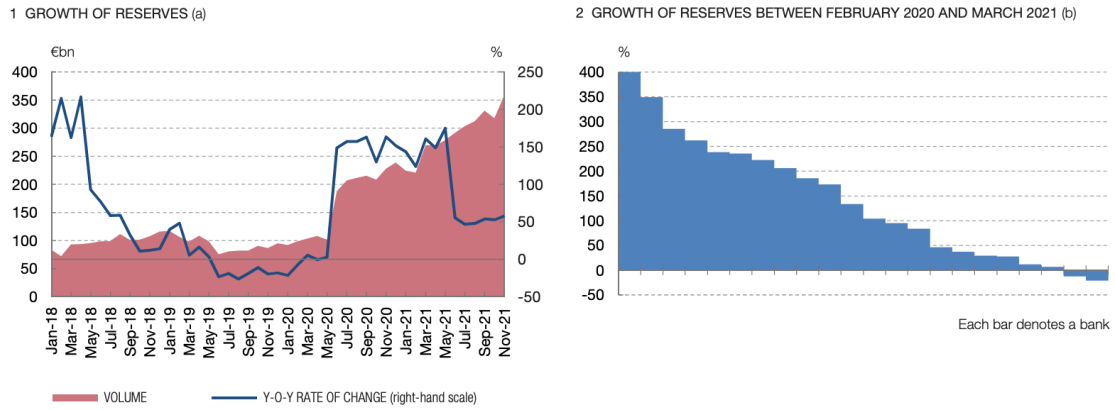


Source: ECB website from an article by M.a Carmen Castillo Lozoya, Enrique Esteban García-Escudero, and M.a Luisa Pérez Ortiz titled "The effect of TLTRO III on Spanish credit institutions' balance sheets."

III. GROWTH OF RESERVES HELD AT THE BANCO DE ESPAÑA

The Banco de Espaa's reserves, which are held by Spanish banks, varied by approximately €100 billion in 2019. However, since June 2020, when the first significant increase was noticed, the volume of reserves has more than tripled thanks to TLTRO III.4, the first opportunity for participation with the revised, more advantageous terms following the recalibration announced in March 2020. When the take-up limit was raised from 50% to 55% of eligible loans as a result of the TLTRO III.7 in March 2021, another, albeit more modest, increase was seen (Chart 3.1). With some of the large banks posting the highest increases, more than half of the banks saw their level of reserves quadruple. As shown in Chart 3.2, a small number of banks also made a small reduction in their reserves.

CHART 3

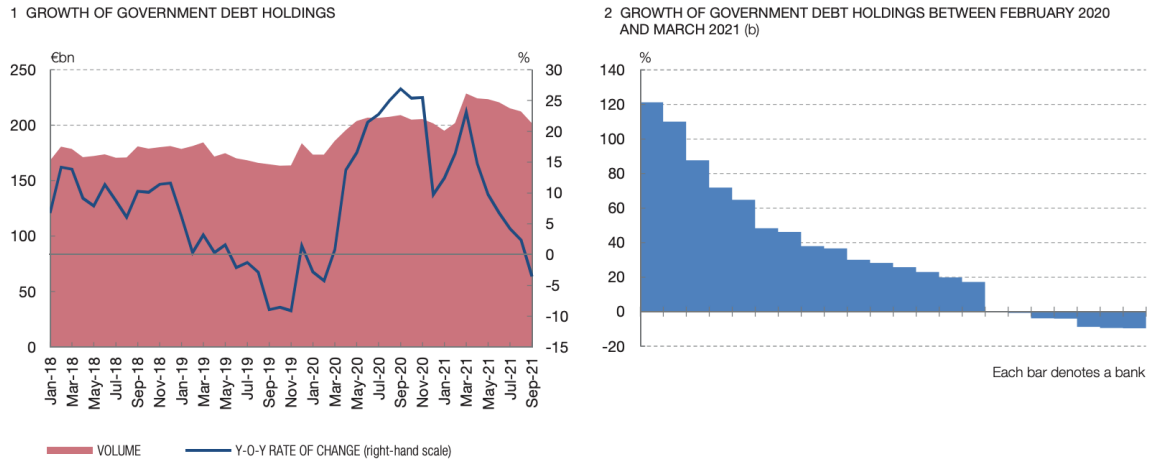


Source: ECB website from an article by M.a Carmen Castillo Lozoya, Enrique Esteban García-Escudero, and M.a Luisa Pérez Ortiz titled "The effect of TLTRO III on Spanish credit institutions' balance sheets."

IV. GROWTH OF GOVERNMENT DEBT HOLDINGS

Spanish banks' holdings of government debt have increased after the implementation of COVID-19, increasing by more than 25% at half of all banks. purchase of public debt Spanish banks' holdings of public debt tended to steadily decline in the lead-up to the COVID-19 crisis as Eurosystem purchase programs expanded. However after the pandemic started (Chart 4.1), this pattern entirely turned around, which coincided with a large rise in the issuance of government debt across several nations. At the individual bank level, most banks' government debt portfolios have grown, increasing by more than 25% at half the institutions analyzed, as shown in Chart 4.2. Small and medium-sized banks saw the highest rates of growth, which is tied to their more established business strategies, which are based on lower-risk investments. The reverse situation, however, is also significant because almost a quarter of the TLTRO III participating banks reported a decline in their holdings of public debt.

CHART 4

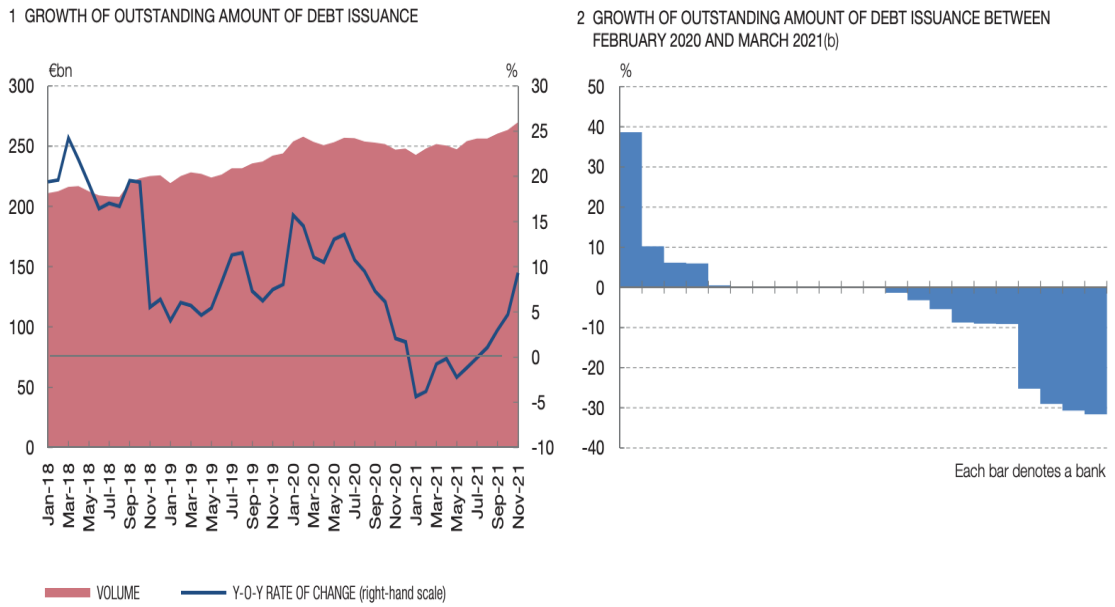


Source: ECB website from an article by M.a Carmen Castillo Lozoya, Enrique Esteban García-Escudero, and M.a Luisa Pérez Ortiz titled "The effect of TLTRO III on Spanish credit institutions' balance sheets."

V. SUBSTITUTION OF MARKET FUNDING

The TLTRO II operations that were gradually being repaid were replaced in 2019, which most likely contributed to the minor increase in the aggregated balance sheet amount of debt issued.24 This tendency altered starting in June 2020, when TLTRO III.4 was distributed, and the amount of debt issued started to fall until the end of the year. This raises the possibility of a replacement effect, albeit one that would have little overall influence on Spanish participating banks (see Chart 5.1). Although the situation is extremely varied across banks, a case-by-case review of the change in the amount of debt issued on the balance sheet indicates that some banks have decreased that amount (see Chart 5.2).The need to maintain a market presence to ensure stable and ongoing connections with investors or compliance with regulatory ratios (MREL and TLAC25) may have had an impact on the quantity of issuance.

CHART 5

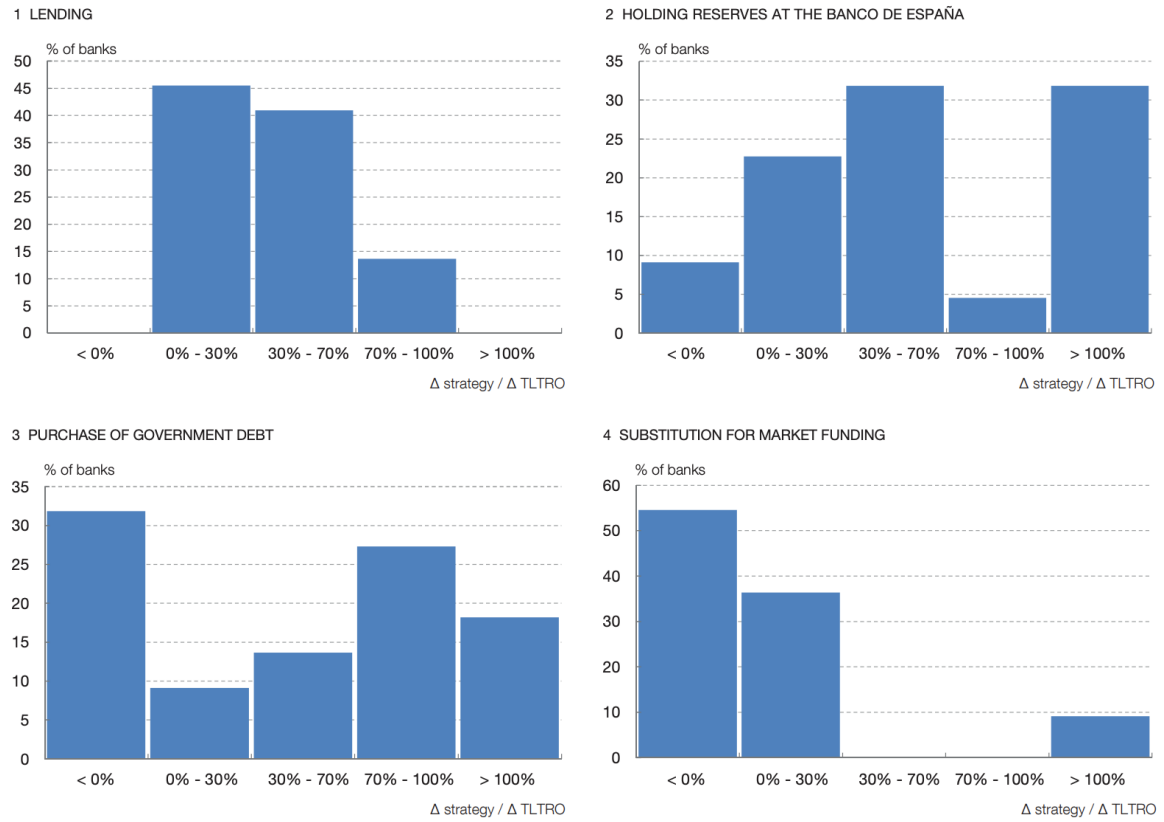


Source: ECB website from an article by M.a Carmen Castillo Lozoya, Enrique Esteban García-Escudero, and M.a Luisa Pérez Ortiz titled "The effect of TLTRO III on Spanish credit institutions' balance sheets."

VI. RELATIONSHIP BETWEEN LTRO III TAKE-UP AND THE STRATEGIES IDENTIFIED

This section investigates whether the level of TLTRO III take-up influences which, if any, of the four outlined options a bank chooses to employ. The distribution of the use of each technique is first examined for this purpose as a general approximation, and it is connected to the amount of TLTRO III take-up (see Chart 6). Because they all fall within the intervals over 0%, the histograms demonstrate that lending is the only technique that all Spanish banks have employed. Furthermore, 32% of banks have boosted their reserves even more than the increase in their TLTRO funding, while only 9% of banks have maintained or decreased their level of reserves. On the other hand, in the case of the two least employed options, 32% of banks did not raise their holdings of government debt, and 55% of banks did not use their TLTRO money to replace market funding.

CHART 6



Source: ECB website from an article by M.a Carmen Castillo Lozoya, Enrique Esteban García-Escudero, and M.a Luisa Pérez Ortiz titled "The effect of TLTRO III on Spanish credit institutions' balance sheets."

The purpose of this article is to describe how TLTRO III has affected the balance sheets of participating Spanish banks. Four potential strategies—including lending to the real economy, which was the program's goal—were selected for this purpose, and the use that banks made of the strategies at both an overall and a personal level was examined. The ICO public guarantee scheme, which undoubtedly also affected lending to firms, and the Eurosystem's asset purchase programs, which have also increased banking system reserves, are examples of factors that may have influenced the changes seen but are not discussed in this article because they are not specifically focused on the TLTROs. Additionally, it was not possible to utilize the Spanish banks that did not take part in TLTRO III as a control group since they are insufficiently representative of the entire Spanish banking industry, neither in terms of number of institutions nor significance. The following findings were as a result reached that the TLTRO III has been crucial in enabling Spanish financial institutions to continue their lending. With the pandemic's highly uncertain environment, the TLTRO III was calibrated to make sure that credit would keep flowing to the actual economy. In the case of Spain, every

participating bank met or easily exceeded its qualifying net lending target for the time frame under consideration (from 28 February 2020 to 31 March 2021). Naturally, as they lower the credit risk taken on by banks, state guarantee schemes have also encouraged lending.

The TLTRO III has also significantly contributed to the substantial increase in reserves held by Spanish credit institutions in their accounts with the Banco de Espana. However, in this instance, additional elements, particularly the ECB's asset purchase programs, have also directly influenced fluctuations in surplus liquidity.

In general, neither the holdings of public debt nor the amount of debt issued by Spanish credit institutions have changed much as a result of the TLTRO III. The rise in government debt holdings seems to be in line with the robust primary market issuance in the public sector in reaction to the crisis. Other variables could have contributed to the minor decrease in the quantity of debt issued by banks, such as the rapid increase in deposits or the increased cost of issuance following the formation of COVID-19.

Conclusion

In conclusion, the insights from two fundamental articles and a huge number of data gathered from the European Central Bank's statistical office shed light on the complex and dynamic subject of the multifaceted impact of the TLTROs on the banking sector of the Eurozone. These TLTRO programs were launched as unconventional monetary policies to encourage bank lending and promote economic expansion in the wake of the global financial crisis, which had left its economic imprint on the Eurozone.

In their thorough study, Desislava C. Andreeva and Miguel Garca-Posada delved deeply into the complex impacts of TLTRO on numerous elements of the banking system.

It discusses both the expected advantages and potential disadvantages of this innovative monetary policy tool. The essay emphasizes how crucial the TLTRO was in easing the burden banks faced with short-term lending, promoting financial stability, and aiding in the recovery of the economy. It does not, however, avoid addressing the controversial elements of TLTRO, raising concerns about how it can unintentionally hinder competition in the banking industry and affect banks' lending practices. This study clarifies the intricacy of TLTRO's impacts by carefully examining the model's premises and dynamics.

Insights into the effectiveness and results of this monetary policy tool, particularly in light of the COVID-19 outbreak, are provided by an analysis of the impact of TLTRO III on the balance sheets of Spanish financial institutions made by M.a Carmen Castillo Lozoya, Enrique Esteban García-Escudero, and M.a Luisa Pérez Ortiz.

First and foremost, during a time of great economic uncertainty, TLTRO III proved to be a potent tool for securing the flow of credit to the actual economy. Bank participation was significant in the recalibration of TLTRO III's parameters, such as the provision of funding at an interest rate below the deposit facility rate. The balance sheets of the participating banks were significantly impacted by this substantial take-up. The expansion of lending was one of the most noteworthy effects. According to the goals of TLTRO III, Spanish banks significantly boosted their lending to both non-financial firms and households. This increase in eligible net lending went above and above estimates and made a substantial contribution to sustaining economic activity during the pandemic.

The program also resulted in a significant increase in reserves maintained at the Banco de Espana by Spanish credit institutions. This liquidity infusion was crucial in preserving stability and guaranteeing that banks had access to the money they needed to respond to changing demands in the unsteady economic climate.

Holdings of government debt increased as well, however, there were differences between different institutions. This increase in holdings was consistent with higher government debt issuance as governments reacted to the pandemic's economic challenges.
Even though TLTRO III appears to have partially replaced existing market-based funding sources, it did not significantly alter the amount of debt that Spanish credit institutions issued. To sum up, during the exceptional obstacles brought on by the COVID-19 pandemic, TLTRO III performed a critical role in assisting the Spanish banking industry and facilitating financing to the real economy. It efficiently ensured the availability of liquidity to the financial system and showed how flexible monetary policy tools are in responding to external shocks. Additionally, the extensive data obtained from the statistical department of the European Central Bank and the expertly designed graphical representations provide a visual narrative of how TLTRO has changed over time. The European Central Bank's persistent dedication to providing crucial monetary support and sustaining liquidity within the complex structure of the financial system is reflected in the steady growth in the allocation of TLTRO funds. Due to their unique financial ecosystems and lending habits, various nations, including France, Germany, Italy, Spain, and Greece have demonstrated diverse levels of participation and outcomes in the TLTRO program. In conclusion, this study offers an important fresh understanding of the intricate dynamics surrounding TLTROs and their impacts on bank lending practices, it highlights the importance of taking into account the complex interconnections between unconventional monetary policy measures and the dynamically changing banking industry for decision-makers, financial institutions, and economists. Understanding the complex nature of TLTROs is still crucial for establishing effective monetary policy and fostering financial stability as the Eurozone continues to face economic challenges.

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- Decision ECB/2015/5 of 10 February 2015 amending Decision ECB/2014/34 on measures relating to targeted longer-term refinancing operations.
- Decision ECB/2016/10 of 28 April 2016 on a second series of targeted longer-term refinancing operations.
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