



Business and Economics

Course of Money and Banking

TARGET2 imbalances:
from the Global Financial Crisis
to the Quantitative Tightening

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Abstract

TARGET2 imbalances started to grow with the inception of the Global Financial Crisis and the subsequent sovereign debt crisis. The start of the Quantitative Easing in 2015, with the massive injection of central bank money in the system, fuelled a new increase in TARGET2 imbalances. By conducting a comprehensive literature review, this dissertation critically assesses the hypotheses and actual data currently available on the causes of TARGET2 imbalances. Furthermore, it also tries to shed some lights about the likely impact of Quantitative Tightening on the future dynamic of such imbalances, providing an econometric analysis about the interactions between monetary policy and TARGET2 imbalances. Overall, this thesis aims to present a thorough analysis of the discussion surrounding the origins of TARGET2 imbalances and their effects, having reached the conclusion of the accommodating phase of monetary policy and to give some insight on how QT will likely affect the dynamics of TARGET2 imbalances in the future.

Table of contents

Introduction.....5

Chapter 1 Target balances: from 2008 to the Quantitative Easing7

1.1 Introduction on TARGET27

1.2 The debate around TARGET2 imbalances.....14

1.3 Comparison and evaluation21

Chapter 2 QE and how it has affected to TARGET imbalances.....23

2.1 QE: an overview.....23

2.2 How the QE works.....25

2.3 The debate around TARGET2 imbalances in the QE era29

2.4 Concluding remarks on QE32

Chapter 3 Target imbalances and QT34

3.1 What is Quantitative Tightening and why should it be implemented?34

3.2 How can the QT be implemented?35

3.3 Empirical analysis.....37

3.4 Concluding remarks on QT41

Conclusions.....43

References.....44

Introduction

The European Monetary Union entails the usage of a common currency issued by the European Central Bank (ECB). The centralised issuance of money is accompanied by decentralised monetary policy operations conducted by National Central Banks (NCBs). Decentralised monetary policy implementation entails that each NCB provides central bank money to their own monetary policy counterparties (i.e., banks) and registers credits and debits related to monetary policy in its own balance sheet. As long as central bank money issued by each NCB matches with bank reserves (and government deposits) held by domestic monetary policy counterparties, bilateral TARGET2 balance between NCBs is zero. Instead, when central bank money issued by a NCB1 moves towards other countries in the euro area, the ECB acts as a centralised counterparty between NCBs writing credits and debits towards them, which re-equilibrate the accounting identity at the national level. Such credits and debts are registered in the TARGET2 account of each NCB towards the ECB.

From the inception of the common currency at the end of 1998 until the 2007-2008 Great Financial Crisis the bilateral credits and debits between NCBs and the ECB were essentially zero. In each country, monetary policy counterparties sourced central bank liquidity by their own NCB. When a bank was left with a deficit of central bank money to accomplish with reserve requirement, it made recourse to the interbank market to fill the hole. The Great Financial Crisis and the subsequent sovereign debt crisis changed the picture. The interbank market ceased to operate. Central bank money began to flow from peripheral to core countries within the euro area. TARGET2 imbalances began to grow. The start of the Quantitative Easing (QE) in 2015, with the massive injection of central bank money in the system, fuelled a new increase in TARGET2 imbalances. Monetary policy accommodation in response to the pandemic reinforced the trend towards growing imbalance. From 2022, in response to high level of inflation, the monetary policy stance of ECB changed. Interest rates have been progressively increased, refinancing conditions related to long-term refinancing operations have been tightened and, from March 2022, the reduction of the monetary policy portfolio (the so-called Quantitative Tightening – QT) has started.

The massive monetary policy operations conducted in the period following the Great Financial Crisis represent an unprecedented experience, as well as its reverse, the QT. TARGET2 imbalances represent a distinctive future of the euro area.

The aim of this thesis is twofold. First, having reached the end of the accommodative phase of monetary policy, it provides an extensive review of the academic and political debate about the causes of TARGET2 imbalances and their consequences. Second, it aims to shed some lights about the likely impact of QT on the future dynamic of TARGET2 imbalances.

The organisation of the work is as follow. Chapter 1 discusses the forces behind the increase of TARGET2 imbalances between mid-2011 and mid-2012 brought by the substitution of private sector bank funding with central bank money. Chapter 2 focuses on the QE period, started in 2015. In such phase the interaction between

the decentralized adoption of the APP and the financial structure of the euro area were the main drivers of the surge in TARGET2 imbalances. As the effects of QT on TARGET2 imbalances remain largely unknown, Chapter 3 analyses the possible impact of QT on TARGET2 imbalances, drawing on empirical evidence available and econometric analysis. Albeit it is highly uncertain whether the QT will exactly work as a QE in reverse, the impacts of the QT and the reduction in net lending by the Eurosystem, with the run-off of TLTROs, may be large and help to offset TARGET2 imbalances.

Chapter 1 Target balances: from 2008 to the Quantitative Easing

1.1 Introduction on TARGET2

The Trans-European Automated Real-time Gross settlement Express Transfer system 2 (TARGET2) is a payment system owned and operated by the Eurosystem that enables the processing of high-value payments in the euro currency.¹ It serves both central banks and commercial banks and plays a critical role in supporting the efficient functioning of the European payments market. To achieve this, TARGET2 accomplishes several different tasks. Firstly, it provides a reliable and secure platform for processing large-value payments in real-time, which supports the implementation of the ECB monetary policy and the smooth functioning of the euro money market. Secondly, it reduces systemic risk in the payments market by preventing the collapse of the entire market due to the actions of a single actor. Finally, it ensures the efficient processing of cross-border payments in euro, which contributes to the safe and efficient flow of payments across Europe and the stability of the euro.

TARGET2 operates as a real-time gross settlement (RTGS) system, where payment orders are continuously processed and settled individually in central bank money.² The amount of transactions is not restricted, and commercial and central banks alike are permitted to issue payment orders for a variety of uses, including monetary policy transactions, interbank payments, and commercial payments. Timed transactions, payment priorities, liquidity reservation facilities, limits, liquidity pooling, and optimization procedures are just a few of the features that TARGET2 has in place to ensure effective liquidity management, which is essential for the smooth processing of payments in RTGS systems.

Except for specified holidays, it is available for processing payments every working day from 07:00 to 18:00 CET. Along with assisting in the execution of the monetary policy of the Eurosystem, TARGET2 also enables EU Member States that have not yet ratified the euro to participate in the system and settle transactions in the common currency, fostering international trade and financial stability. The ECB acts as the central counterpart of the system. Indeed, at the end of the day net credits or debits arising from the TARGET2 balance of each central bank participating in the system are registered as credits or debits vis-à-vis the ECB, instead as bilateral claims among participant central banks.³ The existence of a central counterparty, the ECB, is financially

¹ <https://www.ecb.europa.eu/ecb/educational/explainers/tell-me/html/target2.en.html>.

² In a “gross” (real-time) settlement system each individual transaction is immediately settled in central bank money. Instead, a “net” payment settlement system pools altogether financial transactions of each counterparty, end-of-day or at specified moments of the day and settles the difference between debits and credits. A net payment system allows banks to hold less liquidity during the day compared to a gross system, as in the net system they will have only to settle their net position. However, a net system also involves a much higher level of systemic risk as debt and credit position tend to accumulate over the day. In fact, if bank A at the end of the day fails to pay its debtor net position to bank B, bank B will might have not enough liquidity to pay, say, bank C, leading to a system-wide liquidity shortage (see, for instance, Craig and Fecht, 2011).

³ See, for instance, Cecioni and Ferrero (2012).

equivalent to a system involving net creditor and debtor positions between individual NCBs. However, the role assumed by the ECB strengthens the notion of a currency union. In fact, when a NCB issues central bank money this is reflected on both the asset side (credit, say, related to refinancing operations) and the liability side (bank reserves) of its balance sheet. If euros (bank reserves) originally issued in Italy are transferred to Germany, they will continue to represent a common issued currency under the ECB authority: recurring to bilateral TARGET2 balances would suggest the idea of a distinction between euros issued in one country or in another.⁴

To comprehend the functioning of the TARGET2 system, it is essential to have a thorough understanding of the underlying transactions between countries and the balance sheets involved. To begin, let's consider a simple current account transaction in the euro area. When a commercial bank transfers funds to another commercial bank, what it is actually being transferred is central bank money. Thus, in this transaction, at least three balance sheets are involved: those of the two commercial banks and that of the central bank of the payer/payee. In case the recipient commercial bank is located in another euro country, the procedure is similar, with the only difference being that two central banks are involved. During the transfer between the commercial banks of the two countries, the NCB of the payer country debits the reserve account of the domestic commercial bank reducing its own liabilities, while simultaneously sending a payment order to the NCB of the recipient country. The NCB of the receiving country credits the reserve account of its own bank and increases its own liabilities. As central bank money is represented by the liabilities of NCBs versus the other Monetary and Financial Institutions (i.e., banks), the payer's NCB effectively destroys money, while the recipient's NCB creates new money, offsetting the overall effects on total money in circulation.

Two features of the euro area monetary system are fundamental to understand TARGET2 imbalances. First, interbank payments within the euro area are settled in central bank money in euro. Any interbank payment produces a corresponding change in the balance sheet of the central bank of the country where the payer or the payee bank resides. Second, the operational framework of the ECB monetary policy is decentralised: refinancing operations are conducted in a decentralised manner by each National Central Bank (NCB) towards the domestic monetary policy counterparties.

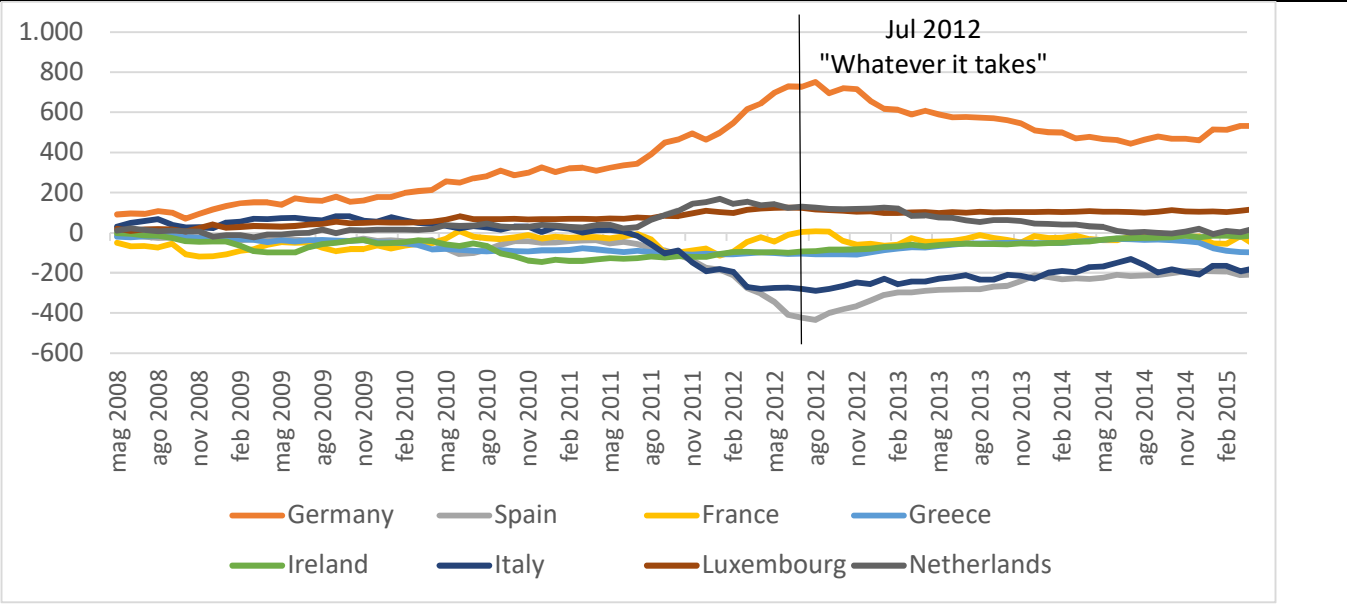
As a matter of fact, the 2008 financial crisis and even more the 2010-2012 sovereign debt crisis led to a significant rise in TARGET2 imbalances due to the interbank market tensions and the abrupt stop of credit to “peripheral” countries from “core” countries. These crises had their roots in the global financial turmoil that began with the collapse of Lehman Brothers in the United States. The financial crisis of 2008 sparked a doubt about the resilience of the banking system in several countries of the euro area. The lack of confidence among banks led to an abrupt stop of the interbank market, as banks grew reluctant to lend to each other. The interbank borrowing

⁴ See, for instance, https://www.ecb.europa.eu/ecb/educational/explainers/tell-me-more/html/target2_balances.en.html.

difficulties required the ECB to intervene through full allotment refinancing operations and TARGET2 then assumed the role previously held by cross-country interbank capital flows, becoming an equilibrating mechanism within the common currency area. As government were forced to increase public debt to rescue their own banking system, the Greek government-debt crisis erupted. In late 2009 the Greek government declared that its previous budget deficits were much higher than what was previously stated. The lack of confidence extended to “peripheral” government bonds. Government spread versus Germany skyrocketed. The governments of Portugal, Ireland, Spain, and Cyprus were forced to ask for international assistance, which was provided by the European Union and the International Monetary Fund. Greece ultimately defaulted on its debt in March 2012. The government debt crisis sparked concerns on the possibility of preserving the euro area, which led to a further increase in the TARGET2 imbalances. Mario Draghi’s “Whatever it takes” in July 2012, partially restored orderly market condition, as he declared that the ECB was ready to take any action to preserve the single currency. Following Draghi’s statement, the ECB implemented a number of crisis-resolution strategies, such as the Outright Monetary Transactions (OMT) program, which aimed to offer limitless assistance to nations in financial distress.

Figure 1 illustrates TARGET2 imbalances from May 2008 to February 2015 in several European countries. TARGET2 imbalances signalled a turning point after Draghi’s remarks in July 2012.

Figure 1 **TARGET2 imbalances**
(EUR billion)



Source: ECB

We will now focus on how the interbank transactions changed from 2008 until the start of the Quantitative Easing.

Figure 2

Interbank transactions before the 2008 crisis

Bank A – Country 1		Bank B – Country 2	
Reserves at NCB1	100	Reserves at NCB2	100
Country 1's government bonds	200	Loan to bank A	100
		Country 1's government bonds	100
		Country 2's government bonds	100
Customer deposit	100	Customer deposit	300
Borrow from bank B	100	Refinancing operating from NCB2	100
Refinancing operating from NCB1	100		

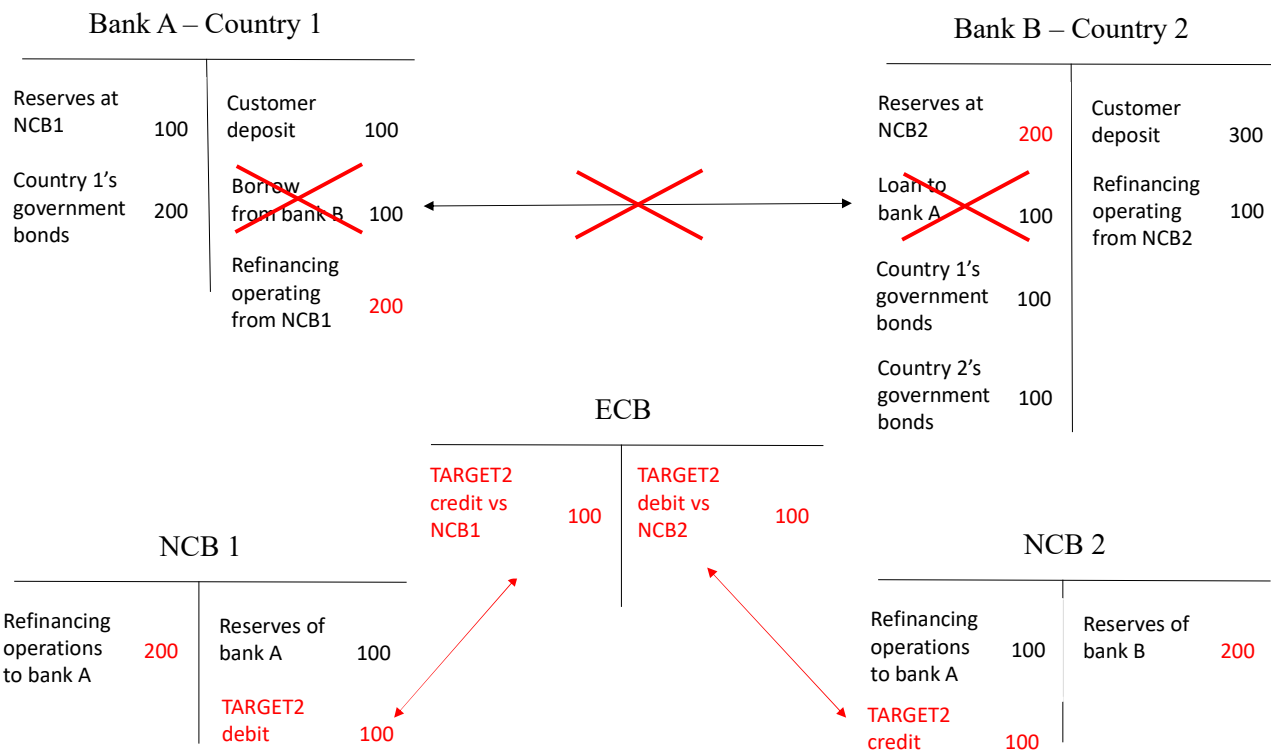
NCB 1		NCB 2	
Refinancing operations to bank A	100	Refinancing operations to bank B	100
Reserves of bank A	100	Reserves of bank B	100

In normal circumstances, the payments in central bank money between the two countries net out: cross-country interbank capital flows fully finance accumulated current account deficit vis-à-vis other countries of the euro area, and no TARGET2 imbalances are accumulated. Let us assume, as in Figure 2, that the banking system of Country 2 finances Country 1 providing loans and buying its government debt. Cross-country interbank loans smoothly offset any misalignment between asset and liability across banking systems (or to give economic interpretation cross-country interbank flows finance the excess of spending in one country with the excess saving in another country via their banking system). In such situation there was no role for target imbalances, as private money (in the form of loans) freely flew from Country 2 to Country 1. Central bank money in each country was roughly equal to the amount provided in that country by its NCB.

Upon its establishment, the TARGET2 system was envisioned as having a limited role in balancing transactions between countries in the euro area. It was believed that any imbalances would be minor and that a mechanism for correcting imbalances would not be necessary. As a matter of fact, before 2008, the imbalances in the TARGET2 system were negligible, and any current account imbalances among euro-area countries were settled through interbank liquidity transfers.

Figure 3

TARGET2 imbalances in the wake of the 2008 crisis

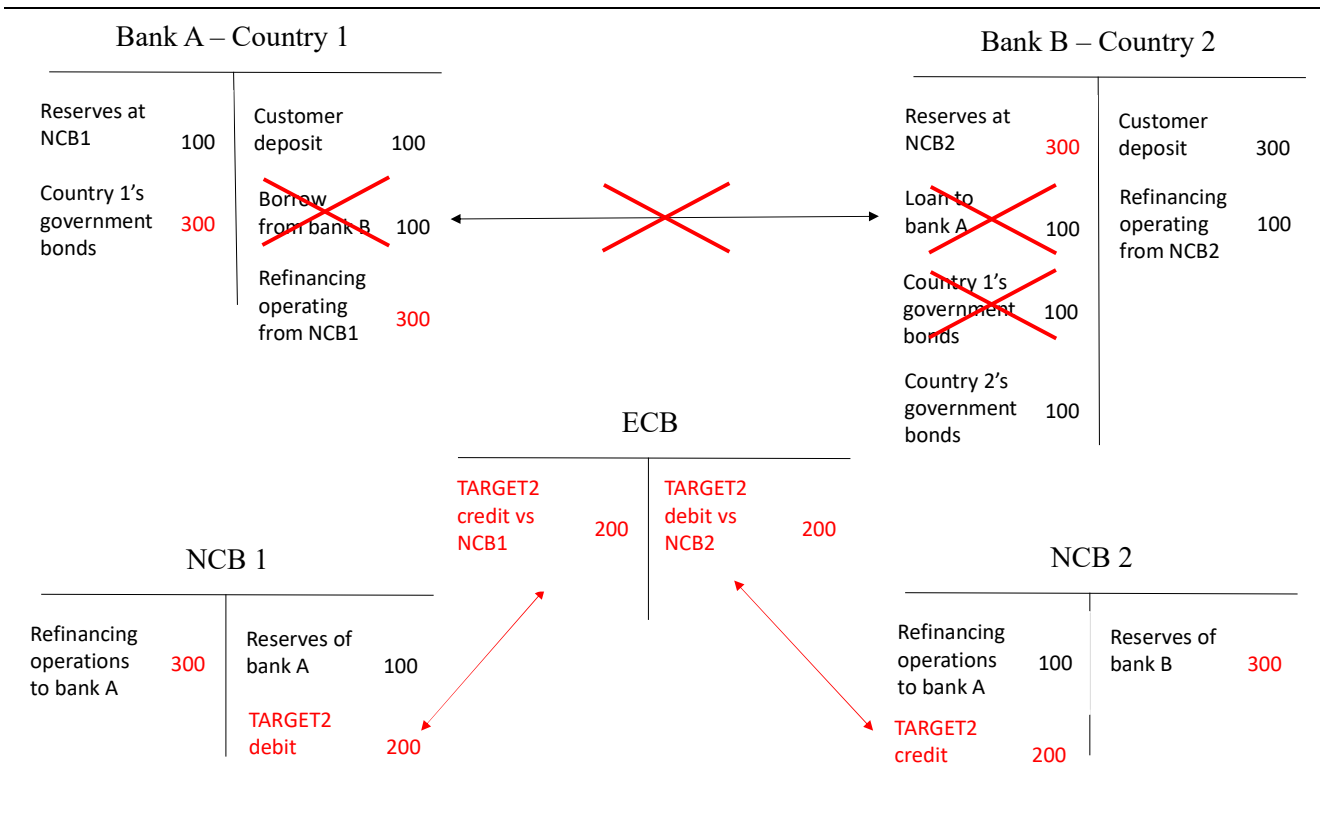


Note: in red items changed with respect to Figure 2.

As cross-country interbank loans wiped out, as it happened during the crisis of 2008, they had to be replaced by central bank money. Indeed, Bank A had to transfer central bank money to Bank B to repay the loan. This required a new injection of central bank money into the system to save banks from Country 1 from a liquidity crisis. The interbank borrowing difficulties required the ECB to intervene through the full allotment refinancing operations. As it is described in Figure 3, refinancing operations by NCB1 had to increase. The new amount of central bank money created by NCB1 flew out of the country to repay the loan by Bank B. Thus, Bank A was left with a larger debt toward NCB1 and NCB1 with a compensating liability, i.e., the TARGET2 debt, versus the ECB. As central bank money flew from Country 1 to Country 2, Bank B registered an amount of central bank money (Reserves at NCB2) in excess with respect to its debt towards its own NCB. Because of that, NCB2 registered a compensating TARGET2 credit. It has to be remarked that albeit the existence of TARGET2 imbalances, the balance sheet of ECB was unaffected: credits and debits vis-à-vis NCBs were perfectly balanced.⁵

⁵ Cecchetti, McCauley and McGuire (2012) provide an effective description of the mechanisms at work.

Figure 4 **TARGET2 imbalances in the wake of the sovereign debt crisis**

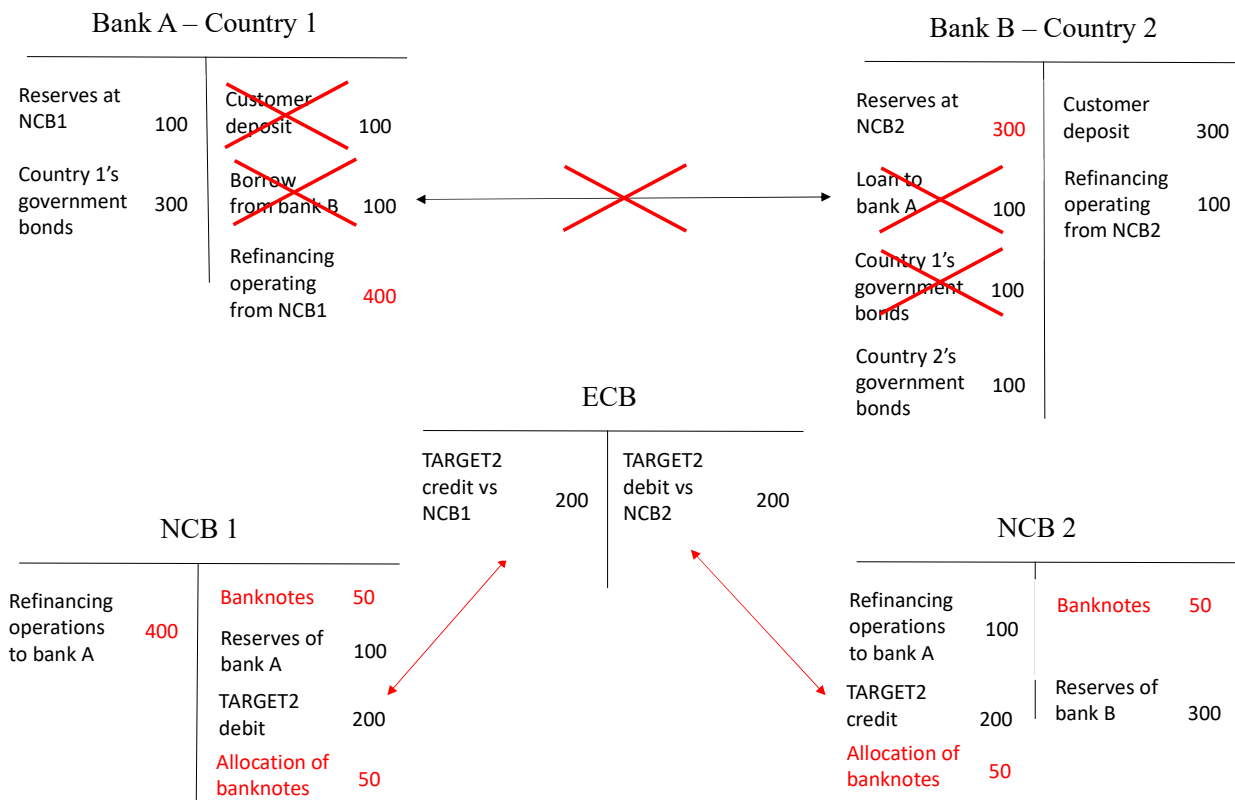


Note: in red items changed with respect to Figure 3.

A third change happened with the sovereign debt crisis. In such circumstance, investors from Country 2 started to dislike government bond of Country 1 and sold it. As government bonds do not wipe out, differently from interbank credit as in the previous example, they had to be bought by someone else, i.e., investors from Country 1. As represented in Figure 4, the passage of ownership of government bonds of Country 1 increased TARGET2 imbalances. In fact, NCB1 had again to provide additional liquidity to the domestic banking system to fill the gap left by the withdrawal of foreign investors from the domestic government bond market, providing Bank A of the required central bank liquidity to buy domestic government bonds sold by investors from Country 2.

Figure 5

TARGET2 imbalances and the run-on deposits



Note: in red items changed with respect to Figure 4.

A similar dynamic plays out in the case of a ‘run’ on commercial banks’ deposits in Country 1 (Figure 5). In fact, if depositors convert commercial bank money into banknotes or deposit it to another commercial bank in the same country, again the liability side of the balance-sheet of Bank A will shrink. Bank A had to convert central bank reserves into banknotes to till its clients’ demand. NCB1 had to intervene providing Bank A with additional central bank money. Differently from the previous cases, a bank run does not directly involve NCB2, as there are no cross-country financial transactions and hence it does not directly affect TARGET2 balances.⁶ However, the increased debt of Bank A towards NCB1 translates into a growing share of banknotes in circulation which are registered in each NCB balance sheet accordingly to the respective “capital key” (here assumed equal to 50% for both NCBs). The adjustment factor becomes a new item related to the credits and debits between NCBs that arises when the share of banknotes issued in one country is smaller or larger of that implied by its capital key.⁷ From an

⁶ Instead, a ‘flight’ of deposit from Country 1 to Country 2 would create a TARGET 2 imbalances in the same vein as the stop of cross-country interbank loans represented in Figure 2.2.

⁷ The capital key represents the NCB’s share into the ECB capital. In reality an 8% of the allocation of banknotes in the euro area is assigned to the ECB. See Whelan (2014) for further details.

economic point of view, the new items in the balance sheet of both NCBs play the same role as TARGET2 balances.

It is important to clarify at this stage that, when interbank capital flows between euro area countries wipe out, TARGET2 balances do not have to directly reflect the overall debtor or creditor position of a country with the rest of the world (i.e., its Net International Investment Position). For instance, debts in EUR versus other euro area countries could be compensated by credit (e.g., in US dollars) versus other countries. At the same time, when a bank in a euro area country (Country 1) buys foreign currency against euro from a bank located in another euro area country (Country 2), the TARGET2 balance of Country 1 will decrease and that of Country 2 will increase, *ceteris paribus*. This kind of transactions net out in the financial account of the Balance of Payment and are not related with the current account of either Country 1 or Country 2.

1.2 The debate around TARGET2 imbalances

The debate over TARGET2 Balances and the ECB monetary policy programs has been contributed to by a number of academics and policy makers. The reasons for and effects of TARGET2 imbalances, which surfaced in the wake of the 2008 financial crisis, have been extensively researched.

A common narrative is that the growth of target imbalances was influenced by the loss of access to funding by peripheral countries and their increasing need of central bank liquidity to replace foreign financing. Later sovereign debt crisis reinforced such mechanism as foreigners started to sell peripheral countries' government bonds, exacerbating the funding stress of the national banking systems.

However, the narrative diverges with respect to the effects of TARGET2 imbalances on financial stability, the risk borne by TARGET2 creditor countries and the role of the ECB monetary policy. In this context, some scholars have proposed various policy recommendations to address the issue, and the debate continues to be relevant in the current economic environment.

Sinn (2011) criticised the implementation of the TARGET2 system and the ECB's monetary policies. In face of an abrupt stop of the cross-country interbank flows, according to Sinn large provisions of liquidity by the ECB led to a distortion of capital flows and the build-up of imbalances between countries, as some countries succeeded in financing large current account deficits through "TARGET2 loans" while other countries accumulated large TARGET2 surpluses. He contended that the TARGET2 system, coupled with an expansive monetary accommodation by the ECB and, in absence of a brake mechanism, led to increasing country imbalances and default risk, particularly for countries that had accumulated sizable current account deficits. In fact, the full allotment operations by the ECB led to a dangerous reliance on central bank financing, which lastly conducted to larger imbalances. As a result, NCBs of the core countries, like Germany and the Netherlands, built up sizable positive balances in the TARGET2 system, while those of nations like Greece, Italy, Spain, and Portugal built up

sizable negative balances. According to Sinn, the financially struggling European nations were effectively borrowing money from the more prosperous European nations via the TARGET2 system. Even worse, the ECB allowed monetary policy counterparties to participate to the refinancing operations with collateral of lower quality, increasing – in Sinn’s view – the risk borne by creditor countries.⁸ Thus, he argued that the TARGET2 system allowed for the settlement of imbalances between central banks via a loan mechanism and that was used by the ECB to carry out a “stealth bailout” of struggling euro area nations. In other words, albeit the Eurosystem did not give money directly to the peripheral governments (as it would have been, if it bought peripheral government bonds on the primary market), it put in place a mechanism where peripheral governments sell bonds to domestic banks, domestic banks place such bonds as collateral in refinancing operations with the Eurosystem and get central bank money to pay foreign creditors (mostly in core nations). As a consequence, peripheral NCB’s TARGET2 deficit increases; core NCBs’ TARGET2 credit increases; central bank money in circulation increases as well, i.e., the same ultimate effects that would have been produced by a direct monetization of peripheral government debts. Sinn also stated that this structure was unstable and threatened the economy of the euro area. In fact, the flow of central bank money from Northern European nations to Southern European ones was causing a progressive transfer of wealth that that was unsustainable in the long run. At the same time, the large credit of German commercial banks towards the Bundesbank, in the form of excess reserves, would crowd out commercial bank credit to the German economy.

Sinn (Sinn, 2012; Sinn and Wollmershäuser, 2012) also discussed the possible losses that would result from a euro breakdown under the TARGET2 framework. He suggested that because of their substantial TARGET2 liabilities, the NCBs of debtor countries, such as Italy and Spain, would probably go bankrupt if the monetary union were to crash. In such scenario, Germany, the largest creditor nation, would be the most impacted by potential losses. At this stage, it is useful to clarify that the possible bankrupt of a central bank differs substantially by the classical notion of “bankruptcy”. In fact, central banks can, and had, operate with negative capital, differently from commercial firms. In fact, central banks are not subject to ordinary bankrupt legislation and actual net capital by a central bank provide little information about its future ability to raise resources through seignorage (i.e. income from the issue of money; the flow of interest from the assets held against the notes in circulation can be used to define central banks' seignorage revenue⁹). However, as in the hypothetical scenario of a euro break-up, TARGET2 imbalances would become foreign currency debts, if the domestic currency crashed

⁸ Guideline of the European Central Bank of 23 October 2008 amending Guideline ECB/2000/7 on monetary policy instruments and procedures of the Eurosystem (ECB/2008/13). In particular the minimum credit was lowered to BBB- from A-; <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008O0013>.

⁹ <https://www.bancaditalia.it/compiti/emissione-euro/signoraggio/index.html?com.dotmarketing.htmlpage.language=1&dotcache=refresh>

vis-à-vis foreign currency (say the new Deutsche Mark), the NCB would have to issue too much domestic currency to honour its TARGET2 debts, possibly destabilising its own economy. Thus, it would find convenient to opt for a default on TARGET2 debts.

Indeed, Sinn (2013) contended the myth that Germany had benefitted from the euro and the accumulation of current account surplus via large capital export to other euro area countries. Instead, he affirmed that Germany had actually paid a high price for joining the common currency, later reflected in the TARGET2 imbalances. In fact, Germany's substantial TARGET2 positive balances pose a significant risk to the country in the event that the monetary union were to crash. Thus, Germany is more susceptible to the possibility of a euro breakup because it would result in significant losses for the nation. To offset such large losses and to avoid the temptation for large debtor countries to leave the common currency area, he suggested that the ECB should impose a "exit tax" on countries that leave the euro area, which would be used to offset any potential systemic loss.

Sinn and Wollmershäuser (2012) also suggested a correction method to avoid the building-up of TARGET2 imbalances and the risks thereof. The TARGET2 imbalances of national central banks would have to be periodically adjusted according to the current account balance and net foreign asset position of each nation. A mechanism similar the settlement of interdistrict balances in the US Federal Reserve System would settle with gold and currency reserves the TARGET2 imbalances at the end of each year. Sinn thinks that such a mechanism would incentivize countries to lower their current account deficits and restore equilibrium in the TARGET2 system.

Cesaratto (2013, 2015) provided a very different perspective on TARGET2 balances and the ECB monetary policy. He argued that TARGET2 imbalances are a necessary mechanism for the functioning of the euro area economy, as they allow for the settlement of payments between countries with different financial structures and economic cycles. According to Cesaratto, TARGET2 imbalances are not the cause of the global imbalances; rather, they are useful – albeit with some limitations – tools for avoiding abrupt crisis when foreign capital flows fly away of a country. Differently from Sinn, he asserted that the TARGET2 system might have saved German banks from default, as it shifted credit risk (vis-à-vis, e.g., Greek banking system) from private lenders (the German banks) to public lenders (the Bundesbank and the Eurosystem as whole). At the same time, the TARGET2 system avoided a disastrous exit of peripheral countries from the euro area, and the risks thereof.

However, Cesaratto recognised that TARGET2 imbalances reflect debts of one nation to another. Missing the possibility to devalue the national currency within a currency area, the three options lefts are: a) a socially painful internal devaluation obtained through austerity policies in deficit countries (and possible expansionary policies in surplus countries); b) fiscal transfers from surplus to deficit countries; c) a combination of the two measures. In particular, given the uncertain effects of internal devaluation, the absence of fiscal transfers leaves the currency union in a "austerity limbo between break-up and an unlikely evolution to a viable union" (Cesaratto,

2013). In such context, TARGET2 imbalances are only a way to gain time avoiding the catastrophic consequences of a disordered crisis but do not replace the need for structural adjusting mechanisms (Cesaratto, 2017).

Fahrholz and Freytag (2012) analysed the rise of target imbalances and looked at the possibility that, once the crisis was resolved, the imbalances in the TARGET2 payment system inside the euro area will be lessened. The authors argued that the emergence of misalignments and TARGET2 imbalances between the core and periphery of the euro area had around three real economic causes and one political-economic cause. Let's us start with the real economic causes. First, together with rising salaries, peripheral economies had experienced relatively better productivity growth. However, the increase in salaries had not been limited to the sector of tradable resources; it had also affected the non-tradable sector. This phenomenon had caused economic imbalances inside the euro area, as general price growth in peripheral countries had been higher than in core countries. Second, a private sector convergence play had been at work. This means that from the beginning of euro area membership (and also during the accession period) investors started to rely on a successful path of economic convergence. As a result, risk premia paid by peripheral countries decreased. Third, as financial condition in the periphery improved, borrowing increased both by the private and public sectors in peripheral countries. On the political side, peripheral countries had been incentivized to take on debt for short-term gains in production and employment, delaying socially and politically painful real adjustments, putting long-term financial stability at risk. The implicit guarantee of euro area membership coming from the "irrevocability" of euro area membership had further exacerbated the moral hazard behaviour. Even if the causes of the crisis did not solely depend on the TARGET2 system, it further amplified the imbalances, as together with the euro area membership also TARGET2 imbalances had become irrevocable. Furthermore, they asserted that the ECB has a substantial responsibility in the surge of TARGET to imbalances, as it enlarged the eligibility of collateral and left to NCB a large freedom in the provision of Emergency Liquidity Assistance (ELA) to domestic banks, even outside Eurosystem eligible collateral requirements.¹⁰

The authors also presented a hypothetical scenario in which the Euro survives the current balance-of-payments crisis unscathed. In such a scenario, most of the flow of financial assets and resulting imbalances in the TARGET2 system caused by capital flights would be reversed, leading to an end in raising TARGET2 imbalances. However, peripheral countries would have no incentive to reverse TARGET2 imbalances. Thus, TARGET2 balances resulting from current account transactions during crisis periods would persist. To avoid that TARGET2 imbalances (built up during the crisis without the approval of the creditor countries) would become permanent, the authors foresee the need for an incentive mechanism that would spur debtor countries to repay imbalances with gold or foreign-exchange reserves. This proposal appears to be very close to that of Sinn and

¹⁰ The ELA framework, confidential during the first years of the currency union, it is now public available <https://www.ecb.europa.eu/mopo/ela/html/index.en.html>.

Wollmershäuser. However, Fahrholz and Freytag allow for a gradual repayment of TARGET2 liabilities during non-crisis times, as opposed to a periodic (annual) adjustment foreseen by Sinn and Wollmershäuser.

Auer (2014) examined the factors that might have contributed to TARGET2 imbalances by performing a panel analysis of euro area nations from 2008 to 2012. His analysis took into account a number of variables, including trade balances, capital flows and fiscal deficits. He found that current account imbalances were significant drivers of TARGET2 imbalances, as countries running large current account deficits had a tendency to accumulate liabilities in the system. He also found that fiscal deficits and capital flows were also important explanatory factors, although to a lesser extent. According to Auer's analysis, TARGET2 imbalances had been mostly caused by fundamental economic issues, rather than by systemic defects of the system. He argued that in order to resolve these imbalances, a variety of steps will be needed, including structural reforms to increase competitiveness and lessen external imbalances and improved coordination of fiscal and monetary policy across the euro area.

Whelan (2014) examined the impact of the Eurosystem use of its balance sheet on TARGET2 imbalances and reached very different conclusions to those of Sinn. Whelan illustrated the existence of a significant positive link between the size of the Eurosystem's balance sheet and TARGET2 imbalances using data from 2007 to 2012. He also pointed out that current account deficits of peripheral nations seemed to have played a minor role. Far from accusing the ECB of an irresponsible behaviour, he underlined that the refusal to provide liquidity to banks in peripheral countries would have caused a financial meltdown whose consequences would have hit creditors in core nations. Thus, he reinforces Cesaratto's view about TARGET2 imbalances as a necessary mechanism to avoid much more negative consequences of the various crises. Whelan also dismissed the existence of dangerous consequences for TARGET2 creditor countries in case of a euro break-up. Creditor countries, and especially Germany, will (re)gain a larger seigniorage income which would rapidly offset the capital loss from writing down the TARGET2 credits. Instead, as an export-led economy Germany had to worry about the likely appreciation of its currency after the break-up and the consequent depreciation of foreign currency assets held by its banking system.

Abad, Löffler and Zemanek (2011) examined the potential effects of a prolonged divergence in TARGET2 balances on monetary policy within the euro area. As TARGET2 claims in core countries expand and central bank credit in those regions diminishes, the ECB's liquidity management could become asymmetric. This would require the ECB to absorb excess liquidity in countries with TARGET2 claims while providing limited liquidity to banks in countries with TARGET2 liabilities. They also discussed whether a credit-driven boom in core countries would be a viable solution to the current crisis. Although such a boom might lead to an increase in GDP growth and asset prices, it could also result in an overinvestment cycle, particularly in Germany. While this could potentially lead to a rise in domestic demand and have positive spillover effects on peripheral countries, it would not be a

sustainable solution. Moreover, relying on a bubble to boost short-term growth would only create the conditions for another crisis in the future. According to their point of view, the best-case scenario would be to avoid infinite divergence of TARGET2 balances by fully restoring the euro area interbank money market and by improving the allocation of liquidity. However, they claimed that this cannot be achieved through usual stabilisation policies, and policymakers should accelerate the restructuring process in European banking sectors and meet fiscal consolidation targets to regain the trust of financial markets.

De Grauwe and Ji' (2012) found a very loose relationship between accumulated and current deficit/surplus and TARGET2 imbalances. Furthermore, the volatility of the TARGET2 imbalances happened to be much higher than the volatility of the current account balances. The accumulation of TARGET2 imbalances in countries with current account deficits was due to their inability to obtain credit from private markets, which left them reliant on the ECB to finance their trade imbalances. In contrast, countries with current account surpluses were not dependent on ECB financing as their surplus funds were invested in other countries, resulting in positive TARGET2 balances. However, it was the "fear and panic", which started in 2008 and exacerbated with the sovereign crisis of 2011-2012, that aggravate the imbalances. Fear and panic led investor to sell bond of countries they distrust in favour of bond issued by nations perceived as safe. When bond of the first group of countries started to be sold, their prices dropped and their yield increased, vice versa for the bonds of the safe nations. The increase in yield of government bond in the first group of nation spillover in increasing financing cost for private borrowers of those countries. Thus, because of fear and panic and the associated (speculative) capital movements a sovereign crisis "spillover into a debt crisis in general". On the other hand, according to De Grauwe and Ji', there is no connection between country accumulation of TARGET2 surpluses and the credit risk it faces. In fact, following the speculative flows e.g., from Spain to Germany, German net claims vis a vis Spain did not change: simply private credits replaced public credits.

Bindseil and König (2011) also agreed that there was no clear connection between current account deficits and TARGET2 imbalances. TARGET2 developments reflected the ongoing funding crises in Greece and Ireland rather than the financing of their nations' current account deficits. They also argued that any limit to TARGET2 imbalances "would throw the common currency area back to a system of fixed exchange rates" where central banks facing monetary outflows needed a sufficient amount of foreign reserves to maintain the peg. Thus, any limit would contradict the "irrevocability" of the single currency, as nations without a sufficient amount of foreign assets and exposed to a speculative attack would be forced to leave the monetary union. Furthermore, they contended that there was no reason why the larger stock of excess reserve of German commercial bank would constraint their ability to lend to the German economy. Reducing TARGET2 liabilities in some member countries would not have an impact on banks' lending activities in TARGET2 creditor nations or act as a motivator for

governments to enact structural changes. It would instead contest the monetary union's and the common currency's legitimacy.

Buiter, Rahbari and Michels (2011) reached very similar conclusions, rebutting Sinn's claims. However, they also stressed that TARGET2 liabilities might be suggestive of serious problems. In particular, increased TARGET2 debts in peripheral countries may be the sign of the fact that their national banking systems were struggling to raise money on the market without help from public authorities. The financial crisis and the sovereign debt crisis in the Eurozone demonstrated the close ties between the destinies of the banking and sovereign systems in many of the member states of the currency union. There were multiple sources of difficulty in many of the member states. Many Eurozone nations had sovereign debt levels that are unsustainable, and an even bigger group of nations had challenging financial conditions. Banking systems both in the periphery and in the core were in need to be recapitalised. Furthermore, many nations struggled with issues related to their ability to compete internationally. Solving these issues would significantly improve these nations' chances of experiencing economic growth. Additionally, Buiter, Rahbari and Michels raised concerns about the funding provided by the Eurosystem to struggling banks in peripheral countries and the first public purchase programme of the ECB (the Securities Market Programme – SMP). In fact, such monetary policy operations might be associated with quasi-fiscal subsidies. Such subsidies might be unavoidable in time of crisis, but they should be provided in a visible manner. Cecioni and Ferrero (2012) examined the factors driving the accumulation of imbalances, focusing on the role of capital flight, cross-border lending, and current account imbalances. Similarly, to De Grauwe and Ji' (2012), they asserted that “trade balance deficits were neither necessary nor sufficient conditions for the increase in TARGET2 imbalances”. In fact, in Greece, Portugal and Spain effectively experienced before the crisis trade deficits financed with foreign capital. However, this was not the case of Italy, where the accumulated current account balance was approximately zero. Instead, TARGET2 imbalances originated in the financial account of the Balance of Payments, as foreign financing wiped out and domestic investment abroad hardly changed. Thus, TARGET2 imbalances reflected a change of composition in the financial account, where private credit was replaced by central bank money.

Summing up the debate about the early about TARGET2 imbalances (i.e., before QE started), two main distinct interpretations on their causes emerge. In the first interpretation (e.g., Sinn, Wollmershäuser, Fahrholz and Freytag, among the others) raising TARGET2 imbalances were a direct consequence of excessive spending by peripheral nations in the years before the 2008 crisis. The accommodative policy by the ECB allowed peripheral nations to indirectly rely on almost unlimited credit from core nations, avoiding the necessary (and painful) adjustments in their living standard. Indeed, core nations, because of ECB actions, were forced to take the burden of the debt of peripheral nations and the risks thereof. In the second interpretation (Cesaratto, De Grauwe, Ji', Bindseil and König), large TARGET2 imbalances were essentially led by “fear and panic” in financial markets and

the action by the ECB was necessary in order to avoid much more negative, and potentially disastrous, consequences. In the latter interpretation, it did not emerge a close link between risks faced by core nations and TARGET2 imbalances. In fact, ECB financing essentially replaced private credit with central bank credit, leaving the overall net position of core versus peripheral nations essentially unchanged (e.g., De Grauwe, Ji', Cecioni and Ferrero). In this second interpretation, the incomplete futures of the European Monetary Union played the essential role. In fact, in the absence of fiscal transfers or coordinated structural adjustments, monetary policy was essentially the only game in town and its action avoided a meltdown of the euro area.

1.3 Comparison and evaluation

When comparing the different perspectives on TARGET2 imbalances, it becomes clear that they hold fundamentally different views on the necessity and functionality of the euro area monetary system. Indeed, some authors (first of all Sinn) argued that the ECB monetary policy from 2008 to early 2015 (when the Public Sector Asset Purchase – PSPP – programme started) was the main responsible of the creation of TARGET2 imbalances between countries and created a risk of default. The ECB monetary policy distorted asset prices, encouraged risk-taking, and undermined the incentive for structural reforms in the peripheral countries. However, the large majority of authors defended the TARGET2 system and the imbalances thereof as a necessary mechanism for the functioning of the euro area economy. Furthermore, in order to preserve the financial stability, the ECB monetary policy, replacing private credit with public credit, shielded the banking systems of core nations from possible losses and the euro area as whole with the disastrous consequences of a break-up.

Overall, both perspectives offer valuable insights regarding the complexities of the euro area monetary system. Indeed, the debate over TARGET2 balances highlighted the challenges and complexity of maintaining a single currency throughout an economically diverse geographic area. These complexities might have a considerable impact on the stability and effectiveness of the euro area.

Many authors highlighted the need for policies that ensure financial stability and prevent the accumulation of unsustainable debt. However, their recipes widely differed. On the one hand, Sinn and others asserted the necessity of an offsetting mechanism where debtor countries would fix their balances with hard currencies and gold. However, a similar mechanism would infringe the nature of a currency union itself where money has to freely flow from one nation to another without limit. De facto, extreme solution (as that of an offsetting mechanism) would translate into a return to a fixed exchange rate regime, where the ability to keep the fixed exchange rates is limited by the availability of currency and gold reserves.

Having recognised the possibility of TARGET2 imbalances as an unavoidable future of a currency union. It remains that large imbalances might be the symptoms of other problems. Among them the unsustainable level

of public debt or the inability of domestic banking system to fund themselves on the market without help from public authorities, or a mix of them and other causes. In all the cases, the lack of confidence of market operators towards financial operators in a given country or their government appear to be the trigger of growing TARGET2 imbalances. Because of that, Draghi's "whatever it takes" acted as powerful tool against growing TARGET2 imbalances, restoring market confidence on the irrevocability of the euro area.

The rise and fall of TARGET2 imbalances between 2008 and early 2015 were the first phase of the phenomenon. The second phase began with the large purchased of financial assets by the Eurosystem in March 2015 with the start of PSPP (i.e., the begin of the Quantitative Easing – QE) and it will be discussed in the next chapter. The last phase is represented with the start of the partial reinvestment of the APP since 1 March 2023, normally labelled as Quantitative Tightening (QT) and it will be discussed in the subsequent chapter.

Chapter 2 QE and how it has affected to TARGET imbalances

2.1 QE: an overview

The rise of TARGET2 imbalances between 2008 and early 2015 have been the subject of our discussion thus far. We will now go through the substantial purchase of financial assets by the Eurosystem from March 2015, also known as quantitative easing or QE. At the end of 2014 when the new strategy was announced, the euro area economies were affected by deflation and anaemic GDP growth. The ECB announced the new monetary strategy in an effort to stimulate the euro area aggregate demand by injecting central bank money into the system and by lowering interest rates across the area. The new strategy called the Asset Purchase Programme (commonly known as APP) comprises four distinct programmes: the Corporate Sector Purchase Programme (CSPP), the Public Sector Purchase Programme (PSPP), the Asset-Backed Securities Purchase Programme (ABSPP) and the third Covered Bond Purchase Programme (CBPP3). The goal of the APP was to support the monetary policy transmission mechanism to bring inflation back in line with the inflation target by improving business and consumer access to credit across Europe to stimulate aggregate demand.

In January 2015, the ECB announced the launch of the APP with an initial size of EUR 60 billion per month. The programme, which started in March 2015, was initially scheduled to expire in September 2016, but it was extended until March 2017 increasing the amount of net purchases to 80 billion. From April to December 2017 the ECB reduced the monthly purchase amount to 60 billion per month. In October 2017, the ECB extended the APP by nine months, until September 2018, but halved the size of the measure to 30 billion per month. The size of the programme was again halved in October 2018 to EUR 15 billion per month and set to zero from January 2019 to October 2019; during this period the Eurosystem purchases were limited to the reinvestments of redemptions. A new limit plan of 20 billion per month of net purchases was established in November 2019 and, in response to the pandemic, in March 2020 it was approved an additional net purchase plan (the so called “temporary envelope”) of EUR 120 billion until the end of the year to deal with the coronavirus emergency. Net purchases were then progressively reduced, 40 billion in April 2022, 30 billion in May 2022 and 20 billion in June 2022. APP net purchases were set to zero from July 2022. During the coronavirus emergency, the ECB also launched a new programme (PEPP, Pandemic Emergency Purchase Programme), with purchases of public and private sector securities. The initial size of PEPP was 750 billion increased by 600 billion in June 2020 and by further 500 billion in December 2020, reaching a total amount of 1,850 billion. Net purchases related to the PEPP were set to zero starting from the end of March 2022.¹¹ Table 1 provides a summary of the ECB's net purchases under both the APP and the PEPP, reflecting the scale and evolution of these initiatives over time.

¹¹ On May 4th, 2023 the ECB announced that it expects to discontinue the reinvestments under the APP as of July 2023 (<https://www.ecb.europa.eu/press/pr/date/2023/html/ecb.mp230504~cdfd11a697.en.html>)

Table 1 **ECB net purchases under APP and PEPP***(EUR billion)*

	APP	PEPP **
March 2015 to March 2016	60	
April 2016 to March 2017	80	
April to December 2017	60	
January to September 2018	30	
October to December 2018	15	
January to October 2019	0	
November 2019 to March 2022	20	
March to December 2020*	32	1,850
Jan 2021 to March 2022	20	
April 2022	40	
May 2022	30	
Jun 2022	20	
July 2022 and February 2023	0	
March 2023 - June 2023?	-15	

* It includes the temporary envelope of 120 billion

** Total PEPP envelope at December 2020

Apart from the QE, the ECB adopted other new monetary tools. Indeed, policy rates had already been aggressively reduced in the years subsequent to the crisis of 2007-2008. At the end of 2014, the rate on the Deposit Facility was already in the negative area (-0,20%); that on the Main Refinancing Operations was at 0.05%. Given the limited space for manoeuvre, in addition to marginally lowering interest rates (the rate on the Deposit Facility reached -0.5% in September 2019), the ECB tried to encourage bank lending to firms and households through a new monetary policy instrument: the Targeted Longer-Term Refinancing Operations (TLTRO). TLTROs provided banks within the euro area at attractive rates conditionally to their loans to non-financial corporations and households with a maturity up to four years. During the pandemic, the package of non-standard monetary policy measures was enriched with the Pandemic Emergency Longer-Term Refinancing Operations (PELTROs), which provide a further backstop for preserving the smooth functioning of money markets within the euro area.

Combined these two types of purchase programmes injected into system central bank money up to over 2 trillion.¹² Together, QE and the others non-standard monetary policy operations enlarges the total assets of the Eurosystems central banks, i.e., the asset of the ECB and the NCBs all together, up to almost 13 trillion in September 2022, compared to 800 billion at the begging of 2000s.

2.2 How the QE works

QE entails the purchase by the central banks of bonds and other financial assets from commercial banks and other financial institutions. In the case of bonds, yields, which are inversely connected to the prices of bonds, decline as the demand curve for bonds moves to the right and their prices rise. As yields on assets purchased by the central bank go down, the expected return of holding such securities goes down as well. The portfolio mix of assets held the private sector changes, as they came to hold more liquidity (i.e., ‘money’ – the liability side of the central banks’ and other Monetary Financial Institutions’ balance sheet) and fewer claims on governmental and private entities (which now are in the asset side of the balance sheet of the central bank). Hence, investors are induced to use the new liquidity to replace the asset classes purchased under the QE with asset classes promising higher returns. The portfolio rebalancing effects lead to a decrease of the yields/increase of prices across asset classes. As interest rates decline, the cost of borrowing goes down as well, enabling banks to provide more favourable conditions on loans and investors to accept a lower remuneration for newly issued bonds. Furthermore, as the prices of bonds and other asset classes increase, investors’ wealth increases as well, further stimulating aggregate demand (wealth effect).

Through QE, the central bank injects liquidity into the system by enlarging its balance sheet through the purchases of assets. In doing so, the central bank establishes, on the liability side of its balance sheet, a claim against itself (bank reserves), which is referred to as an active deposit creation. Either government bonds (or bills) or assets issued by the private sector may be purchased by central banks. The central bank's balance sheet rises; its extra liabilities are matched by greater assets (Joyce et al., 2012).

Given the structure of the euro area, the QE by the Eurosystem produced relevant effects on the TARGET2 imbalances of NCBs. Let’s better understand such effects by looking at the following balance sheets.

Fig. 6 shows the scenario prior to the ECB's adoption of its expansive monetary policy. As is clear from the chart, the situation is similar to the one described in the previous chapter except for the fact that Bank B now owns both Country 1 and Country 2's government bonds, whereas Bank A holds Country 1's government bonds in its assets.

¹² For further details, see <https://www.ecb.europa.eu/mopo/implement/omo/tltro/html/index.en.html> and <https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr201210~8acfa5026f.en.html>. During the pandemic the ECB also temporarily relaxed collateral requirements.

Figure 6

Pre QE implementation

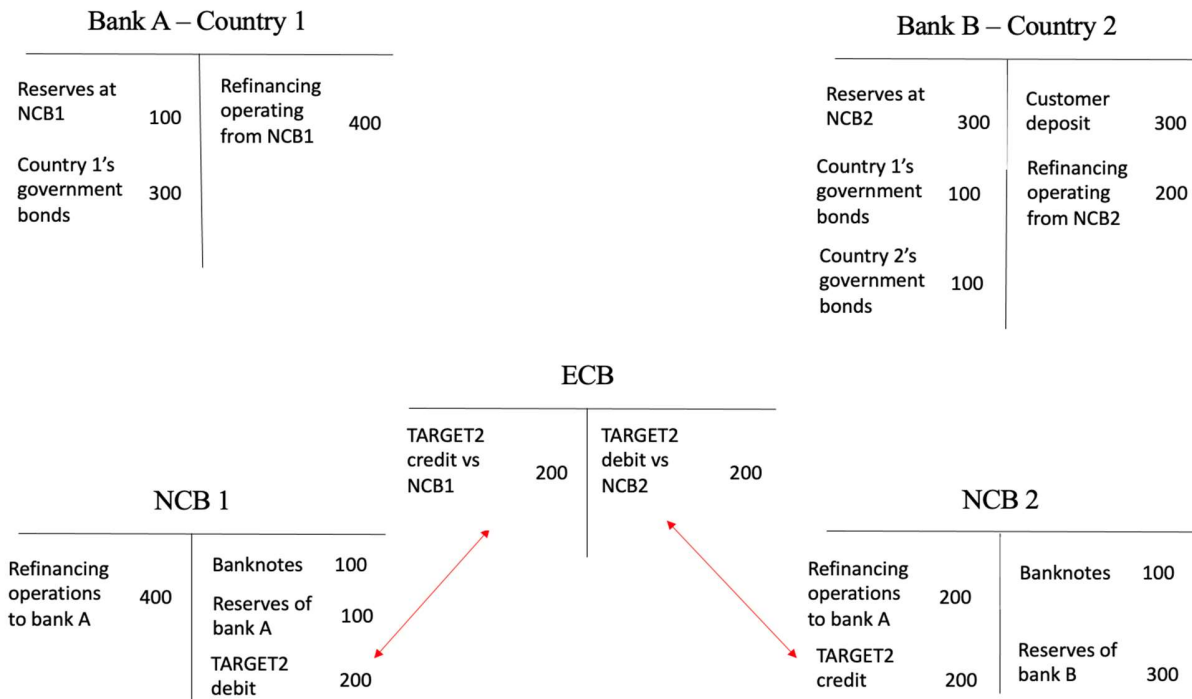
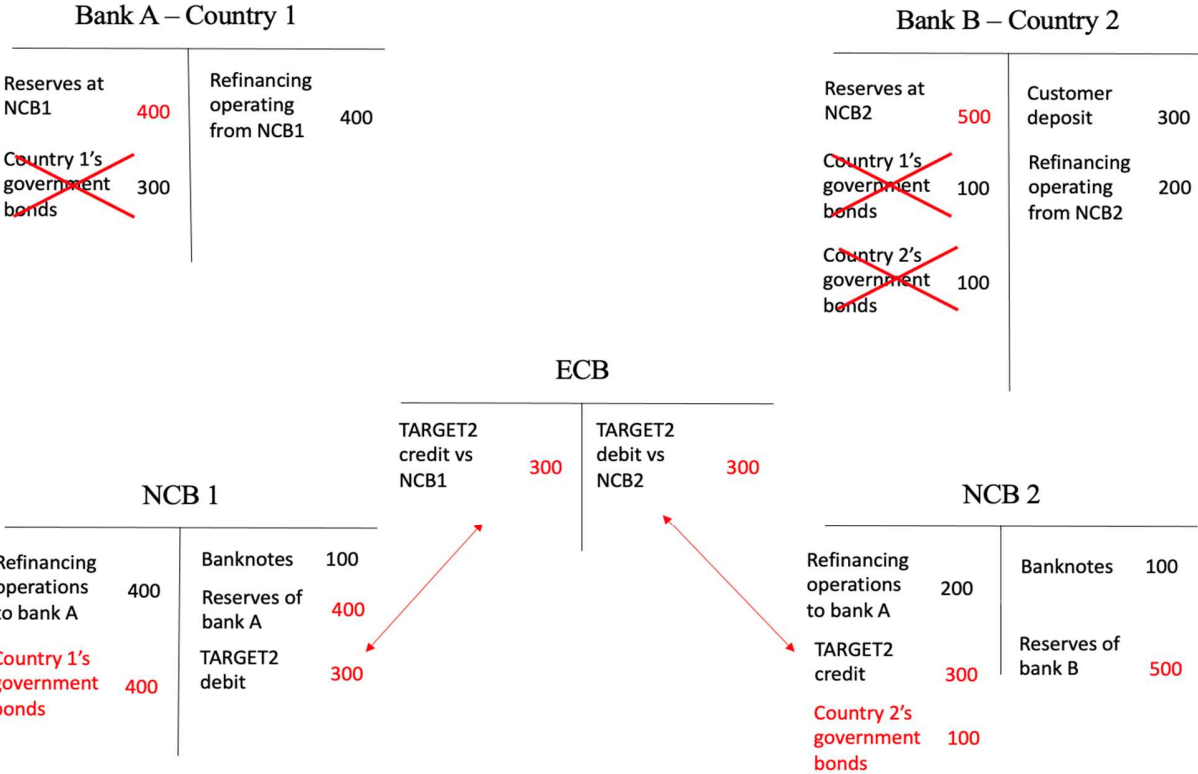


Fig. 7 shows what happens to the balance sheets of the two commercial banks, the two national central banks, and the ECB after the implementation of QE. As previously explained the monetary policy consists in the purchase of financial assets by the NCBs: NCB1 acquires Country 1's government bonds (which were owned by banks both in Country 1 and in Country 2) and NCB2 purchases Country 2's government bonds (which were owned by banks in Country 1 exclusively). The TARGET2 imbalances increase as a result of NCB1 purchasing financial assets in another nation, as shown by looking at the ECB balance sheet.

For instance, when the Bank of Italy purchases Italian government bonds from a German bank, the Bank of Italy wires through the TARGET2 system a payment to the reserve account of the German bank at the Bundesbank, while registering the acquisition of Italian government bonds in the asset side of its balance sheet. Thus, central bank money immediately enters the German financial system (the increase in the reserve account of the German bank) and a TARGET2 debit (Bank of Italy) or credit (Bundesbank) is registered as a compensating balance sheet item by the two NCB. Additionally, the Bundesbank may mediate transactions between operations of banks outside the euro area that frequently use their local subsidiaries to make purchases, further exacerbating TARGET2 imbalances (Minenna, Dosi and Roventini, 2018). In fact, due to the integrated nature of the euro area's financial system, counterparties outside of the purchasing NCB's jurisdiction are frequently used to purchase securities under the APP. In particular, financial centres in selected few nations are home to a sizable

portion of large APP counterparties. Furthermore, non-euro area counterparties, from whom roughly half of transactions by volume have been made, primarily access the TARGET2 payment system through Germany and France. According to ECB (2017b), around 80% of APP acquisitions by volume have involved counterparties located in a country different from that of the purchasing NCB, while roughly 50% have involved counterparties residing outside the euro area, many of which are concentrated in the United Kingdom. Such counterparties get payments for the assets sold to the APP in those countries, causing a significant rise in TARGET2 imbalances.

Figure 7 QE implemented

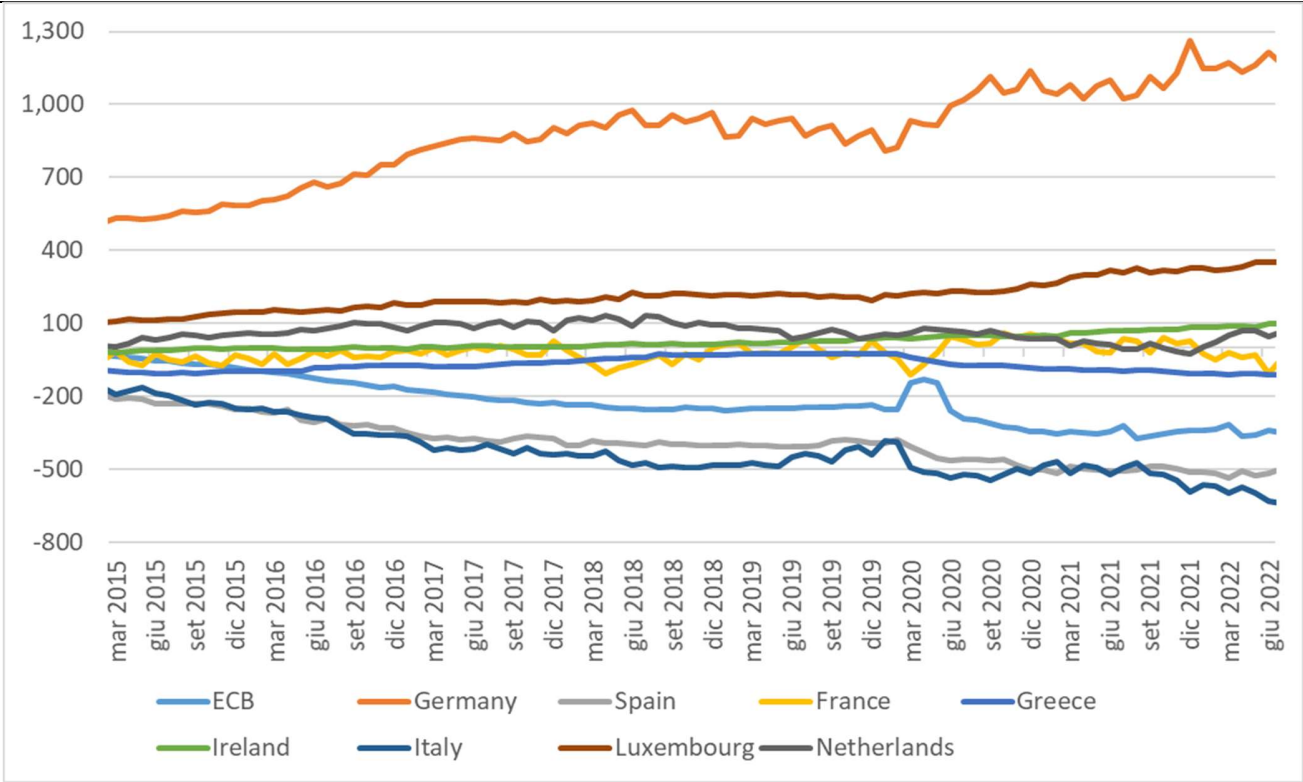


Note: in red items changed with respect to Figure 6.

Furthermore, since the introduction of the APP, the euro area as a whole has undergone a broad-based rebalancing toward non-euro area debt securities, which has been significantly fuelled by the negative interest rate spreads between euro area bonds and bonds released by other advanced economies. During this time, debt instruments issued by other advanced countries, particularly the United States, have made up practically all of what citizens of the euro area have net purchased outside the euro region. Such global portfolio rebalancing typically involves parties based in important financial hubs of the euro area, which helps to build up reserves in specific areas and increase TARGET2 imbalances (ECB, 2017b).

As a matter of fact, the implementation of the APP was associated with a substantial widening of TARGET2 imbalances. The latter increased by a factor of 2 or 3 for many countries (Figure 8), sparking further discussion. The debt position of the Bank of Italy on TARGET2 reached 628 billion at the end of net purchase in June 2022, when net purchased halted: an increase of 475 billion compared to the end of February 2015 (+168%); the credit position of Germany increased in the same period by 653 billion (+137%). It is worth noting the increase in TARGET2 credit positions of Luxembourg. The nation hosts a number of financial institutions, such as mutual funds. As the Eurosystem started to bought securities from financial intermediaries the TARGET2 credit of Luxembourg increased by 246 billion (+239%).

Figure 8 **TARGET2 imbalances**
(EUR billion)

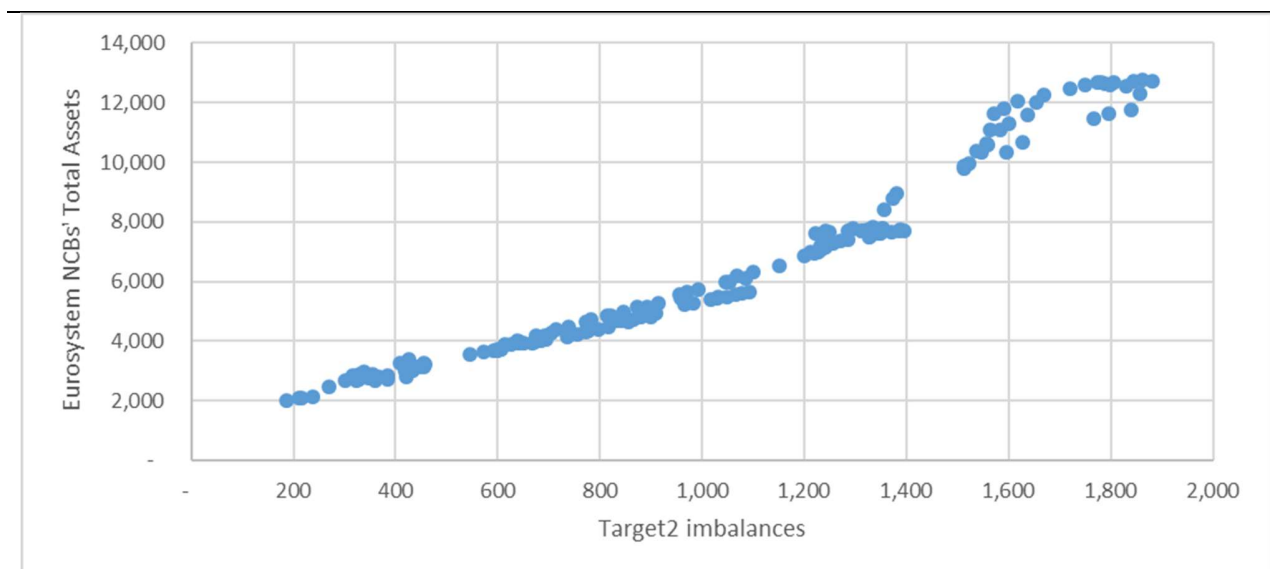


Source: ECB

Figure 9 provides visual evidence of the relation between TARGET2 imbalances and the growing size of the Eurosystem balance sheet. Here TARGET2 imbalances are represented as the sum of all positive net positions across NCBs, to get the absolute magnitude of outstanding claims. As it can be seen, at least visually, there exists a clear relation between the absolute growth of TARGET2 imbalances and the enlargement of the Eurosystem

balance sheet through the purchases of securities (mainly APP and PEPP) and refinancing operations (mainly TLTRO).¹³

Figure 9 **TARGET2 imbalances and Eurosystem balance sheet**
(EUR billion)



Source: ECB

2.3 The debate around TARGET2 imbalances in the QE era

As previously mentioned, TARGET2 imbalances began to emerge with the Great Financial Crisis and the subsequent sovereign debt crisis. The interbank market ceased to operate across euro area countries. The Eurosystem stepped in providing unlimited access to central bank money to monetary policy counterparties. TARGET2 imbalances began to grow as financing from peripheral NCB replaced interbank credit by banks located in core countries. The start of the APP in 2015 fuelled a new increase in TARGET2 imbalance as peripheral NCB started to buy domestic asset from financial intermediaries located in other countries financing purchases with central bank money. Monetary policy accommodation in response to the pandemic reinforced the trend towards growing imbalance. The increase in TARGET2 imbalances following the implementation of APP sparked a new debate among academics and policy makers.

¹³ In the euro area, changes in the NCB balances sheets may also depend on factors not related to monetary policy. Among them, the variability of Treasury deposits at NCBs and the possibility for NCBs to buy and sell asset for reasons not related to monetary policy. Such activity is regulated at the Eurosystem level by the Agreement on Net Financial Assets (ANFA), which sets rules and limits for holdings of financial assets by individual NCB (see, https://www.ecb.europa.eu/ecb/educational/explainers/tell-me-more/html/anfa_qa.en.html).

Auer and Bogdanova (2017) assess that rising TARGET2 imbalances after 2015 should be seen more as related to the APP rather than to the renewed capital flights. Minenna, Dosi and Roventini (2018) draw attention to the fact that NCBs frequently use banks in other nations to perform APP transactions. They illustrate an example pretty similar to the one discussed above. They show what happens whenever a NCB (say, the Bank of Italy) purchases assets from a bank located in another country (say, a London subsidiary of German bank) as part of the APP measurements. The purchase sum is credited to the German correspondent bank's account at the Deutsche Bundesbank, increasing the Bundesbank's TARGET2 surplus in the process. As a consequence, the TARGET2 deficit for the Bank of Italy grows. Therefore, whenever any TARGET2 debtor NCB undertakes an asset purchase with a counterparty that has a correspondent bank based in a TARGET2 creditor NCB, TARGET2 imbalances will increase. They also describe how the development of the TARGET2 balances with respect to Greece further supports the mechanical effect of the APP on TARGET2 imbalances. Since the nation's sovereign bonds were ineligible for the APP, the Greek TARGET2 deficit has been essentially steady over the past few years.

Eisenschmidt et al. (2017, 2022) point out that, in the context of the APP, excess liquidity creation is now mostly driven by supply of reserves, making it independent of the state of the bank financing markets. In contrast, during the previous phase of rising TARGET balances in 2011–12, the growth in surplus liquidity was virtually exclusively driven by demand as banks chose to replace market-based funding with central bank credit as a result of deteriorating circumstances and fragmentation in the bank funding markets.

In the case of Italy, some observers saw this dynamic as a symptom of a 'capital flight' linked to the uncertainty about conditions in Italy. However, according to the Bank of Italy (2017) the available evidence does not support this interpretation. Government bonds yielded less due to the Euro system's public bond purchase programme; placements of bank bonds declined. In such environment, investors' difficulties in achieving greater diversification and adequate expected returns through domestic financial assets, cause a shift of households' portfolios away from government and bank bonds towards insurance and asset management products. As insurance and asset management products often make use of financial vehicles located abroad (e.g., in Luxembourg) and tend to have a more diversified portfolio than individual investors, the increasing recourse to these financial intermediaries caused an increase in TARGET2 imbalances. Thus, the portfolio rebalance by Italian investors did not appear to be due to a preference for safer financial assets (in fact, Italian residents also made net sales of German government bonds during the period under review) but was linked to the search for more balanced portfolios and higher yields than those offered by Italian government and bank bonds.

Similarly, the ECB claims that rising TARGET2 liabilities of the euro area's peripheral nations are a purely mechanical result of QE, without reflecting any mistrust of Italian assets among local or international investors (see for instance, Praet, 2016; ECB 2017a and 2017b). Dor (2016) criticizes the narrative by the ECB. Indeed, he asserts that the Bank of Italy mostly purchased government bonds from local investors. These domestic investors,

especially banks, have purchased foreign assets with the money they received from the sale of their national government bonds, even though the proceeds could have been reinvested domestically. Thus, the rising TARGET2 deficit of Italy has been the result of the vast reallocation of financial investments by Italian banks - away from local assets and towards international assets —that began long before the QE, which has just indirectly influenced the phenomenon (see also Sinn, 2020). This indicates that domestic investors have become more sceptical about Italian assets, a mistrust likely brought on by the nation's projected slow economic growth and the high level of public debt.

Fabiani et al. (2021) compare the frequency and severity of unexpected halt in nations in private net financial inflows within the euro area before and after the ECB's asset purchase programs were implemented. Shocking decreases in private net financial inflows, or overall flows adjusted for loans from the EU and IMF and adjustments to TARGET2 balances, are what they refer to as "sudden pauses". They discover significant distinctions between their sample's euro area and non-euro area countries when comparing cross-country data. When compared to non-euro area economies, the euro area nations experience a sudden stop in private net financial inflows more frequently and with bigger magnitudes. Although less so in euro area countries than in other economies, sudden halts do have an impact on the actual economy. Their findings also suggest that the likelihood of severe sudden pauses in euro area nations has been greatly decreased as a result of asset purchases made by the Eurosystem under the APP and PEPP. According to their findings, the APP and PEPP together have cut the likelihood of a severe sudden stops in nations within the euro zone, but they have had little impact on the likelihood of moderate stops. The findings are consistent with the existence of a "confidence channel", wherein ECB asset purchases aid in reducing international investors' worries about tail risks in specific euro area nations and hence aid in preventing sharp drops in net financial inflows. However, since the ECB's asset purchases do not totally eliminate the potential of severe abrupt pauses in euro area countries, stability-oriented macro-financial policies in each member of the euro area continue to be crucial for a long-term decrease in the likelihood of suffering major abrupt halt with the resulting negative effects and difficult adjustment requirements.

Minenna, Dosi and Roventini (2018) agree with the view of the ECB related to the fact that the APP is related to rising TARGET2 imbalances, but they point out that this explanation doesn't fit properly for Italy, Spain, and Germany. Indeed, these countries have experienced two phenomena: in Spain and Italy, rising negative TARGET2 balances indicate a transfer in private-sector financial wealth from government securities sold to central banks to overseas assets; while, in Germany, the numbers demonstrate the massive effect of current-account surpluses.

Purificato and Astarita (2015) weaken the argument by Sinn and Wollmershäuser (2012), who say that the national central banks of the peripheral nations independently decide to produce and move central bank liquidity towards the core nations in order to meet the needs of their financial institutions. In fact, according to Purificato

and Astarita, the actions of NCBs consist of legal commitments resulting from monetary policy decisions and actions made and carried out by the ECB in its capacity as the ESBC's decision-making body. NCBs are required to manage the central bank liquidity transfer in accordance with the requests made by credit institutions. TARGET2 imbalances typically reflect how the geographical distribution of central bank liquidity has changed from the original distribution as established by refinancing operations, i.e., they reflect how a monetary union typically operates. However, when they reflect the application of unconventional monetary policy tools, TARGET2 imbalances can also be a sign that the Eurosystem is taking on the role of lender of last resort in favour of credit institutions.

To recap, the start of the APP spurred a revival of the debate about the consequences of ECB action, as TARGET2 imbalances surged at unprecedented levels. Most of the authors (e.g. Auer, Bogdanova, Eisenschmidt, Damiani and Dosi) focused on the mechanical relationship between QE and TARGET2 imbalances, given the existing allocation of securities bought by the Eurosystem across international investors. However, according to some authors, fear and panic among investors still played a role in the renewed surge of TARGET2 imbalances. In the context of a pause in private financial flows across countries in the euro area, QE might have allowed to restore market confidence (Fabiani), avoiding a severe sudden stop of international financial flows and its dramatic consequences. Still according to some authors (Sinn, Dor and, to some extent, Purificato and Astarita), the QE again hid a stealth bailout by the ECB of the peripheral banking systems. Thanks to APP, peripheral banking systems were allowed to replace in their portfolios distrusted domestic bonds with foreign bonds, with the ECB acting as the lender of last resort of peripheral financial systems.

2.4 Concluding remarks on QE

Large injections of surplus liquidity by the decentralized central banking system of the euro area led to increasing TARGET2 imbalances. Demand-driven growth in surplus liquidity occurred during the sovereign debt crisis when banks replaced dried-up market-based funding with Eurosystem funding. Although the provision of liquidity through refinancing operations was initially TARGET2-neutral, TARGET2 imbalances climbed as this liquidity subsequently migrated from susceptible to less-sensitive countries (i.e., from peripheral to core nations) in the event of extreme market stress. However, since the beginning of the APP, the renewed rise in excess liquidity has been primarily supply-driven rather than stress-related resort to refinancing operations, as a result of asset purchases by NCBs and the ECB. The APP caused significant cross-border money flows, which led to rising TARGET2 imbalances. These flows appeared during the adoption of the APP and subsequent portfolio rebalancing, respectively.

Cross-border payments are a necessary component of the implementation of decentralized APP in an integrated market. This explains how the financial structure of the Eurozone contributed to the rise in TARGET2

imbalances. In fact, large financial intermediaries have historically used Germany and, to a lesser extent, the Netherlands, as major financial hubs in the euro area to access TARGET2. Thus, the major financial hubs in the euro area have always been in nations that were seen as less vulnerable during the sovereign debt crisis and this fact exacerbated the rising positive TARGET2 balances in such countries.

Overall, compared to other instances of growing balances, the underlying mechanisms causing the increase in TARGET2 imbalances were fundamentally different between the pre-QE and the post-QE period. As shown by a variety of financial market, banking, and balance of payments statistics, the increase in TARGET2 imbalances between mid-2011 and mid-2012 was brought by the substitution of private sector bank funding with central bank money. This shift in funding sources led to a greater reliance on central bank liquidity, which in turn caused TARGET2 imbalances to further widen. The ECB was forced to intervene through full allotment refinancing operations during this period due to interbank market tensions and the abrupt cessation of credit from core countries to peripheral countries. As a result, central bank funding took the role of the interbank market borrowing challenges, increasing the imbalances inside the TARGET2 system. Contrarily, the interaction between the decentralized adoption of the APP and the financial structure of the euro area was substantially responsible for the surge in TARGET2 imbalances from 2015.

Chapter 3 Target imbalances and QT

3.1 What is Quantitative Tightening and why should it be implemented?

In the previous chapters we have discussed how, from the Global Financial Crisis, the ECB monetary policy has affected the TARGET2 imbalances, by injecting a large amount of central bank money into the system through refinancing operations and QE. Let's now focus on how the new restrictive monetary policy of the ECB will impact the financial system, with a particular focus on the reduction of the size of assets in the monetary policy portfolio of Eurosystem's central banks.

In December the ECB declared that as of March 2023, the APP portfolio will start to fall and that it will lose an average of €15 billion each month until June 2023. The Quantitative Tightening (QT) will progressively reduce the size of the Eurosystem portfolio of assets purchased since 2015 by a partial reinvestment of redemptions.

The need for QT has risen due to several factors, which all together contributed to a sharp rise in inflation in the euro area. Such factors are the ongoing COVID-19 pandemic, the swift recovery of the euro area economy in 2021 and the significant rise in energy prices as a result of the war in Ukraine from 2022. Indeed, the ECB is dealing with an unprecedented inflation in the history of the euro area. From the middle of 2021, inflation rates have begun to increase to uncomfortably high levels, with the headline inflation rate in the euro area increasing from 1% to 5% throughout the course of 2021.

Indeed, the broad-based inflation surge became more apparent over time, even before the energy crisis was set off by the start of the war in Ukraine in February 2022. Central banks around the world, including the ECB, initially believed the rising inflation to be of a transitory nature and cautiously adjusted their monetary policy stance. Demand shift from services to commodities during the lockdowns. Fiscal policies were largely used to stabilize incomes during the pandemic. In many countries around the world, bond purchases by central banks absorbed the increase in government deficits. Thus, a fiscal-monetary mix was at work that, *de facto*, helped to offset the negative effects of the pandemic on economic systems using freshly produced money. This combination of fiscal and monetary policies caused the money supply in many nations to expand quickly (Borio et al., 2023). However, because of supply chain disruptions and the ensuing material shortages, accommodative monetary policies and fiscal expansions were not accompanied by an increase in production activity (Sonneberg, 2023). The energy and goods sectors initially saw an increase in inflationary pressures. However, following the progressive removal of containment measures as pandemic mitigated, consumption turned back to services during the initial phase of the post-pandemic recovery. As production capabilities of services had been reduced during the pandemic, inflationary pressures consequently extended to services. The economy's supply-side simply could not keep up with the demand, which was fuelled by the excessive savings of the pandemic period. With the start

of the Ukrainian conflict and the ensuing energy crisis, headline inflation in the euro area increased from 5.9% in February 2022 to 10.6% in October 2022. In fact, following the start of the war in Ukraine, inflationary pressures intensified with the rise in gasoline and gas prices. The rise in gas prices immediately passed through to electricity prices. Producer prices reached previously unheard heights as rising energy costs permeated the whole production chains. Food prices climbed significantly due to soaring fertilizer costs, as well as higher production and transportation expenses brought on by the sharp increase in energy prices (Gern et al., 2022a).

After a decade of accommodating measures, the ECB decided it was time to restrict the monetary policy. The most noticeable evidence of this tightening was the 350 basis points increase in ECB policy rates that took place between July 2022 and March 2023, from 0 to 3.5% for the Main Refinancing Rate. It has been the first increase since 2011 and the biggest cumulative increase since the ECB was founded.¹⁴ In October 2022, the TLTROs were recalibrated with less favourable terms. This encouraged banks to early repay their loans to the ECB. Between November 2022 and February 2023, the size of the ECB balance sheet shrunk by almost 900 billion as a result of TLTRO repayments.

Indeed, before the implementation of the QT a restrictive monetary policy was already at work through increasing official interest rates and balance sheet reduction policies.

3.2 How can the QT be implemented?

The QT can be done in different ways: it might consist in active asset sales from the QE portfolios or in a partial reinvestment of redemptions. The key benefits of choosing the active asset sales option are that the central bank exert a complete control over the rate of balance-sheet reduction and the unwinding can happen quickly. The fundamental disadvantage of this “active QT” is that it might pose serious dangers to financial stability. The key advantages of a partial reinvestment of redemptions (“passive QT”) are that there would be fewer financial risks, as no direct downward pressure will be exerted on market prices of existing securities. However, as the pace of the balance sheet reduction would depend on the amount of monthly redemptions, which are not always completely linear, the lowering pace may be fairly erratic. The ECB does not envision any direct sale on the market, following a passive QT strategy with the partial reinvestment of redemptions, at an initial pace of EUR 15 billion per month. The same strategy is currently applied by the US Federal Reserve with an actual pace of USD 95 billion per month. Conversely, the Bank of England is engaged in an active QT strategy with a yearly target reduction of GBP 80 billion of its balance sheet, including GBP 45 billion in active bond sales.

The ECB justifies QT on the grounds that it aids in reclaiming policy space when excess liquidity exceeds requirements, and it helps to reduce the large exposure to credit and duration risk by the Eurosystem brought by

¹⁴ In addition, financial markets now anticipate future rate increases from the ECB.

QE (Schnabel, 2023). QT reduces the negative impacts of a large balance sheet and removes monetary policy accommodation in support of the tightening of official interest rates.

Nevertheless, it is important to point out that it is extremely questionable how QT works in reality. Few instances in history can be found where central banks have scaled back the size of their bond holdings: the episodes in the US from 2017 to 2019, when the US Federal Reserve decreased its asset holdings by about USD 750 billion, and the Japanese episode from 2006 to 2007, when the Bank of Japan decreased its balance sheet from JPY 64 trillion to JPY 49 trillion (Blinder, 2010).

Lopez-Salido and Vissing-Jorgensen (2023), referring to the US 2017-2019 experience, recall that since reserves and other short-term liquid liabilities are created by central banks to finance their bond purchases, reducing the balance sheet also results in a contraction in the supply of liquidity by the central bank. Since those who own liquid central bank liabilities (i.e., bank reserves) may choose to cling onto them rather than lend them out to others in need of funding, the danger of spikes in funding costs in short-term money markets increases as the supply of central bank money decreases. Thus, an excess of QT could result in financial instability and a loss of control over interest rates. Indeed, in 2019, the US experiment of QT ceased to perform as the rates on short-term debt increased abruptly.

Smith and Valcarcel (2023) demonstrated that, although QT tightened financial conditions, its impacts were not the same as QE in reverse. Indeed, there are solid grounds for anticipating that the effects of QE and QT may not only be nonlinear but also time-varying and state-dependent. The primary explanation is that some channels that were active during QE may not exist or may be diminished during QT. As an illustration, the signalling effect of QE, which was crucial when purchases were made (Krishnamurthy and Vissing-Jorgensen, 2011), will likely be far less significant during QT. Indeed, QE was crucial in restoring market functionality in the aftermath of the Global financial crisis and of the COVID-19 outbreak. The same conditions are no more in place at the start of QT. The effects of buying and unwinding may then be asymmetrical because the current conditions differ significantly from those prevailing when purchases were made. Furthermore, liquidity implications can be more pronounced during QT periods than QE. Thus, QT may not unfold exactly as QE in reverse.

One of the key dangers of QT is that if sovereign bond holdings are reduced by the Eurosystem too quickly, the markets will find it difficult to absorb new issuances of sovereign bonds. The specific risk that is most frequently discussed in the euro area is that QT may result in an unwarranted increase in the spreads of some countries relative to Germany, leading to new episodes of fragmentation of the sovereign bond markets. Consequently, some countries would experience an excessive tightening, incompatible with the ECB's monetary stance and endangering the sustainability of public finances (Claeys et al., 2022). This worries stem from the

possibility that, if asset purchases have helped to narrow country spreads, QT could cause spreads to spike abruptly (Alberola et al, 2022).

Another source of uncertainty refers to the implementation of QT across the various sub-programmes that characterized the APP (namely, PSPP, CSPP, ASBPP and CBPP3), which include private and public asset classes. In fact, a different pace of unwinding each programme might in fact entail a different impact on financial markets and the economy at large (Clayes, 2023).

3.3 Empirical analysis

Albeit QT may not unfold exactly as QE in reverse, as already mentioned before, still an empirical analysis of the relationship between asset purchases by the Eurosystem (as well as other expansionary measures, such as TLTRO) and TARGET2 imbalances may help to give some clues on the possible effect of QT.

Data on TARGET2 imbalances, APP and PEPP purchases, and total refinancing operations by the Eurosystem (including, MRO, LTRO, TLTRO, etc.) are taken from the Statistical Data Warehouse maintained by the ECB. The sample period covers from the end of February 2015 to February 2022, with a monthly frequency.

The investigation is based on an original multivariate model that describes the relationship between change in the absolute dimension of TARGET2 imbalances within the Eurosystem ($\Delta T2$ imbalances), as dependent variable, and total net purchases ($\Delta Total$ Purchases) and variations in total lending by the Eurosystem ($\Delta Eurosystem$ Lending), as explanatory variables. The absolute dimension of TARGET2 imbalances is computed as the sum of all positive balances at any given times for all countries in the euro area (item 9.3, “Other liabilities within the Eurosystem (net)” in the harmonized balance sheet of each NCB). Total net purchases are expressed as net purchases from APP and PEPP (i.e., the change in item 7.1 of the Consolidated balance sheet of the Eurosystem, “Securities of euro area residents denominated in euro”). Variations in total lending encompass the various refinancing measures in place (item 5, “Lending to euro area credit institutions related to monetary operations denominated in euro”). All data are expressed in billions of euros.

The model is expressed as:

$$\Delta T2 \text{ imbalances} = \beta_0 + \beta_1 \Delta Total \text{ Purchases} + \beta_2 \Delta Eurosystem \text{ Lending} + \varepsilon_i, \quad (1)$$

where β_0 , β_1 , and β_2 are parameters, while ε_i represents the unobserved error term. According to our expectations, the greater the use of APP, PEPP, and lending, the greater the countries’ vulnerability to TARGET2 imbalances. Indeed, β_1 and β_2 are expected to be positive, meaning that anytime Total Purchases and Eurosystem Lending rise, T2 imbalances will as rise well.

To verify whether the independent variables have a statistically significant impact on the dependent variable, the following statistical hypothesis is run: $H_0: \beta_1, \beta_2=0$, $H_A: \beta_1, \beta_2 \neq 0$. To test these hypotheses, we use the t-test, measuring the critical value, according to the t-student table.

The first attempt was to employ monthly data. The sign of the coefficient resulted in line with our expectations, however, coefficients were scarcely significant. This could depend on the fact that, in the short run, TARGET2 imbalances might be affected by many other short-term causes. Consequently, quarterly rolling variations have been adopted to conduct the regression for a total of 94 observations.

Table 2 presents the descriptive statistics of the sample. Table 3 describes the results of the regression. All betas have the expected positive signs and are highly significant. Thus, we reject the null hypothesis. The adjusted R-squared is closed to 40%, indicating a relatively high explanatory power of the regression. The F-Statistic indicates that the independent variables are jointly significant.

Table 2 **Descriptive statistics**

	<i>ΔT2 imbalances</i>	<i>ΔTotal Purchases</i>	<i>ΔEurosystem Lending</i>
min	-85.392	-10.73	-861.663
1st Qu.	3.409	51.49	-12.637
Median	38.402	79.26	-3.874
Mean	36.2	100.13	24.101
3rd Qu.	66.897	175.03	37.022
Max.	153.553	251.93	764.041

Notes: quarterly data Feb 2015 – Mar 2022. Source ECB

Table 3 **Regression Results: all Eurosystem**

	<i>Estimate</i>	<i>Std. Error</i>	<i>t value</i>	<i>Pr(t >0)</i>
β_0	7.94918	6.64778	1.196	0.235
β_1	0.25665	0.05309	4.834	5.40E-06***
β_2	0.10587	0.02025	5.228	1.08E-06***

Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05

Residual standard error: 39.73 on 91 degrees of freedom

Multiple R-squared: 0.4139, Adjusted R-squared: 0.401

F-statistic: 32.13 on 2 and 91 DF, p-value: 2.78e-11

Notes: quarterly data Feb 2015 – Mar 2022. Source ECB

Another possibility is to focus on the impact of the independent variables on the TARGET2 imbalances in Germany and Italy, in order to investigate how these policies affected core and periphery countries, respectively. Thus, two new equations are introduced:

$$\Delta T2 \text{ imbalances Germany} = \beta_0 + \beta_1 \Delta \text{Total Purchases} + \beta_2 \Delta \text{Eurosystem Lending} + \varepsilon_i \quad (2)$$

$$\Delta T2 \text{ imbalances Italy} = \beta_0 + \beta_1 \Delta \text{Total Purchases} + \beta_2 \Delta \text{Eurosystem Lending} + \varepsilon_i \quad (3)$$

By looking at historical experience (cfr. Chapter 2), expectations are that the larger the use of APP, PEPP, and loans will affect positively the net TARGET2 balance of Germany and negatively that of Italy. Thus, β_1 and β_2 should result positive for eq. 2 and negative for eq. 3. Indeed, the functioning of the two equations is the same as the one described for the general one (eq. 1): a change in Total Purchases and in Eurosystem Lending affects positively or negatively Target2 imbalances. Table 4 describes the summary statistics of $\Delta T2 \text{ imbalances Germany}$ and $\Delta T2 \text{ imbalances Italy}$, while tables 5 and 6 present the results of the two regressions.

Table 4	Descriptive statistics	
	$\Delta T2 \text{ imbalances Germany}$	$\Delta T2 \text{ imbalances Italy}$
min	-119.092	-132.63
1st Qu.	-3.727	-28.702
Median	22.072	-12.358
Mean	20.947	-15.478
3rd Qu.	47.426	6.664
Max.	145.547	45.583

Notes: quarterly data Feb 2015 – Mar 2022. Source ECB

β s for Germany show the expected positive signs and are highly significant, while β s for Italy have the expected negative sign albeit with a lower level of significance. The adjusted R-squared are lower compared to the one obtained for the Eurosystem (eq. 1, Table 3), especially for Italy. In both cases, the F-Statistic indicates that the independent variables are jointly significant.

Table 5 **Regression Results: Germany**

	<i>Estimate</i>	<i>Std. Error</i>	<i>t value</i>	<i>Pr(t >0)</i>
β_0	2.92329	6.9845	0.419	0.676539
β_1	0.1602	0.05578	2.872	0.005074**
β_2	0.0823	0.02127	3.868	0.000206***

Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05

Residual standard error: 41.74 on 91 degrees of freedom

Multiple R-squared: 0.243, Adjusted R-squared: 0.2264

F-statistic: 14.6 on 2 and 91 DF, p-value: 3.156e-06

Notes: quarterly data Feb 2015 – Mar 2022. Source ECB

Table 6 **Regression Results: Italy**

	<i>Estimate</i>	<i>Std. Error</i>	<i>t value</i>	<i>Pr(t >0)</i>
β_0	-2.85551	5.21694	-0.547	0.58548
β_1	-0.11827	0.04166	-2.839	0.00558**
β_2	-0.03235	0.01589	-2.036	0.0447*

Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05

Residual standard error: 31.18 on 91 degrees of freedom

Multiple R-squared: 0.1442, Adjusted R-squared: 0.1254

F-statistic: 7.664 on 2 and 91 DF, p-value: 0.0008392

Notes: quarterly data Feb 2015 – Mar 2022. Source ECB

From an economic point of view, in order to infer something about the regression models we have to look at the value of the estimated coefficients. Indeed, in the Eurosystem case (eq. 1), we observe a different sensitivity of TARGET2 imbalances with respect to net purchases and net lending. Negative net purchases of 1 billion would reduce overall TARGET2 imbalances by 257 million, while a reduction in lending by the same amount would reduce overall TARGET2 imbalances by 106 million. At the country level (eq. 2 and 3), we again observe two different sensitivities: greater for net purchases and lower for net lending. Indeed, in the German case, negative net purchases of 1 billion would reduce the net positive TARGET2 imbalances by about 160 million and a reduction in lending by the same amount would reduce TARGET2 imbalances by 82 million. For Italy, the β s are negative and thus a 1 billion reduction in the two above variables would reduce the net negative TARGET2 balance by 119 and 32 million, respectively.

3.4 Concluding remarks on QT

Differently from QE, for which the effects on the TARGET2 imbalances have been observed and extensively analysed, up to now, the QT effects remain largely unknown. Indeed, our knowledge can only rely on limited facts and estimates.

If the QT operates in the opposite direction of the QE, there is a good probability that it will offset a large part of TARGET2 imbalances caused by the latter. Indeed, the empirical analysis made in the previous paragraph assume that the effects of QT would be symmetric to the QE ones. The results obtained indicate that the impacts of the QT and the reduction in net lending by the Eurosystem, with the run-off of TLTROs, may be large and help to offset TARGET2 imbalances.

However, it is highly uncertain whether the QT will exactly work as a QE in reverse. In fact, as already mentioned, there are reasons to believe that the effects of QE and QT will be not just nonlinear, but also time-varying and state-dependent. In fact, several channels that were active during QE may no longer exist or may be weakened. In particular, the signalling effect of QE, in restoring market functionality following the Global Financial Crisis and the COVID-19 outbreak, will most likely be far less significant during QT. As the current and perspective economic and financial will likely differ from those prevailing was when the purchases were made, the impacts of QE and QT may be unequal. Furthermore, liquidity effects can be more severe during QT periods than during QE periods, as observed during the QT experience in the USA from 2017 to 2019. Also, the effective implementation of QT across the various sub-programmes that characterized the APP, which include private and public asset classes, will likely influence its consequences.

Nevertheless, as declared by Schnabel (2023), prospects for QT are likely to supplement the monetary policy tightening coming from adjustments in the ECB main policy rates, already in place prior to the start of the balance sheet run-off. The joint work of interested rate tightening and balance sheet reduction might exacerbate uncertainty.

More generally, balance sheet run-off will minimize the market footprint by the Eurosystem, increase market liquidity of purchased asset classes, and reduce the Eurosystem's exposure to credit and duration risk over time, allowing it to reclaim precious policy space. The amount by which bond holdings will be cut will likely be determined by the demand for central bank reserves, which will come from both autonomous forces and the banking sector, as well as by the operational framework that the ECB aims to deploy in the medium term: the return to a corridor system or the maintenance of a floor system. The former will require a large reduction of central bank money in circulation bringing close to zero the level excess reserves, hence an aggressive QT. The latter will be compatible with a large share of excess reserve, which entails a much more moderate QT.

To conclude, the coming months will give a better understanding of how the new monetary policy will effectively influence the financial markets and economies of the euro area. Indeed, there is still significant room for improvement and, if required, for recalibration of QT as empirical evidence accumulate.

Conclusions

During the years following the Great Financial Crisis, the monetary policy of ECB was accused to be responsible of distorting asset prices, encouraging risk-taking, and undermining the incentive for structural reforms in the peripheral countries. TARGET2 imbalances were identified as the main evidence of such negative consequences of the ECB monetary policy. However, many authors have recognised the TARGET2 system and the imbalances thereof as a necessary mechanism for the functioning of the euro area economy. The latter also recognised that the ECB monetary policy shielded the banking systems of the euro area from far more severe consequences with respect to growing TARGET2 imbalances.

The increase in TARGET2 imbalances between mid-2011 and mid-2012 was brought by the substitution of private sector bank funding with central bank money. Contrarily, the interaction between the decentralized adoption of the APP and the financial structure of the euro area was substantially responsible for the surge in TARGET2 imbalances from 2015. During the latter period, the financial structure of the Eurozone contributed to the rise in TARGET2 imbalances as large financial intermediaries have historically used core nations as major financial hubs in the euro area to access the TARGET2 system.

The growing dynamic of TARGET2 imbalances have been extensively analysed. Vice versa, the effects of QT on TARGET2 imbalances remain largely unknown. Indeed, as QT operates in the opposite direction of QE, it should offset a large part of TARGET2 imbalances. However, the environmental conditions in which QT is going to operate are largely different with respect to those characterising the QE period. Several channels that were active during QE may no longer exist or may be weakened. Furthermore, there is reason to believe that nonlinearity can affect the consequences of QT, as it was in the case of QE. The QT experience in the USA from 2017 to 2019 testified the possible existence of unpredictable consequences of monetary policy tightening after a long period of monetary policy accommodation at unprecedented levels.

Even if it is highly uncertain whether the QT will exactly work as a QE in reverse. The empirical analysis made in Chapter 3 suggests that the impacts of the QT and the reduction in net lending by the Eurosystem, with the run-off of TLTROs, may be large and help to offset TARGET2 imbalances. The coming months, as empirical evidence accumulates, will be key to provide a greater understanding of the consequences of QT on TARGET2 imbalances and to eventually suggest monetary policy corrective actions.

This thesis offers a first analysis about the likely dynamic of TARGET2 imbalances during QT, limited by the scarce available empirical evidence. Given the economic and political significance of TARGET2 imbalances the need for further empirical and theoretical analysis on this issue is warranted.

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