

Lessons from TARGET2 imbalances: The case for the ECB being a lender of last resort¹

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Abstract: During the global banking crisis of 2007-2009 and the Eurozone sovereign debt crisis of 2010-2012 the so called ‘TARGET2 imbalances’ attracted considerable attention. Some economists interpreted them as a symptom of the ECB’s ‘stealth bail-out’. The aim of the paper is to highlight that contrary to such claim, the emergence of TARGET2 imbalances reflected the benefits of having a mutual central bank within a monetary union which facilitated cross-border funding in spite of the global financial turbulence. The ECB’s liquidity loans to commercial banks in the Eurozone debtor countries shielded the Eurozone from a much deeper financial crisis than it actually occurred. The emergence of the TARGET 2 imbalances was actually only an accounting phenomenon resulting from the fact that these liquidity loans were technically extended by the debtor countries’ national central banks which are *de facto* (from the monetary policy perspective) ECB’s regional branches.

Keywords: liquid reserve and money creation, TARGET2 imbalances.

JEL codes: E 40, E42, E44

Introduction

TARGET2³ is the ECB’s payments system used for clearing and settling inter-bank claims and liabilities. Usually the balances of low-yielding liquid reserves, which banks hold for such settlements, are small and stable since banks can easily use the interbank market to borrow deficient reserves or lend out their surplus. TARGET2 imbalances are defined as Eurozone national central banks’ (NCBs) accumulated claims or liabilities against the ECB (Handig, Holzfeind

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³ The acronym for Trans-European Automated Real-Time Gross Settlement Express Transfer System.

& Jobst, 2012). They emerged during the 2007-2009 global banking crisis and increased rapidly during the Eurozone sovereign debt crisis of 2010-2012.⁴

Some economists interpreted TARGET2 imbalances as a symptom of “ECB’s stealth bailout” (Sinn, 2011) as during the 2007-2009 banking crisis and the Eurozone sovereign debt crisis (2010-2012) NCBs in the Eurozone debtor countries were providing liquidity to their domestic commercial banks, which enabled the debtor countries to avoid the allegedly necessary adjustments (Sinn, 2011; Sinn & Wollmershauser, 2012; Hetmańczyk & Hetmańczyk, 2018).

The aim of this paper is to give due emphasis to the fact that providing liquidity to commercial banks was an obvious duty of the ECB during both crises as in the case of any other central bank. The ECBs liquidity loans to commercial banks in the debtor countries contributed to saving the Eurozone from a much deeper financial crisis than it actually occurred. The emergence of ‘TARGET2 imbalances’ was mainly an accounting phenomenon resulting from the fact that technically these liquidity loans were provided by the Eurozone NCBs which, in economic terms, are only regional branches of the ECB—like the Federal Reserve System district banks.⁵

When extending liquidity loans, the ECB was fulfilling its normal central banking role of lender of last resort. The importance of this ECB role in saving the Eurozone was accentuated in 2012, when the Eurozone sovereign debt crisis was stopped not by the official announcements concerning the increased volumes of funds at the disposal of the European Stability Mechanism (ESM) but by the declaration that the ECB may (if necessary) launch a massive intervention on the Eurozone sovereign debt market under the Outright Monetary Transactions (OMT) programme. In fact it was envisaged from the very outset that the ECB would extend unlimited liquidity loans in the times of crisis (Garber, 1999).

This paper is structured as follows. Section 1 highlights the role of liquid reserves as the obligatory means of payment in interbank settlements. Section 2 explores the role of liquid reserves in interbank settlements. Section 3 presents the factors enabling the smooth operation of TARGET2 before the 2007 crisis. Section 4 analyses the emergence of TARGET2 imbalances. Section 5 highlights the differences between the Eurosystem and the International Clearing Union proposed by Keynes. The last section concludes that the experiences with TARGET2 imbalances make a strong case for international central banks as institutions that safeguard international financial stability.

⁴ In general non-Eurozone countries also participate in the TARGET2. However in this paper the concentration is purely on the Eurozone and all the references to national central banks should be meant as taking only Eurozone central banks into consideration.

⁵ Here it is stressed that there should be only one central bank for a currency area and not a coalition of separate central banks that are not able to issue liquid reserves being “joint and several” liability of the whole system.

1. Liquid reserves as obligatory means of payment in interbank settlements

Quite often it is assumed that central banks' short-term liquidity loans constitute the source of funding for loans extended by commercial banks. Actually it is somewhat more complex.

Commercial banks do not need a source of funding to extend their loans. From a purely technical point of view they create loans and deposit money *out of thin air* just by entering a given amount of a loan on the asset side of their balance-sheets (as a loan) and the same amount on the liabilities side (as a deposit).⁶ This is why James Tobin called deposit money created by commercial banks "fountain pen money" (Tobin, 1963). Actually the sequence of deposit money creation occurs in the reverse order to that which is usually described in textbooks. A commercial bank looks for liquid reserves only after it has extended a loan and created deposit money (Goodhart, 2009).

An illustration of the fact that commercial banks create not only the domestic deposits but also international deposits 'out of the blue sky' and that they need only very small liquid reserves when doing this, is the emergence of the Eurodollar market. Non-US banks which extend dollar-denominated loans and create dollar deposits need only *nostro* accounts in American correspondent banks to clear and settle their dollar-denominated transactions through the Federal Reserve payments system and draw a dollar-denominated cash if necessary (He & McCauley, 2012). This is the reason why Milton Friedman wrote that "Eurodollars, like 'Chicago dollars,' are mostly the product of the book-keeper's pen" (Friedman, 1971).

Commercial banks' demand for liquid reserves stems mainly from the fact that all payments (executed by banks and their customers) must proceed through a payment system where the obligatory means of settlement are banks' liquid reserves—being the legal tender. In contrast to popular belief when we order our bank to make a payment to a person or institution that holds an account with another bank it is not the deposit money which is actually transferred from our account to the payee's account. In fact our bank must have liquid reserves (legal tender) in order to transfer the necessary amount to our payee's bank. Only after the transfer has been completed is our account debited while our payee's account is credited.

Although some payments (especially large ones) are transferred real time on a gross basis (RTGS systems), banks' end-of-day demand for liquid reserves is significantly reduced by the fact that over a business day the net value of interbank transfers is much lower than their gross value. Therefore liquid reserves make only a relatively small share of total bank assets (see Figure 1). However

⁶ What banks actually do is simply monetize future loan repayments.

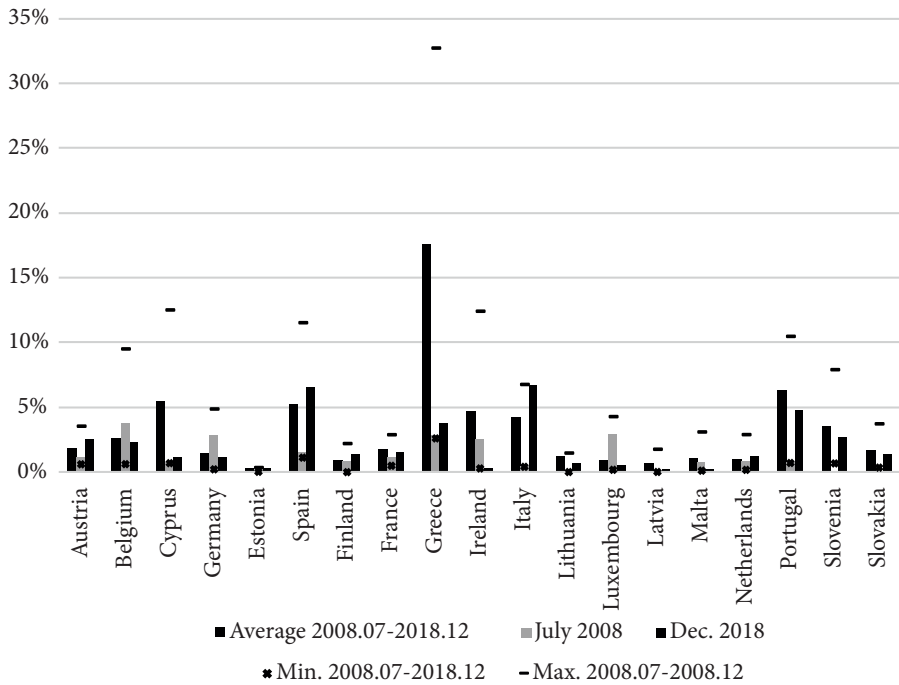


Figure 1. Bank funding with central bank liabilities as a share of the total commercial banks' balance sheet

Source: ECB Data Warehouse.

as is discussed in the following part of the paper, during very volatile periods central banks are able to create additional liquid reserves in large amounts (see also Figure 1).

Technically speaking the central bank is an institution which manages the payment system whereby commercial banks clear and settle their claims and liabilities (Lubik & Rhodes, 2012). In this context the principal characteristic of the central bank is its ability for the unlimited creation of liquid reserves. The main reason why the Federal Reserve was established in 1913 was that previously the existing private clearing houses in large financial centres were unable to create and provide banks with sufficient liquidity during acute bank crises (Gorton & Tallman, 2016; Tallman & Moen, 2012). The unique severity of the 1907 banking crisis necessitated the establishment of a central bank capable of creating liquid reserves (being a legal tender) in quantities large enough to stop any run on banks. The Federal Reserve System (FRS) became the country-wide clearing house able to prevent any liquidity crisis even if it unfortunately did not utilize this potential in the early 1930s (Norman, Shaw, & Speight, 2011).

2. TARGET2 before the outbreak of the global banking crisis of 2007

TARGET2 is the payment system run by the ECB. A characteristic feature of the Eurosystem (the ECB and the National Central Banks of those countries that have adopted the euro) is the decentralisation of the operational side of the ECB. Commercial banks in different EU member states keep their liquid reserves with their National Central Banks (NCBs) which effectively are ECB's regional branches, much like the district Federal Reserve banks are the Federal Reserve System's regional branches. Under the circumstances the so called 'TARGET2 imbalances' (large NCBs' claims or liabilities to the ECB) can emerge when interbank cross-border payments between commercial banks of different Eurozone countries fail to balance.

In a non-crisis time they tend to be balanced, because—especially within a monetary union where there is no exchange rate risk—capital tends to flow smoothly from surplus to deficit economies. Moreover, before the outbreak of the global banking crisis investors assumed that there was no 'fragmentation' within the Eurozone (the term was not coined until the crisis), since the risk of investing in different member states was perceived as essentially the same.

Under such circumstances, capital flowed easily from Eurozone's surplus regions to deficit regions, which is typically the case in any domestic economy. Consequently capital flows matched the cross-border (intra-Eurozone) payments of commercial banks both in creditor and debtor economies (Cecchetti, McCauley, & McGuire, 2012).

Naturally the fine-tuning mechanism for banks' lending and borrowing their liquid reserves was the Eurozone interbank money market.⁷ To illustrate the process let us assume that a Spanish importer drew a loan from a Spanish commercial bank in order to pay its German supplier. If the Spanish commercial bank did not have sufficient liquid reserves to execute the payment it simply borrowed them on the Eurozone interbank market.

Why was the supply of liquid reserves on the interbank market sufficient? One of the reasons was that German exporters' banks lent their excess liquid reserves to other banks (e.g. in Spain) through the Eurozone interbank money market. Hence before the outbreak of the global banking crisis the interbank money market constituted a channel through which excess liquid reserves were being smoothly recycled from banks in creditor countries to banks in debtor countries (Figure 3a). Thus liquid reserves held by commercial banks both in deficit countries and in creditor countries were small and stable despite the substantial trade imbalances within the Eurozone (see Figure 1, observations for July 2008).

⁷ The term 'interbank money market' is traditional but misleading as banks lend and borrow liquid reserves rather than actual money.

3. The emergence of TARGET2 imbalances

Due to the outbreak of the global banking crisis in the summer of 2007 Eurozone banks sustained substantial balance-sheet losses and ceased to trust one another. The interbank money market froze exactly at a time when capital flows from surplus to deficit countries dramatically fell.

Under the circumstances commercial banks' demand for liquid reserves in the Eurozone debtor countries spectacularly grew as their liquid reserves were no longer replenished by capital inflows from the creditor countries and they were unable to borrow on the interbank market. Thus, since 2007, the Spanish importer's bank (cf. the example above) had to borrow liquid reserves from the Bank of Spain. The NCBs in Spain and in other Eurozone debtor countries had to extend substantial liquidity loans to their domestic banks as otherwise short-term interest rates would have had to rise above the ECB's policy target. It is important to stress that this additional creation of liquid reserves was by no means a crisis prevention tool of any sort, but just a standard monetary policy operation aimed at controlling the level of a short-term interest rate.

The new situation was immediately reflected in NCBs' balance sheets both in debtor and in creditor countries. The assets held by debtor countries' NCBs grew owing to the loans extended to their commercial banks whereas the liabilities of the creditor countries' NCBs grew with the increasing volume of excess liquid reserves in their commercial banks as the latter could not relend them through the interbank market due to the sharp increase in the counterparty risk.

The counterbalancing accounting item for the Bank of Spain's increasing assets (representing its loans extended to the domestic commercial banks) was the increase in its liabilities against the ECB. The counterbalancing accounting item for the Bundesbank increasing liabilities (representing German commercial banks' growing liquid reserves) was the increase in its claims to the ECB (Figure 3b). These cumulative NCBs' claims and liabilities were called 'TARGET2 imbalances' (see Table 1 and Figure 2).

The magnitude of the TARGET2 imbalances grew sharply after the outbreak of the Eurozone sovereign debt crisis in 2010 which triggered capital flight from debtor countries (mainly from Italy, Spain and Portugal) to creditor countries (mainly to Germany, the Netherlands, and Luxemburg). The capital flight from the Eurozone debtor countries actually constituted a run on their banks as portfolio investors were unloading e.g. Spanish or Italian treasury bonds and instructed their banks to move the cash thus received to other countries (De Grauwe, Ji, & Acchiarelli, 2017). Consequently the banks' demand for liquid reserves in Eurozone debtor countries sharply surged since they needed such reserves to execute cash transfers to other countries. This development was immediately mirrored by a rapid increase in TARGET2 imbalances.

Table 1. TARGET2 balances by country

	December 2018			July 2008		
	EUR billion	% GDP	% banking sector assets	EUR billion	%GDP	% banking sector assets
Italy	-482.0	-27.3	-13.1	58.4	3.6	1.6
Spain	-401.9	-33.1	-15.2	-19.9	-1.8	-0.6
ECB	-253.2			34.1		
Portugal	-82.8	-41.1	-21.2	-13.4	-7.5	-2.9
Belgium	-52.9	-11.6	-5.3	-56.6	-16.0	-4.1
Austria	-45.6	-11.8	-5.4	-19.0	-6.5	-2.0
Greece	-28.6	-15.5	-9.8	-17.5	-7.2	-4.1
Latvia	-6.2	-21.3	-27.3			
Lithuania	-5.8	-12.9	-19.2			
France	-2.3	-0.1	0.0	-66.1	-3.3	-0.9
Estonia	0.8	3.0	2.9			
Slovenia	1.2	2.7	3.1	-3.6	-9.6	-7.6
Non-Euro area	4.2			0.2		
Malta	4.5	37.8	10.2	-1.0	-16.4	-2.4
Cyprus	7.8	37.7	11.2	-2.8	-14.7	-2.7
Slovakia	9.7	10.7	11.8			
Ireland	14.3	4.4	1.3	-13.5	-7.2	-0.8
Finland	39.8	17.1	6.3	-3.0	-1.5	-0.9
Netherlands	92.6	12.0	4.0	13.3	2.1	0.6
Luxembourg	213.0	366.3	19.8	16.2	42.4	1.3
Germany	966.2	28.5	12.4	94.2	3.7	1.2

Source: ECB Data Warehouse and Eurostat.

The Eurozone sovereign debt crisis was stopped once the ECB announced its Outright Monetary Transactions (OMT) programme. This move protected the Eurozone from a disastrous financial crisis which would have broken out had the Italian and Spanish governments lost access to the markets as was previously the case with Greece, Portugal and Ireland.

The mere announcement of the OMT programme achieved its intended purpose, because investors knew that Mario Draghi's words "whatever it takes" actually implied that there was no limit to the creation of liquid reserves by the central bank. Consequently any potential ECB's intervention on the treasury

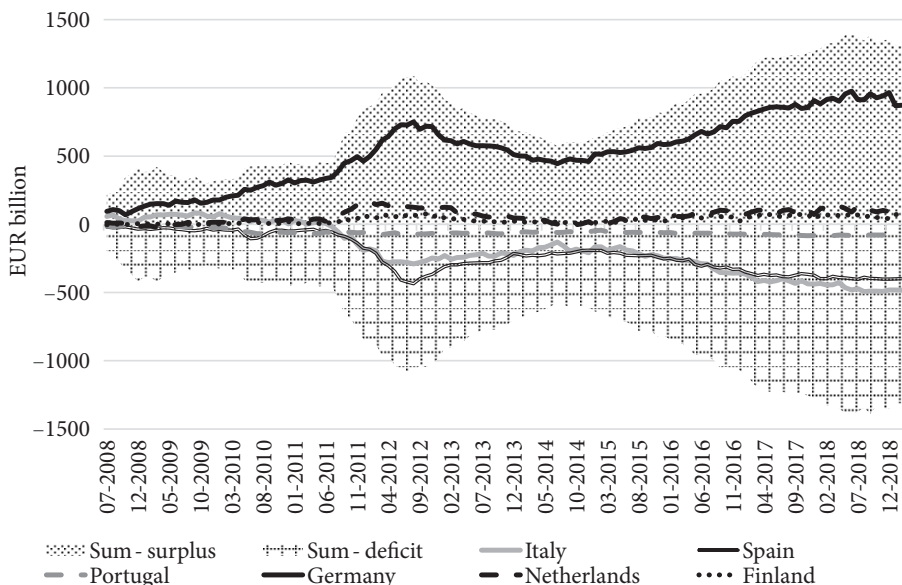


Figure 2. TARGET2 balances over time

Source: ECB Data Warehouse.

bond markets would be effective. That is why, once the OMT programme was announced, the risk premium on the Eurozone financial markets began to recede. Consequently the interbank money market gradually regained its natural role as a mechanism for recycling bank liquid reserves from creditor to debtor countries. Commercial banks' demand for NCBs' liquidity loans was steadily falling. As a result TARGET2 imbalances started to shrink (Hristov, Hülsewig, & Wollmershäuser, 2018).

They rebounded again in March 2015 after the launch of ECB's quantitative easing (QE). This time, however, TARGET2 imbalances did not result from a confidence crisis, instead, they were a purely mechanical outcome of the decentralised way of purchasing sovereign debt by the Eurosystem (Gros, 2017; Alves, Millaurelo, & del Rio, 2018). Eurozone's NCBs were obliged to purchase treasury paper issued by their own governments. Hence, if the Bank of Italy issued liquid reserves in order to buy Italian treasury bonds from a German insurance company the reserves went to the German bank's current accounts held with the Bundesbank. Thus TARGET2 imbalances started to grow again (Eisenschmidt, Kedan, Schmitz, Adalid, & Papsdorf, 2017).

As soon as the ECB's QE programme ends TARGET2 imbalances will start to recede again, but the process may progress slowly until the European Banking Union is completed. Without such a union Eurozone interbank money markets will continue to be 'fragmented,' i.e. the risk premiums are likely still to vary among member countries. If they are higher in debtor countries their commer-

cial banks may continue to borrow liquidity at a lower rate (than that offered by the market) from their NCBs instead on the interbank market, which may slow the reduction of TARGET2 imbalances (Cecchetti & Schoenholtz, 2018; De Grauwe et al., 2017; Whelan, 2017; Gros, 2017).

4. The TARGET2 imbalances as an accounting phenomenon

The emergence of TARGET2 imbalances reflected the fact that the ECB was doing its job of lender of last resort and thus saved the Eurozone from a much deeper crisis than that which actually occurred. If in 2007 the NCBs in Eurozone debtor countries had been unable to extend liquidity loans to commercial banks to finance imports they would have experienced a much more painful recession. If in 2010 the NCBs in debtor countries had been unable to extend liquidity loans to cover capital flight Europe would have experienced a much more severe banking crisis, which could even have ended in a breakup of the Eurozone.

When viewed from this perspective TARGET2 imbalances illustrate the advantages of having an international central bank. It is important to distinguish between the economic substance of the cooperation between NCBs and the formal legal framework. Although NCBs in the Eurosystem⁸ formally are still separate institutions, in economic terms (related to the conduct of monetary policy) they operate as regional ECB branches. So if liquid reserves are created in a transaction between a particular NCB and a commercial bank, those liquid reserves are not a liability of the NCB but actually of the whole Euro system.⁹ Therefore the Eurosystem's consolidated balance sheet reveals that TARGET2 imbalances in fact constitute an accounting phenomenon resulting from the operationally decentralised way of conducting the ECB's monetary policy (Figure 3c).

Admittedly the outbreak of the Eurozone sovereign banking crisis resulted from the ECB's delay in announcing the OMT programme, in contrast to the Federal Reserve and the Bank of England, which launched their QE programmes already in 2009 (Sławiński, 2016). Nonetheless the delay which resulted from incomplete political integration within the Eurozone may have been unavoidable. The ECB probably needed time to become not only the lender of last resort for banks but also an institution capable of effectively intervening on the sovereign debt markets.

⁸ The Eurosystem combines ECB and the NCB's of the Eurozone member countries. The ESCB covers also these EU NCBs which participate in TARGET2, like e.g. Sweden, Poland and Bulgaria.

⁹ So the liquid reserves created constitute in practice "joint and several" liability.

One of the symptoms of the deficient political integration within the Eurozone was the claim that TARGET2 imbalances represented a “stealth ECB’s bailout” (Sinn, 2011). Such a view results from the implicitly adopted assumption that the Eurozone is a fixed exchange rate system rather than a monetary union (Uxó, 2013). Such an interpretation is supported by the requirement that TARGET2 imbalances should be periodically settled (Sinn & Wollmershauser, 2012) which essentially casts doubt upon the irrevocability of the Eurozone. The argument that the ECB should periodically settle the TARGET2 imbalances, as is the case with the FRS district banks (Sinn & Wollmershauser, 2012),

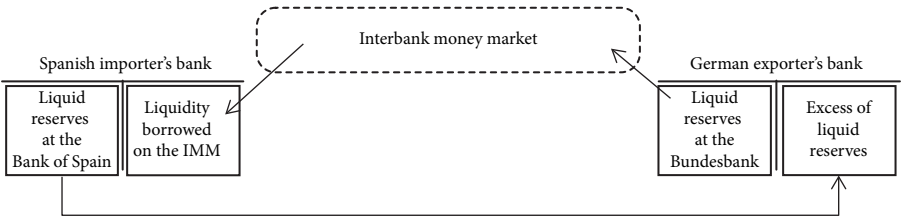


Figure 3a. The Eurozone interbank money market (IMM) as a recycler of liquid reserves (before the 2007 crisis)

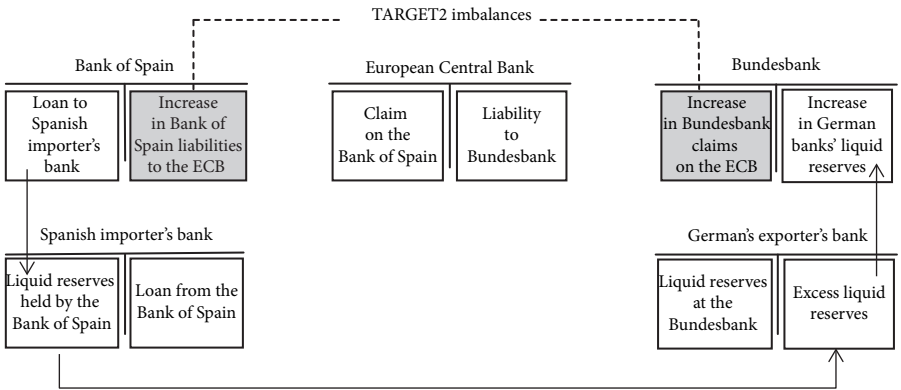


Figure 3b. Circulation of liquid reserves after the IMM freeze (after the 2007 crisis)

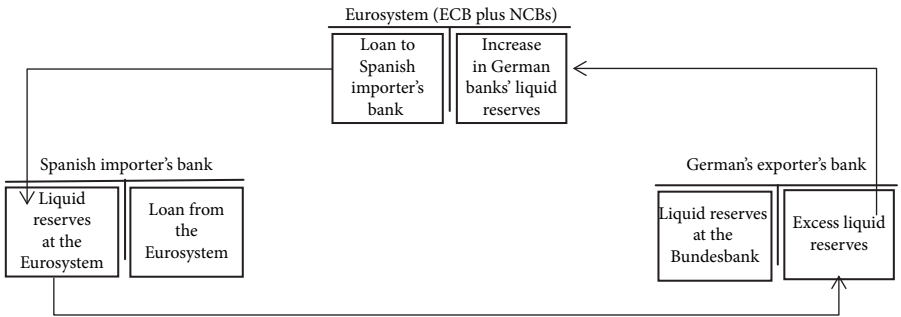


Figure 3c. Eurosystem's consolidated balance sheet: TARGET2 'imbalances' cancel out

Figure 3. TARGET2 imbalances

is not very convincing. There is no risk of a breakup of the U.S. monetary system. Hence such settlements mainly reflect the FRS' adherence to the accounting standards (Wolman, 2010). The fact that the Federal Reserve used gold certificates for these virtual settlements was only a tribute to the past, when such certificates had indeed played the role of liquid reserves held by banks (Eichengreen, Mehl, Chitu & Richardson, 2014).

The question is to what extent TARGET2 imbalances pose a risk to Eurozone's creditor countries. As is shown in Figure 3b NCBs' claims in creditor countries are not directed to debtor countries' NCBs but to the ECB. This significantly reduces the creditor countries NCBs' counterparty risk if a member state decides to leave the Eurozone. In such a situation the costs would be covered by all Eurozone countries in proportion to their share in the ECB's capital (Bank of Finland, 2018).

Moreover the fact that between 2007 and 2012 the ECB transformed itself into a genuine central bank capable of intervening in sovereign debt markets, greatly reduced the risk of Eurozone breakup. Nonetheless, even though such a risk may be very small, its mere existence legitimises Eurozone creditor countries' requirements to collateralise their TARGET2 net claims. Meeting these requirement might be possible if the securities purchased by the Eurosystem under the QE programme were used as collateral for such claims (Cecchetti & Schoenholtz, 2018).

5. The differences between the Eurosystem and the International Clearing Union

The liquidity loans extended by the Eurosystem to the Eurozone debtor countries' commercial banks gave their economies much-needed room to adjust during the balance of payments crisis. Giving the debtor countries time to adjust lies at the core of the John M. Keynes' proposal to create an International Clearing Union (IMF, 1969). The similarities between the Eurosystem and the ICU are discussed in several publications (e.g. Lavoie, 2015; Whyman, 2014). However there are some important differences which are worth highlighting.

Keynes recommended the establishment of a global central bank where national central banks would hold their foreign exchange reserves. The Eurosystem is different in this respect. Even though its operations are decentralised the ECB is not a central bank for central banks but a regular central bank, whereas NCBs are only its regional branches (Schollmeyer, 2019).

Keynes' idea was that the ICU would use excess foreign exchange reserves on the creditor countries' accounts to fund loans extended to debtor countries which as Keynes emphasised (IMF, 1969) was the standard practice in commercial banks. Can the ECB do the same using excess liquid reserves held by

commercial banks in surplus countries to fund loans extended to commercial banks in debtor countries?

The short answer is, no. If it had been possible there would have been no TARGET2 imbalances since the Eurosystem would have transferred excess liquid reserves from banks in creditor countries to banks in debtor countries.

As the textbook credit multiplier mechanism illustrates banks can relend only actually paid-in deposits. The ICU could use the paid-in deposits of creditor countries central banks to extend overdraft credit to central banks in debtor countries. Yet the balances on the commercial banks' current accounts held with the Eurosystem are not paid-in deposits but liquid reserves issued by the Eurosystem itself, even though their issuance process is decentralised. No bank, be it commercial or central, may relend the liabilities issued by itself.

It is important to take into consideration this seemingly purely technical issue because quite often it is assumed or implied that the existence of TARGET2 imbalances proves that the NCBs in Eurozone's creditor countries extended loans to NCBs in debtor countries (Fuest & Sinn, 2018; Whittaker, 2016). Intuitively such an interpretation is very tempting but in fact the claims held by NCBs in creditor countries and the liabilities of NCBs in debtor countries constitute a purely accounting phenomenon (Figure 3c).

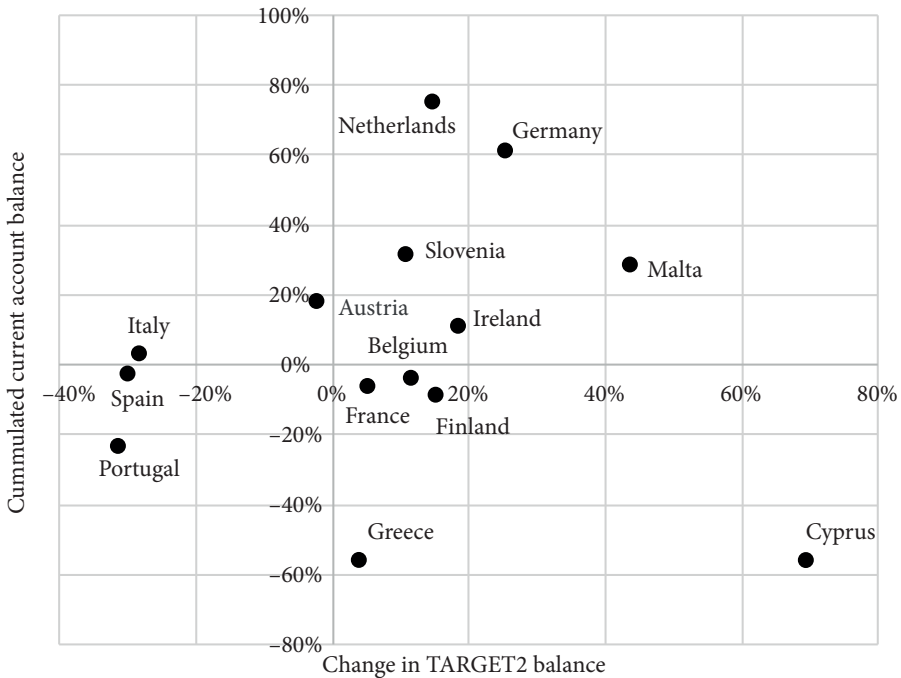


Figure 4. Change in TARGET2 balances vs cumulated current account balances over the period 2008-2018 (normalized by 2018 nominal GDP)
Source: ECB Data Warehouse and Eurostat.

Another important difference between Keynes' ICU model and the Eurosystem is that the aim of the former was to mitigate payment imbalances whereas the Eurosystem almost automatically restores the balance of payments whenever they occur (Figure 4).¹⁰ On the other hand TARGET2 results from successful ex-ante cooperation which (together with Mario Draghi's bold announcement of the OMT programme) did, in fact, shield the Eurozone from a disastrous tail event (Aizenman, 2015).

Conclusions

The phrase "ECB's stealth bailout", referring to the emergence of the TARGET2 imbalances (Sinn, 2011) implies that the ECB did something inappropriate, whereas actually it carried out normal central bank operations by providing liquidity to needy banks. In fact the ECB shielded the Eurozone from a much more destabilising financial crisis than that which actually occurred.

The point that is emphasised in this paper is that the experience with TARGET2 imbalances makes a case for central banks which are better equipped to ensure international financial stability than stabilisation funds. There are two reasons for this. First, central banks are authorised to issue liquid reserves without any limits. Second, a central bank would provide liquidity to banks in need without political strings attached, in contrast to the stabilisation funds as we know them, such as the IMF or the ESM.

The Eurozone sovereign debt crisis was brought to an end not by the announcement that the ESM had an increasing volume of funds at its disposal but by the declaration that the ECB may, if necessary, launch the OMT programme. Investors knew that a central bank, in contrast to a stabilisation fund, faces no limits as to the volume of its interventions. This made the ECB's declaration credible for markets.

The experiences with TARGET2 indirectly confirm the superiority of Keynes' plan, which involved the establishment of a global central bank, over the White Plan which proposed to set up a stabilisation fund. Had the IMF become a global central bank rather than a stabilisation fund the global shortage of reserve currency in the 1950s and 1960s would have been less pronounced, even though it was eventually alleviated by the outflow of the portfolio and direct investments from the United States and the development of the Eurodollar market (McCauley, McGuire, & Sushko, 2015).

Another advantage of having an international central bank was illustrated by the large-scale liquidity provision by the Federal Reserve to non-American commercial banks during the recent global banking crisis (Broz, 2015). Actually

¹⁰ The only barrier which restricted commercial banks' access to liquidity was the quality of collateral standards, however, in practice it was gradually relaxed.

the Federal Reserve had been playing the role of a global central bank even before the global banking crisis, having all the large global banks as its primary dealers (Shin, 2012). In other words if the Fed had decided not to assume the role of a global central bank the 2007-2009 banking crisis would have been much deeper, especially in Europe, where banks had large dollar exposures¹¹.

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¹¹ Before the outbreak of the 2007 crisis, European banks profited from intermediating between the US securitization funds and the US money market funds. When the crisis forced the US money market funds to withdraw their deposits from the European banks, they were left with extremely large uncovered US dollar liabilities.

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