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DETERMINANTS OF TARGET2 IMBALANCES

by Martina Cecioni* and Giuseppe Ferrero*

Abstract

The paper analyzes developments in TARGET2 imbalances within the euro area since 2007, from two perspectives: national central banks' balance sheets and countries' balance of payments (BoP). We examine the relationship between TARGET2 balances and the Eurosystem liquidity provision, analyzing how the circulation of the latter has changed during the crisis. We then study BoP developments in Greece, Portugal, Italy and Spain, investigating which of the following explanations accounts for the growing TARGET2 imbalances: *(i)* current account deficit, *(ii)* decrease of net inflows of private capital from securities and interbank markets and *(iii)* run on deposits. The results of our analysis suggest that while the increase in TARGET2 liabilities is related to the current account deficit in Greece, there is no evidence of this in Italy, Spain and Portugal. In all countries the increase is mostly driven by private capital outflows in securities and interbank markets; deposit runs are apparent only in Greece. In Italy, the reduction of capital inflows consisted entirely in a decrease in the interbank market cross-border activity and in portfolio investments by non-residents.

JEL Classification: E42, E52.
Keywords: payment system, financial crisis, monetary policy.

Contents

* Bank of Italy, Economic Outlook and Monetary Policy Department.

1. Introduction

TARGET2 is a real-time gross settlement system owned and operated by the Eurosystem. Payment transactions, settled in central bank money, take place between euro-area banks, between banks and ancillary systems and between banks and the Eurosystem's national central banks (NCBs) for the settlement of open market operations.[1] Operations occur both between domestic banks and between banks operating in different countries of the area. Cross-border transactions involve the European Central Bank (ECB) as the central counterpart of the system.

A bank that transfers funds to a counterparty located in another country of the area records a reduction in its deposits with its country's NCB, the accounts of which in turn record a TARGET2 liability towards the ECB. Conversely, a bank that receives funds records an increase in its deposits with its country's NCB, the accounts of which record a TARGET2 claim toward the ECB.[2] At close of business, each day, the credit or debit positions resulting from all the transactions are netted out and the NCBs record, on the asset or liability side of their balance sheets, the TARGET2 balance, which shows a credit or a debit vis-à-vis the ECB (Figure 1). These balances reflect the decentralized nature of the Eurosystem's operational framework; for the Eurosystem as a whole they always sum up to zero.

Since the beginning of the financial crisis in August 2007, the absolute size of TARGET2 balances of the Eurosystem's NCBs has been increasing; they accelerated with the intensification of the sovereign debt crisis in the euro area. In particular, in Germany and the Netherlands net claims in TARGET2 increased from close to zero in the first half of 2007 to about €700 and €140 bn respectively, at the end of May 2012; conversely, in Greece, Ireland and Portugal, net liabilities in TARGET2 increased from close to zero to €102, €97 and €63 bn, respectively; the NCBs of Italy and Spain, which had slightly positive TARGET2 net claims before the start of the crisis, registered net liabilities for €275 and €345 bn at the end of May 2012 (Figure 2).

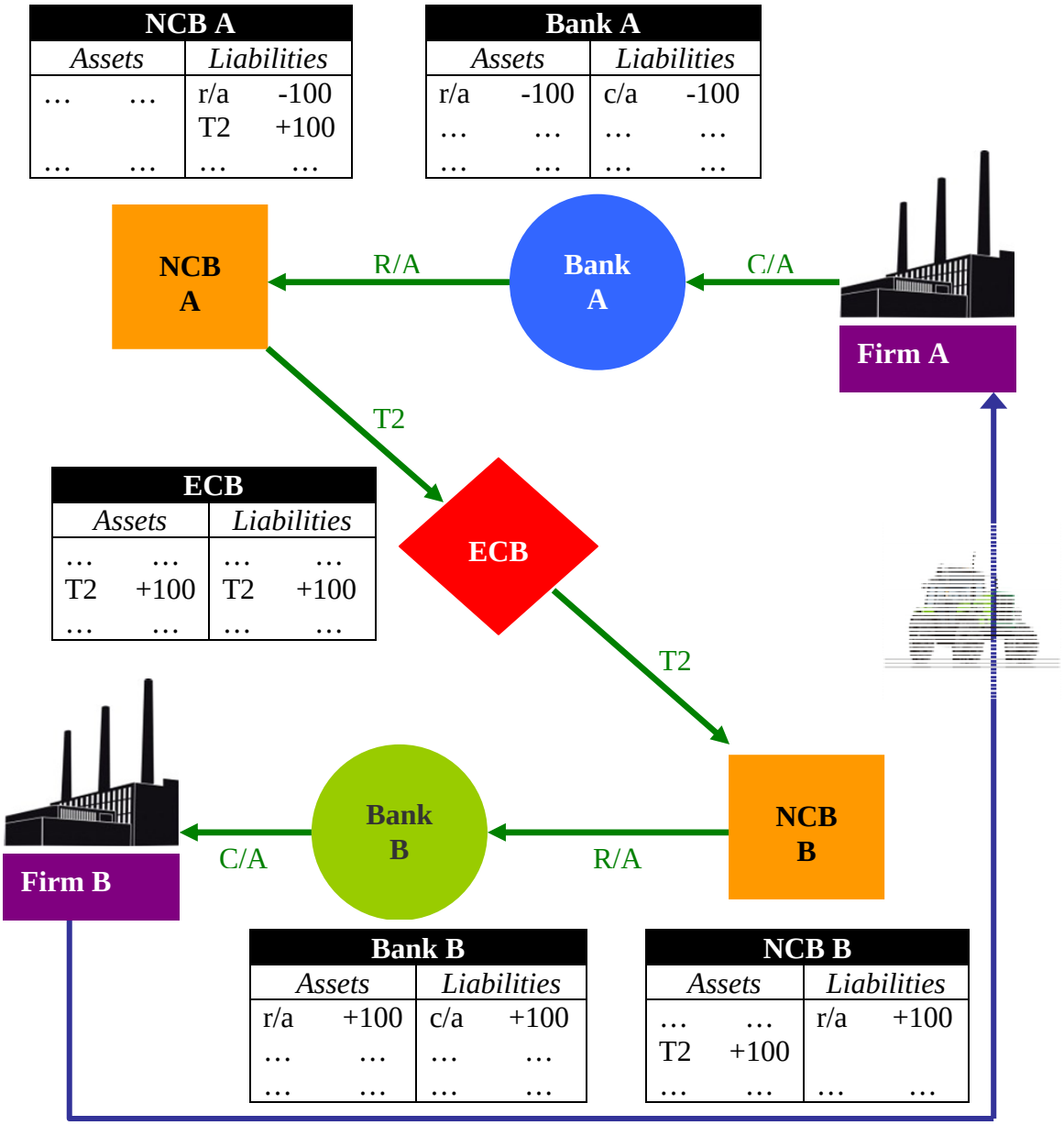
More precisely, until July 2007, TARGET2 positions were balanced overall: cross-border payments were flowing in both directions and were netted out to zero at close of business each day. The beginning of the financial crisis in August 2007 led to one-direction flows from "peripheral" countries (Greece, Ireland and Portugal) to "core" countries (Germany and the Netherlands). The divergences widened with the outbreak of the sovereign debt crisis in May 2010. Since the summer of 2011, as the crisis has intensified and also affected Italy and Spain, divergences of TARGET2 positions have become even wider. In the rest of the paper we refer to the three phases of the crisis as the "global financial crisis" (August 2007 - April 2010), the first phase of the "sovereign debt crisis" (May 2010 - June 2011) and the second phase of the "sovereign debt crisis" (July 2011 - May 2012).

The accumulation of TARGET2 imbalances has drawn the attention of many commentators and raised a discussion on the mechanics of the transactions, the economic factors behind these imbalances and, most importantly, their implications for the ECB's monetary policy.

[1] TARGET2 is the second generation of TARGET; it was launched in November 2007. By May 2008 all euro area member countries migrated to the new platform. In 2011 TARGET2 settled a daily average of 348,505 transactions with an average daily value of €2,385 billion.

[2] For operations that involve residents of the same country, TARGET2 balances towards the ECB remain unchanged.

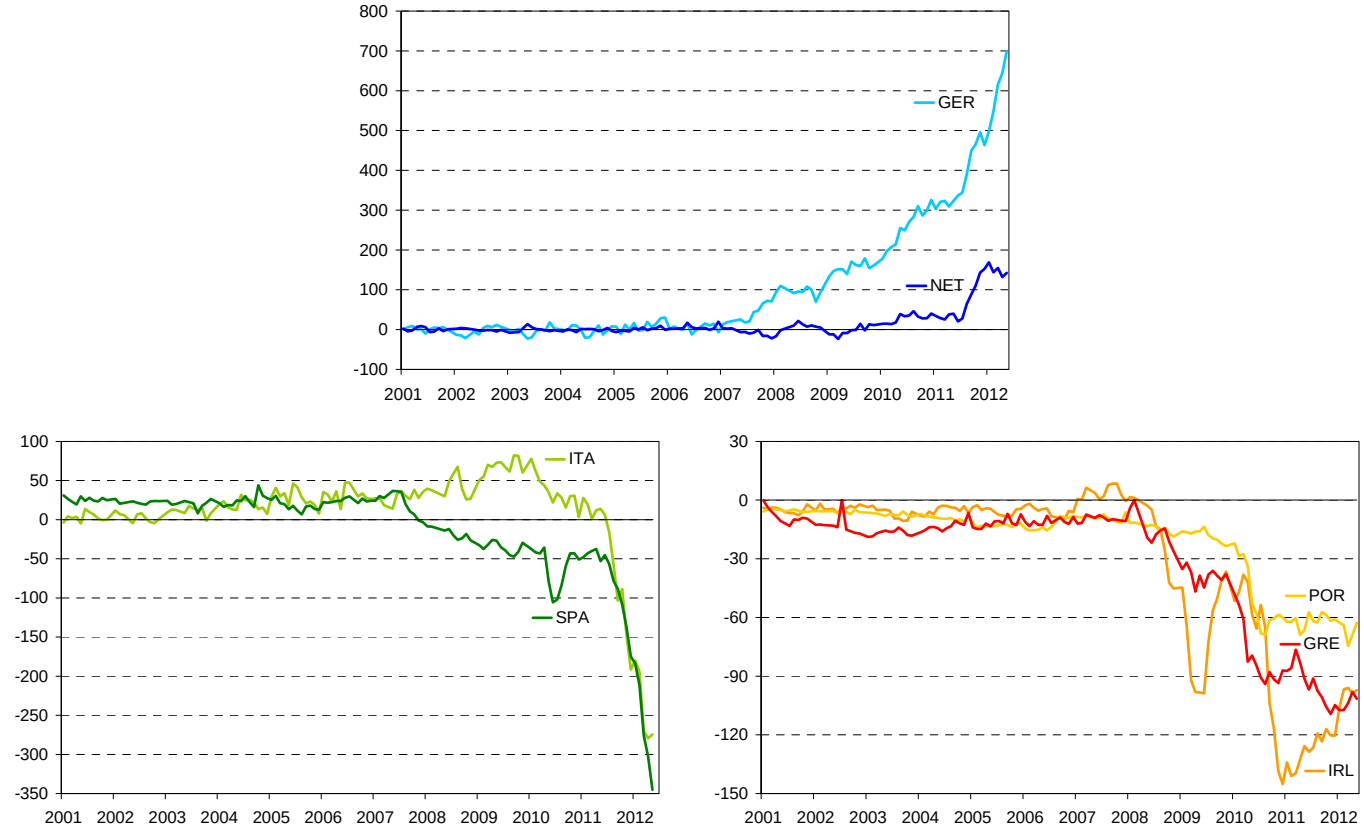
Figure 1 - Purchases of goods by a firm located in one country from a firm in a different country, both within the euro area



Note: In order to purchase a machinery from Firm B located in Country B, Firm A in country A asks Bank A to make a transfer from its current account (c/a) to the current account of firm B in Bank B; Bank A reduces the c/a of Firm A by €100; at the same time the reserve account (r/a) of Bank A at the national central bank (NCB) of Country A is reduced by €100; TARGET2 (T2) liabilities of NCB A increases by €100 and the ECB's T2 claims increase by the same amount; conversely Bank B, which receives the €100, records an increase in its r/a at its own NCB, whose accounts record an increase of €100 of T2 claims on the ECB (which records an increase of €100 of T2 liabilities); finally Bank B increases the c/a of Firm B by €100.

Figure 2 - TARGET2 cumulated net balances

(monthly data; € billions)



Source: NCBs balance sheets.

On the latter, the debate has been triggered by Sinn (2011) and Sinn and Wollmershäuser (2011). Their rather extreme view is that: *(i)* the large inflows of reserves to the Bundesbank crowded out German banks from the Eurosystem refinancing operations and may induce a reduction in their lending activity; *(ii)* the continuous flows of reserves from the Bundesbank to the "peripheral" NCBs is *de facto* a fiscal policy transfer (a "stealth bailout") which allows the respective countries to finance their, otherwise unsustainable, current account deficits; *(iii)* the large quantity of central bank money held by German banks would eventually prompt a rise in inflation in Germany; *(iv)* the TARGET2 creditor countries are more exposed to the risk of a default in one of the member countries; *(v)* the policy implication is that the accumulation of credit and debit positions in TARGET2 needs to be limited.

Several convincing rebuttals of these arguments were provided by Whelan (2011), Buiter et al. (2011), Reichlin (2011), Bindseil and Konig (2011), Deutsche Bundesbank (2011) and ECB (2011). The issues were also addressed in Banca d'Italia (2012). These papers showed that:

- The fact that for some banking systems, such as Germany's, the refinancing obtained from the Eurosystem, net of the funds placed with the reserve account and the deposit facility, is negative in no way limits the ability of the Eurosystem to control the monetary base. What is important for the transmission of monetary policy is the net liquidity provided to euro-area banks, not how it is distributed.

- More generally, the increase of TARGET2 imbalances does not interfere with the conduct of monetary policy or the objective of price stability within the area; in particular, the existence of a large positive TARGET2 balance in some euro-area countries does not entail a risk of inflation; the Eurosystem maintains its ability to mop up all the excess liquidity with appropriate instruments whenever changes in economic and financial conditions make this necessary.

- Moreover, in the Eurosystem the increase of TARGET2 imbalances does not create any specific risk not already contained in monetary policy refinancing operations, which in any case for the NCBs is *(i)* managed and mitigated by the threshold for the quality of collateral accepted in refinancing operations and the system of haircuts and *(ii)* shared across the Eurosystem according to the ECB's capital key and thus independent of the credit or debit TARGET2 position of each single NCB.

In this paper, we address the mechanics of the transactions and the economic factors behind these imbalances looking at balance of payments (BoP) identities. We first look at NCB balance sheets to analyze reserves' flows across countries before and during the crisis and how TARGET2 imbalances emerged (Section 2); then we analyse the balance of payments (BoP) for selected countries (Greece, Italy, Portugal and Spain) to identify the main determinants of the observed imbalances (Section 3); finally, we sum-up the implications for the conduct of monetary policy and its transmission to the economy (Section 4).

We reach the following conclusions:

- TARGET2 imbalances are correlated to the recourse to monetary policy refinancing operations, via NCBs' balance sheets, but they are not caused by them. Adopting the fixed-rate full allotment (FRFA) procedure in the refinancing operations and expanding the list of eligible collateral countered the pressures on banks' liquidity and on financial markets, which originated from the massive disruption of interbank and capital markets at the peak of the crisis and to the drying up of cross-country flows. These measures played a key role in preserving the functioning of the payment system and the financial stability of the euro area. The resulting increase in central bank's reserves was accompanied by the widening of the TARGET2 balances.

- The increase in the TARGET2 balances has been closely linked to BoP imbalances. During the crisis trade balance deficits were neither necessary nor sufficient conditions for the increase in TARGET2 imbalances; BoP financial account imbalances were a necessary condition.
  - Before the crisis, both the BoP current account and the trade balance of the countries currently under stress were in deficit, with the exception of Italy where they were approximately balanced; these deficits were funded mostly by foreign investments in domestic securities and in the interbank market. The capital flowing in and out of the countries were almost completely netted out, leaving small average net balances in the individual items of the BoP financial account.
  - During the crisis, the absolute size of individual items in the BoP increased and its composition changed significantly. The main changes were in the financial account. The reversal of foreign investments in domestic securities and of liabilities issued by domestic MFIs was not matched by a similar increase in disinvestments of domestic capital previously invested abroad. Net outflows in the financial accounts of the BoP were compensated by a considerable increase in the respective NCB's TARGET2 liabilities with the ECB.
  - The timing of these changes was uneven across countries. During the "global financial crisis" and in the first phase of the "sovereign debt crisis", Italy's and Spain's financial accounts remained almost unchanged while those of Greece and Portugal showed the largest adjustments. In the latter countries foreigners disinvested from the interbank and the securities markets and some signs of deposit flight from domestic banks by residents appeared. In the second phase of the "sovereign debt crisis", access to international financial markets by the Italian and Spanish governments and MFIs was also impaired: between July 2011 and May 2012 Italy and Spain recorded net outflows from the MFIs respectively for €118 and €182 bn and net outflows of portfolio investments for about €90 bn; in Italy, in

particular, net outflows of portfolio investments largely corresponded to a failure by non-residents to roll over maturing sovereign debt securities and, to a lesser extent, to sales by non-residents of sovereign debt securities on the secondary market. In the same period TARGET2 liabilities increased respectively by about €280 and €300 bn.

As to the implications for the monetary policy transmission and the risks for the balance sheet of the Eurosystem, the main conclusions are that:

- The ECB unconventional monetary policies are contrasting the risks of segmentation in the money markets along national lines with the aim of preserving the transmission of the unique monetary policy. Any institutional change that would limit the flow of payments through TARGET2,[3] would have a procyclical effect, by tightening further liquidity conditions in troubled countries, and it would increase asymmetries within the euro area, undermining the existence of the unique monetary policy.
- Moreover, when evaluating the cross-country risks, it should be taken into account that member states' net external positions have not changed because of the widening of TARGET2 balances; rather, private credit (debit) positions have been substituted by NCBs' credit (debit) TARGET2 positions vis-à-vis the ECB; the risks that were previously entirely borne on the private sector of creditor countries are now shared across Eurosystem's NCBs.
- Nevertheless, the banking system cannot be permanently reliant on central bank funds for its main source of funding; in the medium term "peripheral" countries cannot continue to substitute inflows of foreign private sector liquidity with TARGET2 liabilities. Countries under stress need to return to private markets and attract funds from the rest of the area; this requires that confidence be restored both in the banking sector and in the sustainability of public finance.

2. TARGET2 and central bank liquidity

TARGET2 imbalances are closely correlated to countries' recourse to Eurosystem refinancing operations, through the NCB balance sheets; however, they are not caused by these operations. In order to discuss the relationship between TARGET2 and the Eurosystem liquidity provision we start by considering a simplified version of the Eurosystem balance sheet (Table 1).

The conventional monetary policy instruments, through which the Eurosystem provides central bank money, are the main refinancing operations (MROs), the longer-term refinancing operations (LTROs) and the marginal lending facility (ML). During the crisis, a regime of fixed-rate and full allotment (FRFA) has been adopted for all refinancing operations, eligibility criteria for collateral have been widened and the maximum maturity of the LTROs has been progressively increased. Moreover, unconventional tools - the Covered Bonds Purchase Programmes (CBPP, CBPP2) and the Securities Market Programme (SMP) - were introduced to counter market impairments and to preserve the functioning of the monetary policy transmission mechanism. These exceptional measures determined a strong expansion of the Eurosystem's balance sheet.[4]

[3] Sinn (2011) proposed limiting the build-up of TARGET2 liabilities by settling liabilities annually by transferring gold or other marketable assets from the debtor to the creditor NCB. Currently the only limit to the build-up of TARGET2 imbalances is set by the availability in debtor countries of collateral accepted by the Eurosystem in refinancing operations and by the willingness of the ECB to accommodate the banks' demand for funds.

[4] The liquidity provided through the SMP is absorbed by weekly collections of fixed-term deposits. Central bank liquidity can also be injected through Emergency Liquidity Assistance (ELA), for which NCBs are responsible. ELA operations are recorded in the NCBs balance sheets under the domestic assets item.

Table 1 - Simplified Eurosystem balance sheet[5]

Assets	**Liabilities**
Autonomous factors	Autonomous factors
- Gold	*- Banknotes in circulation*
- Net foreign assets	*- Government deposits*
- Domestic assets	*- Other (net) autonomous factors*
Monetary policy instruments	Monetary policy instruments
- Main Refinancing Operations	*- Reserve account*
- Longer Term Refinancing Operations	*- Deposit facility*
- Marginal Lending	*- Fixed-term deposits*
- Covered Bonds Purchase Programmes	
- Securities Market Programme	Foreign-currency liquidity absorbing operations
Foreign-currency liquidity providing operations	Capital and reserves

The liquidity injected into the banking sector must necessarily be used by banks to satisfy the reserve requirement (RR), to accommodate the net autonomous factors (AF) or can be held as excess reserves (ER) on the deposit facility at their respective NCBs. At the Eurosystem level, the following identity holds:

$$\sum_{i=1}^{17} \Delta\left(OMO_i + ML_i\right) = \sum_{i=1}^{17} \Delta RR_i + \sum_{i=1}^{17} \Delta ER_i + \sum_{i=1}^{17} \Delta AF_i$$

where *i* denotes a country of the euro area and OMO includes the liquidity provided through MROs, the LTROs, SMP and CBPPs, net of the liquidity absorbed through fixed term deposits.

In the NCBs' balance sheets (Table 2), there are two additional items, that do not appear in the Eurosystem consolidated balance sheet because they sum up to zero: *(i)* liabilities or claims on TARGET2 and *(ii)* other liabilities towards or claims on the Eurosystem (in large part related to the banknotes that an NCB puts into circulation above, or below, the amount allocated according to the capital key).

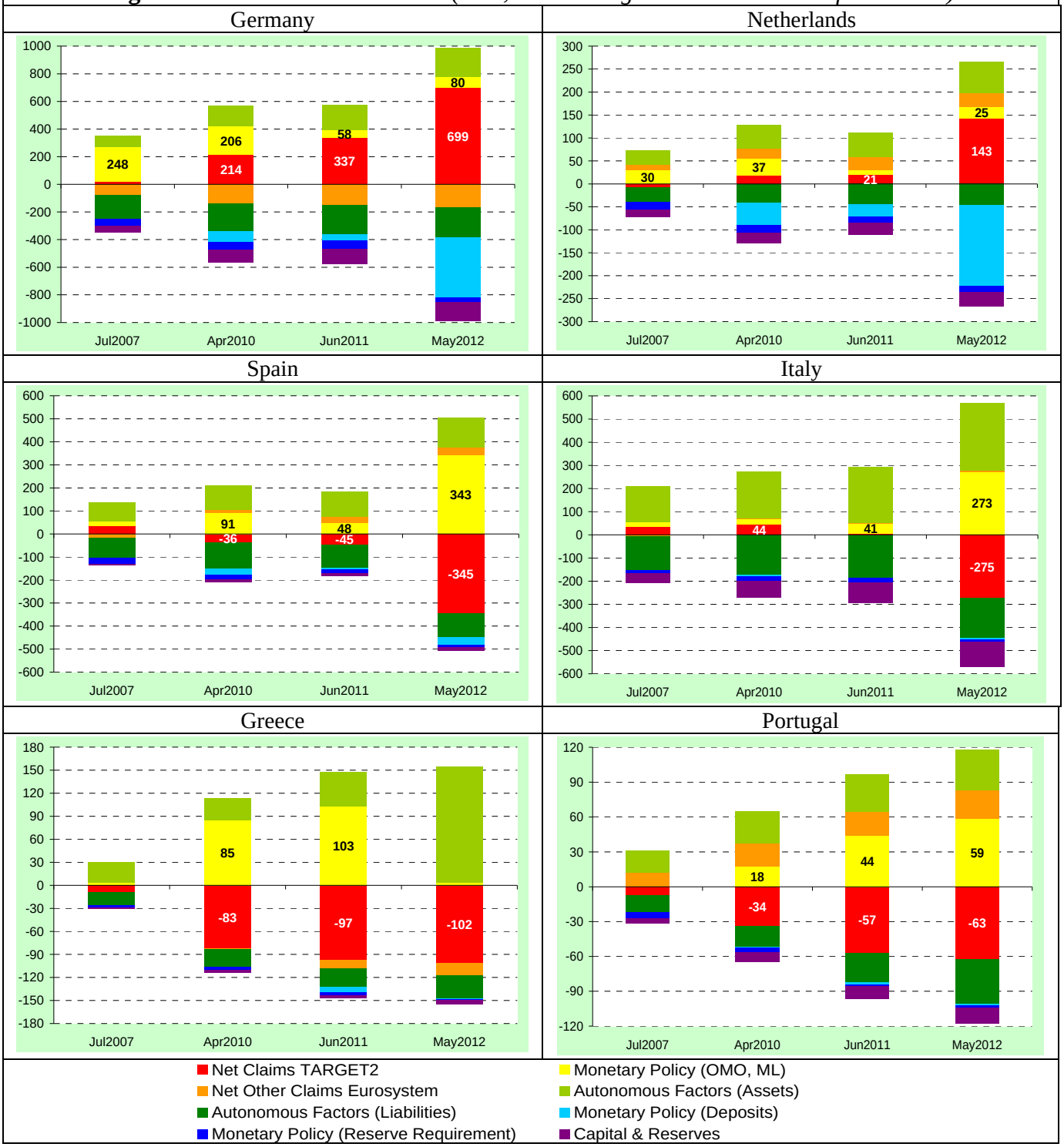
Table 2 - Simplified NCB balance sheet

Assets	**Liabilities**
Autonomous factors	Autonomous factors
- Gold	*- Banknotes in circulation*
- Net foreign assets	*- Government Deposits*
- Domestic assets	*- Other (net) autonomous factors*
- Other claims with the Eurosystem **Claims on TARGET2**	***- Other liabilities with the Eurosystem*** **Liabilities on TARGET2**
Monetary policy instruments	Monetary policy instruments
- Main Refinancing Operations	*- Reserve account*
- Longer Term Refinancing Operations	*- Deposit facility*
- Marginal Lending	*- Fixed-term deposits*
- Covered Bonds Purchase Program (CBPP)	
- Securities Market Program (SMP)	Foreign-currency liquidity absorbing operations
Foreign-currency liquidity providing operations	Capital and reserves

[5] In this paper we refer to the NCBs' item "current account (covering the minimum reserve system)" as the "reserve account" in order to distinguish it from the item "current account" in the BoP.

Since the beginning of the global financial crisis the size and composition of the NCBs' balance sheets changed significantly (Figure 3). The size of the NCBs' balance sheets (as measured by total assets) at the end of March 2012 was about three times as large as at the end of July 2007 in Germany, Netherlands, Italy, Spain and Portugal and about five times in Greece. Most of the increase in Greece and Portugal occurred between mid-2010 and mid-2011, during the first phase of the "sovereign debt crisis", while in Spain and Italy it took place during the second phase of the "sovereign debt crisis"; in Germany and the Netherlands the size of NCBs' balance sheets increased gradually during the three phases of the crisis.

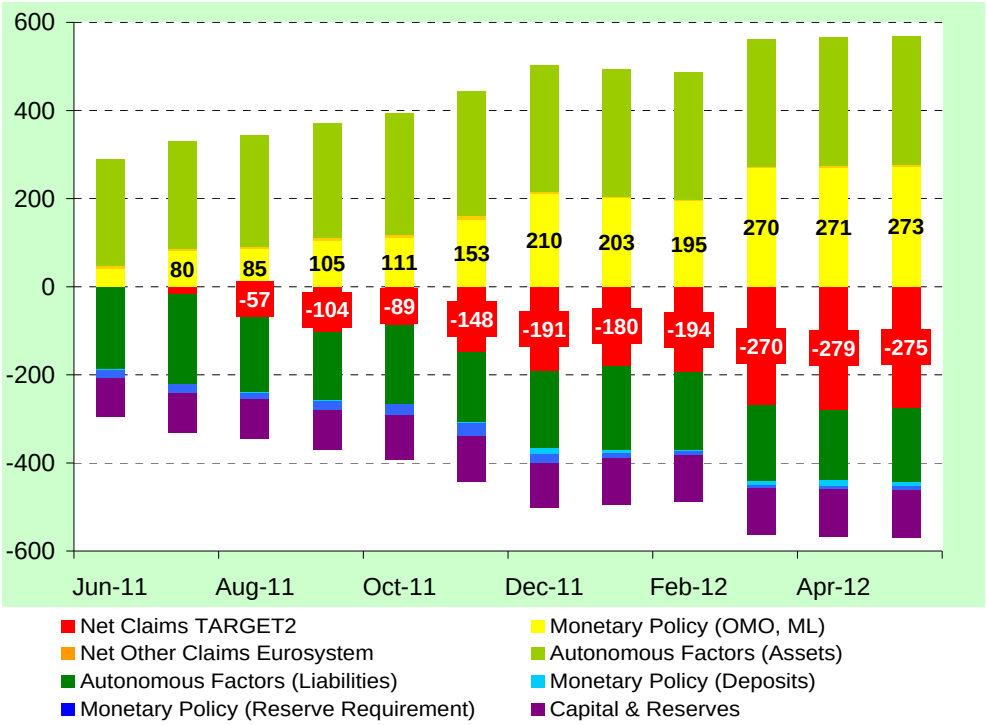
Figure 3 – NCBs' balance sheets *(€ bn; outstanding amount at the end of the month)*



Concerning the changes in the composition of the balance sheet, we can distinguish two groups of countries: those whose banks recorded large increases in their recourse to OMOs and in TARGET2 liabilities (Greece, Portugal, Italy and Spain) and those that recorded a reduction in their recourse to OMOs and an increase in TARGET2 claims, in the deposit facility and term deposits (Germany and the Netherlands). In Italy, in particular, at the end of June 2011, the TARGET2 position with the ECB was balanced and the recourse to OMOs was relatively low (about €40 bn; Figure 4); at the end of the year the recourse of the Italian banking system to OMOs increased to about €210 bn, especially after the first 3-year LTRO; at the same time, Banca d'Italia recorded TARGET2 liabilities of €191 bn. In March 2012, after the second 3-year LTRO was settled, both recourse to OMOs and the TARGET2 liabilities increased further, to €270 bn, and remained on this level in the two subsequent months.

Figure 4 – Banca d'Italia balance sheet during the second phase of the "sovereign debt crisis"

(monthly data; outstanding amount at the end of the month; € bn)



Source: Banca d'Italia

Figure 5 shows how the circulation of central bank liquidity between countries belonging to these two groups occurred before and during the crisis. Without loss of generality, we consider only two countries (Germany and Greece), we assume that the net autonomous factors are zero in both of them, that the two banking sectors have the same size and that during the crisis the German banks' recourse to OMOs is zero.

Before the crisis (panel A), both banking sectors obtain €1 from their respective NCB in OMOs (blue arrow), deposit it in their reserve account, use their respective NCBs to settle payments through TARGET2 with the banking sector of the other country (red and green arrows 1, 2, 3 and 4) and use the reserves obtained through TARGET2 to satisfy the reserve requirement (red and green arrows 5). In particular, the reserves used by the German banking sector to settle payments to Greece through TARGET2 (€1) gives rise to the following flows between the banks of the two countries, the respective NCBs and the ECB: *(i)* the German banks reduce by €1 their reserve account with the Bundesbank (red arrow 1), which, in turn, records a TARGET2 liability towards

the ECB of the same amount (red arrow 2); *(ii)* conversely, the Bank of Greece records a €1 TARGET2 claim (red arrow 3) and transfers the same amount to the Greek banks reserve account (red arrow 4); *(iii)* the Greek banks use the €1 to satisfy their reserve requirement (red arrow 5); at the same time, the Greek banks use the reserve obtained in the OMO to settle transactions with their German counterparts, again involving the respective NCBs and the ECB as central counterpart (green arrows 1, 2, 3 and 4); the German banks use the reserves obtained through TARGET2 to satisfy their reserve requirement (green arrow 5). At the end of the day, the flows on TARGET2 are balanced and no excess reserves are held either by Greek or German banks.[6]

With the outbreak of the crisis (panel B), the German banks scale back their transactions with their Greek counterparts. Reduction in the velocity of circulation needs to be compensated with an increase in quantities of money; this is what the ECB has been doing with the changes in the Eurosystem OMOs procedure (introduction of FRFA and enlargement of the eligible collateral). It allowed the Greek banks to increase their demand for funds in OMOs to €3 (blue arrow) and to use this liquidity to satisfy their reserve requirements (€1; orange arrow) and for payments to the German banking sector through TARGET2 (€2; green arrows 1, 2, 3 and 4). The German banks satisfy their reserve requirements (€1) with the funds received through TARGET2 (€2; green arrow 5) and keep the additional liquidity (€1) as excess reserves in the deposit facility or in term deposits (violet arrow). The Bank of Greece and the Bundesbank display, respectively, a debit and a credit position on TARGET2 towards the ECB (€2).

Three aspects need to be stressed regarding NCB balance sheets and the circulation of central bank reserves before and during the crisis.[7]

First, the changes in the circulation of central bank reserves observed during the crisis between banks of different nationality (figure 5) would have been observed also outside a monetary union, in an economy populated by "good" banks, with liquidity constraints not binding, and "bad" banks, with no access to wholesale markets. Also in this case the recourse of "bad" banks to refinancing operations would have increased and unidirectional flows of reserves from the "bad" to the "good" banks would have occurred. In the Euro area this phenomenon is involving the banking sectors of specific countries as tensions originated in the sovereign debt market are transmitted rapidly to the banking sector (BIS, 2011).

Second, the decision to adopt the FRFA procedure in refinancing operations and to enlarge the eligibility criteria for the collateral compensated for the reduction in velocity of circulation of central bank money; the rise of liquidity and the widening of the TARGET2 balances are a reflection of the financial market tensions. These unconventional measures have been necessary in order to counter the pressures on banks' liquidity and on financial markets caused by the massive disruption of interbank and capital markets at the peak of the crisis, which was undermining the functioning of the payment system and the uniform and smooth transmission of monetary policy.

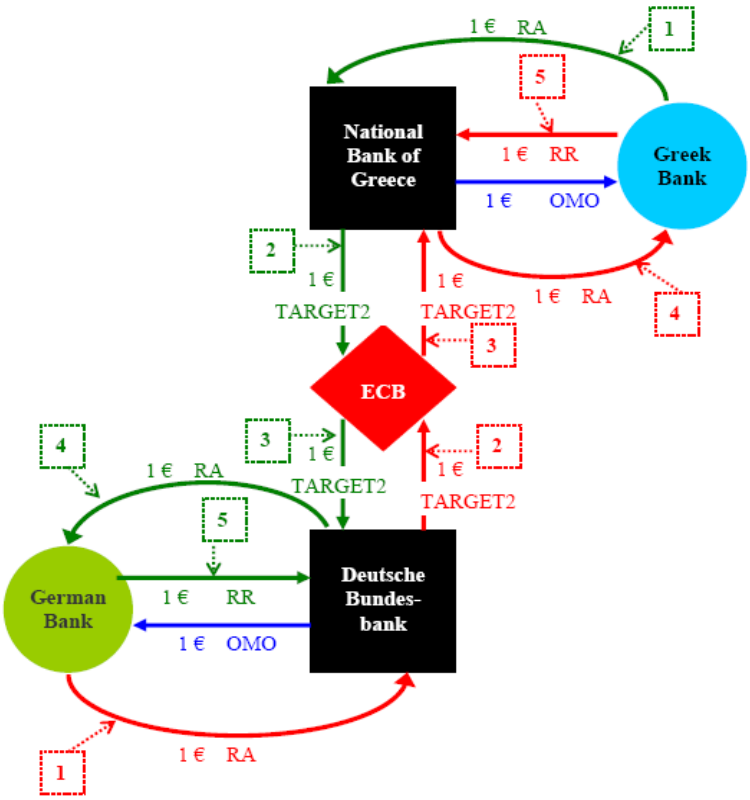
Third, in countries not exposed to financial market tensions the reduced recourse to Eurosystem's refinancing operations reflected a smaller need for liquidity, as a consequence of the larger net inflows of central bank money from the peripheral countries. The fact that in some countries banks have substituted reserves obtained directly in OMOs with those obtained through TARGET2 has no consequences on their ability to finance the economy.

[6] In reality, since the German banking sector is much larger than the Greek one, the demand for reserves on the part of German banks in OMOs and their reserve requirement are larger than those of the Greek banks; in our example, the German banks would use part of the reserves obtained in the OMOs to satisfy the reserve requirement directly and would still inject €1 through the TARGET2 system. Again, the flows on TARGET2 would be balanced and there would be no excess reserves in the system.

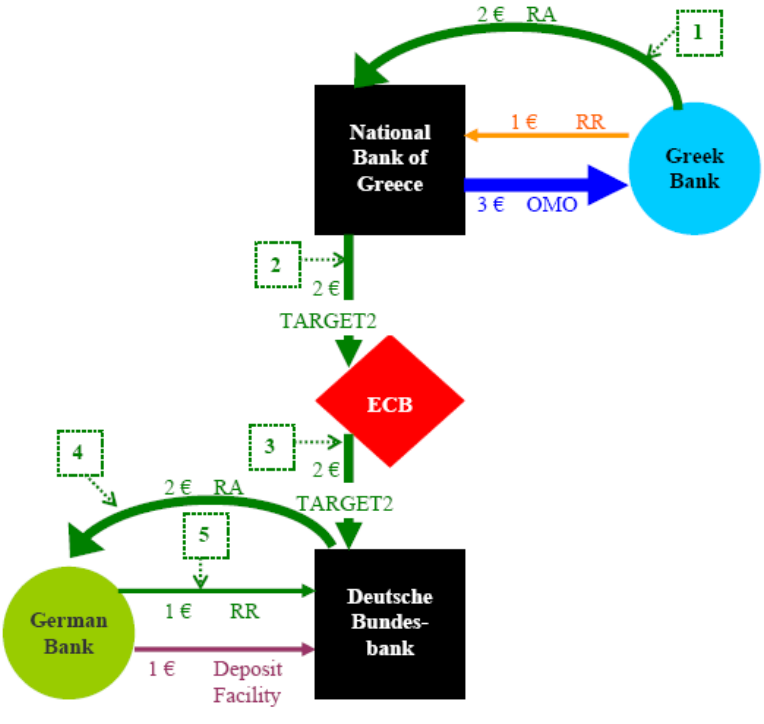
[7] See also Banca d'Italia (2012), ECB (2011), Deutsche Bundesbank (2011), Bindseil et al. (2012).

Figure 5 – The circulation of central bank money

A) Before the crisis



B) During the crisis



3. The determinants of TARGET2 imbalances

So far we have described how central bank liquidity flows from one country to another. However, to understand the fundamental determinants of TARGET2 balances one should rather look at BoP developments. In this section we use data on the BoP of Greece, Portugal, Spain and Italy to examine BoP developments during the three phases of the crisis and compare them with the pre-crisis period (Section 3.1)[8]; we also illustrate the results of correlation analysis aimed at identifying the main determinants of TARGET2 imbalances during the crisis (Section 3.2).

3.1 National balance of payment developments

The BoP keeps track of all transactions between a country and the rest of the world, while TARGET2 is a payment system in central bank money only for banks operating in the euro area.[9] Nonetheless we use BoP data because a geographical breakdown of the counterparts is not available and also because the observed TARGET2 net balances might come from the settlements of transactions in foreign currency.[10]

The BoP accounting identity implies that the current account must be financed by either the capital account or the financial account, except for possible errors and omissions:

$$\textit{Current account} + \textit{Financial account} + \textit{Capital account} + \textit{Errors \& omissions} = 0$$

TARGET2 balances crucially enter the BoP identity. In order to discuss this relationship we analyse only the items of the simplified BoP reported in Table 3.

Concerning the BoP current account we focus on the *"Trade balance"* (distinguishing between intra-area and rest of the world balances), which includes all transactions that pertain to goods and services. In the financial account we consider: *"Direct investment"*, which includes the purchase or acquisition of a controlling interest in a foreign business (by other means than the outright purchase of shares); *"Portfolio investment"*, which includes transactions involving equities and debt securities; *"Other investment"*, which includes trade credits, loans, deposits and other accounts receivable and payable. This last item has in turn a breakdown by (resident) sectors: *"Monetary authority"*, which includes all transactions of the central bank with foreign counterparts and which, in the euro area, are in large part related to NCBs TARGET2 position with the ECB; *"General government"*, which records cross-border financial transactions that have the general government as a counterpart and during the crisis were largely influenced by financial support from international and European institutions to the domestic government; *"MFIs"*, which are in large part related to loans from foreign MFIs and deposits of foreign non-MFIs in the domestic MFIs (liabilities) and loans of domestic MFIs to foreign MFIs and non-MFIs (assets); *"Other sectors"*, which also includes deposits of domestic non-financial firms or households in foreign MFIs (assets).

[8] We do not consider Ireland in our analysis since data on its BoP are available only quarterly and with a less detailed breakdown.
[9] See Appendix A1 for a short description of BoP items and Appendix A2 for the relationship between BoP items and TARGET2.
[10] The euro leg of a foreign currency transaction is settled in TARGET2. Trade balance is the only item for which we have the euro area as a counterpart.

Table 3 - Simplified balance of payment

	Inflows	**Outflows**
Current account	(- sign)	(+ sign)
- Trade balance - Income and transfers	• Import of goods and services • Income and transfers paid	• Export of good and services • Income and transfers received
Financial account	(+ sign)	(- sign)
- Direct investment - Portfolio investment - Other investment • Monetary authority (**includes TARGET2 balances**) • General government • MFIs • Other sectors - Other (financial derivatives and reserve assets)	• (*liabilities*) increase of foreign capital invested in the country • (*assets*) repatriation of domestic capital, previously invested abroad	• (*liabilities*) repatriation of foreign capital, previously invested in the country • (*assets*) increase of domestic capital invested abroad
Capital account and errors		

Note: In the financial account a positive (negative) sign indicates an inflow (outflow). Each item in the financial account has an asset and a liability side: an increase (decrease) in the asset side is entered with a minus (plus) sign; an increase (decrease) in the liability side is entered with a plus (minus) sign.

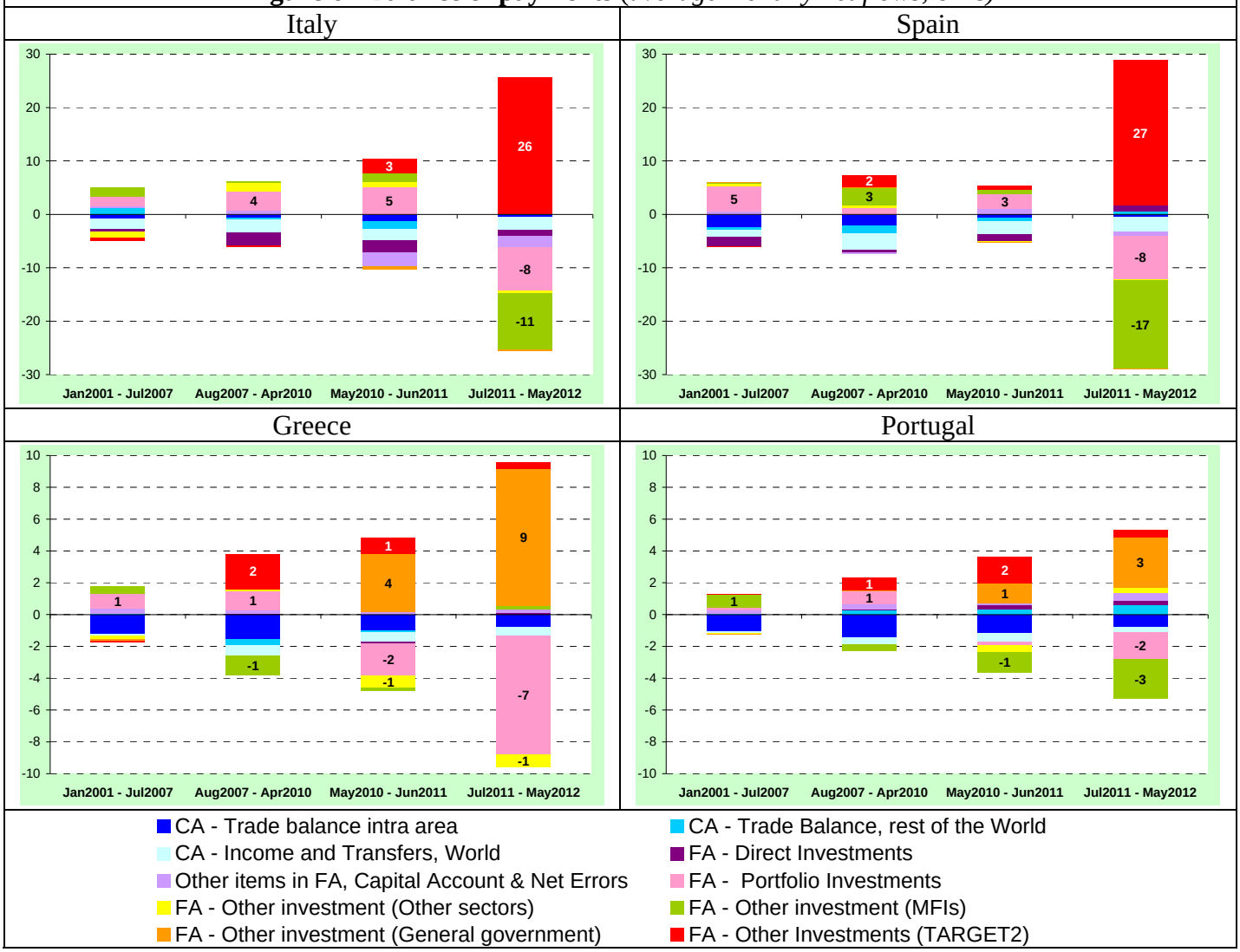
Before the crisis, both the current account and the trade balance are in deficit for all the countries under review, with the exception of Italy where they are approximately balanced; these deficits are funded mostly by financial inflows through portfolio and other investments with the MFIs (Figure 6). The capital flowing in and out of the countries are almost completely netted out, leaving average net balances in the BoP's financial accounts which were small compared to the total volume of cross-border capital (Figure 7).[11]

During the crisis, the absolute size of individual items in the BoP increases and its composition changes significantly. All countries display current account deficits although with different size and composition. The trade balance component of the current account remains fairly stable across the three phases,[12] while the current account deficit, which includes also transfers and incomes, increases somewhat in the first phase (the global financial crisis) and stabilizes afterwards. However, during the crisis, the main changes are in the financial account. The decline of foreign investments in domestic securities and in domestic MFIs is not matched by a similar increase of disinvestments of domestic capital previously invested abroad. Financial account net outflows are counterbalanced by a considerable increase in NCBs' TARGET2 liabilities with the ECB and by loans from international and European institutions to the Greek and Portuguese governments.

[11] All the countries considered had small inflows coming from direct investments before the crisis. The absence of long-term investments by foreigners makes the countries with persistent current account deficits more vulnerable to the crisis (see also Pisani-Ferry and Merler, 2012).

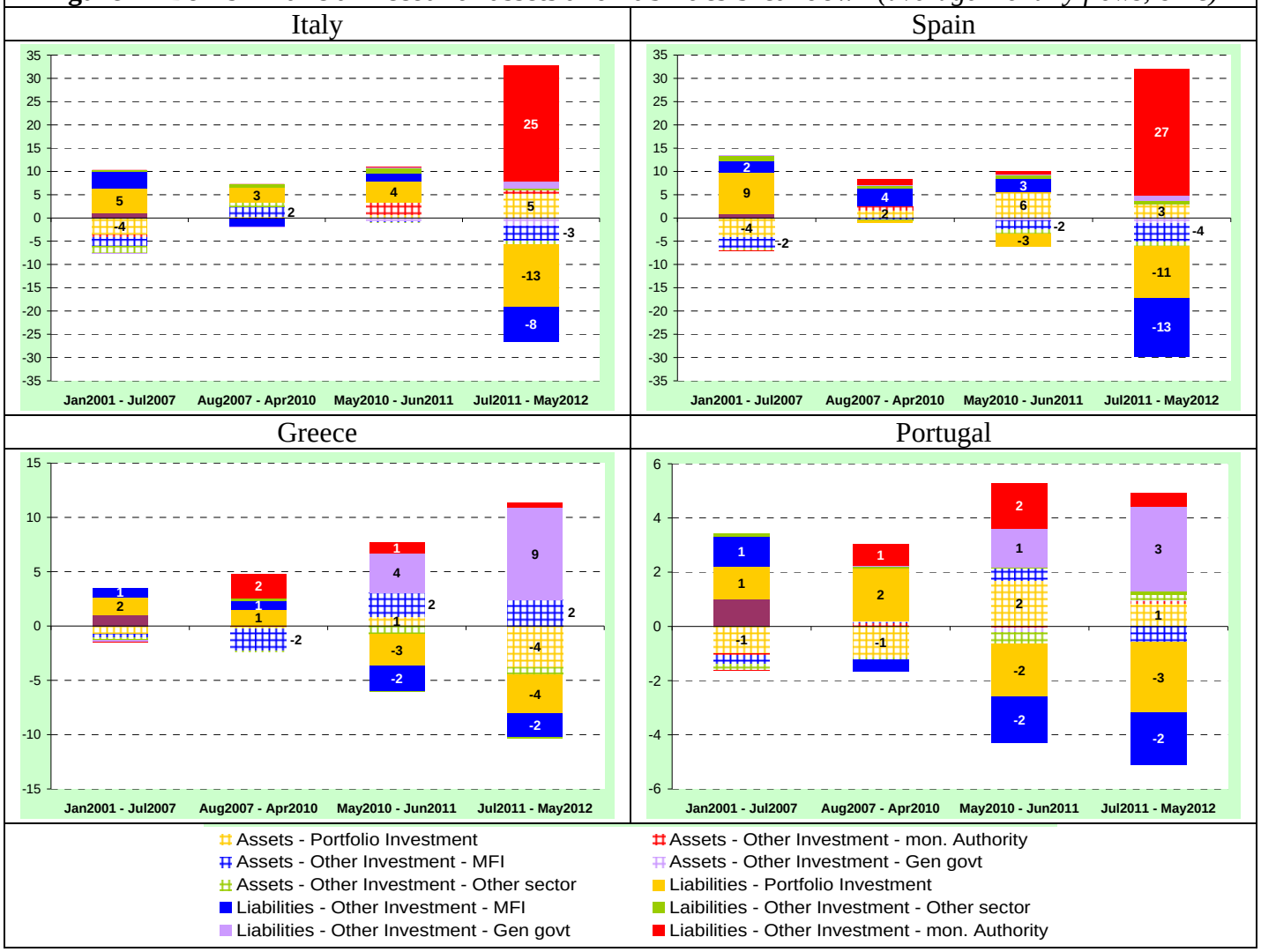
[12] If anything, the trade deficit decreases during the crisis in Spain, Greece and Portugal.

Figure 6 - Balance of payments (*average monthly net flows; bn €)*



The timing of these changes in the financial account is different across countries. During the "global financial" phase of the crisis (August 2007 - April 2010), the Italian and Spanish financial accounts remain almost unchanged while the Greek and Portuguese accounts show large changes. In these two countries we observe (*i*) an increase of the negative contribution of the income and transfers item of the current account and (*ii*) an increase in net outflows of other investments of domestic MFIs; in particular, in Greece the latter item becomes negative as a result of domestic MFIs increasing their investments abroad substantially (the asset side of the MFIs investments; Figure 7), while in Portugal foreigners start disinvesting from domestic MFIs (the liability side of the MFIs investments), reflecting increasing tensions in the interbank market. In the same period TARGET2 liabilities start increasing (by €74 bn in Greece and €26 bn in Portugal).

Figure 7 - BoP's Financial Account - assets and liabilities breakdown *(average monthly flows; bn €)*



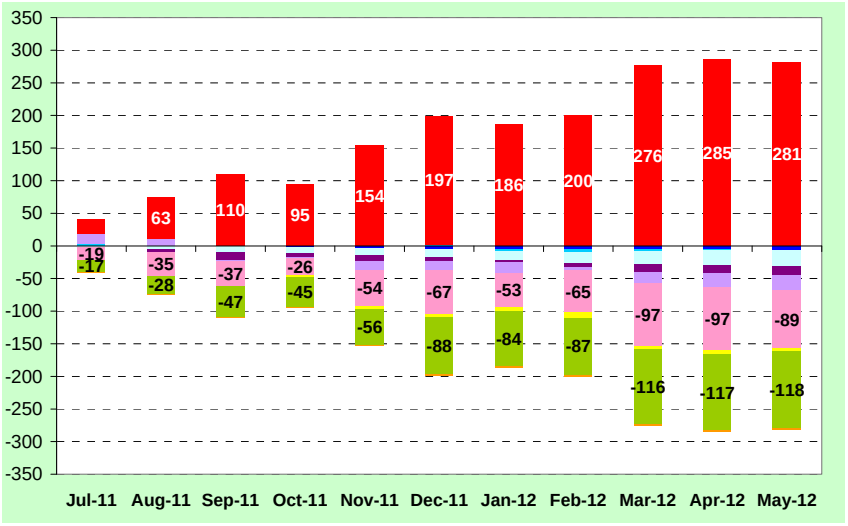
During the first phase of the "sovereign debt crisis" (May 2010 - June 2011) current account deficits decrease. The Italian and Spanish items of the financial account remain almost unchanged, while the dynamics observed in the first phase of the crisis in Greece and Portugal evolve further. Net outflows of other investments of the MFIs continue to increase; foreigners also start disinvesting from Greek MFIs (in Figure 7 the liabilities side of MFIs' other investments is negative both in Greece and in Portugal); access to the cross-border interbank market becomes very difficult for Greek and Portuguese banks. Net portfolio investments become negative in both countries; the assets/liabilities breakdown of this item shows that foreigners start disinvesting from domestic securities (the negative liabilities in Figure 7). The asset side of other investments of other sectors, which also includes deposits of domestic non-financial firms or households in foreign MFIs, increases, signalling a deposit flight from these two countries. Finally, the average size of TARGET2 liabilities slightly decreases in Greece and increases in Portugal; the governments of these two countries, moreover, obtain financial support from IMF and EC in May 2010 (Greece) and May 2011(Portugal); the loans from international and European institutions to the Greek and Portuguese governments prevent further increases of TARGET2 liabilities.

Finally, in the second phase of the "sovereign debt crisis" (July 2011 - May 2012), the monthly average current account deficits continue to decline in all four countries with respect to the previous phases of the crisis (Figure 8); during this period, however, the access of Italy and Spain to the interbank market becomes impaired and the foreign appetite for sovereign debt securities fades;

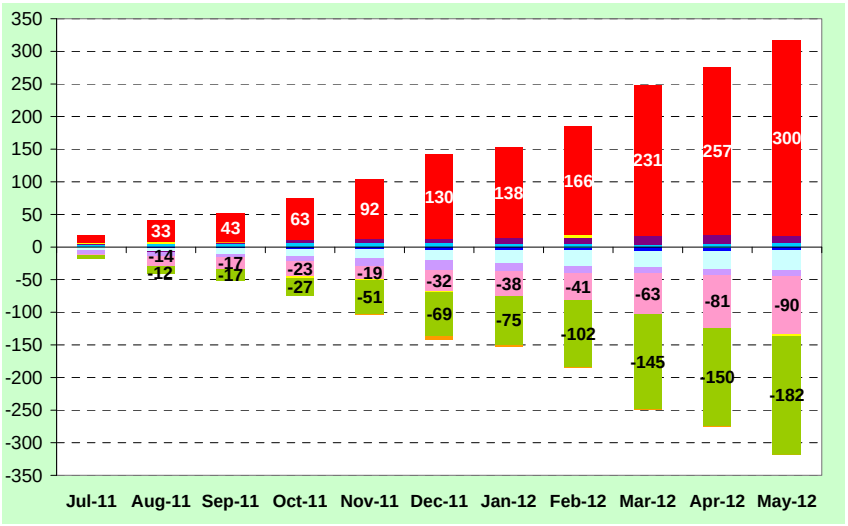
they record net outflows of portfolio investments for about €90 bn (during the first phase of the "sovereign debt crisis" they have net inflows, respectively, for €71 and 38 bn) and net outflows from the MFIs for €118 and 182 bn (in the previous phase they have net inflows for €21 and 11 bn, respectively). In Italy, in particular, net outflows of portfolio investments are not due to capital flight by residents, but largely correspond to a failure by non-residents to roll over maturing sovereign debt securities (about 80% of the liabilities side of portfolio investments) and, to a lesser extent, to sales by non-residents of sovereign debt securities on the secondary market (about 20% of the liabilities side of portfolio investments).

Figure 8 - Balance of payments in the first phase of the "sovereign debt crisis"
(cumulated monthly net flows; bn €)

Italy



Spain



CA - Trade balance intra area
CA - Trade Balance, rest of the World
CA - Income and Transfers, World
FA - Direct Investments
Other items in FA, Capital Account & Net Errors
FA - Portfolio Investments
FA - Other investment (Other sectors)
FA - Other investment (MFIs)
FA - Other investment (General government)
FA - Other Investments (TARGET2)

3.2 The determinants of TARGET2 flows before and during the crisis

In this section we investigate the extent to which the large increase in TARGET2 liabilities can be accounted for by each of the following three explanations: *(i)* large current account and trade balance deficits; *(ii)* flight of private capital from the country at risk in terms of portfolio investment and interbank loans and deposits; and *(iii)* deposit run by resident households and non-financial firms. To this end, we focus on pairwise correlations between TARGET2 net flows and some BoP items and we compare them before and during the crisis. [13]

Figure 9 shows pairwise correlations for Greece, Portugal, Italy and Spain (solid bars denote p-values smaller than 0.1). Due to the lack of a sufficient number of observations, we consider only three periods: before the crisis (January 2001- July 2007), the global financial crisis (August 2007 - April 2010) and the sovereign debt crisis (May 2010 - February 2012). We use monthly data and variables in flows instead of cumulated values, as the latter display a common trend in the period under review.

Regarding explanation *(i)* – current account and trade balance deficits – the correlation of TARGET2 flows with the current account is not significant for any country before 2007 suggesting that the deficits before the crisis are financed by other liabilities in the financial accounts.[14] The correlation becomes negative and significant only in Greece during the "global financial crisis".[15] Therefore, with the exclusion of Greece, the analysis suggests that during the crisis the current account and trade balance deficits *per se* are neither a necessary nor a sufficient condition for observing large TARGET2 liabilities (see also Bindseil and Koenig, 2012).

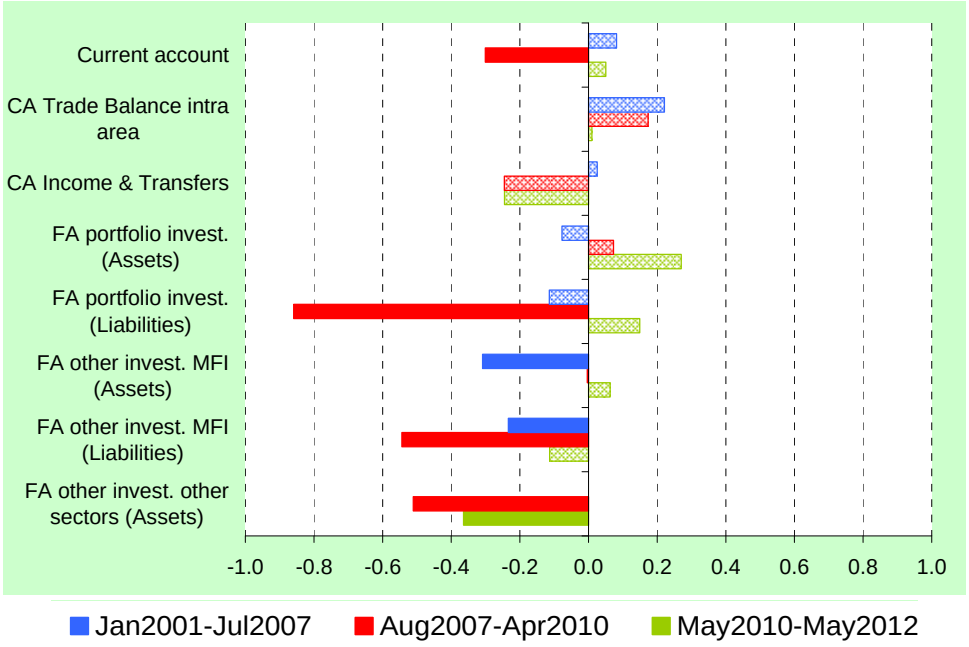
Concerning explanation (*ii*) – private capital flight – for Portugal, Spain and Italy the correlations of TARGET2 flows with portfolio investment liabilities, already negative and significant before 2007, become more sizable after May 2010, indicating that the reduced inflows in portfolio investments are substituted with TARGET2 inflows; in Greece this correlation is significant and sizable only during the "global financial crisis".[16] In addition, we find that the reduction of cross-border interbank market activity plays an important role in all countries. The correlation of TARGET2 flows with liabilities of MFIs' other investments, which include loans by foreigners to resident MFIs, is negative and significant during the crisis: during the "global financial crisis" in Greece and Portugal and during the "sovereign debt crisis" in Italy and Spain.[17]

Finally, in relation to explanation *(iii)* – a run on banks' deposits by resident households and non-financial firms – we find evidence only for Greece.[18] The correlation between TARGET2 flows and the asset side of other investments of other sectors,[19] which include deposits of resident non-

[13] Since there is an accounting identity that links the items of the BoP (and TARGET2 among them), a regression analysis that includes monthly changes in the TARGET2 net position as the dependent variable and all the other BoP items, as the explanatory variables, would not be viable; one that include only some of them would be misspecified.
[14] A current account balance deficit is entered with a negative sign in the BoP, while TARGET2 liabilities are entered with positive sign (see Table 3).
[15] The correlation with the current account is positive and significant in Portugal, but this is related to the Income and Transfers item.
[16] From May 2010, in Greece and Portugal the increase in TARGET2 inflows slows down and funds from European and international institutions (other investment of general government) increase substantially.
[17] This is explained not only by the segmentation of the interbank market observed during the sovereign debt crisis, but also by the change in the management of liquidity of multi-country banking groups. In fact, counterparties in the payment system could also be subsidiaries of a banking group, and obtain liquidity from different NCBs.
[18] A deposit flight in Greece is signalled also by the increase in the demand for banknotes, which during the crisis, exceeded the Greek capital key share (net other claims toward the Eurosystem; figure 2).
[19] The liabilities of other investments in other sectors include deposits and loans of non-resident households and non-financial corporations, while the asset side includes loans and deposits of residents obtained abroad. The size of other investment of other sectors is, in general, much smaller than the other items included in other investments.

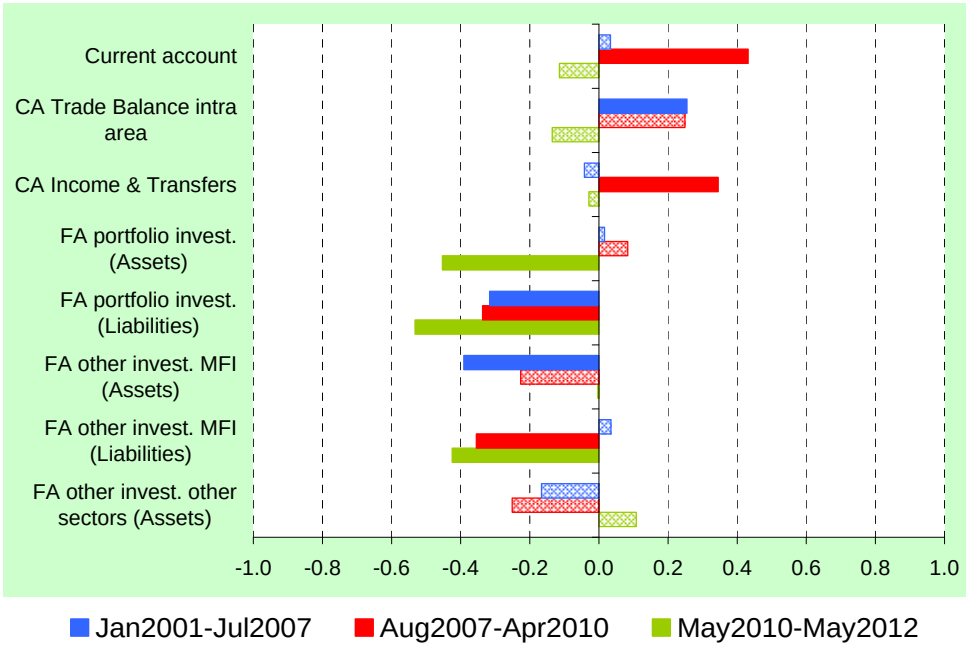
MFIs in foreign MFIs, is not significant for Italy, Spain and Portugal, while it is negative and significant in Greece, both during the "global financial crisis" and the "sovereign debt crisis".

Figure 9 (a) - Correlations with flows of TARGET2 liabilities - *Greece*



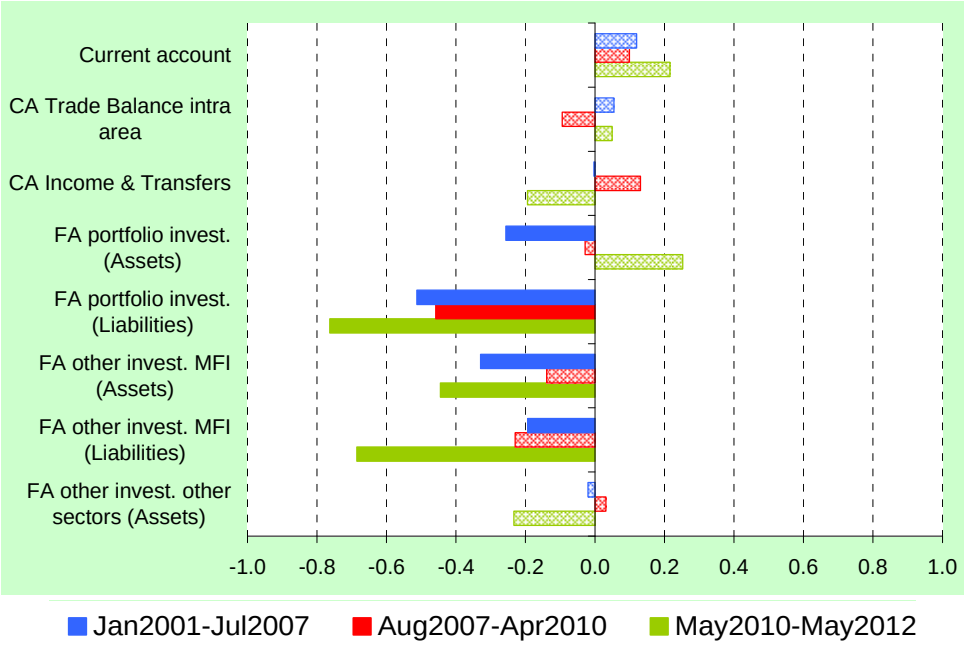
Note: Solid bars denote significance at least at 10% level (p-values smaller than 0.1);
FA = financial account; CA = current account.

Figure 9 (b) - Correlations with flows of TARGET2 liabilities - *Portugal*



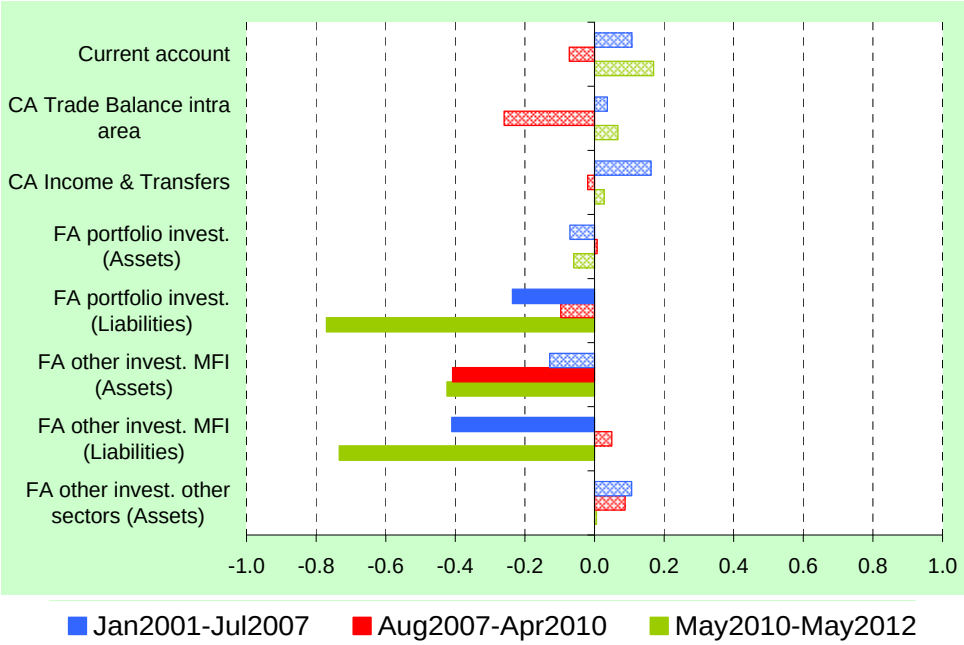
Note: Solid bars denote significance at least at 10% level (p-values smaller than 0.1);
FA = financial account; CA = current account.

Figure 9 (c) - Correlations with flows of TARGET2 liabilities - *Italy*



Note: Solid bars denote significance at least at 10% level (p-values smaller than 0.1);
FA = financial account; CA = current account.

Figure 9 (d) - Correlations with flows of TARGET2 liabilities - *Spain*



Note: Solid bars denote significance at least at 10% level (p-values smaller than 0.1);
FA = financial account; CA = current account.

Summing up, movements in the current account's deficit are significantly related to TARGET2 balances only for Greece (explanation (*i*)); however, intra-area trade balances are not related to TARGET2 in any country. For all countries the large increase in TARGET2 liabilities appears to be mostly related to capital flight, concerning both portfolio investments and cross-border interbank

activity (explanation (*ii*)). Finally, there is evidence of a deposit flight only for Greece (explanation *(iii)*).

4. Monetary policy considerations

In the euro area some countries are undergoing a balance of payments crisis characterized by strong outflows of private capital. In a monetary union, a BoP crisis does not manifest itself in a "classical" way; no sharp depreciation of the exchange rate can be observed. The strong increase in the demand for central bank liquidity in peripheral countries, which flows toward "core" countries through the cross-border payment system (TARGET2), compensates for the outflows of private capital.

As mentioned in the introduction, the existing literature has shown that TARGET2 imbalances do not entail any additional risk with respect to that related to the monetary refinancing operations, do not limit the ability of the Eurosystem to control the monetary base and, more in general, do not interfere with the conduct of monetary policy or the objective of price stability within the area.

The adoption of the FRFA procedure in the refinancing operations and the enlargement of the list of eligible collateral countered the pressures on banks' liquidity and funding, which originated from the massive disruption of the interbank and capital markets at the peak of the crisis. These measures played a key role in preserving the functioning of the payment system and the financial stability of the euro area. The EU Treaty (Article 105) assigns to the ECB the task of "promoting the smooth operation of payment systems" which implies "facilitating the circulation of money in a country or currency area". Without the increased role of intermediation assumed by the Eurosystem during the crisis, it would have been impossible to maintain the "smooth" functioning of the payment system, which is a necessary condition for the uniform transmission of the common monetary policy and, therefore, for pursuing the main objective of price stability. The resulting rise of liquidity was accompanied by the widening of the TARGET2 balances.

Unconventional policies have also limited the asymmetric effects of the crisis within the euro area. Without the FRFA funding costs would have increased to unsustainable levels for banks in countries under stress. The very large amount of reserves provided in the two LTROs with a 3-year maturity held in December 2011 and February 2012 and the additional increase in TARGET2 balances that followed, also coincided with a considerable easing of the strains in the interbank market: the spread between the 3-month interest rate on unsecured loans (Euribor) and that on the corresponding interest rate swaps (Eonia swap), which provides a measure of the risk premium, diminished by 60 basis points; the spreads between the overnight rates paid by banks located in countries under stress and EONIA, which in some cases had risen to above one percentage point, fell to zero. Therefore, from a monetary policy point of view, the increase of TARGET2 balances is an unavoidable consequence of preserving a uniform monetary policy transmission within the area.

The distribution of central bank liquidity across banking systems located in different countries is, however, uneven. Banks belonging to countries not exposed to financial market tensions decreased their recourse to Eurosystem's refinancing operations reflecting a reduced need for liquidity, as a consequence of the larger net inflows of central bank money from the "peripheral" countries; this translates into heterogeneity in the cost of funding as banks in "core" countries have no liquidity needs or, if any, they can finance them at a lower cost than the one they would pay in refinancing operations. This resulting heterogeneity, however, is of secondary importance with respect to those that would have been observed without the ECB interventions.

Any institutional change that would limit the flow of payments through TARGET2 would have a procyclical effect, by tightening further liquidity conditions in troubled countries, increasing

asymmetries in the euro area and undermining the existence of the common monetary policy.[20] The solution would not be to limit TARGET2 flows, but to intervene by means of appropriate policies to solve the market dysfunctions that led to the build-up of these imbalances, namely the fragility of the financial and banking system in some countries of the area, diverging competitiveness and fiscal policies in others.

When evaluating the potential cross-country risks deriving from TARGET2 balances it should be taken into account that, as shown in Section 3, through its interventions, the Eurosystem has replaced the private sector located in creditor countries in the exposure to the peripheral debt. As a result, member states' net external positions did not change; rather, private net credit positions were substituted by national central banks' balances with the ECB and shared across euro-area countries according to their capital key.

Nonetheless, the banking systems of "peripheral" countries cannot be permanently reliant on central bank liquidity as their main source of funding; in the medium term they cannot continue substituting inflows from private sector capital with TARGET2 liabilities. Countries under stress need to attract funds from the rest of the area; confidence in the banking sector and in the sustainability of public finances needs to be restored.

[20] Sinn (2011) proposed to limit the build-up of TARGET2 liabilities by settling the liabilities once a year by transferring gold or other marketable assets from the debtor to the creditor NCB. Currently, there are no operational limits to the build-up of TARGET2 imbalances across countries. The only limit for debtor countries is given by the availability of collateral accepted by the Eurosystem in refinancing operations and by the willingness of the ECB to continue to accommodate entirely the banks' demand for funds.

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Appendix

A1. Brief description of BoP items

Balance of Payments	
Items	*Description*
Current account	Includes all transactions that pertain to goods, services, incomes and current transfers
- *Goods*	Comprising General merchandise, Goods for processing, Repairs on goods, Goods procured in ports by carriers and non-monetary gold.
- *Services*	Transportation, Travel, Communications, Construction, Insurance, Financial, Computer and information, Royalties and license fees, Other business services, Personal services, Government services.
- *Income*	Compensation of employees paid to non-resident workers and investment income, that is receipts and payments associated, respectively, with holdings of external financial assets by residents and with liabilities to non-residents.
- *Current Transfers*	Current transfers are the offsets to changes, which take place between residents and non-residents, in the ownership of real resources and financial items.
Capital account	Includes capital transfers and intangible assets (such as patents and goodwill).
Financial account	
- *Direct investment*	The purchase or acquisition of a controlling interest in a foreign business by means other than the outright purchase of shares.
- *Portfolio investment*	Transactions between residents and non-residents involving equity securities and debt securities.
- *Financial derivatives*	Transactions in financial derivatives.
- *Other investment*	Trade credits, loans, currency and deposits and other accounts receivable and payable.
✓*Monetary authorities*	Includes all transactions of the central bank with foreign counterparts (excluding changes in official reserves).
✓*General government*	Cross-border financial transactions that have as a counterpart the general government.
✓*MFIs*	Cross-border trade credits, loans, currency and deposits and other accounts receivable and payable that have as a counterpart domestic MFIs.
✓*Other sectors*	Cross-border trade credits, loans, currency and deposits and other accounts receivable and payable that have as a counterpart domestic non-financial firms or households.
- *Reserve assets*	External assets that are readily available to and controlled by monetary authorities (monetary gold, special drawing rights, reserve position in the IMF, foreign exchange assets, other claims).
Errors and omissions	Balancing item accounting for statistical discrepancies

A2. TARGET2 and the balance of payment

Here we describe how two types of cross-border transactions that entail flows in TARGET2 are registered in the BoP (purchase or sale of goods and services and purchase or sale of securities or interbank loans).

- Cross-border purchases/sales of goods and services: The purchase of goods or services by a resident of one country in the area (country A) from a resident in another country in the area (country B) increases the trade deficit (or reduces the trade surplus) of country A. This is

balanced by an increase in the liability side of the "other investment – monetary authority" item in the financial account of the BoP as the payment between the two banks is settled in TARGET2 and generates a debit position of the NCB towards the ECB. The BoP of country B records an increase in trade surplus (or a reduction of the trade deficit) and an increase in the asset side of the "other investment – monetary authority".

- Cross-border purchases/sales of securities or interbank loans: The same mechanism applies if the underlying transaction entails a cross border purchase/sale of securities or the opening of an interbank loan. All movements are registered in the financial account (either "portfolio investments" or "other investment – MFIs", and "other investment – monetary authority"). Notice that when the security (or the loan) comes to maturity an opposite transaction takes place reversing the original debit/credit positions in TARGET2.

Before the crisis, purchases of goods and services are financed by sales of domestic securities, interbank loans or direct investments; moreover, when securities (or interbank loans) come to maturity foreign investors are willing to roll over their financial investment. As a consequence, on average TARGET2 balances (i.e. the item "other investment - monetary authority") were almost zero. Since the financial crisis and in particular since May 2010, some countries are cut off from market financing and banks substitute wholesale funds with reserves from the Eurosystem and use them to compensate for the capital outflows, giving rise to TARGET2 liabilities.