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JANUARY 2020

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Lisboa, 2020 • www.bportugal.pt

Occasional Papers | Lisboa 2020 • Banco de Portugal Av. Almirante Reis, 71 | 1150-012 Lisboa • www.bportugal.pt •
Edition Economics and Research Department • ISBN (online) 978-989-678-709-7 • ISSN (online) 2182-1798

Banco de Portugal TARGET balance: evolution and main drivers

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Abstract
Banco de Portugal TARGET balance, an accounting position representing a liability towards the European Central Bank arising from net cross-border payments in central bank money settled via the TARGET2 payment system, was the largest item on Banco de Portugal balance sheet by the end of 2018. In this paper, we depict the evolution and explain the main underlying drivers of Banco de Portugal TARGET liability since the beginning of Stage III of the EMU, following two perspectives, one based on Banco de Portugal balance sheet and other on the Portuguese Balance of Payments. We find that the evolution of Banco de Portugal TARGET liability is highly related with the volume of liquidity-providing monetary policy operations, although the underlying drivers evolved throughout the time: demand driven in 2011/2012 and supply driven from 2015 onwards. We find no time-invariant causal link between Banco de Portugal TARGET liability and neither financial market stress indicators nor the net financing needs of the Portuguese economy. We corroborate our findings empirically using simple OLS regressions.

JEL: E42, E44, E52, E58

Keywords: Monetary policy, TARGET balance, TARGET2 system, Balance Sheet, Balance of Payments.

Acknowledgements: This paper summarises part of the findings and reflections of an expert-team set up in the context of an internal Banco de Portugal study. The authors would like to thank Ana Margarida Ribeiro, Ana Margarida Soares, Catarina Rego, Guilherme Afonso, Lara Fernandes, Luís Miguel Oliveira, Nuno Seara Rodrigues, Sara Areia and Sónia Mota for their valuable input to the team work as well as Miguel Raimundo and Sónia Félix for their useful comments and suggestions. We also gratefully acknowledge valuable inputs and insights from the heads of Departments, Divisions and Units involved and from the participants at Banco de Portugal seminars in which the conclusions of the paper were presented. The analyses, opinions and findings of this paper represent the views of the authors, which are not necessarily those of Banco de Portugal or the Eurosystem.

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1. Introduction

TARGET balances are accounting positions representing claims or liabilities of National Central Banks (NCB) vis-à-vis the European Central Bank (ECB) arising from net cross-border payments in central bank money settled via the TARGET2 payment system.

TARGET balances were low and relatively stable until 2007, i.e. prior to the beginning of the financial crisis. From that period onwards, TARGET balances started to increase significantly, together with the focus and debate on their evolution and related economic and monetary policy effects.

While there is an overall agreement that TARGET balances can arise from either real transactions or financial flows, there is no consensus on their main drivers. Broadly speaking, two streams of visions have been extensively explored in the literature. On the one hand, most authors agree that increasing TARGET balances are caused by different liquidity and funding conditions across the banking system in the euro area, accommodated by the Eurosystem with its Monetary Policy Operations (MPO).[1] On the other hand, some authors hold the view that TARGET balances are directly driven by the financing of Balance of Payments' Current Account imbalances via Eurosystem refinancing.[2]

Several Eurosystem central banks have contributed to the literature on TARGET balances, making available their own analysis on the respective positions.[3] Banco de Portugal, until now, lacked this type of contribution, which is the gap this paper addresses.[4]

With the exception of the very initial phase of the euro, in which its TARGET balance was, in some days, slightly positive, Banco de Portugal presents a negative TARGET balance, i.e. this item is recorded on its balance sheet as a liability. By the end of 2018, Banco de Portugal TARGET liability amounted to 82.8 billion euros, which represents around 50 per cent of Banco de Portugal balance sheet, 40 per cent of the Portuguese Republic Gross Domestic Product and 20 per cent of the Portuguese banking system total assets.

In this paper, we study the evolution of Banco de Portugal TARGET balance between January 1999 and December 2018 and infer its main drivers. On the one hand, we follow Banco de Portugal's balance sheet perspective, as the TARGET

1. See, for instance, Bindseil and König, 2011; Bindseil, Cour-Thimann and König, 2012; Cour-Thimann, 2013; Deutsche Bundesbank, 2012; Eisenschmidt, Kedan, Schmitz, Adalid, and Papsdorf, 2017; Gros, 2017; Tornell, 2012; Whelan, 2014.

2. For example, Auer, 2012; Sinn, 2011; Sinn and Wollmershauser, 2012.

3. For example, Alves, Millaruelo and del Rio, 2018; Banca d'Italia, 2017; Bank of Finland, 2018; Deutsche Bundesbank, 2017a; Deutsche Bundesbank, 2017b; Haran and Bailey, 2012; Jobst, Handig and Scheeberger, 2012.

4. However, some of the revised literature briefly analyses the underlying drivers of Banco de Portugal TARGET balance. See, for instance, Auer, 2012; Bindseil and König, 2011; Cecioni and Ferrero, 2012; Hristov, Huelsewig and Wollmershauser, 2018; Lucarelli, 2017; Minenna, 2017; Minenna, Dosi and Roventini, 2018; Sinn and Wollmershauser, 2012; Tornell, 2012; Whelan, 2014.

balance represents its largest item. On the other hand, we analyse the Portuguese Balance of Payments perspective, as the Balance of Payments summarises the cross-border relationships of the Portuguese economy and the TARGET balance is a large Financial Account component. We break down the analysis into five sub periods: pre-crisis, financial crisis, sovereign debt crisis, "whatever it takes" and Public Sector Purchase Programme (PSPP).

The remainder of the paper is organised as follows. Section 2 presents an overview of the TARGET2 payment system. Section 3 explains the central bank balance sheet and TARGET balances. Section 4 studies the evolution of Banco de Portugal TARGET balance and Section 5 tries to corroborate it empirically. Section 6 concludes.

2. The TARGET2 payment system and its importance for a well-functioning EMU

According to Article 127, number 2, of the Treaty on the Functioning of the European Union (TFEU) and Article 3 of the Statute of the European System of Central Banks (ESCB) and the ECB, the promotion of the smooth operation of the payment systems is one of the basic tasks to be carried out by the ESCB.

TARGET – "Trans-European Automated Real-time Gross Settlement Express Transfer" – system is a platform owned and operated by the Eurosystem that is used to process euro-denominated payments in the form of central bank money in real time.

The first generation of the TARGET system went live in January 1999, with the goal of enabling links between the national real-time gross settlement systems of the European Union (EU) member states. The participation was mandatory for NCB within the euro area and optional for those which did not adopt the euro. The second generation, the TARGET2 system, was launched in November 2007 with full migration in May 2008. Technically speaking, the TARGET2 system is a single shared platform, connecting legally distinct TARGET2 component systems.

By the end of 2018, there were 25 communities with access to the TARGET2 system: the 19 euro area member states, five non-euro area member states[5] and the ECB (Figure 1).[6] Each of the 25 central banks operates its own TARGET2 component. In the case of Portugal, the national component is the TARGET2-PT.[7]

5. Bulgaria, Croatia, Denmark, Poland and Romania.

6. Consequently, the ECB plus all EU member states except Czech Republic, Hungary, Sweden and the United Kingdom (UK). To note, Sweden and the UK participated in the first generation of the TARGET system but did not migrate to the TARGET2 system.

7. Portugal participated in the TARGET system since its inception, in 1999, and migrated to the TARGET2 system in February 2008. Banco de Portugal's duty to regulate, oversee and promote

In the remainder of the paper, the expression TARGET2 system will be used to refer to both generations of the system, i.e. TARGET (the first generation) and TARGET2 (the second generation).

Source: Banco de Portugal

Figure 1: Central Banks participating in the TARGET/TARGET2 system by connection year

The TARGET2 system allows the settlement of both domestic and cross-border transactions. The payments settled via the TARGET2 system are related to Eurosystem MPO, interbank payments, payments of banks on behalf of clients and transactions related to the settlement of other financial market infrastructures, such as other payment systems, securities settlement systems or central counterparties.

Beside central banks, the remaining entities that can be TARGET2 system participants comprise credit institutions, Treasury departments and public sector bodies, investment firms and entities managing ancillary systems (Banco de Portugal, 2012; ECB, 2012). Entities (broadly speaking banks) that are eligible to participate in the TARGET2 system normally open a TARGET2 account with their local NCB. Banks belonging to jurisdictions where the respective central bank does not participate in the TARGET2 system, given that they are established in the EU or in the European Economic Area (EEA), normally choose a participating NCB at which to open a TARGET2 account (see Eisenschmidt *et al.*, 2017).

The TARGET2 system is an indispensable tool for the well-functioning of the European Monetary Union (EMU) and consequently a key building block of the financial integration in the euro area as it (i) increases payment efficiency, enables the free flow of money across borders and helps to preserve the confidence in the common currency; (ii) is essential to the maintenance of the stability of the financial system and the reduction of systemic risk; and (iii) is a necessary condition for the

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the proper functioning of the payment systems, in the context of its participation in the ESCB, is established in Article 14 of the Organic Law of Banco de Portugal.

implementation of the single monetary policy as it ensures that the deposits of banks held with the Eurosystem NCB are fully fungible across euro area member states, i.e. that deposits of banks in one NCB can be "exchanged" at the lowest possible cost against such deposits in another NCB, or in other words, that one euro is equal to one euro across the entire EMU (Bindseil and König, 2011).

3. The Central Bank balance sheet and TARGET balances

3.1. Starting with the basics: the creation of Central Bank money

The central bank is the monopoly supplier of the monetary base, i.e. the sole issuer of banknotes and banks reserves (ECB, 2011a).[8] The provision of the monetary base to the banking system is done, by the central bank, via the conduction of MPO. In other words, the central bank creates money when it conducts liquidity-providing MPO.[9] Therefore a plain vanilla central bank balance sheet can be illustrated as follows (Figure 2):[10]

Assets	Liabilities
Liquidity-providing monetary policy operations	Banknotes
	Deposits held by banks

Figure 2: Stylised Central Bank balance sheet: impact of the creation of money

Liquidity-providing MPO can be conducted by two means: i) via reverse credit operations, in which the central bank lends the funds to banks and receives eligible assets as a guarantee, with the operation being reverted on its maturity date; and/or ii) via outright purchases, in which the central bank buys assets in a definitive way.

As long as all the liquidity provided by the central bank stays in its jurisdiction, the liability item "deposits held by banks" in the central bank balance sheet remains, in aggregate, unchanged, as there will only be a domestic liquidity redistribution among banks. However, this is not the case when the liquidity provided by one NCB flows to and remains at another NCB, as explained below.

8. In precise terms, the monetary base consists of currency in circulation (banknotes and coins), deposits held by banks with the central bank (broken down into minimum required and excess reserves) and banks' recourse to the deposit facility. For simplification reasons we refer to the monetary base as the sum of banknotes and deposits held by banks with the central bank. In the euro area, as coins are not issued by most of the central banks, they do not constitute central banks liabilities in such cases.

9. The central bank can also create money by other means, e.g. by purchasing assets for its own portfolio of assets under management. However, the purpose of this Section is to present the most basic money creation process, i.e. through the conduction of monetary policy.

10. For simplicity of the exposition, central bank capital is omitted.

3.2. TARGET balances: origin, accounting and main features

Participants in the TARGET2 system can make both domestic and cross-border payments for a variety of purposes. In case of interbank domestic payments, every transaction in the TARGET2 system involves two banks and a sole NCB. On the contrary, in case of interbank cross-border payments, every transaction in the TARGET2 system involves two banks and two NCB.

Consider a domestic payment, via TARGET2 system, from Bank A to Bank B (both having their deposit accounts with the same NCB) in the form of central bank money. This leads to a change in the composition of the central bank liability, i.e. an increase in deposits of Bank B, which is the bank receiving the funds, and a decrease in deposits of Bank A, which is the bank making the payment, but the total liability of the NCB towards the banking system does not change.

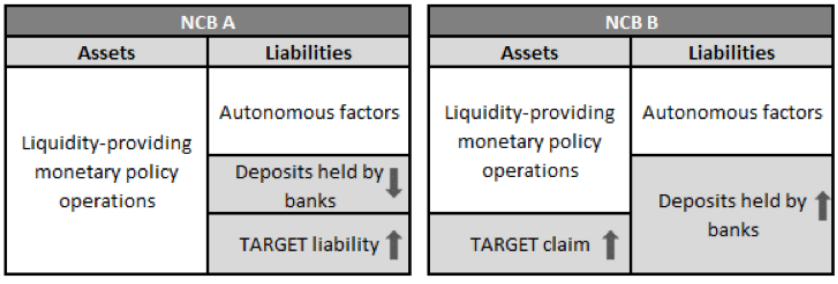


Figure 3: Stylised Central Bank balance sheet: impact of cross-border flows from A to B[a]

a. Autonomous factors are items on the central bank balance sheet which are unrelated to monetary policy. These include liquidity-providing factors, such as gold, foreign reserves and euro assets, and liquidity-absorbing factors, such as banknotes and Government deposits. In Portugal (as in the euro area as a whole), net autonomous factors absorb liquidity and are therefore a liability item in the central bank balance sheet.

Now consider a cross-border payment, via the TARGET2 system, from Bank A in country A (holding a deposit account with NCB A) to Bank B in country B (holding a deposit account with NCB B). The two NCB process the transaction as follows: NCB A decreases the deposit account of Bank A held with NCB A and NCB B increases the deposit account of Bank B held with NCB B. This reduces the liabilities of NCB A vis-à-vis the domestic banks and increases the liabilities of NCB B vis-à-vis their domestic banks. To offset the impact of this transaction, NCB A increases its liabilities (or reduces its claims) towards NCB B, while NCB B increases its claims (or reduces its liabilities) towards NCB A. This is done using the balance sheet item "intra-Eurosystem claims (or liabilities) related to TARGET". The amounts that accumulate in this balance sheet item are the so called "TARGET balances" (see Figure 3).

At the end of the day, each NCB offsets all its bilateral positions into a single asset or liability vis-à-vis the ECB, i.e. each NCB only records the net position on its balance sheet. The sum of all TARGET balances of the 25 participating

central banks is zero, as these balances simply reflect the cross-border flows of available central bank liquidity within a closed system, as (mainly) provided by MPO. Therefore, TARGET balances do not represent additional euro liquidity or, in other words, TARGET balances do not create money (Jobst, Handig and Holzfeind, 2012).

Summing up, throughout this paper, the term TARGET balance[11] will be used to refer to an accounting position representing claims or liabilities of NCB vis-à-vis the ECB arising from net cross-border payments in central bank money processed via the TARGET2 payment system.[12]

3.3. TARGET balances, excess liquidity and other intra-Eurosystem claims and liabilities

The liquidity needs of a domestic banking system comprise two components: i) the deposits that banks must hold with the NCB in order to fulfil the reserve requirements, and ii) the net autonomous factors. The Eurosystem addresses these liquidity needs with the conduction of liquidity-providing MPO.[13] TARGET balances arise when the amount of money created by one NCB (recorded in the asset side of its balance sheet) does not match the amount of money held at the same NCB (recorded in the liability side of its balance sheet).

In a context of excess liquidity (i.e. when central bank liquidity provided to banks is above their liquidity needs), large TARGET balances can more easily arise as larger amounts of liquidity are available on the deposit accounts of banks and can be transferred abroad. Consequently, a high level of excess liquidity is a necessary condition for large and persistent TARGET balances. On the contrary, in an environment without excess liquidity, TARGET balances are limited by the size of the liquidity needs of the banking system, assuming that all the liquidity provided by one NCB via the MPO would move to other NCB (Eisenschmidt *et al.*, 2017).

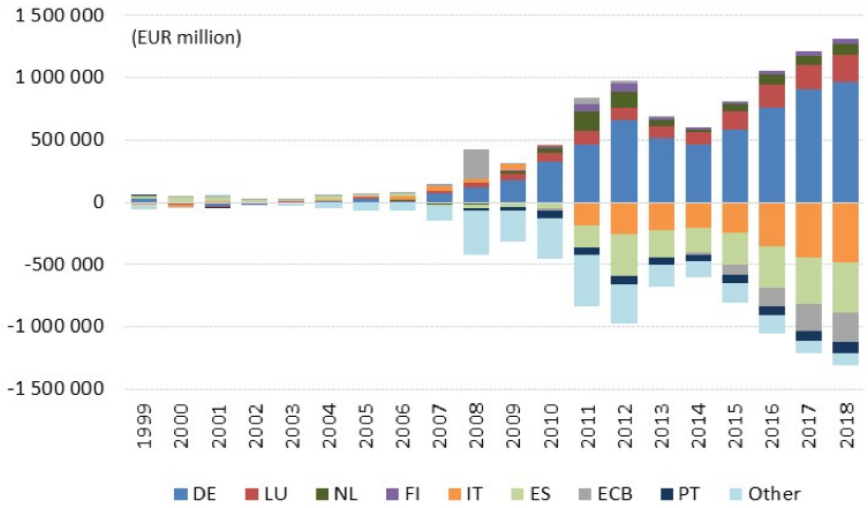
The total TARGET balance, i.e. the sum of all positive balances (which by design equals the sum of all negative balances) only changes when central bank money flows between a country with a TARGET claim and a country with a

11. The term TARGET balance is used in this paper because it is the expression commonly used in related literature. However, it accumulates the accounting positions created in both generations of the TARGET2 system, i.e. TARGET system and TARGET2 system. Summarizing, we will use the term TARGET balance to refer to the intra-Eurosystem accounting positions, and the term TARGET2 system to refer to the payments and settlement infrastructure.

12. Please note that a payment from the ECB to an account held at the Deutsche Bundesbank also constitutes a cross-border payment for the purpose of this analysis, even though both central banks are located in Germany.

13. For simplicity of the exposition, we ignore that central bank liquidity can also be provided via intraday credit and Emergency Liquidity Assistance (ELA).

TARGET liability.[14] Flows between two countries with TARGET claims (or two countries with TARGET liabilities) change the composition of the total TARGET balance, but not its aggregate value (ECB, 2016).



Source: ECB. Authors' calculations.
Note: Data as of end-December.

Figure 4: Euro area TARGET balances

By the end of 2018, at the Eurosystem level,[15] the sum of all TARGET claims (or liabilities), amounted to 1.35 trillion euros. The four central banks with higher TARGET claims were those of Germany, Luxembourg, the Netherlands and Finland and accounted for 97 per cent of the total. In turn, the four central banks with higher TARGET liabilities were Italy, Spain, the ECB and Portugal and represented 90 per cent of the total (see Figure 4).

Although TARGET balances are the most important intra-Eurosystem claim/liability, there are other balance sheet items which also constitute intra-Eurosystem accounting positions, the most important of which is related to the adjustment to banknotes.

In the euro area, banknotes circulate among member states and consequently they can be returned to any NCB regardless of whether they were issued by that NCB. This led to the need to create intra-Eurosystem items as a counterpart to banknotes in circulation in a way that each NCB presents on its balance sheet its share in the total value of euro banknotes in circulation according to the banknote

14. The total TARGET balance increases if central bank money flows from a country with a liability to a country with a claim and decreases if the money flows in the opposite direction.

15. Although for simplicity we refer to the Eurosystem, the total amount also includes the TARGET balances of the five non-euro area NCB.

allocation key.[16] If the value of banknotes that one NCB puts into circulation net of the value of banknotes it takes out of circulation is higher than the share according to the banknote allocation key, this gives rise to an intra-Eurosystem liability, while the opposite situation gives rise to an intra-Eurosystem claim. The latter is the case of Banco de Portugal. Mostly due to tourism cash inflows, the value of banknotes returned to Banco de Portugal is higher than the value of banknotes it puts into circulation. Consequently, so that in the liability side of Banco de Portugal balance sheet the amount of banknotes shown is the one that results from the application of the banknote allocation key, Banco de Portugal has to record, in the asset side of the balance sheet, the corresponding intra-Eurosystem claim.

In other words, although only the TARGET liability of Banco de Portugal is under the scope of the current paper, it is worth noting that, by the end of 2018, Banco de Portugal had an intra-Eurosystem claim related to the banknotes' adjustment of more than 45 billion euros.

4. Understanding the evolution of Banco de Portugal TARGET balance

4.1. Organisation and scope of the analysis

The aim of the current Section is to depict and explain the evolution of the TARGET balance recorded in Banco de Portugal balance sheet since the beginning of Stage III of the EMU, i.e. in the period ranging from 1 January 1999 to 31 December 2018. Taking into account that the paper covers a period of 20 years, it was deemed suitable to split the analysis into sub periods in accordance with the path observed in the TARGET balance:[17]

- The pre-crisis period: from 1 January 1999 to 31 July 2007;
- The financial crisis period: from 1 August 2007 to 31 March 2010;
- The sovereign debt crisis period: from 1 April 2010 to 31 July 2012;
- The "whatever it takes" period: from 1 August 2012 to 28 February 2015; and
- The PSPP period: from 1 March 2015 to 31 December 2018.

With the exception of the very initial phase of the euro, in which the TARGET balance was, in some days, slightly positive, Banco de Portugal presents a negative TARGET balance, i.e. this item is recorded on its balance sheet as a liability. By the end of 2018 it amounted to 82.8 billion euros.

16. Which allocates 8 per cent to the ECB and the remaining 92 per cent to the NCB in proportion to their capital key.

17. To note, as the sub periods were defined taking into account the main trends of Banco de Portugal TARGET balance, they can somehow differ from e.g. sub periods used for the analysis of aggregate Eurosystem trends.

The drivers of the evolution of Banco de Portugal TARGET balance will be explored in our paper taking into account two perspectives: the central bank balance sheet and the Portuguese Balance of Payments.

4.1.1. Banco de Portugal balance sheet. As already explained in Section 3, since TARGET balances arise from cross-border payments in central bank money, and central bank money is, in its genesis, deposited in accounts that the banks hold with the central bank, the link between the monetary policy authority balance sheet and the TARGET balance is intrinsic. Consequently, one of our aims is to explain the evolution of Banco de Portugal TARGET balance via the evolution of the remaining items of Banco de Portugal balance sheet, which are the following:

A. Assets:

- Reverse liquidity-providing MPO: comprising the MRO, the Longer-Term Refinancing Operations (LTRO), the Targeted Longer-Term Refinancing Operations (TLTRO), the Marginal Lending Facility (MLF) and the Fine-Tuning Operations (FTO);
- Outright liquidity-providing MPO: which include the several securities purchase programmes for monetary policy purposes, i.e. the Securities Market Programme (SMP), the two Covered Bond Purchase Programmes (CBPP1 and CBPP2) and the Expanded Asset Purchase Programme (APP). The latter is split into the CBPP3 and the PSPP;[18]
- Assets under management by Banco de Portugal: which include gold, foreign reserves and euro assets.

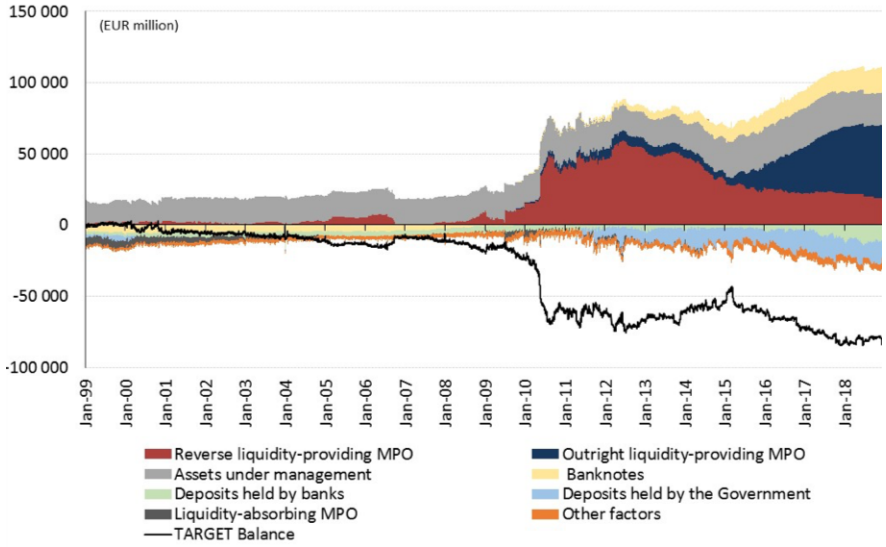
B. Liabilities

- Banknotes: defined as the difference between banknotes put into circulation by Banco de Portugal and the banknotes it takes out of circulation. Given that, from 2011 onwards, the latter is higher than the former, the resulting aggregate is a negative liability from that point onwards;
- Deposits held by banks: deposits placed by credit institutions with Banco de Portugal for the purpose of fulfilling minimum reserve requirements. The amount deposited above the minimum reserves requirement corresponds to excess reserves;
- Deposits held by the Government: which include the deposits held by the Portuguese Treasury and Debt Management Agency as well as the deposits held by the Portuguese deposit guarantee fund and the Portuguese resolution fund;

18. The APP includes two further programmes which are not booked under Banco de Portugal balance sheet: the Asset-Backed Securities Purchase Programme (ABSPP) and the Corporate Sector Purchase Programme (CSPP).

- Liquidity-absorbing MPO: which include the recourse to the deposit facility and the participation in FTO. It also includes, in the period from 1999 to 2004, the outstanding amount of the liquidity-absorbing instruments issued by Banco de Portugal prior to the euro;
- Other factors: residual balance sheet aggregate with all the remaining items.

Figure 5 shows the evolution of the Banco de Portugal balance sheet aggregates described above.



Source: ECB. Authors' calculations.

Figure 5: Evolution of Banco de Portugal balance sheet aggregates

Summing up, the following balance sheet identity is going to be considered throughout the paper:

$$\begin{gathered}\Delta\text{TARGET liability} = \Delta\text{Reverse liquidity-providing MPO} + \\ \Delta\text{Outright liquidity-providing MPO} + \Delta\text{Assets under management} - \\ \Delta\text{Banknotes} - \Delta\text{Deposits held by banks} - \Delta\text{Deposits held by the Government} - \\ \Delta\text{Liquidity-absorbing MPO} - \Delta\text{Other factors}\end{gathered} \tag{1}$$

4.1.2. Portuguese Balance of Payments. Changes in TARGET balances mirror net cross-border transactions and are hence recorded in euro area member states' Balance of Payments. There is no static relationship between specific components of the Balance of Payments and changes in TARGET balances. Rather, the relationship between TARGET balances and other Balance of

Payments components evolves over time, depending on the implementation of the Eurosystem's monetary policy measures as well as the extent of financial stress and external imbalances.

According to the Balance of Payments identity, it holds that:

$$\text{Current Account} + \text{Capital Account} + \text{net errors and omissions} = \text{Financial Account} \tag{2}$$

The Current Account comprises the trade balance as well as cross-border factor income and transfers. The Capital Account mainly comprises capital transfers and payments related to EU structural funds. In turn, the Financial Account reflects financial transactions of domestic residents (banks, other financial institutions, non-financial corporations, the official sector and households) with foreign residents.

The Financial Account can be decomposed as follows:

$$\text{Financial Account} = \text{Reserve Assets} + \text{Foreign Direct Investment} + \text{Portfolio Investment} + \text{Derivatives} + \text{Other Investment} \tag{3}$$

TARGET balances are recorded as part of the "Other Investment" aggregate in equation (3), under the sub-item "National Central Bank". The aggregate "Other Investment" also includes, among other flows, the loans from the EU and the International Monetary Fund (IMF) to the Governments, and therefore can be decomposed as follows:

$$\text{Other Investment} = -\,\Delta\text{TARGET liability} - \text{Foreign loans to Portuguese Government} + \text{remaining investments} \tag{4}$$

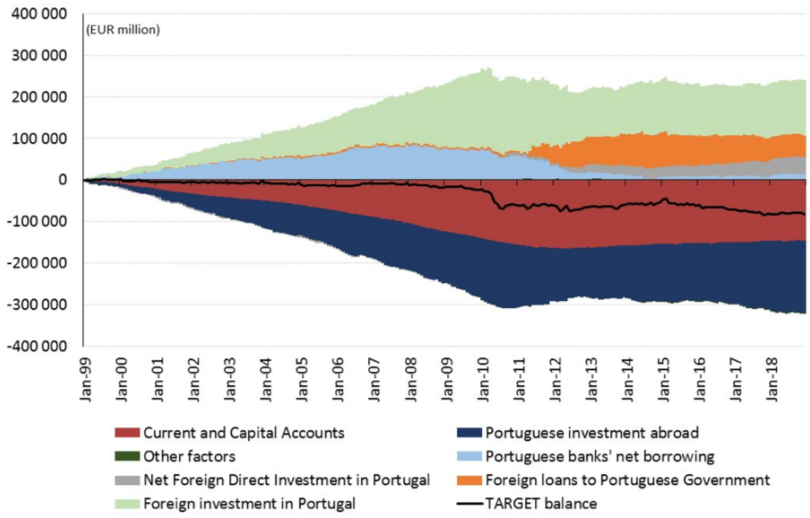
In practice, the Current Account and the Financial Account constitute most of the Balance of Payments in euro area countries, since the Capital Account tends to be small in developed countries. In "normal times", a country's Current Account deficit (surplus) with the rest of the world tends to be matched by private net financial inflows (outflows) (Eisenschmidt *et al.*, 2017). However, if private financial inflows stop, i.e. if private foreign residents refrain from lending to domestic residents, the country will be exposed to an unsustainable Balance of Payments development. In order to rebalance the situation, the country needs

to either improve its Current Account position by reducing imports or increasing exports, or to replace private external financial inflows with public inflows. For the euro area countries, this can be mostly done via the Eurosystem refinancing operations. If the liquidity obtained is afterwards used to perform cross-border payments, TARGET balances will increase. Stated differently, the liabilities of originally private debtors in bilateral relationships reflected in a country's Financial Account will be replaced by TARGET liabilities of the corresponding central bank (Cour-Thimann, 2013).[19]

Combining equations (2), (3) and (4), the change in Banco de Portugal TARGET liability can be expressed as a function of the remaining Balance of Payments aggregates as follows:

$$\begin{aligned}\Delta\text{TARGET liability} = &- \text{Current Account} - \text{Capital Account} + \text{Reserve Assets} + \\ &\text{Foreign Direct Investment} + \text{Portfolio Investment} + \text{Derivatives} - \\ &\text{Foreign loans to Portuguese Government} + \text{remaining investments} - \\ &\text{net errors and omissions}\end{aligned} \tag{5}$$

Figure 6 depicts the evolution of the Portuguese Balance of Payments accumulated since 1999.



Source: ECB. Authors' calculations.
Note: Values accumulated since January 1999.

Figure 6: Evolution of Portuguese Balance of Payments aggregates

19. Similarly, the claims of private creditors will be replaced by TARGET claims of the respective central banks.

Following the same approach used for the balance sheet of Banco de Portugal, we will try to explain the changes in Banco de Portugal TARGET balance using the evolution of the remaining aggregates of the Balance of Payments. For this purpose, the following aggregates are considered:

- Current and Capital Accounts;
- Portuguese investment abroad: Financial Account item that can be recorded either as Reserve Assets, Portfolio Investment, or remaining investments, depending on the nature of the assets and purpose of the investment; refers to amounts invested by the Portuguese private and public sectors, including Banco de Portugal;
- Portuguese banks' net borrowing: Financial Account item recorded as remaining investments that includes the loans provided to Portuguese banks net of the loans granted by Portuguese banks to foreign agents;
- Net Foreign Direct Investment in Portugal: defined, in this paper, as the difference between the Direct Investment by foreigners in Portugal and the Direct Investment in other countries by Portuguese agents;[20]
- Foreign investment in Portugal: Financial Account item that can be recorded either as Portfolio Investment or remaining investments, depending on the nature of the assets; includes, among others, amounts invested by foreign entities in Portuguese Government bonds and in the private sector, including banks;
- Foreign loans to Portuguese Government: Financial Account item mostly composed of the EU/IMF Financial Assistance Programme net inflows;
- Other factors, including the remaining Financial Account item (Derivatives) and the net errors and omissions.

Summing up, the following Balance of Payments identity is going to be considered throughout the paper:[21]

$$\begin{gathered}\Delta\text{TARGET liability} = -\text{ Current and Capital Accounts} + \\ \text{Portuguese investment abroad} - \text{Portuguese banks' net borrowing} - \\ \text{Net Foreign Direct Investment in Portugal} - \text{Foreign Investment in Portugal} - \\ \text{Foreign loans to Portuguese Government} - \text{Other factors}\end{gathered} \tag{6}$$

20. Please note that Portugal is a net receiver of Foreign Direct Investment, thus it is preferable to analyse it from this perspective.

21. Please note that the Balance of Payments' disaggregation used in this paper is not the standard disaggregation used in the context of the Balance of Payments analysis but the one that better fits the purpose of explaining the Portuguese TARGET balance.

4.1.3. The impact of each aggregate on Banco de Portugal TARGET balance. Equations (1) and (6) above will guide the analysis throughout the remainder of the paper.

From equation (1) we will derive the main balance sheet drivers of the evolution of Banco de Portugal TARGET balance.

The increase in both reverse and outright liquidity-providing MPO makes Banco de Portugal TARGET liability increase, although by different means. One of the main features of the monetary policy framework in the euro area is that its implementation is decentralised, i.e. liquidity is created at the level of the NCB. In the case of reverse liquidity-providing operations, the counterparties of NCB have to be necessarily established in the respective jurisdiction. Thus, the settlement of these operations is TARGET balance-neutral because it does not involve a cross-border payment, i.e. the liquidity is credited to the deposit account the counterparty holds with the respective NCB. However, if the counterparty afterwards uses the liquidity to make a cross-border payment, then the TARGET liability (in the case of Banco de Portugal) will increase.

On the contrary, the Eurosystem outright liquidity-providing MPO affect Banco de Portugal TARGET balance immediately in the settlement moment, i.e. when securities are exchanged for cash. Although the asset purchase programmes are also predominantly implemented in a decentralised manner, the integrated financial market structure in the euro area is such that the market infrastructure and securities holdings are not limited by national boundaries and, consequently, the securities purchased by one NCB are often sold by counterparties located in another jurisdiction. This leads to a cross-border payment and, consequently, impacts NCB TARGET balances. Asset purchase programmes may affect TARGET balances not only at implementation but also afterwards, depending on the action of the entity to which the central bank delivers the funds. If it uses the liquidity to make cross-border payments or investments, NCB TARGET balances will be impacted.

The increase in assets under management by Banco de Portugal also leads to an increase in the TARGET liability mostly due to financial market infrastructural reasons: the funds are normally transferred to the sellers from cash accounts Banco de Portugal holds in institutions located outside Portugal.[22]

Turning now to the balance sheet aggregates recorded in the liability side of the balance sheet, a decrease in banknotes leads to an increase in Banco de Portugal TARGET liability, although the impact is not direct. If there is a deposit of banknotes by a credit institution (banknotes' decrease), the accounting records are the following: banknotes in circulation are debited and deposits held by banks are credited, and consequently the balance sheet aggregate related to the TARGET balance is not impacted. However, if afterwards the credit institution uses the amount deposited to make a payment to a foreign credit institution, the deposits held by banks in Banco de Portugal decrease and the TARGET liability increases.

22. On the contrary, the TARGET liability decreases when Banco de Portugal sells these assets.

Jobst *et al.* (2012b) comprehensively explain how when cash (banknotes) leaves the country in cashless form (decrease in deposits with the central bank) this causes an equivalent increase in the central bank TARGET liability. The authors show that, for Austria, in periods characterised by high net banknote inflows into the country, more central bank money tends to be transferred abroad via the TARGET2 system. While this does not need to be necessarily the case, i.e. cross-border movements of banknotes and TARGET2 system cross-border transfers should in principle be independent, the authors show that when banknotes' inflows are substantial relative to the size of the country's economy, these inflows must at least partially be offset by outbound TARGET2 system transactions.[23]

In turn, a decrease in deposits held by banks might directly lead to an increase in Banco de Portugal TARGET liability. This is so because if e.g. a Portuguese credit institution makes a payment to a French credit institution, the deposits held by banks are debited and the TARGET liability is credited.

In the case of deposits held by the Government, if the Government withdraws the deposits it holds with Banco de Portugal and transfers the funds to a Portuguese credit institution, the TARGET liability will not be impacted. However, if the funds are used to make cross-border payments, Banco de Portugal TARGET liability will increase.

Also the decrease of liquidity-absorbing MPO may be a driver of Banco de Portugal TARGET liability increase. This is so because when counterparties receive the reimbursement of a liquidity-absorbing MPO, they deposit the corresponding funds in their deposit accounts held with the central bank. Again, if afterwards they use the funds to make cross-border payments, the TARGET liability will increase.

Finally, the residual balance sheet items aggregated in the other factors might contribute positively or negatively to the TARGET liability, depending on the underlying records.

In turn, from equation (6) the change in TARGET liability can be explained using the Balance of Payments flows.

A Current Account positive balance typically means that the country imported less than it exported, which indicates that the cash inflows obtained from exports are higher than the cash outflows to pay for imports, thus resulting in a net inbound cash flow. A similar rationale applies to the Capital Account. Such net inflows generated by Current or Capital Account surpluses will therefore decrease the TARGET liability.

Regarding the elements of the Financial Account, net positive Portuguese investment abroad, either done by Banco de Portugal or by other Portuguese agents, results in cash outflows and therefore increases the TARGET liability. When Portuguese residents sell foreign investments that gives rise to an inflow of cash, the TARGET liability decreases.

23. The same type of rationale holds for countries with TARGET claims and banknotes put into circulation higher than banknotes taken out from circulation – see the explanation for the Deutsche Bundesbank in Jobst *et al.* (2012a).

Conversely, when foreign agents invest in Portuguese assets or lend cash to Portuguese banks or to the Portuguese Government, there is a cash inflow to Portugal, reducing the TARGET liability. When foreign agents sell those investments or demand the reimbursement of the loans, a corresponding cash outflow occurs and the TARGET liability increases.

Figure 7 below summarises all the impacts previously described.[24]

Impact on Banco de Portugal TARGET liability due to an increase in each aggregate			
Balance Sheet aggregates		**Balance of Payment aggregates**	
Reverse liquidity-providing MPO	↑	Current and Capital Accounts	↓
Outright liquidity-providing MPO	↑	Portuguese investment abroad	↑
Assets under management	↑	Portuguese banks' net borrowing	↓
Banknotes	↓	Net Foreign Direct Investment in Portugal	↓
Deposits held by banks	↓	Foreign Investment in Portugal	↓
Deposits held by the Government	↓	Foreign loans to Portuguese Government	↓
Liquidity-absorbing MPO	↓	Other factors	↓
Other factors	↓		

Figure 7: Drivers of Banco de Portugal balance sheet[a]

a. The impact on Banco de Portugal TARGET liability will be the opposite if the aggregates decrease.

4.2. The pre-crisis period

The pre-crisis period ranges from the beginning of stage III of the EMU until the end of July 2007, just before the first signs of the global financial crisis started to materialise.[25] In this period, Banco de Portugal TARGET liability, which in the beginning of the period was roughly zero, increased by 7.3 billion euros. The prominent balance sheet driver of this evolution was the maturity of the liquidity-absorbing MPO that Banco de Portugal had outstanding when it entered the euro (Figure 8). Before adopting the euro, Portugal was in an excess liquidity situation that can be explained by a series of factors that start with monetary financing of Government deficits in the 1970s, followed by inflows of foreign capital in the late 1980s and first half of the 1990s, due to high interest rate differentials and the gradual stabilisation of the Escudo's exchange rate (necessary for Portugal to enter

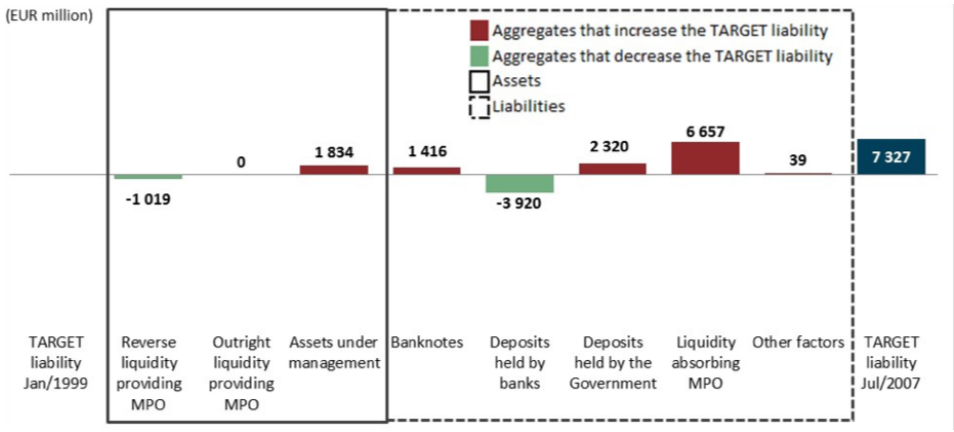
24. Please see Figures A.1 and A.2 in the Appendix for the overall picture of the main balance sheet and Balance of Payments drivers of Banco de Portugal TARGET balance during the period of 20 years under analysis.

25. We consider the first major sign to be the decision of BNP Paribas to suspend three of its money market funds on 9 August 2007, as problems in the U.S. subprime mortgage sector were preventing the institution from calculating their value.

the EMU), and a reduction of the minimum reserve coefficient from 17 per cent to 2 per cent in 1994. The excess liquidity created by the latter was sterilised with liquidity-absorbing instruments issued by Banco de Portugal, some of which were still outstanding when the euro was adopted, in the amount of around 6.7 billion euros.[26]

Both balance sheet and TARGET2 system data show that in the dates in which the assets matured, the institutions did not keep the bulk of the funds in their deposit accounts with Banco de Portugal, i.e. the institutions mostly used the funds to make cross-border transfers, contributing to the increase in Banco de Portugal TARGET liability.[27]

The impacts of the remaining balance sheet items mostly offset each other, i.e. increase in Assets under management by Banco de Portugal and the decrease in deposits held by the Government and in banknotes also contributed to the increase in the TARGET liability, while the decrease in the transfer abroad of funds obtained in the reverse liquidity-providing MPO and the increase in the deposits held by banks partially offset the increase in the TARGET liability.



Source: Banco de Portugal. Authors' calculations.

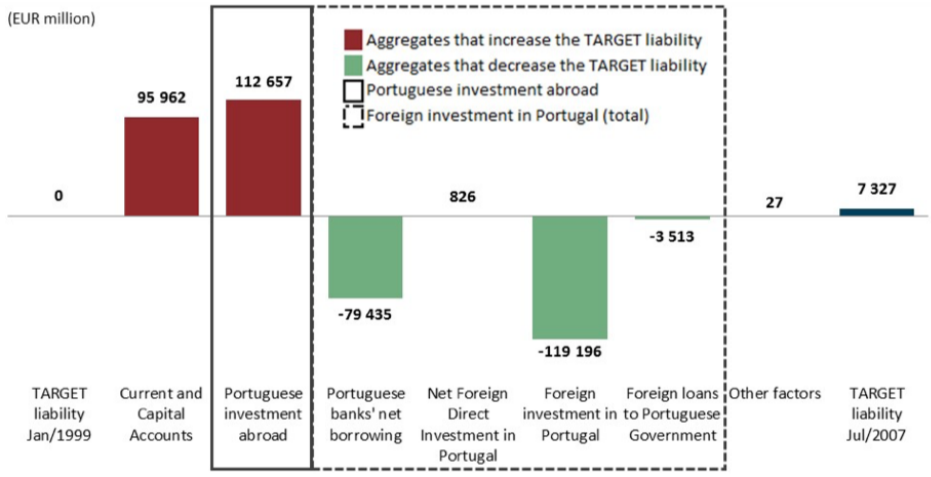
Figure 8: Balance sheet drivers in the pre-crisis period[a]

a. The chart depicts the contribution of each aggregate to the path of Banco de Portugal TARGET liability. Aggregates above the x-axis (in red) make the TARGET liability increase, i.e. increases in assets and decreases in liabilities. Aggregates beneath the x-axis (in green) make the TARGET liability decrease, i.e. decreases in assets and increases in liabilities.

26. For more details, see Abreu (2005) and Amaral (2010).

27. In all sub periods we have performed this type of checks, i.e., we were able to see in the TARGET2 system transactions that Portuguese counterparties sent most of the funds received from the Eurosystem's MPO to other countries during the day or the following days of the settlement of the operations. Similarly, when repayments of MPO took place, we were able to observe the bulk of the amount being received by banks from abroad in the day or the days before the reimbursement of the MPO.

The Balance of Payments aggregates show that Portugal ran high Current Account deficits and increased the net investment abroad in the pre-crisis period (Figure 9). Although these two factors gave rise to outflows of cash and therefore contributed to increase the TARGET liability, the Portuguese economy was able to find private financing from foreign agents, both for the banking and non-banking sectors. These foreign inflows of cash almost fully offset the outflows, resulting in a relatively small increase in the TARGET liability when compared to the magnitude of the overall Balance of Payments flows.



Source: Banco de Portugal. Authors' calculations.

Figure 9: Balance of Payments drivers in the pre-crisis period[a]

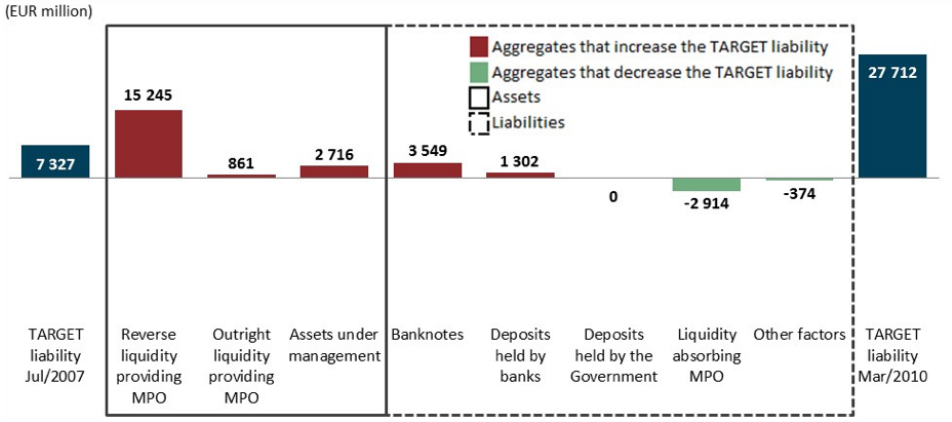
a. The chart depicts the contribution of each aggregate to the path of Banco de Portugal TARGET liability. Aggregates above the x-axis (in red) make the TARGET liability increase and beneath the x-axis (in green) make the TARGET liability decrease. If the Current and Capital Accounts are shown above the x-axis, this means that they presented a deficit, which makes the TARGET liability increase. If Portuguese investment abroad is shown above the x-axis, this means that the amount invested by Portuguese agents increased, which also makes the TARGET liability increase. If the different aggregates of foreign investment in Portugal are shown above the x-axis, this means that there were net repayments from Portuguese agents, which makes the TARGET liability increase.

4.3. The financial crisis period

The financial crisis period is defined, in this paper, as the period between the beginning of August 2007 and the end of the first quarter of 2010. We consider that the sovereign debt crisis hit Portugal in the second quarter of 2010.

As Figure 10 reveals, the undisputed driver of the increase in Banco de Portugal TARGET liability in this period was the recourse to Eurosystem reverse liquidity-providing MPO. Roughly all the remaining balance sheet aggregates, with the exception of the Portuguese counterparties' participation in Eurosystem liquidity-absorbing MPO which partially offset the effect of the liquidity-providing MPO, also moderately contributed to the increase in Banco de Portugal TARGET liability.

As stated by Cour-Thimann (2013), before the United States subprime crisis and the subsequent bankruptcy of Lehman Brothers in September 2008, banks could finance themselves domestically or abroad at similar conditions across the euro area. The single monetary policy contributed to the integration in financial markets and the interbank cross-border market, in particular, was highly developed. Thus, at the aggregate country level, banks could largely compensate payment outflows with funding inflows, so that the overall cross-border position tended to be broadly balanced. As a result, NCB TARGET balances were small and stable. Following the onset of the financial crisis, confidence between banks decreased and the perceived credit risk increased; consequently the interbank market functioning became impaired. For some national banking systems, the cross-border outflows could no longer be compensated for with sufficient inflows and as a result banks increased their borrowings from the Eurosystem, mainly accommodated via the conduction of most of the reverse liquidity-providing MPO with a fixed rate full allotment (FRFA) procedure since October 2008. In other words, and as summarised by ECB (2013), increased TARGET balances arose, in this period, as a result of imbalanced cross-border payment flows between banks in the euro area and the Eurosystem's accommodation, with its MPO, of the ensuing liquidity needs of eligible counterparties against an expanded adequate collateral framework.



Source: Banco de Portugal. Authors' calculations.

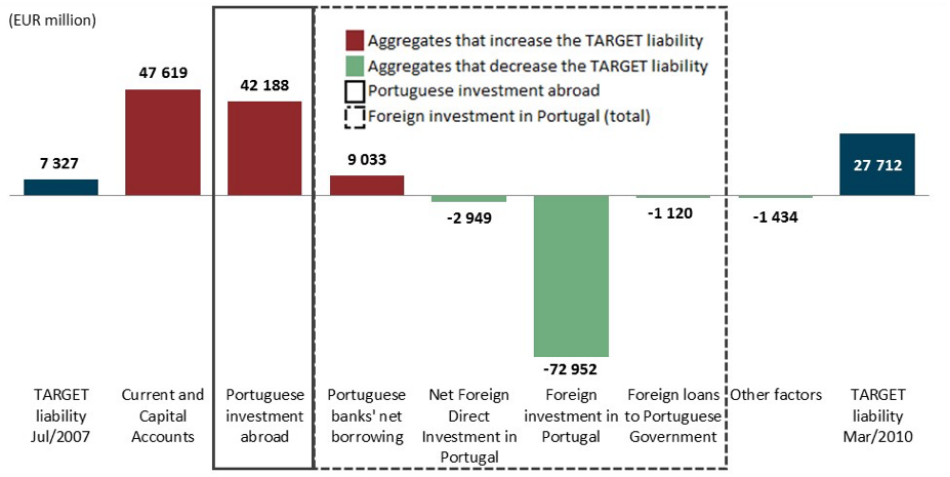
Figure 10: Balance sheet drivers in the financial crisis period

If it is undeniable that there is a link between the loss of market access, the increase in central bank refinancing and the increase in TARGET liabilities, it is also true that the TARGET balance of a NCB reflects only imperfectly the economic reality of the respective country. According to ECB (2011b) this is due to several main reasons. The first is related with multi-country banking groups internal organisation. If the liquidity management is centralised but the recourse to MPO is decentralised, the transfer of MPO funds within the group will impact TARGET balances although not reflecting economic needs of the corresponding countries.

The second refers to the settlement of cross-border payments in commercial bank money. Given that the flows are not settled in central bank money, they are not accounted for in TARGET balances. This happens when a commercial bank holds an account in another commercial bank located in a different jurisdiction and uses that account to perform the payment (the so-called "correspondent banking system"). [28] A third reason refers to euro transactions from banks not connected to the TARGET2 system which resort to the system via accounts at banks holding TARGET2 accounts in euro area NCB. For instance, UK banks historically access the TARGET2 system via the Deutsche Bundesbank and, to a lesser extent, De Nederlandsche Bank (Eisenschmidt *et al.*, 2017). Consequently UK banks' payments affect the TARGET balances of these two NCB for reasons not necessarily related to the economic drivers of Germany or the Netherlands.

During this period, the Eurosystem conducted several reverse liquidity-providing MPO with non-standard maturities, such as the duration of the reserve maintenance period (in 2008), 6 months (in 2008) and 1 year (in 2009). It also introduced the first outright liquidity-providing MPO, i.e. the CBPP1 (in 2009).

Portuguese banks increased the participation in the Eurosystem MPO, first following the Lehman Brothers' bankruptcy, amid a strong loss of confidence environment, and afterwards, in 2009, when the 1-year LTRO was conducted (see Figure A.3 in the Appendix).



Source: Banco de Portugal. Authors' calculations.

Figure 11: Balance of Payments drivers in the financial crisis period

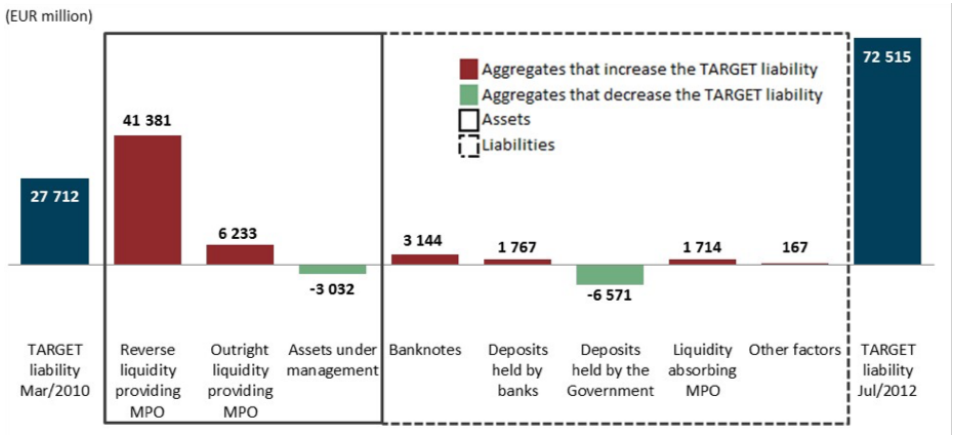
During the financial crisis period, Portugal faced an increase in the Current Account deficit and a decrease in the Capital Account surplus, which combined

28. It can be assumed that the size of these flows has diminished following the financial (and above all sovereign) crisis, given the lack of confidence among institutions.

with smaller but still positive amounts of Portuguese investment abroad resulted in increased needs for foreign financing (Figure 11). However, the foreign private inflows of financing to Portuguese banks contracted and therefore part of the financing previously provided by private inflows had to be replaced by Eurosystem funding. The imbalance between private outflows and inflows in the Balance of Payments led to a circa 20 billion euros increase in the TARGET liability in less than three years.

4.4. The sovereign debt crisis period

In this paper, the sovereign debt crisis period ranges from the second quarter of 2010 until the end of July 2012. We consider the speech of the President of the ECB, on 26 July 2012 (*"Within our mandate, the ECB is ready to do whatever it takes to preserve the euro. And believe me, it will be enough"*) to mark the beginning of the subsequent period of this paper.



Source: Banco de Portugal. Authors' calculations.

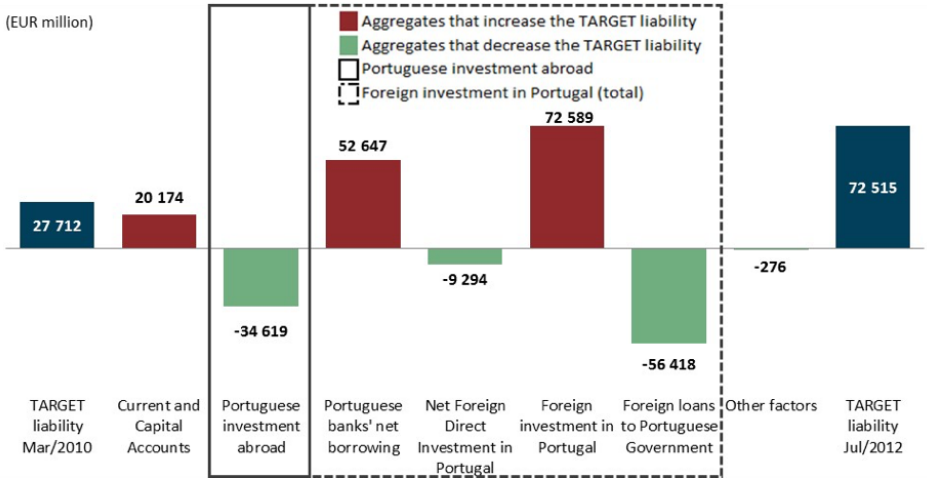
Figure 12: Balance sheet drivers in the sovereign debt crisis period

At the peak of the sovereign debt crisis, amid a high risk aversion environment, segmentation in funding markets became more marked along national boundaries. Banks in lower-rated countries struggled to finance themselves since foreign investors refrained from rolling over their investments (Baldo *et al.*., 2017). The stop of circulation of liquidity among banks, in particular across borders, led to the hoarding of liquidity in certain jurisdictions assessed as safer (which accumulated in this period high TARGET claims), while banks in the jurisdictions under stress heavily participated in the Eurosystem refinancing operations and when used these funds to perform cross-border payments added considerable TARGET liabilities. The increase in these TARGET liabilities was further inflated by the sovereign-banking system nexus and the concerns about the integrity of the monetary union (Cecchetti, McCauley and McGuire, 2012; ECB, 2013). According to these authors,

some banking groups from high-rated countries decided to replace head office funding for subsidiaries established in stressed jurisdictions by local funding, which meant that Eurosystem refinancing was, also in some cases, used to replace intra-group funding.

In this period, the Eurosystem introduced further outright liquidity-providing MPO, namely the SMP (in 2010) and the CBPP2 (in 2011). In addition, it enlarged the scope of reverse liquidity-providing MPO by conducting one further 1-year LTRO (in 2011) and two 3-year LTRO (in 2011 and 2012). Finally, it decreased the minimum reserves coefficient from 2 per cent to 1 per cent (in 2012).

Banco de Portugal TARGET liability increased by 45 billion euros in the sovereign debt crisis period. Again, the noticeable driver of this evolution was Portuguese banks participation in the reverse liquidity-providing MPO, followed by Banco de Portugal outright purchases in the context of the previously mentioned Eurosystem asset purchase programmes. The aggregates Assets under management and deposits held by the Government were the only counteracting the increase in Banco de Portugal TARGET liability (Figure 12). In this latter case, this was due to an increase in the deposits the Government placed with the central bank in the context of the EU/IMF Financial Assistance Programme.



Source: Banco de Portugal. Authors' calculations.

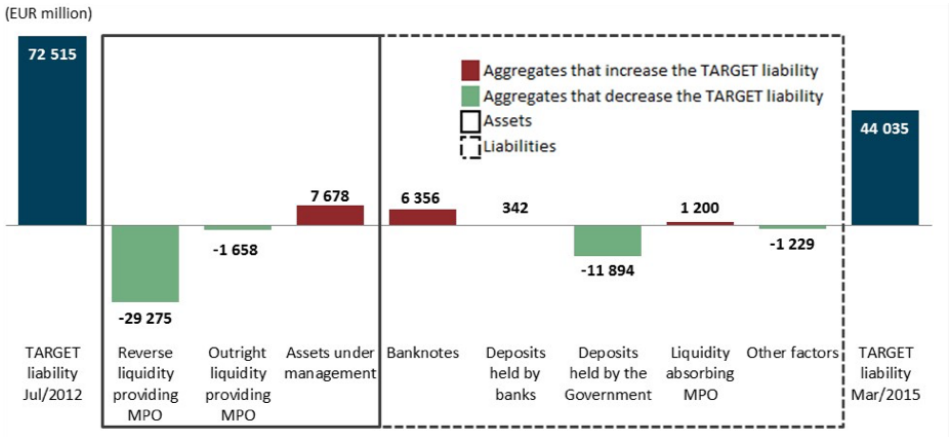
Figure 13: Balance of Payments drivers in the sovereign debt crisis period

The sovereign debt crisis period brought severe adjustments to the Portuguese economy. The Current Account deficit started to decrease due to the reduction of imports and increase in exports which, combined with an increase in the Capital Account surplus, reduced the pressure on the Financial Account (Figure 13). However, the risk concerns regarding Portugal's ability to pay its debt made foreign agents unwilling to keep providing financing to the Portuguese Government and banks. As a consequence, the Financial Account showed a reversal of the private flows that used to finance the Portuguese economy: banks had to repay

their foreign borrowings and foreign investors sold their holdings of Portuguese assets or, at least, did not reinvest the amounts that matured during the period. As a result, massive net outflows of cash occurred due to these two aggregates. Portuguese agents reduced their investments abroad, which provided some liquidity inflow, but not enough to cope with the needs to repay foreign obtained financing. Portugal needed to resort to alternative, mostly public, sources of financing to replace the funds that used to be obtained from private sources: the Portuguese Government requested financial assistance to the EU/IMF (from May 2011 until July 2012 Portugal received EU/IMF funds in the amount of almost 56.5 billion euros) and the Portuguese banks resorted to Eurosystem refinancing. As banks used the Eurosystem refinancing to repay their foreign borrowings, a net outflow of cash which was not offset by corresponding inflows explains why the TARGET liability increased by almost 45 billion euros in only two years.

4.5. The "whatever it takes" period

The "whatever it takes period" goes from the beginning of August 2012 up to the end of February 2015, i.e. before the start of the PSPP. The ECB President's declaration on 26 July 2012 on the commitment of the ECB to preventing the fears about the reversibility of the euro to materialise, as well as the subsequent ECB Governing Council decision to introduce Outright Monetary Transactions (OMT), the modalities of which were announced on September 2012 (although purchases were never conducted), helped to calm down the markets. This was followed by a return of capital flows to countries under stress and a consequent decline of the TARGET liabilities of these countries (ECB, 2013).

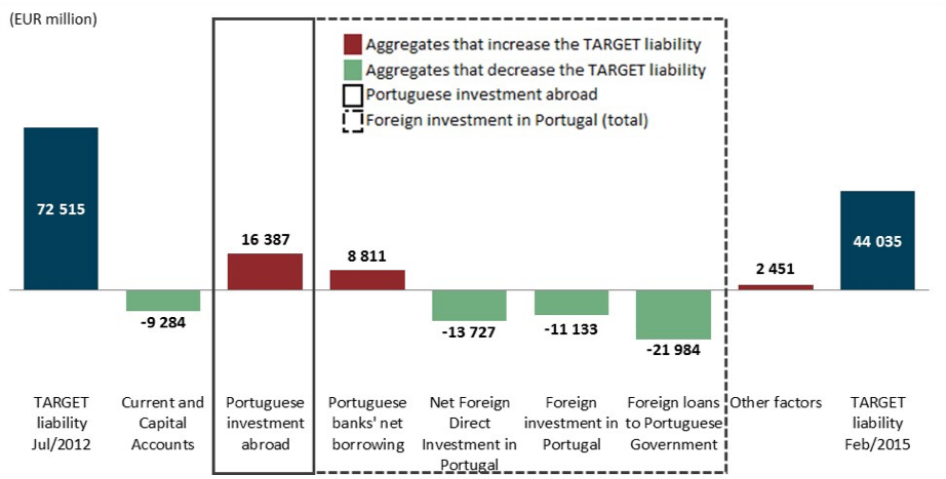


Source: Banco de Portugal. Authors' calculations.

Figure 14: Balance sheet drivers in the "whatever it takes" period

In this period, Banco de Portugal TARGET liability declined by 28.5 billion euros. Figure 14 reveals that the factors contributing to this evolution were

the decrease in reverse liquidity-providing MPO by 29 billion euros, mostly due to the early repayments of the 3-year LTRO as from January 2013, and the increase in deposits held by the Government, mainly due to the continuing inflows associated with the EU/IMF Financial Assistance Programme. The main balance sheet aggregates which partially offset the decrease in the TARGET liability were the increase in Assets under management by Banco de Portugal and the decrease in banknotes.



Source: Banco de Portugal. Authors' calculations.

Figure 15: Balance of Payments drivers in the "whatever it takes" period

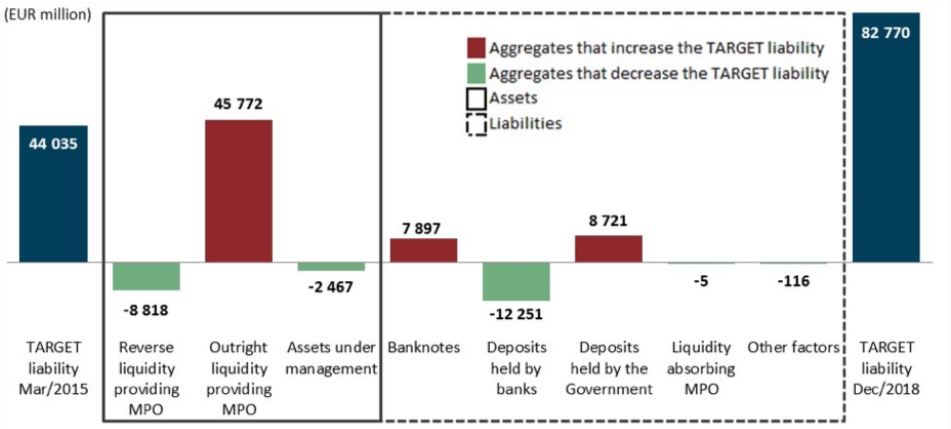
During this period Portuguese banks were still not able to find enough private financing to their needs and Portuguese agents resumed the investment abroad. However, the Current Account balance reverted from deficit to surplus, mostly due to the positive behaviour of exports, and several Financial Account private and public flows also resulted in net inflows of cash: the EU/IMF Financial Assistance Programme provided external financing to the Government, foreign investors started reinvesting in Portugal, although at smaller levels, and Net Foreign Direct Investment in Portugal also represented a relevant inflow. These changes combined led to the observed reduction in the TARGET liability (Figure 15).

4.6. The PSPP period

The last period analysed in this paper goes from March 2015 up to the end of December 2018. The period starts in March 2015 since this was the month in which PSPP purchases began (and the PSPP had a prominent role on the path of Banco de Portugal TARGET balance). However, the PSPP was one measure within a package of Eurosystem actions to accomplish its price stability mandate, some of which were implemented in the "whatever it takes period". In fact, the

CBPP3, the ABSPP and the TLTRO were initiated in 2014. Afterwards, the PSPP was launched in 2015, and the CSPP and the TLTRO-II in 2016.

In this period, Banco de Portugal TARGET liability reverted the descending path observed in the previous one, and increased by almost 39 billion euros.



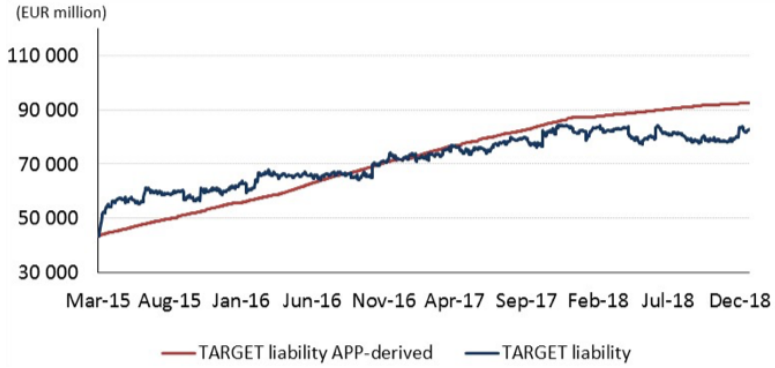
Source: Banco de Portugal. Authors' calculations.

Figure 16: Balance sheet drivers in the PSPP period

Contrary to what was observed in the three previous periods, Portuguese banks participation in the reverse liquidity-providing MPO was not the driver of the evolution of Banco de Portugal TARGET liability. Banks mostly replaced MRO, 3-month LTRO and TLTRO funds by TLTRO-II funds, but in aggregate the total outstanding amount decreased by around 8.8 billion euros. The increase in deposits held by banks and the decrease in Assets under management also did not contribute to the increase in Banco de Portugal liability (Figure 16).

The evident driver of the evolution of Banco de Portugal TARGET balance was the increase in the outright liquidity-providing MPO, in particular, Banco de Portugal purchases under the PSPP (see Figure A.4 in the Appendix for the complete picture of the several Eurosystem asset purchase programmes booked in Banco de Portugal balance sheet). If only outright liquidity-providing MPO were considered, Banco de Portugal TARGET liability would in fact be even higher (see Figure 17), which corroborates the finding that, in this period, other factors such as those previously mentioned partially counterbalanced the increase.

To a minor extent, the decreases in banknotes and deposits held by the Government, in the latter case mostly due to the repayments to the IMF, also contributed to the increase in Banco de Portugal TARGET liability.



Source: Banco de Portugal. Authors' calculations.

Figure 17: Banco de Portugal TARGET liability APP-derived[a]

a. The chart is based on transaction data from the APP. The TARGET liability APP-derived is computed as follows: TARGET liability before the beginning of the PSPP plus all purchases under the CBPP3 and the PSPP by Banco de Portugal, less the redemptions of the CBPP3 and PSPP, less the purchases made by other euro area central banks to counterparties established in Portugal.

The decentralised implementation of the APP,[29] the financial structure and landscape of the euro area, with banks with business models that attract the largest excess of liquidity holdings predominantly located in certain jurisdictions, and the concentration of international banking services in particular financial centres that act as gateways between the euro area and the rest of the world, strongly impact cross-border flows and, consequently, TARGET balances (Auer and Bogdanova, 2017; ECB, 2017; Eisenschmidt *et al.*, 2017). The APP affects TARGET balances both at the settlement (i.e. when securities are exchanged for payments) and afterwards due to the portfolio rebalancing of sellers or owners of the securities purchased by the Eurosystem.

Contrary to what happens in the reverse liquidity-providing MPO, in which the counterparties have to be obligatorily established in the jurisdiction of the NCB, central banks can purchase APP securities from foreign counterparties. According to Eisenschmidt *et al.* (2017) around 80 per cent of APP purchases have been from counterparties located in a jurisdiction other than that of the purchasing central bank, while around 50 per cent of the purchases have been from counterparties resident outside the euro area, mostly in the UK.

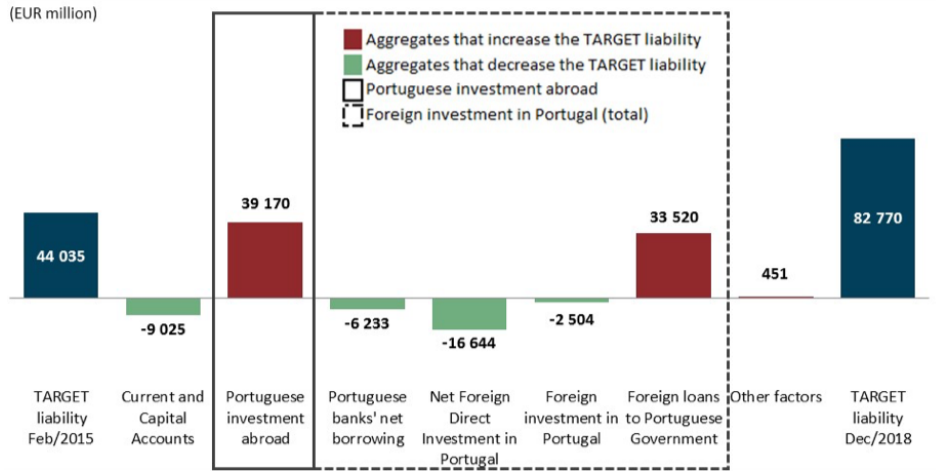
Furthermore, the purchases are settled with custodians and clearing entities located, most of the times, in a different euro area country. In fact, the large international custodian banks have their main settlement accounts in very few euro area countries, mostly Belgium and Luxembourg, which gives rise to cross-border flows with impact in NCB TARGET balances.

29. To note, the ECB also makes purchases, and that is the reason why it accumulates a TARGET liability, as all purchases are considered to be cross-border.

In addition, the location of the TARGET2 system account of the seller is also a factor to take into consideration when considering APP-induced cross-border flows, since as custodians and clearers typically discourage large holdings of liquidity on their customers' accounts, the liquidity is normally invested again or moved to the institutions' TARGET2 system account.

In other words, since it is roughly impossible, in technical terms (i.e. using TARGET2 system data), to track the APP liquidity (as although the settlement of the purchase is easily identified, the subsequent flows are not), the location of the counterparty, custodian and TARGET2 system accounts might be indicative (but merely indicative) of where the APP liquidity accumulates in the end.

In the specific case of Banco de Portugal, given that the great majority of the Portuguese Government Debt Primary Dealers are foreign institutions,[30] the fact that Banco de Portugal performed the bulk of APP purchases with counterparties located abroad is not a surprising result. Furthermore, due to the infrastructural landscape of the euro area, the purchases were mostly settled with custodians and clearing entities located outside Portugal. Finally, most of the sellers hold their TARGET2 system accounts abroad. All three factors gave rise to important cross-border outflows, with impact in Banco de Portugal TARGET liability. The increasing trend of Banco de Portugal TARGET liability since the onset of the PSPP is an indicator that the bulk of liquidity created by Banco de Portugal with its asset purchases did not return to the country.



Source: Banco de Portugal. Authors' calculations.

Figure 18: Balance of Payments drivers in the PSPP period

Now turning to the analysis of Balance of Payments aggregates, Portuguese investments abroad increased, thus representing an outflow of cash from the

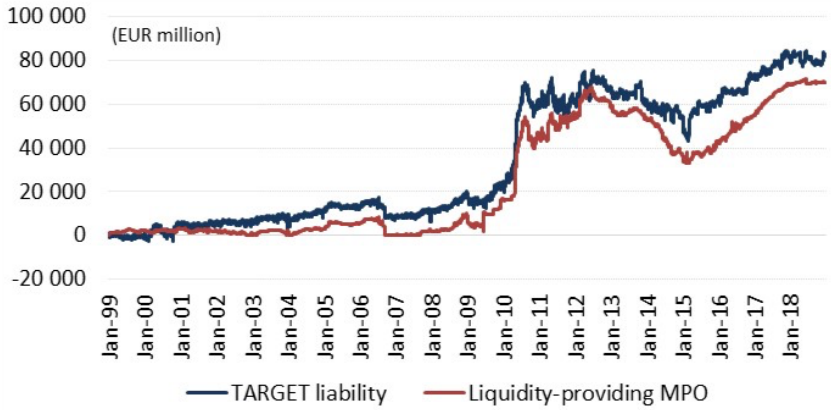
30. See https://www.igcp.pt/en/1-4-399/market-participants/oevt-and-omp/.

country. Furthermore, during this period Portugal was no longer receiving inflows from the EU/IMF Financial Assistance Programme, which ended in June 2014. The Portuguese Government was able to gradually recover access to market financing and started repaying the IMF debt, resulting in cash outflows. The remaining aggregates resulted in inflows of cash for the Portuguese economy: the Current and Capital Accounts presented surpluses, but smaller than in the previous period, Net Foreign Direct Investment in Portugal increased vis-à-vis the previous period and both Portuguese banks and the rest of the economic agents received net inflows of cash (Figure 18).

To note, the aggregate foreign investment in Portugal includes, among other items, the holdings of Portuguese Government securities by foreign investors. Figure A.5 in the Appendix shows that these holdings did not show a sharp and steady reduction since March 2015, which may signal that the purchase of Portuguese Government securities by Banco de Portugal under the PSPP from non-residents was partially compensated by foreign agents' reinvestment in Portuguese Public debt.

4.7. The analysis of Banco de Portugal TARGET balance in a nutshell

Following the analysis performed in the previous Sections, with the breakdown per sub period, this Section highlights a few general findings resultant from the observation of the evolution of Banco de Portugal TARGET balance in the overall horizon of 20 years.



Source: Banco de Portugal. Authors' calculations.

Figure 19: Banco de Portugal TARGET liability and liquidity-providing MPO[a]

a. TARGET liability shown with the opposite sign.

Figure 19 systematises the first main conclusion, i.e. that the evolution of Banco de Portugal TARGET liability is highly related with the evolution of the total liquidity-providing MPO, comprising both the reverse and the outright MPO.

Source: Banco de Portugal. Authors' calculations.

Figure 20: Banco de Portugal TARGET liability and the 10 years PT-DE yield spread[a]

a. TARGET liability shown with the opposite sign.

Source: Banco de Portugal. Authors' calculations.

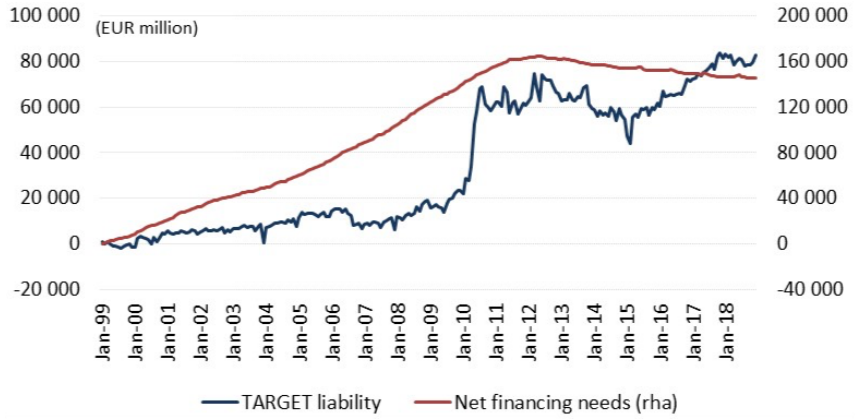
Figure 21: Banco de Portugal TARGET liability and the ICSF[a]

a. TARGET liability shown with the opposite sign.

The second main finding is that while the increase in Banco de Portugal TARGET liability in 2011/2012 was almost entirely demand-driven, as banks substituted market-based funding with central bank refinancing due to the prevailing euro area fragmentation and deteriorating bank funding markets, the increase from 2015 onwards is mostly supply-driven. In other words, this increase in Banco de Portugal TARGET liability largely reflects the cross-border payments that arise in the context of the APP in an integrated euro area financial market and does not seem to be indicative of increased financial market stress or unstainable Balance of Payments developments.

Figure 20 and Figure 21 compare the evolution of Banco de Portugal TARGET liability with two indicators of financial markets stress: the 10-years yield spread between Portugal and Germany and the Composite Indicator of Financial Stress for Portugal (ICSF) developed by Braga, Pereira and Reis (2014).[31]

Both stress indicators show that there is no clear relation with the accumulation of TARGET liabilities by Banco de Portugal. While both indicators were high in the financial and sovereign debt crises, when the TARGET liability increased, in the PSPP period, in which the TARGET liability also had an increasing trend, both stress indicators present low levels.



Source: Banco de Portugal. Authors' calculations.

Figure 22: Banco de Portugal TARGET liability and the Portuguese economy net financial needs [a]

a. TARGET liability shown with the opposite sign. Net financial needs (accumulated since January 1999) computed as the symmetric of the Current and Capital Accounts. If net financial needs are positive (negative), the Current and Capital Account are, in aggregate, in deficit (surplus).

Finally, the third conclusion that can be drawn is that there is no time-invariant causal link between Banco de Portugal TARGET liability and the net financing needs of the Portuguese economy (Figure 22). Before the financial crisis the net financing needs were elevated, although the TARGET liability was small, since cross-border inflows strongly compensated the associated outflows. Therefore, a low TARGET liability coexisted with the accumulation of macroeconomic imbalances and the increase in external indebtedness. With the financial and, above all, sovereign debt crises these outflows were no longer offset by private inflows which led to the increase in Eurosystem refinancing (and associated TARGET liability)

31. The ICSF results from the aggregation of five sub-indices from the money market, bond market, equity market, financial intermediaries and foreign exchange market into a composite indicator, using portfolio theory (where the sub-indices aggregation reflects their time-varying cross-correlation structure). The ICSF tries to identify the most relevant stress events and to measure the financial stress level in Portuguese financial markets since 1999.

to compensate for the decrease in private funds. In turn, in the PSPP period, although Banco de Portugal TARGET liability increased, the net financing needs of the Portuguese economy decreased, in part associated with the deleveraging of the banking system and the correction of some macroeconomic imbalances.

5. Empirical evidence on Banco de Portugal TARGET balance

5.1. Data and methodology

In this Section we aim at corroborating, using an empirical analysis, the conclusions reached in the previous Section. For that purpose we estimate – and verify the statistical significance of – the correlation between Banco de Portugal TARGET liability and the components of (i) Banco de Portugal balance sheet and (ii) the Portuguese Balance of Payments, deemed more relevant according to the analysis performed in Section 4. We demonstrate, empirically, the extent to which the timing of certain aggregates coincides with the evolution of Banco de Portugal TARGET liability.[32]

VARIABLES	Obs	Mean	Std. Dev.	Min	Max
TARGET liability	240	33 916	29 212	-1 773	83 909
Liquidity-providing MPO	240	25 207	25 825	89	71 031
Assets under management	240	19 686	3 711	12 317	27 614
Banknotes	240	-1 101	6 990	-17 777	6 921
Deposits held by banks	240	4 093	2 582	1 347	15 431
Deposits held by the Government	240	4 340	5 800	0	18 466
Liquidity-absorbing MPO	240	1 407	1 753	0	8 132

Source: Banco de Portugal. Authors' calculations.

Table 1. Descriptive statistics for the balance sheet items

We use monthly data on the items of the balance sheet and the Balance of Payments, from January 1999 to December 2018, provided by Banco de Portugal.

Table 1 shows the descriptive statistics for the variables included in the dataset concerning the balance sheet items.[33]

32. Our starting point was the analysis performed by Auer (2012).

33. To note, the liquidity-providing MPO include both reverse and outright MPO.

	TARGET liability	Liquidity-providing MPO	Assets under management	Banknotes	Deposits held by banks	Deposits held by the Government	Liquidity-absorbing MPO
TARGET liability	1						
Liquidity-providing MPO	0.5986***	1					
Assets under management	0.2058***	0.0066	1				
Banknotes	0.0034	0.1584**	0.0156	1			
Deposits held by banks	-0.2388***	0.1117*	0.0145	0.3249***	1		
Deposits held by the Government	-0.5217***	-0.0372	-0.0175	-0.2554***	-0.2653***	1	
Liquidity-absorbing MPO	-0.1730***	0.1686***	-0.0613	0.1229*	-0.0613	-0.1775***	1

*** p<0.01, ** p<0.05, * p<0.1

Table 2. Pairwise correlations among the balance sheet items

Table 2 shows that the TARGET liability is highly correlated with all the variables except the banknotes. Moreover, with a few exceptions, the remaining variables are not very much correlated with each other. Thus, we can estimate the correlation between the TARGET liability and each of the variables with a one-by-one estimation.

First, we estimate the correlation of each item with the TARGET liability for the entire period under analysis with the following OLS regression:

$$\Delta TARGET_t = \alpha + \beta BSflows_t + \sum_{T=2}^{5} \gamma_T \Phi_T + \epsilon_t \tag{7}$$

where $\Delta TARGET_t$ represents the change in the TARGET liability in relation to the previous month, $BSflows_t$ is the change in the balance sheet item under analysis in relation to the previous month, Φ_T is a dummy equal to 1 when T corresponds to sub period i (i = 2, 3, 4 and 5) and ϵ_t is an error term. The sub periods are defined as follows: 2 is the financial crisis period, 3 is the sovereign debt crisis period, 4 is the "whatever it takes" period and 5 is the PSPP period.

In a second approach, we perform a structural break analysis in order to infer what drives the TARGET liability in each sub period. To do so, we include the interaction between the balance sheet item and each of the dummies for each of the five sub periods.[34] Thus, we estimate the following OLS regression:

$$\Delta TARGET_t = \alpha + \sum_{T=1}^{5} \beta_T \Phi_T BSflows_t + \sum_{T=2}^{5} \gamma_T \Phi_T + \epsilon_t \tag{8}$$

34. However, the liquidity-absorbing MPO variable was not included in the analysis for the last two sub periods as the participation of Portuguese banks in these operations was very limited.

where Φ_T is a dummy equal to 1 when T corresponds to sub period i ($i = 1$, 2, 3, 4 and 5). The sub periods are defined as follows: 1 is the pre-crisis period, 2 is the financial crisis period, 3 is the sovereign debt crisis period, 4 is the "whatever it takes" period and 5 is the PSPP period.

VARIABLES	Obs	Mean	Std. Dev.	Min	Max
TARGET liability	240	33 916	29 212	-1 773	83 909
Current and Capital Accounts	240	-606	781	-2 472	1 419
Portuguese investment abroad	240	732	1 679	-7 273	5 737
Portuguese banks' net borrowing	240	63	2 273	-10 906	7 425
Net Foreign Direct Investment in Portugal	240	-174	996	-7 886	4 154
Foreign investment in Portugal	240	555	2 619	-14 146	6 876
Foreign loans to Portuguese Government	240	206	1 707	-6 845	11 767

Table 3. Descriptive statistics for the Balance of Payments components

We follow an analogous approach for the Balance of Payments. Table 3 shows the descriptive statistics for the variables included in the dataset concerning the Balance of Payments components.

	TARGET liability	Current and Capital Accounts	Portuguese investment abroad	Portuguese banks' net borrowing	Foreign Direct Investment in Portugal	Foreign investment in Portugal	Foreign loans to Portuguese Government
TARGET liability	1						
Current and Capital Accounts	-0.0469	1					
Portuguese investment abroad	0.1248*	-0.1190*	1				
Portuguese banks' net borrowing	-0.4073***	-0.0929	0.3392***	1			
Net Foreign Direct Investment in Portugal	0.0946	-0.0744	-0.1127*	0.1305**	1		
Foreign investment in Portugal	-0.4485***	-0.2315***	0.3509***	0.007	0.1139*	1	
Foreign loans to Portuguese Government	-0.3849***	-0.0506	-0.2592***	-0.1538**	-0.0142	-0.2109***	1

*** p<0.01, ** p<0.05, * p<0.1

Table 4. Pairwise correlations among the Balance of Payments components

Table 4 shows that the TARGET liability is highly correlated with Portuguese banks' net borrowing, foreign investment in Portugal and foreign loans to the Portuguese Government, as well as marginally correlated with the Portuguese investment abroad. Moreover, the remaining variables are not very much correlated with each other, so we estimate the correlation between the TARGET liability and each of the variables with a one-by-one estimation.

First, we estimate the correlation of each item with the TARGET liability for the entire period under analysis using the following OLS regression:

$$\Delta TARGET_t = \alpha + \beta BoPflows_t + \sum_{T=2}^{5} \gamma_T \Phi_T + \epsilon_t \quad (9)$$

where $\Delta TARGET_t$ represents the change in TARGET liability in relation to the previous month, $BoPflows_t$ is the Balance of Payments flow under analysis, Φ_T is a dummy equal to 1 when T corresponds to sub period i (i = 2, 3, 4 and 5) and ϵ_t is an error term. The sub periods are defined as in equation (7).

In a second approach, we also perform a structural break analysis, including the interaction between the Balance of Payments component and each of the dummies for each of the five sub periods. Thus, we estimate the following OLS regression:

$$\Delta TARGET_t = \alpha + \sum_{T=1}^{5} \beta_T \Phi_T BoPflows_t + \sum_{T=2}^{5} \gamma_T \Phi_T + \epsilon_t \quad (10)$$

where Φ_T is a dummy equal to 1 when T corresponds to sub period i (i = 1, 2, 3, 4 and 5). The sub periods are defined as in equation (8).

5.2. Empirical analysis

The first set of empirical results concerns the correlation between the TARGET liability and each of the balance sheet items.

VARIABLES	(1) Liquidity-providing MPO	(2) Assets under management	(3) Banknotes	(4) Deposits held by banks	(5) Deposits held by the Government	(6) Liquidity-absorbing MPO
1999:01-2018:12	0.8465***	1.3513***	0.0549	-0.5238***	-0.7318***	-0.4851***
	(0.0799)	(0.3404)	(0.6202)	(0.1334)	(0.0764)	(0.1729)
Time controls	YES	YES	YES	YES	YES	YES
Observations	240	240	240	240	240	240
R-squared	0.359	0.111	0.051	0.110	0.318	0.082

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
The regression also includes four sub period dummies and a constant term.

Table 5. Correlation between the TARGET liability and the balance sheet items

Table 5 shows the results for the OLS regression of equation (7), where we find statistically significant correlations between the TARGET liability and all the selected variables, except the banknotes. Thus, considering the 20-year period under analysis, we conclude that the increase in liquidity-providing MPO and Assets under management and the decrease in liquidity-absorbing MPO seem to have contributed to the increase in Banco de Portugal TARGET liability. These results seem to indicate that banks used the liquidity obtained in liquidity-providing

MPO and the money reimbursed from liquidity-absorbing MPO to make cross-border transactions. In contrast, the increase in deposits held by banks and by the Government seem to partially offset the increase in the TARGET liability.

VARIABLES	(1) Liquidity-providing MPO	(2) Assets under management	(3) Banknotes	(4) Deposits held by banks	(5) Deposits held by the Government	(6) Liquidity-absorbing MPO
1999:01-2007:07	0.2437	0.7685*	-1.8521**	-0.9054***	-0.4166	-1.0153
	(0.3035)	(0.4630)	(0.8300)	(0.1871)	(0.7146)	(1.1944)
2007:08-2010:03	0.0540	0.3193	-1.0913	-1.4399***	-7.1441	-0.7664***
	(0.2519)	(1.3269)	(1.6359)	(0.5534)	(58.0509)	(0.2315)
2010:04-2012:07	1.0175***	5.7154***	6.9052***	0.8987	-0.9795***	0.1827
	(0.0905)	(0.9538)	(1.8472)	(0.6225)	(0.1335)	(0.3685)
2012:08-2015:02	0.8009**	1.1572*	1.2935	0.2627	-0.5914***	-
	(0.3163)	(0.6909)	(1.9331)	(0.6040)	(0.1479)	
2015:03-2018:12	0.6589*	0.2138	2.1394	-0.1593	-0.6315***	-
	(0.3699)	(1.0236)	(1.5594)	(0.2126)	(0.1209)	
Time controls	YES	YES	YES	YES	YES	YES
Observations	240	240	240	240	240	240
R-squared	0.405	0.196	0.133	0.170	0.334	0.102

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
The regression also includes four sub period dummies and a constant term.

Table 6. Correlation between the TARGET liability and the balance sheet items for each sub period

Table 6 presents the results for the OLS regression of equation (8). In the pre-crisis period, we find statistically significant correlations between the TARGET liability and banknotes and deposits held by banks, as well as a marginally statistically significant correlation between the TARGET liability and Assets under management. Thus, the increase in Assets under management and the decrease in banknotes seem to have contributed to the increase in TARGET liability, while the increase in deposits held by banks seem to have partially compensated the increase in the TARGET liability.

The results for the financial crisis period show statistically significant impacts of deposits held by banks and liquidity-absorbing MPO on TARGET liability. Therefore, in this period, the results seem to suggest that the decrease in deposits held by banks has contributed to the increase in the TARGET liability, while the increase in liquidity-absorbing MPO seem to have partially offset it.

Regarding the sovereign debt crisis period, the results present statistically significant correlations for liquidity-providing MPO, Assets under management, banknotes and deposits held by the Government, although the positive coefficient of banknotes is a puzzling result. Therefore, the results seen to indicate that the increase in liquidity-providing MPO has contributed to the increase in the TARGET liability. However, the decrease in the Assets under management and the increase in deposits held by the Government, especially due to the liquidity received from the EU/IMF, seem to have contributed to offset some of the increase in the TARGET liability.

The results for the "whatever it takes period" show statistically significant correlations between the TARGET liability and liquidity-providing MPO and deposits held by the Government, as well as a marginally statistically significant correlation between the TARGET liability and Assets under management. In this period, the decrease in liquidity-providing MPO and the increase in deposits held by the Government seem to have contributed to the decrease in the TARGET liability, slightly compensated by the increase in Assets under management.

For the PSPP period, the results present statistically significant correlations for deposits held by the Government and marginally statistically significant correlation for liquidity-providing MPO. Therefore, the increase in liquidity-providing MPO and the decrease in deposits held by the Government seem to have contributed to the considerable increase in the TARGET liability.

The second set of empirical results concerns the correlation between the TARGET liability and each of the Balance of Payments components.

VARIABLES	(1) Current and capital accounts	(2) Portuguese investment abroad	(3) Portuguese banks' net borrowing	(4) Net Foreign Direct Investment in Portugal	(5) Foreign investment in Portugal	(6) Foreign loans to Portuguese Government
1999:01-2018:12	-0.1215	0.4026***	-0.5638***	0.3182	-0.6135***	-0.9182***
	(0.4090)	(0.1275)	(0.0847)	(0.1987)	(0.0768)	(0.1136)
Time controls	YES	YES	YES	YES	YES	YES
Observations	240	240	240	240	240	240
R-squared	0.052	0.090	0.202	0.062	0.255	0.258

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
The regression also includes four sub period dummies and a constant term.

Table 7. Correlation between the TARGET liability and the Balance of Payments components

Table 7 shows the results for the OLS regression of equation (9) for the full sample period, presenting statistically significant correlations for Portuguese investment abroad, Portuguese banks' net borrowing, foreign investment in Portugal and foreign loans to Portuguese Government. We find no statistically significant correlations for the Current and Capital Accounts and Net Foreign Direct Investment in Portugal.

Therefore, the increase in Portuguese investment abroad seems to have contributed to the increase in the TARGET liability, as it represents an outflow in cross-border transactions. However, the inflows that resulted from the increase in Portuguese banks' net borrowing, foreign investment in Portugal and foreign loans to Portuguese Government seem to have partially compensated the increase in the TARGET liability.

VARIABLES	(1) Current and capital accounts	(2) Portuguese investment abroad	(3) Portuguese banks' net borrowing	(4) Net Foreign Direct Investment in Portugal	(5) Foreign investment in Portugal	(6) Foreign loans to Portuguese Government
1999:01-2007:07	-0.5510	0.2669	-0.3702**	-0.2263	-0.3362**	0.0865
	(0.7461)	(0.2234)	(0.1431)	(0.3977)	(0.1455)	(0.4736)
2007:08-2010:03	0.9213	0.1442	-0.5907***	0.0242	-0.2385	-0.7369
	(1.5133)	(0.2931)	(0.1929)	(1.3653)	(0.2087)	(0.7129)
2010:04-2012:07	-0.7019	0.4040	-0.8752***	1.0994***	-0.9667***	-0.8806***
	(0.8068)	(0.2767)	(0.1624)	(0.3097)	(0.1374)	(0.1379)
2012:08-2015:02	1.9325	0.7624*	-0.4707*	0.0765	-0.5706***	-1.2766***
	(1.2756)	(0.3886)	(0.2628)	(0.4114)	(0.1823)	(0.3933)
2015:03-2018:12	-0.1558	0.7372**	-0.4231	-0.7204	-0.7941***	-1.2620***
	(0.7927)	(0.3173)	(0.2850)	(0.5775)	(0.2049)	(0.2767)
Time controls	YES	YES	YES	YES	YES	YES
Observations	240	240	240	240	240	240
R-squared	0.068	0.102	0.222	0.108	0.298	0.280

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
The regression also includes four sub period dummies and a constant term.

Table 8. Correlation between the TARGET liability and the Balance of Payments components for each sub period

Table 8 presents the results for the OLS regression of equation (10). In the pre-crisis period, the results are statistically significant for Portuguese banks' net borrowing and foreign investment in Portugal. Therefore, the increase in banks' net borrowing and foreign investment in Portugal seem to have partially compensated the increase in the TARGET liability observed during the pre-crisis period.

For the financial crisis period, the results are statistically significant for Portuguese banks' net borrowing. Thus, the decrease in this item seems to have contributed to the increase in the TARGET liability observed during the period.

The results for the sovereign debt crisis period show statistically significant correlations for Portuguese banks' net borrowing, Net Foreign Direct Investment in Portugal, foreign investment in Portugal and foreign loans to Portuguese Government. Thus, the decrease in Portuguese banks' net borrowing and foreign investment in Portugal seem to have contributed to the increase in the TARGET liability. In contrast, the increase in Net Foreign Direct Investment in Portugal and foreign loans to Portuguese Government (funds received under the EU/IMF Financial Assistance Programme) seem to have partially compensated the increase in the TARGET liability.

The results for the "whatever it takes" period present statistically significant correlations for foreign investment in Portugal and foreign loans to Portuguese Government and marginally statistically significant correlation for Portuguese investment abroad and Portuguese banks' net borrowing. Thus, the increase in foreign investment in Portugal and foreign loans to Portuguese Government seem to have contributed to the decrease in the TARGET liability verified in this period. This decrease was slightly compensated by the increase in Portuguese investment abroad and the decrease in Portuguese banks' net borrowing.

The results for the PSPP period show statistically significant correlations for Portuguese investment abroad, foreign investment in Portugal and foreign loans to

Portuguese Government. Therefore, the increase in Portuguese investment abroad and the decrease in foreign loans to Portuguese Government (repayments to the IMF) seem to have contributed to the increase in the TARGET liability, partially compensated by the increase in foreign investment in Portugal.

6. Conclusions

In this paper we have studied the drivers of the rising liability booked under Banco de Portugal balance sheet related to intra-Eurosystem responsibilities arising from cross-border flows via the TARGET2 payment system. The analysis performed has followed two different perspectives, namely the Banco de Portugal balance sheet and the Portuguese Balance of Payments.

As for Banco de Portugal balance sheet perspective, we have concluded that the noticeable driver of the increase in the TARGET liability was the conduction of the liquidity-providing MPO, both reverse operations, like the 3-years LTRO and the TLTRO/TLTRO-II, and outright operations, like the APP. However, even if always linked to the MPO, the nature of the factors underlying the rising TARGET liability evolved over time.

In the financial and sovereign debt crises periods, the evolution reflects an elevated fragmentation and market stress in the euro area, which led Portuguese banks to participate in the Eurosystem refinancing operations to replace private sources of funding that had dried up. When Portuguese banks used the funds obtained to make cross-border payments, to (mainly) repay wholesale borrowings which banks were not able to rollover, the TARGET liability increased. Consequently, the impact on the TARGET liability of Portuguese banks participation in the reverse MPO was indirect.

However, in the PSPP period, the outright purchase of assets by Banco de Portugal had a direct impact on the TARGET liability. Due to the integrated structure of financial markets in Europe, the purchase and the settlement of the assets was not confined to national borders. Banco de Portugal purchased the bulk of the securities from foreign counterparties and settled the purchases using cash accounts held abroad, giving rise to an increase in the TARGET liability. The persistence of the high TARGET liability afterwards indicates that the circulation of liquidity associated with portfolio rebalancing has been insufficient to correct the outflow of liquidity caused by the initial settlement of the APP. However, contrary to what was verified in the financial and sovereign debt crises periods, the increase in Banco de Portugal TARGET liability in the PSPP period seems to be independent of financial market stress.

As for the Balance of Payments perspective, we found no time-invariant link between Banco de Portugal TARGET liability and the net financing needs of the Portuguese economy. In the pre-crisis period, Portugal ran high Current Account deficits and invested in foreign assets but the Portuguese economy managed to find private financing from foreign agents. These foreign inflows almost fully offset

the outflows, resulting in a relatively small TARGET liability. In contrast, in the sovereign debt crisis period, the Current Account deficit started to decrease but foreign agents became unwilling to keep providing financing to Portuguese agents and as a consequence massive net outflows of cash occurred to repay their foreign borrowings, leading to an increase in the TARGET liability. Unlike during the sovereign debt crisis, the growth in Banco de Portugal TARGET liability since 2015 does not reflect major capital outflows arising from divestment by non-residents. In this period, major cross-border outflows due to the repayment to the IMF in the context of the EU/IMF Financial Assistance Programme coexisted with a recovery in the Current Account and a reinvestment by foreign agents in Portuguese debt, as the stock of foreign holdings did not show a sharp and steady decrease. Furthermore, during this period, Portugal's sovereign debt spread over Germany has remained relatively stable at reduced levels.

A high level of excess liquidity is a necessary condition for large, growing and persistent TARGET balances, regardless of whether excess liquidity creation is demand-driven or supply-driven. Consequently, going forward, a decrease in Banco de Portugal TARGET liability might come together with a decrease in the euro area excess liquidity.

However, in the next few years, some factors might lead Banco de Portugal TARGET liability to increase further. First, if new or renewed monetary policy measures lead to an increased participation by Portuguese banks and/or to a higher transfer of funds abroad, this might impact Banco de Portugal TARGET liability. Second, the repayment schedule of the EU/IMF Financial Assistance Programme will translate into cross-border outflows. Finally, if the value of banknotes returned to Banco de Portugal continues to exceed the value of banknotes put into circulation and if the Portuguese banks do not keep the related funds in their deposit accounts with Banco de Portugal, this can also translate into continuing net cross-border outflows.

On the contrary, if in the near future euro area fragmentation decreases and confidence continues to recover, foreign investors might increase their holdings of Portuguese assets and their lending in the interbank market, which might counteract the increase in the TARGET liability.

In any case, none of the reasons stated for the potential increase in the TARGET liability seem to signal renewed financial stress or unsustainable Balance of Payments developments. Moreover, any considerations on the future evolution of Banco de Portugal TARGET liability cannot be isolated from the analysis of other intra-Eurosystem positions, recorded in the asset side of Banco de Portugal balance sheet and mainly related to banknotes in circulation, which offset a considerable part of the TARGET liability.

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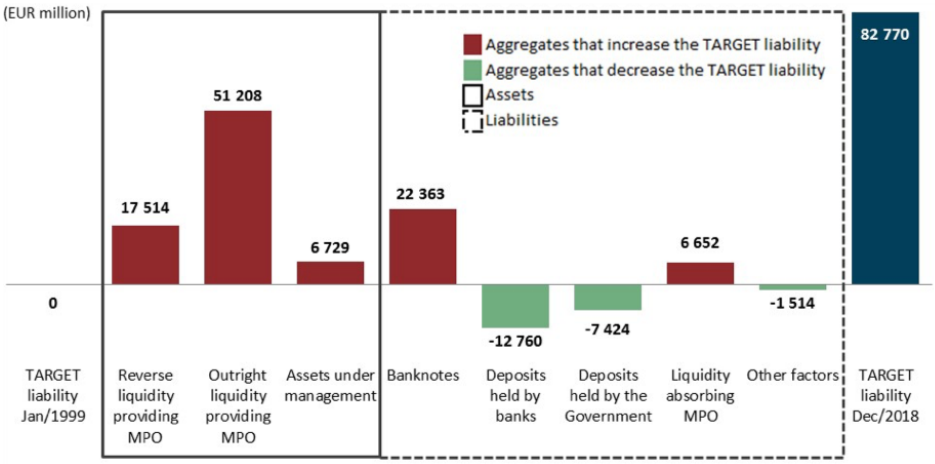
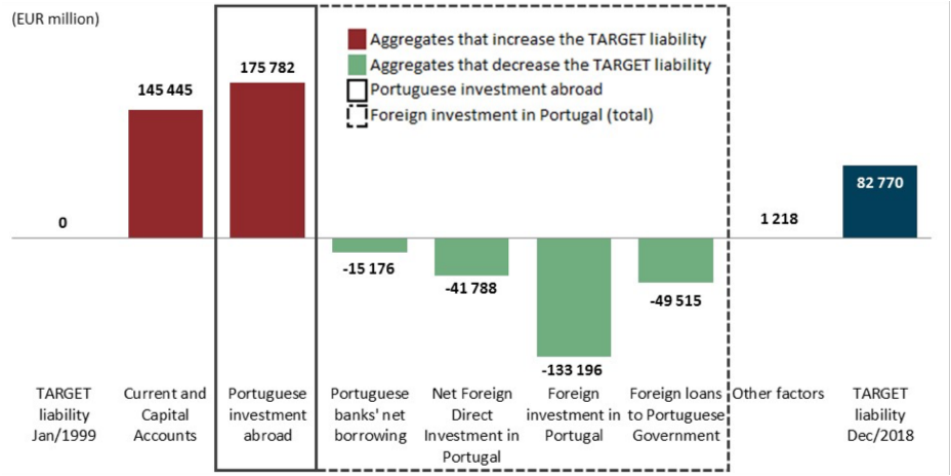
Appendix



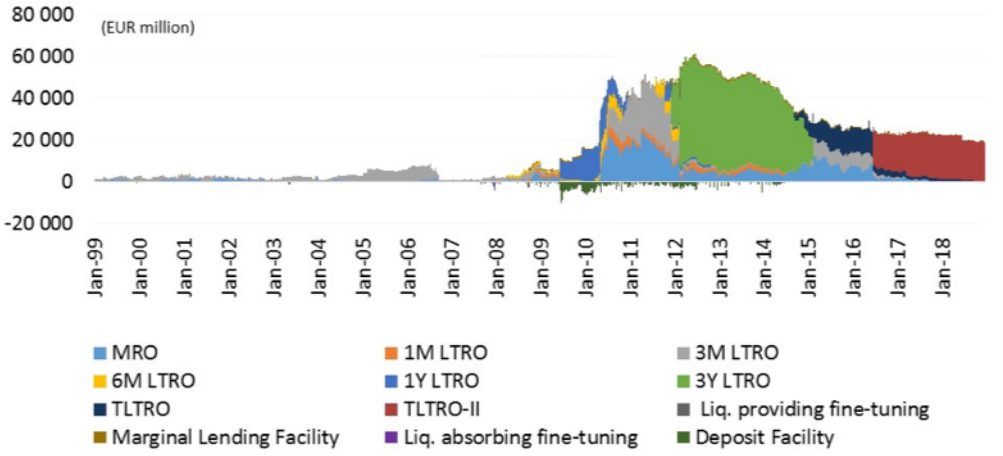
Source: Banco de Portugal. Authors' calculations.

Figure A.1: Balance sheet drivers of Banco de Portugal TARGET liability



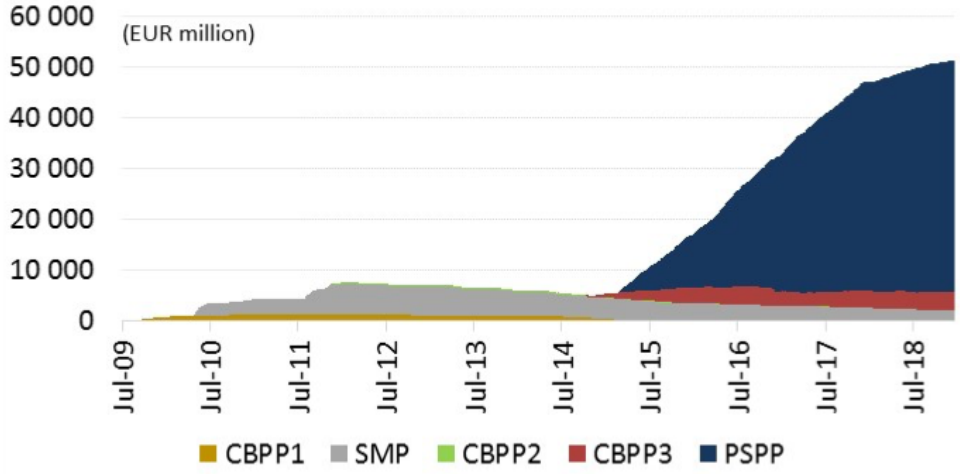
Source: Banco de Portugal. Authors' calculations.

Figure A.2: Balance of Payments drivers of Banco de Portugal TARGET liability



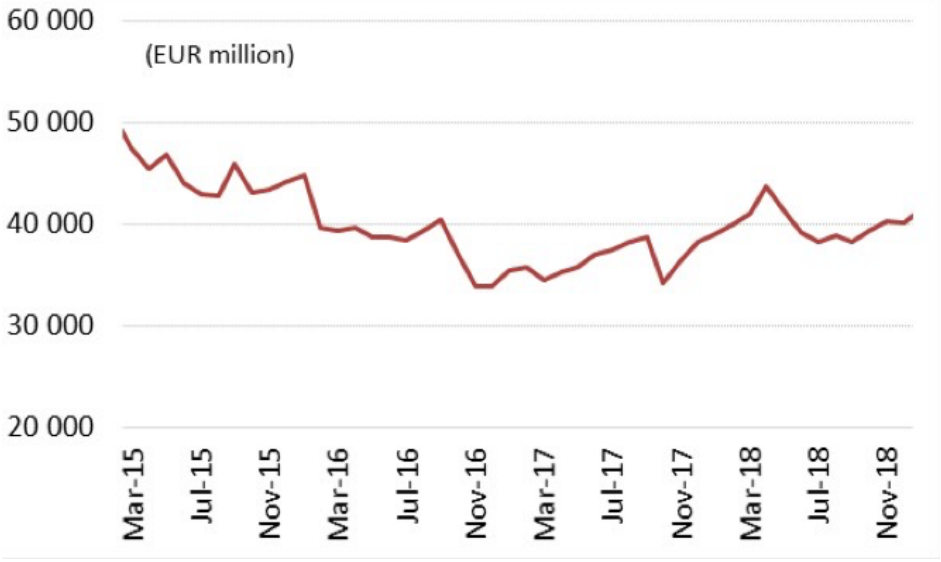
Source: Banco de Portugal. Authors' calculations.

Figure A.3: Portuguese banking system outstanding amount in reverse MPO



Source: Banco de Portugal. Authors' calculations.

Figure A.4: Outright MPO in Banco de Portugal balance sheet



Source: Banco de Portugal (Balance of Payments data).

Figure A.5: Foreign holdings of Portuguese Government securities since the start of the PSPP

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