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The analyses, opinions and findings of these papers represent the views of the authors, they are not necessarily those of the Banco de Portugal or the Eurosystem

Please address correspondence to Banco de Portugal, Economics and Research Department Av. Almirante Reis, 71, 1150-012 Lisboa, Portugal Tel.: +351 213 130 000, email: estudos@bportugal.pt



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### Sovereign exposures in the Portuguese banking system: evidence from an original dataset

Maria Manuel Campos

Banco de Portugal

Ana Rita Mateus Banco de Portugal

#### Álvaro Pina

ISEG (Lisbon School of Economics and Management, Universidade de Lisboa), REM (Research in Economics and Mathematics) and UECE (Research Unit on Complexity and Economics)

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#### Abstract

We present an original dataset on exposures of banks operating in Portugal to the domestic public sector, and document the main dynamics of those exposures against the broader backdrop of public sector indebtedness and financing needs. Built from granular information, our dataset takes account of both bond holdings and loans, and ensures comprehensive coverage of both the banking system and public sector entities, either classified inside or outside general government. Domestic banks, unlike those mostly owned by foreigners, played a key role in financing public sector entities in the most acute stages of the sovereign debt crisis, when access to international capital markets was virtually lost. We present evidence of this role in the cases of the Treasury and of state-owned enterprises.

JEL: G01, G21, H63, L32

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#### 1. Introduction

This paper presents an original dataset on exposures of banks operating in Portugal to entities of the Portuguese public sector, both through bond holdings and by loans granted, in the 2005-2016 period. It also describes the main dynamics of those exposures, against the backdrop of developments pertaining to public sector debt and financing needs.

The period under analysis was particularly eventful, comprising the global financial crisis, the ensuing sovereign debt crisis in the euro area, and the Economic and Financial Assistance Programme to Portugal (the Programme, henceforth). The linkages between banks and the sovereign, ever a topic of interest to economists, have been brought to the fore in the past decade, gaining prominence in the public debate. Unsurprisingly, theoretical and empirical research on the sovereign exposures of banks and their motivations has expanded considerably (a detailed overview of this literature can be found in Campos *et al.*, 2019).

Taking advantage of high-quality granular information from the Portuguese credit register and securities statistics, as well as from a number of other proprietary datasets of Banco de Portugal, we have assembled a comprehensive dataset combining information drawn from several existing databases. We have first identified the individual exposures of each bank to each public sector entity. We have then classified both banks and public sector entities in accordance with a set of features that allows us to aggregate exposures into statistically and economically interpretable variables, such as – to give one among many possible examples – the loan exposures of foreign-owned banks to the subsector of regional and local government. Thus our dataset is not new in terms of providing novel primary information, but rather in exploiting and combining existing information in new ways.

For confidentiality issues, this new dataset cannot be made public. However, providing further detail on its construction is important for several reasons. First, it improves the transparency of research results by giving more detailed information on data than what can typically be found in a working paper or journal article. Second, documenting how we have addressed a number of issues when using and assembling data from primary sources may be useful for future researchers working on related topics. Finally, readers wishing to compare results from our dataset with results from other studies will often need to understand the details on the definition and construction of variables.

The paper also aims to describe how exposures of banks to the public sector evolved over 2005-2016. Events pertaining to the financing of the Treasury and of other public entities, such as state-owned enterprises, were lived intensely by policy-makers and practitioners, especially in the stressful years of the sovereign debt crisis. But people move on to address new challenges, and even vivid memories fade with time. Providing accurate descriptive evidence on the recent past can therefore be of value, and may help economists and historians studying the Portuguese economy in the early 21<sup>st</sup> century. A companion piece (Campos *et al.*, 2019) takes advantage of

this new dataset to analyse econometrically different motivations for the evolution of sovereign exposures in the case of Portugal.

The remainder of this paper is organised as follows. Section 2 describes the construction of the dataset, highlighting the primary sources used and the exhaustive coverage of both banks and public sector counterparts. Then, as an illustration of the potential uses of the dataset, Section 3 provides new insights on the role played by banks operating in Portugal in financing the domestic public sector, devoting particular attention to the challenging times of the euro area sovereign debt crisis. Section 4 concludes.

#### 2. A new dataset on exposures to the public sector

We have assembled a unique dataset built from different data sources which allows for an exhaustive coverage of public sector exposures of the Portuguese banking system. In particular, we use Banco de Portugal's Securities Statistics Integrated System (SSIS) and Central Credit Register (CCR) to collect end-of-month information on security holdings and loans recorded on the balance sheet of every monetary financial institution (MFI) and having as counterpart any public sector entity over 2005-2016. CCR data in 2005-2007 are only available on a quarterly basis, whilst for the rest of the period all data are monthly.

Our dataset includes information on both stocks and flows of exposures. Stocks denote the total end-of-period value of exposures, while flows refer to the value of net transactions, i.e. purchases minus sales (these comprising redemptions on maturity), during a certain period. For securities, SSIS includes granular information on both stocks and net transactions. Stocks are taken at book value (for consistency with Monetary and Financial Statistics), whereas for transactions only market value is available. In turn, the credit register only includes stocks of loans and, in this case, net transactions are computed as the change in stocks, correcting for write-offs and exchange rate fluctuations. This computation is also granular, i.e., performed for the outstanding loans of each bank to each public sector entity.

#### 2.1. Covering the whole banking system

As regards banks, our coverage exceeds that of alternative sources, which typically feature information only on the most significant institutions in the Portuguese banking system. For instance, the Individual Balance Sheet Items (IBSI) dataset only includes 6 Portuguese banks (Altavilla *et al.*, 2017). Instead, we cover the whole system as long as individual institutions are classified as monetary financial institutions and these institutions ever held sovereign assets, either in the form of debt securities or loans, over 2005-2016. Across this period, our dataset contains information on 191 institutions, 45 of which are banks or savings banks (including foreign subsidiaries), 111 are mutual agricultural credit banks, 27 are branches of credit institutions located in or outside the European Union (EU) and 8 are

money market funds. Throughout this paper we will often loosely refer to all these different institutions as "banks". Of the 111 mutual agricultural credit banks, 5 are independent and 106 are part of an integrated system, Sistema Integrado de Crédito Agrícola Mútuo (SICAM). In some datasets information from all 106 banks is gathered at an individual level, while in others data are already aggregated at the level of the Head Office. Therefore, for the sake of comparability, we have aggregated those 106 banks into one, which we have treated as a single institution. Hence, for all analytical purposes, we consider only 6 mutual agricultural credit banks (the head office of SICAM<sup>1</sup>, aggregating the individual exposures of the 106 i institutions, and the 5 independent banks). This leaves us with a total of 86 institutions.

Our database allows us to distinguish also public from private ownership and therein country of ownership. Each institution's country of ownership was ascertained from identifying the geographical source of capital: whichever country was the source of a majority of capital was deemed to be the country of ownership. It follows that banks in which a majority of capital was held by Portuguese shareholders were classified as domestic in the respective time period<sup>2</sup>, with the remaining banks being classified as foreign. We also classified institutions according to additional features, such as being part of a banking group or being a subsidiary or a branch of a foreign institution. Additionally, we have identified institutions for which support by the Portuguese government was provided, either through equity injections or the granting of guarantees.

For each bank, our dataset also covers attributes that are relevant from accounting and prudential perspectives, such as balance sheet structure<sup>3</sup>, solvency, liquidity, profitability<sup>4</sup> and size. Four size classes have been defined, based on the maximum value of each bank's total assets in 2008-2016 (the period used in the econometric analysis): large banks (maximum assets above EUR 10 billion), medium-sized banks (EUR 2.5 to 10 billion), small banks (EUR 1 to 2.5 billion) and very small banks (below EUR 1 billion). All data was used on an individual

<sup>1.</sup> To ensure consistency, solvency, liquidity and profitability variables refer to information on a consolidated basis at the level of the Head Office.

 $<sup>2.\,</sup>$  In an overwhelming majority of cases, shareholders identified as Portuguese hold more than 50% of banks classified as domestic.

<sup>3.</sup> Drawn from the Monetary and Financial Statistics.

<sup>4.</sup> Solvency and liquidity information is drawn from the prudential dataset. For the liquidity data, it was possible to resort to information gathered according to the national framework for the whole time span, since the EU liquidity reporting framework was implemented at a later date, avoiding a structural break in the series. Given that the sample period includes both data gathered according to the national reporting framework and to the Common Reporting (COREP) at the EU level, and taking into consideration that there were novelties in the prudential definition of some relevant variables with the entry into force of the Capital Requirement Regulation (CRR), there are some structural breaks in the series. To minimise the impact of breaks, a Tier1 ratio, deemed the most comparable, was used throughout the period. The Tier1 ratio was computed as Tier 1 capital over Risk Weighted Assets with no corrections being made to either definition used in any of the periods (before and after introduction of the CRR).

basis (i.e. non-consolidated)<sup>5</sup>. Table 1 gives the distribution of banks by size and country of ownership (domestic *versus* foreign).

	Domestic	Foreign
$\begin{array}{l} \mbox{All institutions} \\ \mbox{Large: Maximum assets} \geq EUR \ 10 \ \mbox{bn} \\ \mbox{Medium: EUR 10 \ bn} > Maximum \ \mbox{assets} \geq EUR \ 2.5 \ \mbox{bn} \\ \mbox{Small: EUR 2.5 \ \mbox{bn} > Maximum \ \mbox{assets} \geq EUR \ 1 \ \mbox{bn} \\ \mbox{Very small: Maximum \ \mbox{assets} < EUR \ 1 \ \mbox{bn} \\ \end{array}$	43 8 8 8 19	43 3 9 9 22

Table 1. Dataset: breakdown of banks, by size and country of ownership

Source: Banco de Portugal and authors' calculations.

For the vast majority of variables, it was possible to gather data on a monthly basis. This was, however, not the case for the variables on solvency and profitability, which are quarterly. To avoid loss of observations in econometric analysis, we computed monthly solvency and profitability variables by a simple linear interpolation.

### 2.2. Covering the whole public sector and taking account of its changing perimeter

Regarding the public sector, the dataset covers all entities that appear in either the CCR or the SSIS at least once in the 2005-2016 period. This includes units classified within the general government national accounts' institutional sector, but also non-general government public corporations.

According to the criteria agreed with EUROSTAT in the context of the European System of National Accounts (ESA), the general government sector includes units controlled by public entities whose market sales cover less than 50 per cent of production costs (i.e., non-market units). Non-general government public corporations refer to institutions that are autonomously managed but in which the State or other public entities exert direct or indirect managerial influence. These

Notes: This table refers to all monetary financial institutions resident in Portugal that had, at least for one month, outstanding exposures to the Portuguese public sector during 2005/03-2016/12. It excludes 105 Caixas de Crédito Agrícola Mútuo, which belong to domestic banking group SICAM (Sistema Integrado do Crédito Agrícola Mútuo), headed by Caixa Central de Crédito Agrícola Mútuo. For the purpose of this table, classification of domestic or foreign was made in accordance with the situation of each institution as of 31 December 2016. Classification by size was made in accordance with the maximum value of total assets in 2005-2016.

<sup>5.</sup> With the exception of the previously mentioned case of SICAM.

are units that are predominantly engaged in mercantile activities, providing goods and services at economically significant prices, and whose sales cover at least 50 per cent of production costs. Figure 1 provides a representation of the Portuguese public sector.



Figure 1: The Portuguese public sector

The official lists of general government and non-general government entities are made public by the statistical authorities, Statistics Portugal and Banco de Portugal. We have used these lists to distinguish between general government and other public entities and to further allocate them to the appropriate subsector (central government, regional governments, local governments or Social Security funds). In the case of non-general government corporations, the subsector is that of the public body exerting managerial influence (*e.g.* while being identified as a corporation, a public enterprise owned by a municipality is allocated to the local government). Whereas the information on the subsector is available for most public entities, the lists are not exhaustive as regards the so-called Integrated Services (*Serviços Integrados*) and Autonomous Funds and Services (*Serviços e Fundos Autónomos*). Most of these, however, are known to be classified in central government and were therefore allocated to this subsector on a rule-of-thumb basis. Furthermore, among central government entities, we have singled out the Treasury, due to its prominence as a bond issuer.

Also relevant for analytical purposes is the distinction of corporate and noncorporate public entities. There is no official statistical definition of State-Owned Enterprise (SOE) and hence the distinction from non-corporations is made by statistical authorities on the basis of statutory criteria. We adopt a similar strategy and classify entities as corporations by matching their legal designation with the most common types of enterprises (*e.g., EPE- Entidade Pública Empresarial, EM*  - Empresa Municipal, Lda.- limited liability company). Additional refinements were made on the basis of an entity-by-entity analysis. It should be stressed that, for the purpose of national accounts, corporate entities may be classified within general government or in other institutional sector. For the sake of simplicity, throughout this paper we label as an SOE any corporate entity directly or indirectly controlled by the State or other public unit, whether classified within the general government are taken to be SOEs. A further adjustment is made to exclude exposures to monetary financial institutions (*e.g.* the state-owned banks) from the analysis.

For several reasons, the delimitation of the general government (or of the public sector) is time-varying. First, because of usual turnover: units are created, merged, shut down or sold to private entities. Second, because the criteria agreed with EUROSTAT are revisited from time to time. The most recent set of criteria has been in force since the adoption of the ESA2010 framework in 2014. It implied a major reshaping of the general government perimeter, including, for instance, the reclassification of a large number of hospitals managed under public-private partnerships. Finally, the very nature of some criteria implies that reclassifications from and into general government can be frequent. For instance, depending on its operational results, a market producer controlled by a public entity may see its sales fall short of the 50 per cent of production costs threshold and, as such, be reclassified into general government.

In our dataset, we take account of this time-varying delimitation by defining what we call *real-time perimeters* for the general government and for the broader public sector. Our main source for defining these perimeters are the abovementioned official lists of general government and non-general government public entities. However, as described below, these lists have some limitations, which we have addressed through a number of *ad-hoc* adjustments so that perimeters better match economic and institutional developments.

Up to 2017, those lists were annual, reflecting the delimitations in December each year and thus ruling out the possibility of identifying intra-annual reclassifications. In our dataset, we have assumed that, whenever an entity has different classifications in the official lists of years t and t + 1, the reclassification takes effect as of January t + 1. A notable exception to this assumption refers to the reclassifications resulting from the adoption of ESA2010, in late 2014. Because of the especially large number of reclassifications (and of the magnitude of the affected units), they were assumed to have occurred in December 2014 (rather than in January 2014, as our general rule would imply).

Another *ad-hoc* adjustment was made as regards the well-known Special-Purpose Entities created within the scope of operations of government support to the financial sector. These entities were found to be recorded in general government lists only in the year after their establishment. However, because they have affected the general government accounts since their creation, we have placed them in the general government sector since the onset.

A number of other issues are worth mentioning. First, lists of non-general government SOEs are only available as from 2011. For lack of information, we have then assumed that the same set of entities in the 2011 list was classified as non-general government public units in 2005-2010, which admittedly may not have been the case. An adjustment was made for two large transportation companies which were reclassified into general government only in 2011, and which were hence categorised as non-general government SOEs in 2005-2010. Secondly, there are a few cases in which an entity appears erratically in one list or the other. In such instances, it has been allocated to the institutional sector in which list it appears in the most recent year. Thirdly, there are also entities included simultaneously in the non-general government and in the general government lists for the same year. These entities are re-allocated to the most frequently reported institutional sector over time. Finally, the lists of entities may have been amended ex-post and thus may not fully reflect a real-time approach. In any case, and in spite of these potential problems, we argue that our procedures yield a fairly reliable depiction of the evolution of the set of entities under government control over 2005-2016, as well as of their splitting in terms of national accounts' institutional sector<sup>6</sup>. Such evolution is illustrated in Panel A of Figure 2.



Figure 2: Public sector delimitation: real-time vs perimeter corrected for reclassifications Source: Banco de Portugal and authors' calculations.

Notes: In Panel A, the allocation of each public sector entity into general or non-general government is undertaken on the basis of the situation of that entity in the last observation of each year.

<sup>6.</sup> Monetary and Financial Statistics (and datasets like IBSI) adopt a real-time delimitation of general government: in each month, the national accounts criteria in force define the set of entities to be included. A cross-checking exercise was undertaken for the comparison of the exposure of banks operating in Portugal to general government entities as per the Monetary and Financial Statistics with that obtained from our real-time general government perimeter. Results (not reported) show a good match and thus support the reliability of the real-time delimitation we have done on the basis of the existing official lists of entities.

For analytical purposes, a correction for the effects of reclassifications may be warranted. In particular, when assessing the evolution of banks' exposure to public entities and its determinants, fluctuations in debt stocks solely induced by reclassifications bear no economic meaning. Thus, we define as a different delimitation of the public sector and the general government one which is corrected for those effects. According to this delimitation approach, we assume that units that are in any of the statistical authorities' official lists referring to 2016 have belonged to the public sector since 2005. Moreover, units are allocated throughout the whole 2005-2016 period to their 2016 subsector. For instance, an SOE reclassified into the general government in 2012 is included in that sector since the outset. Therefore, in 2016, the set of entities included in the public sector real-time delimitation approach coincides, by construction, with the set of entities in the perimeter corrected for reclassifications, and the splitting of entities by institutional sector is also the same. Table 2 provides a breakdown of the 1,020 units present in our dataset in 2016. These are the public sector entities which, in that year, had either outstanding securities held or loans granted by banks operating in Portugal. The vast majority of these entities is classified within the general government and belongs to the regional and local government subsector. SOEs are evenly spread in and outside the general government and slightly more concentrated in the regional and local subsectors.

	Total	Central government	Regional and local government	
General government	854	118	736	
Corporations	151	60	91	
Non-corporations	703	58	645	
Non-General government	166	63	103	
Corporations	166	63	103	
Non-corporations	0	0	0	
Overall entities	1020	181	839	
Corporations	317	123	194	

Table 2. Dataset: breakdown of public sector entities in 2016

Source: Banco de Portugal and authors' calculations.

Special attention should be paid to entities that have appeared at least once in either the general government or the non-general government lists but are not recorded in any of them in 2016. This implies that such units were (i) either privatised or (ii) have been extinct or merged into some other entity. These two cases need to be distinguished, as they call for different treatments in our dataset. Privatisations refer to cases in which entities are no longer controlled by the government but evidence can be found that they remain operative under private ownership. In the perimeter corrected for reclassifications, these entities are assumed to be excluded from the public sector throughout 2005-2016. For instance, an SOE privatised in 2014 is never included in the public sector. Entities that are extinct (or merged into others) are included in the analysis while operating and, throughout this period, are assumed to have remained in the institutional sector in which they were last classified. Hence, the composition of the public sector and of general government changes due to the creation or extinction of units, but not due to reclassifications.

A comparison of the set of entities covered by the two delimitation approaches shows that the perimeter corrected for reclassifications (panel B in Figure 2 is slightly less encompassing than the one defined by real-time national accounts (panel A). This means that over 2005-2016 the number of privatisations has tended to exceed the number of private entities reclassified into the public sector. General government units account for a larger share of the overall public sector in the corrected perimeter, reflecting the fact that many SOEs ended up being reclassified into general government sometime along 2005-2016. As of end-2014, following the large wave of reclassifications resulting from the adoption of ESA2010, the entities covered in the two delimitation approaches broadly coincide.

Figure 3 illustrates the evolution of total bank exposures to the Portuguese public sector (computed as a sum of each monetary financial institution exposure to all public counterparties, as a percentage of total assets of all institutions) using the two delimitation approaches – real-time vs corrected for reclassifications<sup>7</sup>. Although the real-time perimeter includes more entities, total exposure is higher in the perimeter corrected for reclassifications throughout most of 2005-2016. This reflects the fact that, on average, banks' exposure to units that end up privatised is smaller than to originally private firms that end up under government control. As of 2008, the differential between exposures as per the two different approaches widens, implying a sharper increase in debt of originally private firms recorded in the portfolio of banks operating in Portugal. After ESA2010 entered into force, exposure to public sector units essentially coincides irrespective of the delimitation approach.

#### 3. New insights on trends in sovereign exposures<sup>8</sup>

#### 3.1. Exposures to the General Government

The 2005-2016 period witnessed a major increase in public debt, with the outstanding amount more than doubling. The pace of this increase was particularly fast in 2008-2012 (Figure 4), largely reflecting an adverse "snow-ball effect",

<sup>7.</sup> This chart, as well as the others that use our original dataset, presents quarterly data, since credit register data in 2005-2007 are only available on a quarterly basis.

<sup>8.</sup> Unless otherwise stated, evidence described in this section relies on the delimitation of public sector and its segments corrected for reclassifications.



Figure 3: Total exposure of monetary financial institutions to the public sector: real-time vs perimeter corrected for reclassifications

Source: Banco de Portugal and authors' calculations. Notes: Vertical lines mark May 2011 and June 2014 (beginning and end of the Programme).





calculations.

Source: Banco de Portugal and authors'



whereby the implicit interest rate on debt exceeded the growth of nominal GDP, as well as a deterioration in government's primary balances. In terms of debt instruments, the loans received in the context of the Programme were important drivers of the increase in public debt over the recent decade. At the same time, the structure of debt holdings by geographical areas and institutional sectors underwent important changes.

As of 2009, against a backdrop of GDP contraction, high unemployment and deteriorating public finances, credit agencies started to downgrade Portuguese sovereign debt. During 2010, as concerns over Greece's public finances and Ireland's banking sector materialised and these countries requested financial assistance





Figure 6: Portuguese public debt, breakdown by holder

Notes: Geographical holdings of Portuguese general government debt, in percentage of total.



Source: Banco de Portugal and authors' calculations.

Notes: Public debt takes the form of loans, debt securities and currency and deposits (which includes non-marketable debt instruments, such as saving and treasury certificates). This chart depicts loans and debt securities only.

packages, market tensions and downgrades intensified and Portuguese debt yields soared to unsustainable levels (Figure 5).

The difficulties in market access faced by the Portuguese sovereign in 2010 can be illustrated by the clear decrease, in that year, in the share of Portuguese debt held by non-residents (Figure 6)<sup>9</sup>. In May 2011, the Portuguese authorities agreed on an economic and financial assistance programme with the European Commission, the European Central Bank and the International Monetary Fund, which lasted until June 2014. During this period, most financing needs were covered by the Programme, which explains the increase in loans owed to non-residents from 2011 until 2014 (Figure 7). More recently, since early 2015, in the context of Asset Purchase Programmes of the Eurosystem, bond holdings by the Portuguese central bank have also increased markedly (Figure 8). Resident banks appear to have played a major role in the earlier years of the crisis, ensuring funding to government entities and State-owned enterprises (SOEs) by stepping in to fill the void left by non-resident investors (Figure 8).

Figure 9, based on our dataset, depicts the evolution of the most encompassing measure of banks' exposure (both bond and loan holdings) to the domestic public sector, defined as comprising both general government and non-general government segments. Indeed, these charts show a sharp increase in the exposure of banks operating in Portugal to the Portuguese public sector. Exposures to the general

<sup>9.</sup> This decline proved more persistent in the case of euro area investors.



Figure 8: Portuguese public debt held by residents, breakdown by institutional sector

Source: Banco de Portugal and authors' calculations. Notes: Sectoral holdings of Portuguese general government debt, in percentage of total. MFI stands for monetary financial institutions.

government drive the bulk of the increase in public sector asset holdings, rising markedly in 2009-2011 and broadly stabilising afterwards in a context where banks' balance sheets have been shrinking. Moreover, though smaller, exposures to public entities outside the general government are far from negligible.



(a) In billion Euro

(b) In percentage of total banking assets

Figure 9: Total exposure to the Public Sector

Source: Banco de Portugal and authors' calculations.

Note: Exposure computed as the sum of every institution's stock of public sector debt (both loans and securities) as a ratio to the sum of assets in all institutions' balance sheets. Vertical lines mark May 2011 and June 2014 (beginning and end of the Programme).

The dynamics of exposures of domestic banks to the Portuguese general government are very different from those of banks whose majority of capital is held

by foreign shareholders (which we label as foreign banks). Domestic institutions massively increased their exposure to the domestic sovereign in the run-up to the Programme, while foreign banks took the opposite route (Figure 10). Evidence in Campos *et al.* (2019) suggests that this evolution may reflect the existence of "moral suasion" mechanisms, whereby domestic banks stepped in to provide funding to the sovereign in stressful periods.



Figure 10: Total exposure to the general government

Source: Banco de Portugal and authors' calculations.

Notes: Exposure computed as the sum of every institution's stock of public sector debt as a ratio to the sum of assets in all institutions' balance sheets. The increase in the exposure by foreign banks at the end of 2015 is influenced by the fact that, in the context of a resolution measure, a foreign institution took over a domestic institution. Vertical lines mark May 2011 and June 2014 (beginning and end of the Programme).

Up until the onset of the crisis, the bulk of the exposures of the Portuguese banking system to the domestic general government consisted of loans (Figure 11). That has changed significantly since 2010, when holdings started to reflect much higher amounts of debt securities.

Though mainly focussed on the domestic public sector, our dataset also includes holdings of securities issued by other EU governments, which are depicted in Figure 12. In the early stages of the sovereign debt crisis, banks operating in Portugal not only increased their intake of Portuguese general government securities, but also of those issued by other EU governments, both from countries under market pressure and from core euro area countries (possibly reflecting, in this latter case, a phenomenon of flight to safety). According to results in Campos *et al.* (2019), this is often associated to increases in the availability of central bank funding. This evidence suggest that banks used additional liquidity to increase their holdings of government securities, an asset that can in turn be pledged as collateral to obtain liquidity (both in market operations and in operations with central banks).

Since mid-2013, resident banks have significantly increased their holdings of bonds issued by other EU countries, and especially by vulnerable euro area



Figure 11: Total exposure to the general government by debt instrument: domestic vs foreign banks

Note:Exposure computed as the sum of every institution's stock of public sector debt as a ratio to the sum of assets in all institutions' balance sheets. The increase in holdings by foreign banks at the end of 2015 is due to the fact that, in the context of a resolution measure, a foreign institution took over a domestic institution. Vertical lines mark May 2011 and June 2014 (beginning and end of the Programme).

sovereigns. Therefore, unlike domestic sovereign bond holdings, exposures to euro area general governments have continued to gain importance until the end of our period of analysis. A possible interpretation for this evolution is that, while funding needs of the Portuguese sovereign were largely accounted for by the Programme, securities issued by other governments remained attractive for banks. Indeed, evidence in Campos *et al.* (2019) suggests that "moral suasion" mechanisms lost prevalence in the period after 2012, while increases in central bank funding remain a driver of banks' exposures to debt issued by GIIPS sovereigns.

Changes in banks' sovereign exposures ultimately reflect their decisions to purchase or sell sovereign bonds and grant new loans to the general government. However, since stocks are affected by countervailing valuation adjustments, focusing on their dynamics may partly obscure these actual flows. For instance, in 2012-2014 Portuguese sovereign yields markedly fell (Figure 13) and Treasury bond prices concomitantly increased, driving a mild overall increase in stocks. However, flows (i.e., the net transactions) were mostly negative, as rising prices may have led banks to sell some of their holdings. Especially in 2012 and 2013, this behaviour was more pronounced among foreign banks (Figure 13). Looking at half-yearly aggregate flows (Figure 14) reiterates the conclusion that domestic banks were the ones driving the bulk of change in exposures, most notably in the difficult years of 2010-2012.



Figure 12: Exposure to Treasury securities from EU countries

Note: Exposure computed as the sum of every institution's stock of Treasury securities as a ratio to the sum of assets in all institutions' balance sheets. Vertical lines mark May 2011 and June 2014 (beginning and end of the Programme). The acronym "GIIPS" refers to Greece, Ireland, Italy, Portugal and Spain.



Figure 13: Change in exposure to general government securities: domestic vs foreign banks

Source: Banco de Portugal and authors' calculations.

Notes: The change in exposure is defined as the net flow of exposures to general government securities divided by the stock in the previous month. To make Chart 14 more readable given the high volatility of flows, a centred moving average of 7 months is used in the numerator. Figure 14: Semi-annual flows to general government securities: domestic vs foreign banks

Source: Banco de Portugal and authors' calculations.

Notes: Semi-annual flows are computed as the six-month sum of monthly flows.

The growth of banks' overall exposure to the general government is largely explained by Treasury debt (Figure 15), given high levels of inflows of Treasury bonds to (domestic) banks' balance sheets in the run-up to the Programme.



Figure 15: Total exposure to the general government by subsector: domestic vs foreign banks

From July 2009 to December 2010, the net flow of Portuguese Treasuries in banks' balance sheets surpassed EUR 12 billion, which is almost twice the total stock held by the Portuguese banking system in June 2009 and more than 50 per cent of the amount of Portuguese medium- and long-term Treasury bonds (Obrigações do Tesouro) issued in competitive allotments during these 18 months (over EUR 23 billion)<sup>10</sup>. In April 2011, just prior to the signing of the Programme, banks absorbed a very significant further amount of Portuguese Treasury bonds, stretching their net inflows until June 2011 (Figure 16). The strong correlation between banks' net purchases and auctioned amounts at the peak of the sovereign debt crisis stands in sharp contrast with their much looser relationship in the rest of the 2005-2016 period. Again, this is consistent with the "moral suasion" hypothesis put forward in Campos *et al.* (2019): in periods of sovereign stress, banks stepped in to ensure funding to the Treasury.

Notes: Exposure computed as the sum of every institution's stock of public sector debt as a ratio to the sum of assets in all institutions' balance sheets. Exposure to the social security subsector is very small, and hence not depicted in the charts. The increase in holdings by foreign banks at the end of 2015 is due to the fact that, in the context of a resolution measure, a foreign institution took over a domestic institution. Vertical lines mark May 2011 and June 2014 (beginning and end of the Programme).

<sup>10.</sup> When compared to issuances net of redemptions on maturity and reverse auctions, this percentage rises to over 100%.



Figure 16: Portuguese Treasury Bonds auctioned net of reverse auctions and Net flows of Portuguese Treasury securities in banks' balance sheets

Source: Banco de Portugal and authors' calculations.

Note: The bars refer to net flows of PT Treasuries in banks' balance sheets. The blue dots refer to Portuguese Treasury Bonds (Obrigações do Tesouro) auctioned (competitive and non-competitive tranches) net of reverse auctions.

#### 3.2. Exposures to state-owned enterprises (SOEs)

The indebtedness of non-financial SOEs displayed contrasting dynamics in 2005-2016. Up to mid-2011, debt strongly rose, reaching macroeconomic significance (26% of GDP at end-2010), mainly on the back of financing provided by non-residents and by the resident financial sector (Figure 17)<sup>11</sup>. From then on, debt growth has slowed down and indebtedness has eventually broadly stabilised.

<sup>11.</sup> This section draws on different data sources; in particular, some charts use data on debt of non-financial SOEs from the Statistical Bulletin of Banco de Portugal, while others resort to our new dataset. Both sources help illustrate the dynamics of SOE financing over 2005-2016, but important methodological differences prevent direct comparisons between them. Reasons for differences between the debt of SOEs owed to the resident financial sector (Statistical Bulletin) and total exposure of the resident banking system to SOEs (our dataset) include the following:

A different universe of creditors, as the resident financial sector comprises, but is not limited to, the resident banking system;

A different universe of SOEs, inter alia due to the fact that data from the Statistical Bulletin excludes all financial SOEs, while our dataset only excludes those which are banks, and to a different treatment of reclassifications of SOEs across institutional sectors;

Different valuation criteria: for instance, data from the Statistical Bulletin takes bonds at nominal value, while our dataset takes bonds (for the purposes of computing the stock of exposures) at book value.



Figure 17: Debt of SOEs, holdings by institutional sector

Source: Banco de Portugal (Statistical Bulletin, December 2017). Notes: Vertical lines mark September 2008 (Lehman Brothers' collapse), May 2011 and June 2014 (beginning and end of the Programme). "ROW" stands for Rest of the World.

Despite the absence of a consistent time series prior to end-2007, available evidence suggests that SOE indebtedness gathered pace since 2005<sup>12</sup>. From late 2008 onwards, as the global financial crisis worsened, Portuguese SOEs faced growing difficulties to access market funding. In a few cases, the Treasury itself had to provide loans to firms. In much larger amounts, the Treasury increasingly provided guarantees for SOE borrowing (MFAP, 2010). In 2011, as the Republic lost access to market financing at affordable rates and asked for official assistance, the financing of SOEs underwent major changes. Indebtedness growth slowed down, with overall debt levels broadly stabilising in the following years<sup>13</sup>. Access to international capital markets was all but lost in 2011, with the exception of some short-run bond issues of a few large SOEs. As the share of financing provided by the rest of the world (and, to a smaller extent, by the resident financial sector) has declined, the domestic general government has steadily gained prominence in funding non-financial SOE. This funding role of the Treasury to SOEs was reinforced

<sup>12.</sup> Ministry of Finance annual reports on SOEs, available since 2006, show that debt (loans and bonds) in the balance sheets of non-financial SOEs increased from about EUR 17 billion in 2005 (MFAP, 2006) to EUR 23 billion in 2007 (MFAP, 2008). In contrast, available figures for 2001 and 2005 are broadly similar, with an increase up to 2003 compensated by a subsequent decline (MFAP, 2006). Comparisons across reports should nonetheless be regarded with prudence, *e.g.* because figures for common years do not always coincide. Furthermore, it should be noted that figures from these Ministry of Finance reports are not comparable with those of Figure 17, *inter alia* because the universe of SOEs differs (*e.g.* reports do not include SOEs controlled by regional and local government).

<sup>13.</sup> The slight post-2012 decrease (Figure 17) should be weighed against the fact that the SOE universe became smaller due to some important privatisations.

in 2013 with the entry into force of Decree-Law no. 133/2013, which prevented companies inside the perimeter of general government from accessing new funding from commercial banks (except when funding from the Treasury is forbidden due to competition rules). The general government has become non-financial SOEs' main creditor as from 2015.

This financing role of general government, which essentially took the form of loans from the Treasury, was channelled almost exclusively to SOEs inside the general government perimeter (Figure 18). The impact of these loans on public debt (gross debt of general government) was neutral, but this neutrality would not hold for loans to SOEs outside general government. Regardless of the economic case for such loans (which would be reinforced if the cost of financing for the Treasury was below the cost of market financing for the relevant SOEs), the Programme simply did not cover the borrowing needs of non-general government SOEs (Banco de Portugal, 2014).



Figure 18: Debt of SOEs held by general government

Source: Banco de Portugal (Statistical Bulletin, December 2017). Notes: Vertical lines mark September 2008 (Lehman Brothers´ collapse), May 2011 and June 2014 (beginning and end of the Programme).

According to our dataset, between 2005 and 2008, exposures to SOEs accounted for a large and growing share of the total exposure of the Portuguese banking system to the domestic public sector (Figure 19). Indeed, the growth of bank holdings of public sector assets, which was later to accelerate significantly, started in these years with the corporate segment. Loans, rather than bond holdings, accounted for the bulk of bank exposures to SOEs in 2005-2008 (Figure 20). In these years, both domestic and foreign banks operating in Portugal took part in funding the growing indebtedness of SOEs (Figure 21). Nonetheless, econometric results presented in Campos *et al.* (2019) suggest that, in the period before the onset of the sovereign debt crisis, increases in exposures to SOEs were particularly driven by the behaviour of foreign banks.



Figure 19: Total exposure to the public sector

Notes: Exposure computed as the sum of every institution's stock of public sector debt. Vertical lines mark September 2008 (Lehman Brothers ' collapse), May 2011 and June 2014 (beginning and end of the Programme).



Figure 20: Total exposure to SOEs by debt instrument

Source: Banco de Portugal and authors' calculations.

Notes: Exposure computed as the sum of every institution's stock of public sector debt. Vertical lines mark September 2008 (Lehman Brothers ´ collapse), May 2011 and June 2014 (beginning and end of the Programme).

In 2009 and 2010 the indebtedness of SOEs towards banks operating in Portugal increased further. Loans remained the most important form of exposure of the banking system to the corporate segment of the public sector (Figure 21), but SOE bond holdings by domestic banks increased markedly. This partly reflected



Figure 21: Total exposure to SOEs by debt instrument: domestic vs foreign banks

Notes: Exposure computed as the sum of every institution's stock of public sector debt as a ratio to the sum of assets in all institutions' balance sheets. The spike in holdings by foreign banks at the end of 2015 is due to the fact that, in the context of a resolution measure, a foreign institution took over a domestic institution. Vertical lines mark September 2008 (Lehman Brothers' collapse), May 2011 and June 2014 (beginning and end of the Programme).

the establishment of government-controlled Special Purpose Entities to manage the assets of a bank subject to public intervention.

The post-2011 decrease in SOE financing was milder for the resident financial sector than for non-residents, especially until early 2014 (Figure 17). This relative stability of exposures of the resident financial sector in 2011-2013 is also observed, unsurprisingly, for the resident banking system as a whole (Figure 20). However, system-wide figures mask sharply contrasting dynamics of domestic and foreign banks (Figure 21). The former sustained SOE funding, while foreign banks strongly reduced it, especially as regards loans. In the case of SOEs outside general government, outstanding loans granted by domestic banks actually increased, suggesting that these banks stepped in to provide funding to the SOE segment which the Treasury had most difficulty to support (figures 22 and 23<sup>14</sup>). These insights find support in results obtained by Campos *et al.* (2019), according to which there is some evidence of "moral suasion" mechanisms also in driving banks' exposures to SOEs. Such evidence is especially clear in the case of SOEs classified

<sup>14.</sup> In these charts, the institutional classification of SOEs (inside *versus* outside general government) is defined in real time, as this was the relevant criterion for assessing the public debt neutrality of loans from the Treasury. Furthermore, since loans are key to the contrasting dynamics described, we have (unlike in Section 3.1) charted only stocks, and not flows: for loans, given the small role played by price fluctuations, the change in stocks is generally a very good approximation to the corresponding flow.

outside the perimeter of general government (consistent with the growing role of the Treasury as a lender to SOEs inside the perimeter).



Figure 22: Total exposure to SOEs inside general government (real-time perimeter) by debt instrument: domestic vs foreign banks

Source: Banco de Portugal and authors' calculations.

Notes:Exposure computed as the sum of every institution's stock of public sector debt as a ratio to the sum of assets in all institutions' balance sheets. The spike in holdings by foreign banks at the end of 2015 is due to the fact that, in the context of a resolution measure, a foreign institution took over a domestic institution. Vertical lines mark September 2008 (Lehman Brothers' collapse), May 2011 and June 2014 (beginning and end of the Programme).



Figure 23: Total exposure to SOEs outside general government (real-time perimeter) by debt instrument: domestic vs foreign banks

Notes: Exposure computed as the sum of every institution's stock of public sector debt as a ratio to the sum of assets in all institutions' balance sheets. The spike in holdings by foreign banks at the end of 2015 is due to the fact that, in the context of a resolution measure, a foreign institution took over a domestic institution. Vertical lines mark September 2008 (Lehman Brothers' collapse), May 2011 and June 2014 (beginning and end of the Programme).

#### 4. Concluding remarks

This paper presents an original dataset built from granular information that provides full coverage of the loan and debt securities exposures of banks operating in Portugal to the domestic public sector. Covering 2005-2016, we present a description of the main dynamics of those exposures in this especially eventful period for the Portuguese economy.

Our data shows that banks operating in Portugal played a very important part in ensuring financing to public sector entities in the most acute stages of the sovereign debt crisis, when access to funding from international capital markets was all but lost. Notably, banks bought large amounts of bonds issued by the Treasury in the run-up to the Programme, and kept granting loans to SOEs during that Programme. But not all banks operating in Portugal acted similarly. The supportive role described was essentially played by domestic banks. In contrast, the behaviour of banks mostly owned by foreigners resembled, to some extent, that of non-resident private investors. A companion paper (Campos *et al.*, 2019) investigates in more detail the motivations determining these dynamics.

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