



**Trinity College Dublin**  
Coláiste na Tríonóide, Baile Átha Cliath  
The University of Dublin

# The Intra-financial Assets and the Intermediation Role of the Financial Sector

Daniel Carvalho

TEP Working Paper No. 0622

December 2022

**Trinity Economics Papers**  
Department of Economics

# Intra-financial assets and the intermediation role of the financial sector

Daniel Carvalho\*

December 19, 2022

## Abstract

This paper provides two main contributions. First, it proposes a measure of intra-financial assets, i.e., financial assets within the financial sectors, and documents the rapid growth of these claims in European countries. Second, it looks at the relationship of total and intra-financial assets of banks and non-banks and credit provided to the non-financial sectors. Results show that while total assets of both banks and non-banks are strongly associated with loans to non-financial corporations and households, intra-financial assets of banks are associated with loans to non-financial corporations only and intra-financial assets of non-banks with loans to households.

JEL No.: F36, G10, G21, G23.

Keywords: Banks and non-banks, interconnectedness, credit, finance-growth nexus.

---

\*Banco de Portugal, Rua Francisco Ribeiro 2, 1150-165 Lisboa, Portugal, daniel.sousa.carvalho@bportugal.pt. I am grateful to Philip Lane for invaluable discussions and comments. I would also like to thank OECD's Working Party on Financial Statistics participants for comments. The opinions expressed in this paper represent the views of the author, they are not necessarily those of the Banco de Portugal, the European Central Bank, or the Eurosystem.

# 1 Introduction

As financial systems become more complex, understanding their structure and how it relates to credit intermediation is of first-order importance. At the most elementary level, the financial sector balance sheet should expand hand in hand with the amount of credit provided to the non-financial sectors: the assets of financial sectors should include loans extended to non-financial corporations (NFCs) and households; in turn, liabilities should comprise deposits that the non-financial sectors place with the banking sector, as well as other financial investment in non-bank institutions, such as investment fund shares or claims on insurance companies and pension funds. This is the view of the financial sector as an intermediary or a facilitator of the activity of other sectors, channeling savings to those seeking financing to invest. There is, however, a second view of the financial sector, one in which it is a growth sector in itself, carrying out non-intermediation non-interest earning activities, such as asset management, advisory services, insurance, proprietary trading or market making – see [Beck et al. \(2014\)](#).

A number of studies have documented the growth of the financial sector and that the non-intermediary role of the financial system has been gaining ground. On the one hand, the value added share of finance in GDP has been growing in the past century in advanced economies, at the same time that the number of people employed by the sector, as well as the average wages paid, have outpaced those of other economic activities ([Philippon and Reshef, 2012, 2013](#)). This evidence has prompted questions regarding the costs and efficiency of financial intermediation – see [Philippon \(2015\)](#). On the other hand, focusing on financial claims, [Greenwood and Scharfstein \(2013\)](#) conclude that, not only did the financial sector in the US expand substantially in the past couple of decades, but also its growth has been faster than that of the non-financial sectors. The authors propose a credit intermediation index, which is computed as the ratio of total credit in the economy to credit provided to end-user sectors, encompassing NFCs, households and the general government. Exploring the US financial sector in more detail, [Antill et al. \(2014\)](#) find that the shadow banking sector was, in recent years, the main driver of the financial sector’s growth, mostly associated to securities and asset management activities.

While earlier contributions have focused on the *total* size of the financial sector balance sheet, other

work has instead turned to the size of intra-financial assets, i.e., the size of financial relationships among financial corporations. [Bhatia and Bayoumi \(2012\)](#) document that the US financial sector expansion was chiefly due to the increase in claims between financial intermediaries. Due to the lack of a complete who-to-whom picture in the US Financial Accounts, [Barattieri et al. \(2019\)](#) opt to compute upper- and lower-bounds to interconnectedness, defined as the claims on direct counterparts that belong to the financial sector, scaled by total credit market instruments. In turn, [Montecino et al. \(2014\)](#), faced with the same shortcoming, develop a measure of intra-financial assets for the US based on estimations of who-to-whom positions within the financial sectors. In a subsequent study, [Montecino et al. \(2016\)](#) explore the relationship between intra-financial assets, credit and capital formation: they find that, in general, intra-financial assets are negatively associated with gross capital formation. Turning to the euro area, [Bakk-Simon et al. \(2012\)](#) put forward a definition of the shadow banking sector and conclude that the interconnectedness of the shadow banking sector and the regulated banking system is high in the EMU. The authors also argue that the increase in leverage in the financial sectors of the euro area in the run-up to the global financial crisis was generated in the non-bank financial sectors. Along the same lines, [Cour-Thimann and Winkler \(2012\)](#) argue that the leverage boom in the 2006-2008 period in the euro area was, to a large extent, associated to the increase of intra-financial sector claims. In a recent article, [Abad et al. \(2017\)](#) use a dataset of the European Banking Association to map the exposures of EU banks to shadow banks.

In addition to contributing to the expansion of the financial sector balance sheet and leverage, some of these intra-financial positions are deemed to be particularly flighty when compared to standard deposits, and may contribute to system-wide runs and fire-sales. For instance, [Hanson et al. \(2015\)](#) discuss how US money market funds were pivotal in transmitting instability to financial institutions in the aftermath of the Lehman bankruptcy: these funds provided an important share of the US funding of global banks and, when facing a run, they imposed serious financial strain on global financial institutions, which depended on them to fund their dollar assets. Finally, higher levels of financial interconnectedness are also found to dampen the monetary policy transmission mechanism and are put forward by [Barattieri et al. \(2019\)](#) as one of the reasons behind the time-varying effects of monetary policy shocks on real variables.

Accordingly, the goal of this paper is twofold. First, it draws on financial accounts and sectoral balance sheet data to measure, in a harmonized fashion and at the aggregate level, intra-financial assets and interconnectedness among the domestic financial sectors, broken down into banks and non-banks, for a broad set of European countries. This is a relevant contribution as, to the best of my knowledge, there is so far no cross-country study pinning down the size of claims within the financial sectors. In doing so, the paper documents the rapid expansion and the general patterns of these financial sector intra-sectoral claims in recent years. Second, the paper studies the relationship between the growth of financial systems, both total consolidated assets and intra-financial, and their relationship with credit provided to the non-financial sectors. Are intra-financial assets associated with credit in the same fashion as total assets? Is the relationship similar across the bank and non-bank sectors? These are the questions that the paper addresses.

Previewing the results, regression analysis shows that, while total consolidated assets of both banks and non-banks are strongly associated with loans to NFCs and households, intra-financial assets of banks are associated with loans to NFCs and intra-financial assets of non-banks with loans to households. In turn, NFC bonds have a tenuous relationship with domestic variables, a feature likely related to the internationalisation of debt issuance of large NFCs. Finally, general government debt has a totally distinct behaviour, aligned with its stabilizing role: it expands when the balance sheet of the financial sector is contracting.

The remainder of the paper is organised as follows: Section II goes through the data sources of intra-financial assets and how they are computed; Section III describes the general patterns and most salient aspects found in the data; the empirical analysis of the relationship between total consolidated financial assets and intra-financial assets of financial sectors and credit to the non-financial sectors is carried out in Section IV; Section VI discusses the main results and respective implications; finally, Section VII concludes.

## 2 Intra-financial assets

Financial and sectoral accounts data are the backbone used to determine intra-financial assets.<sup>1</sup> These data are available for a number of countries at the Eurostat and OECD online databases.

In broad terms, they include flows and stocks of financial assets and liabilities for a number of different instruments (loans, deposits, shares, investment fund shares, debt securities, etc.). Furthermore, they are broken down according to the following sectoral classification: non-financial corporations (NFCs); monetary and financial institutions (MFIs), which encompasses the central bank (CB) and other monetary and financial institutions (OMFIs);<sup>2</sup> other financial intermediaries (OFIs);<sup>3</sup> non-money market investment funds (NMMFs); insurance companies and pension funds (ICPFs); general government (GG); households (HH);<sup>4</sup> and the rest of the world (RoW), which represents the external sector of a given country.<sup>5,6</sup>

Of particular importance for the purpose of this paper is the fact that some countries publish national financial accounts data both on a consolidated basis (i.e., excluding intra-sectoral claims) and non-consolidated (i.e., including intra-sectoral claims). Therefore, taking the difference between the non-consolidated and consolidated positions for a given sector or aggregate yields, by definition, these intra-sectoral claims: for instance, for the financial corporations aggregate sector – encompassing all bank and non-bank financial corporations – the latter would yield, by construction, the intra-financial positions among all financial corporations.

More formally, I define the intra-financial position (*IFA*) of a given sector or aggregate group of sectors  $S$ , in a given period  $t$ , as the difference between non-consolidated and consolidated positions

---

<sup>1</sup>I use the terms intra-financial positions, intra-financial claims and intra-financial assets interchangeably throughout the paper.

<sup>2</sup>Although it also includes money-market funds, I refer to OMFIs loosely as "banks" throughout the paper, as the former are of a much smaller size than OMFIs.

<sup>3</sup>Includes, for instance, securitization corporations, security and derivative dealers, financial auxiliaries – such as insurance brokers, loan and security brokers, insurance and pension consultants – captive financial institutions and money lenders.

<sup>4</sup>The household sector also includes non-profit institutions serving households (NPISH), which have only a residual dimension.

<sup>5</sup>In other words, it's the financial accounts equivalent of balance of payments and international investment position statistics.

<sup>6</sup>For more comprehensive information on the characteristics of these data, see Eurostat (2013) and European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, and World Bank (2009).

(i.e., including all types of equity and debt claims) as

$$IFA_t^S = STOCK_t^{nc} - STOCK_t^c \quad (1)$$

where the superscripts  $nc$  and  $c$  stand for non-consolidated and consolidated data, respectively.

But what exactly is this measure capturing? To get a better intuition, the following expression breaks the previous one into its different components

$$IFA_t^S = \sum_{i=1}^n INTRA_{i,t} + \sum \binom{n}{k} INTER_{k,t} \quad (2)$$

where  $INTRA$  refers to intra-sectoral positions and  $INTER$  to inter-sectoral positions. The second term in the previous expression is the binomial coefficient  $\binom{n}{k} = \frac{n!}{k!(n-k)!}$  where  $n$  is the overall number of sectors and  $k = 2$  given that pairs of bilateral inter-sectoral positions are considered. All previous subscripts/superscripts remain the same.

Consider first the case of a single individual sector, say that of the OMFI. In this case, the second term trivially is null – i.e., there is no inter-sectoral position as only one sector is considered – and only the intra-sectoral relationship within that same sector exists. I label this position  $IFA^B$  as it pertains to the positions established between banks. In turn, when considering the aggregate MFI, one gets two intra-sectoral positions (CB and OMFI) and one inter-sectoral position between these two sectors. I label this position  $IFAMFI$ . Furthermore, noting that  $IFACB = 0$ ,<sup>7</sup> one can isolate the inter-sectoral positions of the central bank vis-à-vis banks by subtracting  $IFA^B$  from  $IFAMFI$ . Finally, when considering the intra-financial assets of all financial corporations,  $n$  will be five (CB, OMFI, OFI, NMMF and ICPF), which implies a total of five individual intra-sectoral positions ( $INTRA^{CB}$ ,  $INTRA^{OMFI}$ , etc.) and ten different pairings of inter-sectoral positions ( $INTER^{CB,OMFI}$ ,  $INTER^{CB,OFI}$ , etc.). I label this position  $IFA^{FC}$ .

Furthermore, it is possible to get a better picture of the relationship between, on the one hand, non-bank and, on the other hand, bank and non-bank financial corporations, using a combination of

---

<sup>7</sup>Despite being conceptually relevant, in practical terms no intra-financial position is normally expected for the CB sector as it normally only encompasses one entity. Some countries do, however, have residual differences between the consolidated and non-consolidated positions of their central banks due to specific statistical reasons - see Banco de España (2015).

the previous intra-financial asset measures. Specifically, by subtracting from the total intra-financial assets of financial corporations those of the MFI sectors, one gets the intra-financial positions of the non-bank sectors (i.e., OFIs, NMMFs and ICPFs) and the inter-sectoral positions across the bank and non-bank sectors. More formally,

$$\begin{aligned}
IFA_t^{NB} &= IFA_t^{FC} - IFA_t^{MFI} \\
&= INTRA_t^{OFI} + INTRA_t^{FA} + INTRA_t^{ICPF} + INTER_t^{CB,OFI} + INTER_t^{CB,NMMF} \\
&+ INTER_t^{CB,ICPF} + INTER_t^{OMFI,OFI} + INTER_t^{OMFI,NMMF} + INTER_t^{OMFI,ICPF} \\
&+ INTER_t^{OFI,NMMF} + INTER_t^{OFI,ICPF} + INTER_t^{NMMF,ICPF}
\end{aligned}$$

where  $IFA_t^{NB}$  is the residual intra-financial measure related to non-banks.

The full list of countries for which data are available is presented in Table 1.<sup>8</sup> It goes without saying that it would be useful to have a larger and more representative set of countries. Unfortunately, a number of countries – such as, notably, the US – publish non-consolidated but not consolidated data, which limits the coverage of the sample.

A couple of comments are in order in what concerns these measures. First, they have the advantage of portraying the inter-linkages between financial sectors uniformly across all countries and without involving any estimations. Second, measuring intra-financial assets in this fashion captures *domestic* interconnectedness only and does not capture positions among financial corporations which are held across countries' borders. In this sense, this approach could be seen as yielding a lower estimate for the overall (i.e., domestic and international) value of these positions.

---

<sup>8</sup>I also include a column with missing sectoral breakdowns for the cases where some sectors are not provided (although they are included in the relevant aggregates). Although data are available for Slovakia, in a number of instances consolidated figures are larger than non-consolidated, resulting in unlikely negative intra-financial positions. For this reason – and although data are, in fact, available –, I remove this country from the analysis. The same is also the case for Romania, but only for the initial years of 1995 and 1996, for which reason I removed these two observations but kept the remainder of the data for this country.



### 3 General patterns in the data

There is hardly a stronger initial point to make when discussing the cross-country empirics of financial balance sheets than referring to the sizable growth experienced in the last decades. Figure 1 plots the cross-sectional average of total non-consolidated assets scaled by GDP, splitting them into consolidated and intra-financial assets.<sup>9</sup> Between 1995 and 2018, the average size of non-consolidated assets almost tripled, from slightly in excess of 200% to roughly 600% of GDP. Growth was particularly expressive between 2004 and 2008 and, albeit at a slower pace, from the outburst of the global financial crisis until 2012: the increase in this period was likely also the result of a denominator effect, given the generalised fall of economic activity. After a peak of close to 675% of GDP in 2014, total assets of financial corporations have since decreased somewhat.

Zooming in on intra-financial assets, Figure 2 splits the latter into intra-financial assets of banks and non-banks (respectively, gray and striped bars) and the inter-sectoral positions between the central bank and banks (black bars). The spectacular increase of intra-financial assets of all financial corporations from slightly in excess of 40% to more than 100% of GDP in 2011 and 2012 was mostly on account of non-bank positions and between the latter and banks. In turn, since 2009, intra-financial assets of banks have been progressively decaying and, in 2018, were approximately the same proportion of GDP as they were in 2002 (slightly below 20%), at the same time that positions between the central bank and banks have increased. This evidence is in line with the reduction of intra-bank activity and deleveraging efforts since the global financial crisis, which was compensated by actions of central banks, aimed at providing liquidity to the banking sector. In contrast, despite reaching an all-time high in 2010, the intra-financial assets of non-banks slightly decreased in the ensuing years but have, since 2014, started increasing once more, only to dip in 2018.

But how have intra-financial assets evolved in comparison to the aggregate balance sheets of these economies? The answer to this question is provided in Figure 3, which contains the same information as the previous except that now intra-financial assets are scaled by the total consolidated assets of all financial corporations. The most relevant difference is that, contrary to when they are measured

---

<sup>9</sup>Due to its extremely large positions when compared to the economy's size, I remove Luxembourg from average measures whenever they are scaled by GDP.

by economic activity, intra-financial assets were relatively stable when measured by the total balance sheets of financial corporations, hovering around levels just below 25% since 2000. However, the same pattern of increasing importance of non-banks at the expense of intra-bank activity is also discernible, together with an increase in the inter-sectoral positions of the central bank vis-à-vis banks.

To illustrate the diversity across countries, Figures 4 and 5 display the country distribution, in 2018, of intra-financial assets scaled by GDP and total financial assets, respectively. The differences are more striking in the first case, especially due to Luxembourg, that ranks in a class of its own, with intra-financial assets exceeding various multiples of its GDP. But even leaving Luxembourg aside, figures higher than 100% of GDP are not uncommon: some countries, known for their sizable financial systems, and/or for being financial centres – such as the Netherlands and Malta – stand out, but also others with a less prominent finance industry – such as Denmark, France, Sweden, Austria and Italy – whose intra-financial assets surpass that barrier. At the bottom of the ranking are Eastern European economies – such as Croatia, Romania and Lithuania –, and Greece, where intra-financial assets are only a small proportion of GDP. When intra-financial assets are scaled by total financial assets, France, Denmark and Austria still occupy the top places of the ranking, together with Luxembourg, with figures in excess of 40%. In contrast, countries such as Ireland, Cyprus and Malta are close to the bottom of the table, with figures below 10% – accordingly, these are, from a financial perspective, highly open economies with, however, a low domestic interconnectedness

How does this evidence compare with the developments in the balance sheets of the remaining non-financial sectors of these economies? Is it that the growth of financial sectors' balance sheets was in line with that of credit provided to the non-financial sectors? To shed some light on these questions, I scaled the total consolidated and intra-financial assets of financial corporations by credit – sum of bond and loan liabilities – provided to the non-financial sectors – NFCs, households and the general government. As in some cases before, I left Luxembourg out, whose values, once more, completely stand out from those of all other countries. Figure 6 shows that, at the start of the period, in 1995, the aggregate balance sheet of financial corporations was one and a half times the credit provided to end-user sectors. Moreover, that figure was gradually increasing, especially in the run-up to the global financial crisis, when it surpassed two and half times; since then, it has stabilised somewhat above

250% in more recent years. In other words, the size of the financial sector is nowadays much larger for the same level of credit to end-user sectors.

## 4 Financial sector and credit to the non-financial sector

In this section, I first introduce the empirical approach used and then the results obtained. Robustness tests to these baseline results are provided in the third subsection.

### 4.1 Empirical approach

One of the purposes of this paper is to study how the size and structure – in terms of bank and non-bank financial institutions as well as regarding total and intra-financial positions – of the financial sector balance sheet is associated with credit provided to the non-financial sector. With this purpose in mind, I use the following empirical specification:

$$\Delta CREDIT_{it} = \beta^1 + \beta_i^2 \alpha^c + \beta_t^3 \alpha^y + \beta^4 FINSEC_{it-1} + \beta^5 CONTROL_{it-1} + \varepsilon_{it}$$

where the dependent variable,  $\Delta CREDIT_{it}$  are credit measures expressed in log difference: NFC loans ( $\Delta NFC_{it}^l$ ); NFC bonds ( $\Delta NFC_{it}^b$ ); household loans ( $\Delta HH_{it}^l$ ); general government loans ( $\Delta GG_{it}^l$ ); and general government bonds ( $\Delta GG_{it}^b$ ). To assure consistency, these data are also from the Eurostat sectoral accounts database and they include not only credit provided by the resident financial system, but also cross-border funding.<sup>10</sup>

Turning to the independent variables and starting with the financial sector measures  $FINSEC_{it-1}$ , these are the log differences of both total (consolidated) assets as well as intra-financial assets of financial corporations, banks and non-banks. Descriptive statistics of both credit and financial sector measures are displayed in Table 3.

---

<sup>10</sup>While arguably measures of *domestic* credit provided to the non-financial sectors would be the most appropriate to explore in this context, the fact is that such data do not exist. Available measures either provide (i) the breakdown between the different non-financial sectors recipients of credit but also encompass cross-border lending, or (ii) exclude foreign lending but are only available for the aggregate private non-financial sectors, i.e., total credit to both NFCs and households – see [Dembiermont et al. \(2013\)](#) for a detailed discussion.

A number of control variables  $CONTROL_{it-1}$  are also included, which can broadly be separated in two groups. On the one hand, the log GDP per capita and the rate of real GDP growth portray the stage of development of a given country, as well as its economic performance – [DellAriccia et al. \(2016\)](#) document that credit growth tends to be associated with these two variables: specifically, credit growth tends to be higher in countries with mid-levels of income per capita (i.e., convergence is observed) and that experience faster growth. On the other hand, the inflation rate, interest rate and the change in the real effective exchange rate (REER) are meant to capture the impact on credit growth of prices and price changes. Detailed definitions of the control variables, as well as the respective sources, are provided in the data annex; descriptive statistics as well as correlations are displayed in [Tables 3 and 4](#). Importantly, both the financial sector measures and the control variables are lagged, so as to alleviate the concerns of possible endogeneity and reverse causality issues. Finally,  $\alpha^c$  are country fixed effects,  $\alpha^y$  are time fixed effects and  $\varepsilon_{it}$  is the error term.

## 4.2 Results

Baseline results for NFC, household and general government credit are presented in, respectively, [Tables 5, 6 and 7](#).

Starting with NFC loans, the latter are strongly associated to almost all measures of financial sector growth, with the sole exception of the intra-financial assets of non-banks. In turn, and strikingly, NFC bond growth has barely any relationship with measures of the domestic financial sector; it also has a much weaker relationship with the control variables than NFC loans. The disconnect between NFC bond growth and domestic economic and financial structure developments should be seen against the backdrop of the increasingly international fashion in which the NFC sector issues debt securities. This evidence is in line with the findings of [Bertaut et al. \(2018\)](#), who argue that a significant amount of US investors holdings of securities issued in financial centres represents investment in US companies incorporated offshore or debt issued by a financing arm located in those centres. Moreover, it is also a reason for the changes introduced to the BIS debt securities statistics, in order to tackle the higher internationalisation of debt securities issuance, and which leads to an increasing discrepancy between the residency concept (used in most datasets on cross-border positions) and the nationality concept

(Gruić and Wooldridge, 2012). In contrast, NFC loans tend to be more domestic oriented, based on the direct provision of credit by domestic banks.

Moving to the household sector, the results are relatively similar; the only substantial difference is the fact that, in this case, besides the financial sector measures based on total assets, only the intra-financial assets of the non-bank sectors significantly correlate with household credit.

Turning to the general government sector, and similar to NFC bond growth, there is, in general, a relatively weak relationship with the developments in the domestic financial sector, pointing to the possibility that most of the countries in the sample have access to international capital markets and, thus, are not dependent on the domestic financial sector for funding. But more than that, in the few cases where a statistically significant relationship actually exists, the coefficient is *negative*. In other words, the general government expands its balance sheet whenever that of the domestic financial sector contracts, a feature consistent with the stabilizing and counterbalancing role of the public sector. More specifically, the negative correlation stems from the total assets of banks and from the intra-financial assets of non-banks. Furthermore, in the few cases where GDP growth is (weakly) significant, it has a negative sign, indicating that the general government takes on more debt in times of worst economic outcomes, which further corroborates the results obtained for the financial variables and is in line with the findings in Carvalho (2020). A second striking aspect is the fact that, while convergence effects are present in general government bonds, the opposite is true of loans, as the coefficient on the level of real GDP per capita is positive. This means that general government loans grow proportionally more in those countries in the sample with higher GDP per capita.

Regarding the control variables, whenever significant, they generally have the expected signs. On the one hand, the log level of real GDP per capita has a negative sign, corroborating the existence of convergence effects, whereby mid-income countries tend to have a faster rate of credit growth. Moreover, GDP growth also has a positive sign, indicating that credit growth tends to be higher in countries that experience higher activity growth. Turning to the interest rate, it has a negative sign: as expected, a lower cost of borrowing leads to higher credit growth. What is more, credit growth increases with inflation: the latter can be understood to the extent that inflation erodes the (nominal) value of outstanding debt and encourages leveraging. Finally, the REER is less relevant than the previous

variables but, still, whenever significant, the coefficient has a negative sign, hinting at the possibility that periods of lower exchange rate valuation may attract funding flows from foreign investors, which, in turn, provide additional resources that can be channeled to domestic credit provision.

### **4.3 Robustness checks**

Robustness tests to the baseline results are presented in this subsection.

#### **4.3.1 Financial centres**

A question that naturally arises in this context is whether these results could be influenced by the existence of financial centres in the country sample. The balance sheets of the financial sectors in these countries are several times their GDP and orders of magnitude larger than in other non-financial centre countries. Moreover, a very significant proportion of their financial activity is related to cross-border financial intermediation and round-tripping, with little connection to domestic economic developments and between the financial structures and the domestic credit provided to other end-user non-financial sectors. For these reasons, I repeated the baseline empirical approach, excluding financial centres. I use the taxonomy proposed by [Lane and Milesi-Ferretti \(2018\)](#) to classify financial centres, according to which the relevant countries are the following: Belgium, Cyprus, Ireland, Luxembourg, Malta, the Netherlands and the United Kingdom.

Results excluding financial centres are displayed in Tables [8](#), [9](#) and [10](#) and are qualitatively the same as the baseline.

#### **4.3.2 Banking crises**

The fact that the paper's sample includes the global financial crisis may be conditioning the results. To assess whether that is the case, the baseline specification was ran once more, excluding the years for which countries were in banking crises. To identify those, I use the banking crises definition of [Laeven et al. \(2018\)](#), sourced from the World Bank Financial Development dataset (see [Čihák et al. \(2013\)](#) for details).

Results are displayed in Tables 11, 12 and 13 for, respectively, NFC, households and the general government and are broadly qualitatively similar to the baseline. Having said that, there are two differences worth mentioning. The first, regarding NFC bond growth, is that it is associated with the intra-financial assets of non-banks. The second, regarding general government bond growth, is that it is no longer associated with a retrenchment of bank balance sheets, as well as intra-financial assets of non-banks, which further reinforces the idea of the public balance sheet being deployed in crisis periods. This way, government bond debt ceases to be associated with developments in the financial sector balance sheet altogether.

## 5 Discussion

Exploring the dynamics of the financial sector balance sheet and credit provision to the private non-financial sectors contributes not only to the discussion on the different roles of the financial sector, but also to the extensive literature that has studied the relationship between its size and economic growth. [King and Levine \(1993\)](#) rank among the first to argue that financial development is positively associated with economic development. Using four different indicators, they find that higher levels of financial development correlate with faster economic growth, physical capital accumulation, and economic efficiency improvements, in a panel containing 80 countries, spanning from 1960 to 1989. Since then, a number of studies have reassessed the relationship between financial development and growth. Some studies have found that, while financial deepness is an essential requisite for economic growth, it can also be a drag whenever it is excessive – prominent examples are [Arcand et al. \(2015\)](#), [Beck et al. \(2014\)](#), [Cecchetti and Kharroubi \(2012\)](#), [Levine et al. \(2000\)](#) and [Sahay et al. \(2015\)](#). In other words, there is a bell-shaped relationship, with clear benefits for further financial development at low levels but, above a certain point – [Cecchetti and Kharroubi \(2012\)](#) and [Beck et al. \(2014\)](#) place it at around 100% of GDP –, more finance is actually detrimental for productivity growth. This happens because the financial sector competes with other sectors for resources – for instance, it attracts high skilled workers which would otherwise find employment in other sectors. At the same time, excessive finance is oftentimes associated with overinvestment in less productive sectors, such as construction

and real estate. In subsequent work, [Cecchetti and Kharroubi \(2015\)](#) argue that the high collateral of real estate activities is a driver of the investment in this relatively low productivity activity.

One of the results of the finance-growth nexus literature is that the sectoral composition of credit is a key determinant of impact of finance on growth. [Beck et al. \(2012\)](#) find cross-country evidence supporting the view that bank lending to the NFC sector is associated to GDP growth and that the same does not apply to credit to households. They argue that, while credit to the non-financial corporate sector is typically associated with investment in productive activity, credit to the household sector is generally used to finance real estate purchase or consumption and, hence, likely to generate a more limited impact on growth (if any at all).<sup>11</sup> This result puts into perspective the fact that intra-financial assets of banks are associated with NFC credit, but not with household credit and, on the other hand, that intra-financial assets of the non-bank sector are associated with household credit.

Furthermore, the association between household credit and intra-financial assets of non-banks should also be seen in light of other studies which argue that (i) an increasing share of the total credit provided in advanced economies is channeled to the household sector and, in particular, for housing purposes ([Jordà et al., 2016](#)) and (ii) that securitisation practices – which establish financial links across bank and non-bank financial corporations – were fundamental to this process by transforming illiquid financial instruments into tradable securities ([Bhatia and Bayoumi, 2012](#)). Additionally, the higher share of household loans in the total securitised loans might reflect the higher level of harmonization of such types of contracts as opposed to NFC loans.

A second implication of these results is related to the disconnect between the place of activity and funding of large NFCs. In contrast to smaller scale enterprises, large NFCs tend to have access and are able to issue bonds in international capital markets, as already alluded to. What is more, they also tend to have multinational operations at the global scale. In other words, not only is there a looser connection between the jurisdiction where they issue their debt securities and the dynamics of credit to end-user sectors, but also between their funding and, ultimately, economic activity.<sup>12</sup>

---

<sup>11</sup>see also [Benczur et al. \(2019\)](#).

<sup>12</sup>In the context of global banking, [McCauley et al. \(2012\)](#) distinguish banks with more centralised or international operations from those with decentralised multinational operations. Moreover, [McCauley et al. \(2019\)](#) argue that focusing on the nationality perspective instead of residency-based ensures a clearer picture of developments in cross-border banking after the global financial crisis.



## 6 Conclusion

This paper provides two main contributions. First, it looks at the cross-country evidence of intra-financial claims of the financial sectors. For that purpose, it hinges on a simple and harmonized way of measuring intra-financial positions using consolidated and non-consolidated aggregate financial accounts data and which can be used for different sectors or groups of sectors, restricted however to data availability. The proposed measure documents the rapid and impressive growth of intra-financial asset positions within the financial sectors across most European economies, in recent times. Secondly, the paper provides an initial attempt to relate these interconnections, along with the total consolidated assets of the financial sectors, with the credit provided to the end-user sectors, in the form of both loans and bonds.

One important aspect that this paper has highlighted is the need for more and better aggregate balance sheet data, not only regarding the country coverage, which should be extended beyond European countries, but also the level of detail, in such a way as to enable a closer inspection within intra-financial assets, to better assess the different connections therein. Data improvements should also bear in mind the cross-border element, aiming at better measuring and understanding foreign financial sector exposures, beyond those of domestic financial institutions.<sup>13</sup> Furthermore, the challenges posed by the operations of large multinationals also make it difficult to ascertain the interplay of large corporations, with access to international capital markets, with the domestic economy and its financial system.

---

<sup>13</sup>See FSB and IMF (2018) and FSB (2018) on the latest improvements in data coverage.

## A Data appendix

### A.1 Control variables

- **Real GDP per capita** – Log level and annual growth rate of real GDP per capita. Source: Eurostat
- **Real GDP** – Annual growth rate of real GDP. Source: Eurostat
- **Inflation** – Annual growth rate of consumer price index. Source: Eurostat
- **Interest rate** – Short-term interest rate or, whenever not available, money market rate. Source: OECD and IMF International Financial Statistics
- **REER change** – Annual growth rate of average REER, calculated for 42 trading partners and CPI deflated. Source: ECB
- **Population** – Annual growth rate of total population. Source: Eurostat

## References

- Abad, J., M. D’Errico, N. Killeen, V. Luz, T. Peltonen, R. Portes, and T. Urbano (2017). Mapping the interconnectedness between eu banks and shadow banking entities. Working Paper 23280, National Bureau of Economic Research.
- Antill, S., D. Hou, and A. Sarkar (2014). Components of us financial sector growth, 1950-2013. *Economic Policy Review* 20(2).
- Arcand, J. L., E. Berkes, and U. Panizza (2015). Too much finance? *Journal of Economic Growth* 20(2), 105–148.
- Bakk-Simon, K., S. Borgioli, C. Giron, H. S. Hempell, A. Maddaloni, F. Recine, and S. Rosati (2012). Shadow banking in the euro area: an overview. ECB occasional paper 133, European Central Bank.
- Barattieri, A., M. Eden, and D. Stevanovic (2019). Financial sector interconnectedness and monetary policy transmission. *Macroeconomic Dynamics* 23(3), 1074–1101.
- Beck, T., B. Büyükkarabacak, F. K. Rioja, and N. T. Valev (2012). Who gets the credit? and does it matter? household vs. firm lending across countries. *The BE Journal of Macroeconomics* 12(1).
- Beck, T., H. Degryse, and C. Kneer (2014). Is more finance better? disentangling intermediation and size effects of financial systems. *Journal of Financial Stability* 10, 50–64.
- Benczúr, P., S. Karagiannis, and V. Kvedaras (2019). Finance and economic growth: financing structure and non-linear impact. *Journal of Macroeconomics* 62, 103048.
- Bertaut, C., B. Bressler, S. E. Curcuru, et al. (2018). Globalization and the geography of capital flows. Paper presented at the Ninth IFC Conference on Are post-crisis statistical initiatives completed?.
- Bhatia, A. V. and T. Bayoumi (2012). Leverage? what leverage? a deep dive into the us flow of funds in search of clues to the global crisis. IMF Working Paper 12/162, International Monetary Fund.
- Carvalho, D. (2020). Leverage and valuation effects: How global liquidity shapes sectoral balance sheets. *International Review of Financial Analysis* 72, 101565.

- Cecchetti, S. G. and E. Kharroubi (2012). Reassessing the impact of finance on growth. BIS Working Paper 381, BIS working paper.
- Cecchetti, S. G. and E. Kharroubi (2015). Why does financial sector growth crowd out real economic growth? BIS Working Paper 490, BIS working paper.
- Čihák, M., A. Demirgüç-Kunt, E. Feyen, R. Levine, et al. (2013). Financial development in 205 economies, 1960 to 2010. *Journal of Financial Perspectives* 1(2), 17–36.
- Cour-Thimann, P. and B. Winkler (2012). The ecbs non-standard monetary policy measures: the role of institutional factors and financial structure. *Oxford review of economic Policy* 28(4), 765–803.
- DellAriccia, G., D. Igan, L. Laeven, and H. Tong (2016). Credit booms and macrofinancial stability. *Economic Policy* 31(86), 299–355.
- Dembiermont, C., M. Drehmann, and S. Muksakunratana (2013). How much does the private sector really borrow? a new database for total credit to the private non-financial sector. *BIS Quarterly Review* March.
- European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, and World Bank (2009). *System of national accounts 2008*. European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, and World Bank.
- Eurostat (2013). *European system of accounts 2010*. Eurostat.
- Greenwood, R. and D. Scharfstein (2013). The growth of finance. *Journal of Economic Perspectives* 27(2), 3–28.
- Gruić, B. and P. D. Wooldridge (2012). Enhancements to the bis debt securities statistics. *BIS Quarterly Review* December.
- Hanson, S. G., D. S. Scharfstein, and A. Sunderam (2015). An evaluation of money market fund reform proposals. *IMF Economic Review* 63(4), 984–1023.

- Jordà, Ò., M. Schularick, and A. M. Taylor (2016). The great mortgaging: housing finance, crises and business cycles. *Economic Policy* 31(85), 107–152.
- King, R. G. and R. Levine (1993). Finance and growth: Schumpeter might be right. *The quarterly journal of economics* 108(3), 717–737.
- Laeven, L., F. Valencia, et al. (2018). Systemic banking crises revisited. Working Paper 18-206, International Monetary Fund.
- Lane, P. R. and G. M. Milesi-Ferretti (2018). The external wealth of nations revisited: international financial integration in the aftermath of the global financial crisis. *IMF Economic Review* 66(1), 189–222.
- Levine, R., N. Loayza, and T. Beck (2000). Financial intermediation and growth: Causality and causes. *Journal of Monetary Economics* 46(1), 31–77.
- McCauley, R., P. McGuire, and G. von Peter (2012). After the global financial crisis: From international to multinational banking? *Journal of Economics and Business* 64(1), 7–23.
- McCauley, R. N., A. S. Bénétrix, P. M. McGuire, and G. von Peter (2019). Financial deglobalisation in banking? *Journal of International Money and Finance* 94, 116–131.
- Montecino, J. A., G. Epstein, and I. Levina (2014). Intra-financial lending, credit, and capital formation. PERI Working Paper 345, Political Economy Research Institute - University of Massachusetts Amherst.
- Montecino, J. A., G. Epstein, and I. Levina (2016). Long-term trends in intra-financial sector lending in the united states (1950–2012). *Eastern Economic Journal* 42(4), 611–629.
- Philippon, T. (2015). Has the us finance industry become less efficient? on the theory and measurement of financial intermediation. *American Economic Review* 105(4), 1408–38.
- Philippon, T. and A. Reshef (2012). Wages and human capital in the us finance industry: 1909–2006. *The Quarterly Journal of Economics* 127(4), 1551–1609.

Philippon, T. and A. Reshef (2013). An international look at the growth of modern finance. *Journal of Economic Perspectives* 27(2), 73–96.

Sahay, R., M. Čihák, P. NDiaye, A. Barajas, R. Bi, D. Ayala, Y. Gao, A. Kyobe, L. Nguyen, C. Saborowski, et al. (2015). Rethinking financial deepening: stability and growth in emerging markets. IMF Staff Discussion Note 15/08, International Monetary Fund.

Figure 1: Total assets of the financial corporations scaled by GDP - sample average (ex Luxembourg)

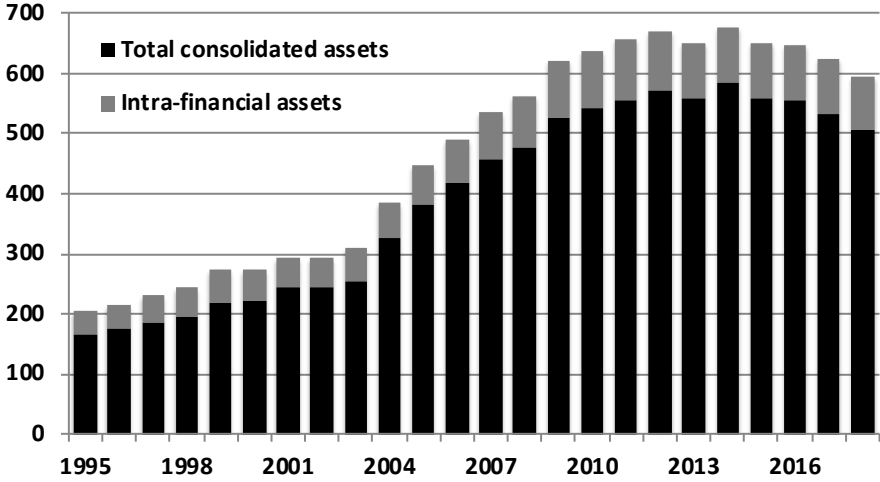


Figure 2: Intra-financial assets scaled by GDP - sample average (ex Luxembourg)

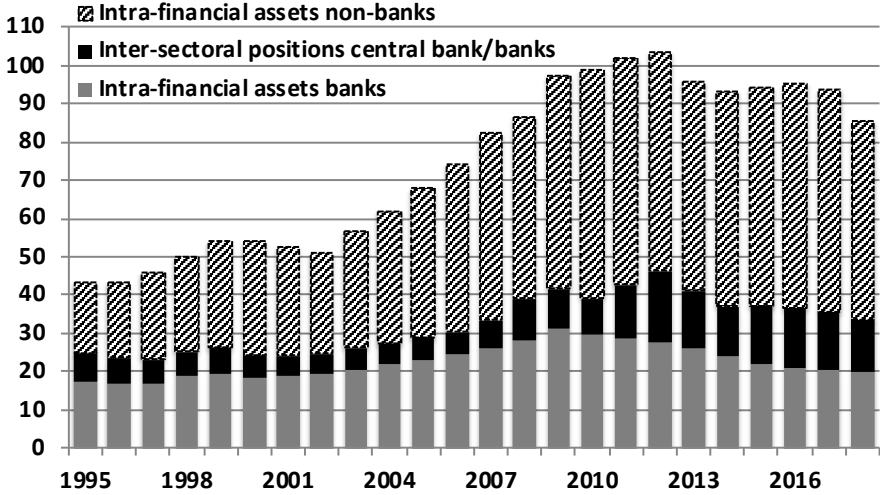


Figure 3: Intra-financial assets scaled by total financial corporations assets - sample average

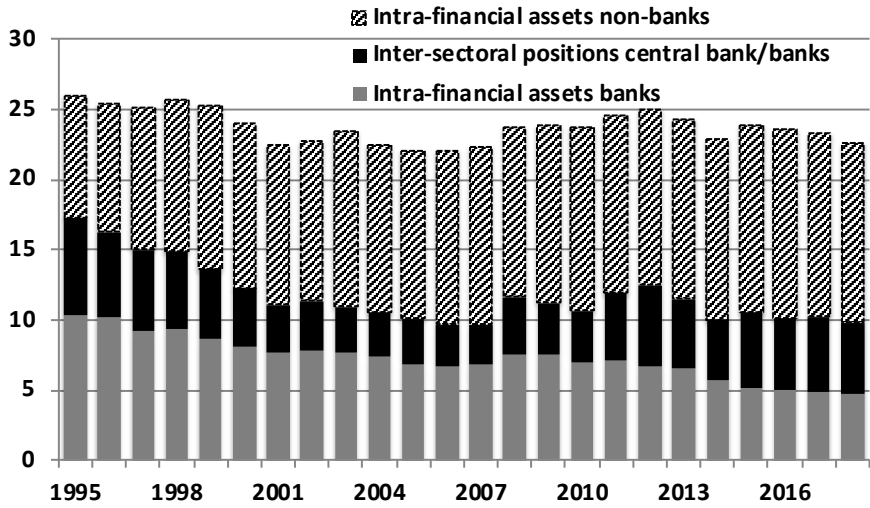




Figure 4: Intra-financial assets scaled by GDP in 2018

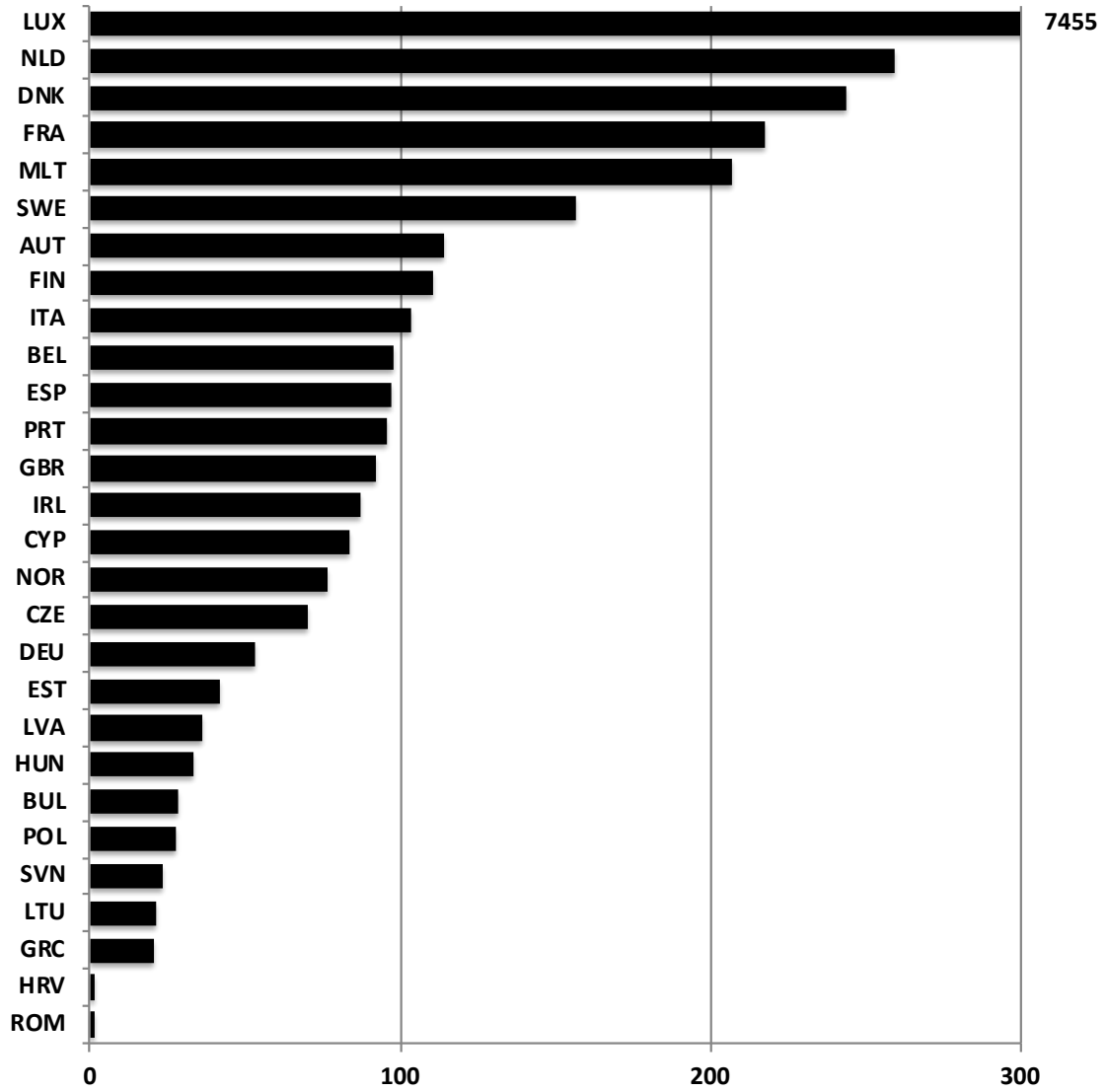


Figure 5: Intra-financial assets scaled by financial corporations assets in 2018

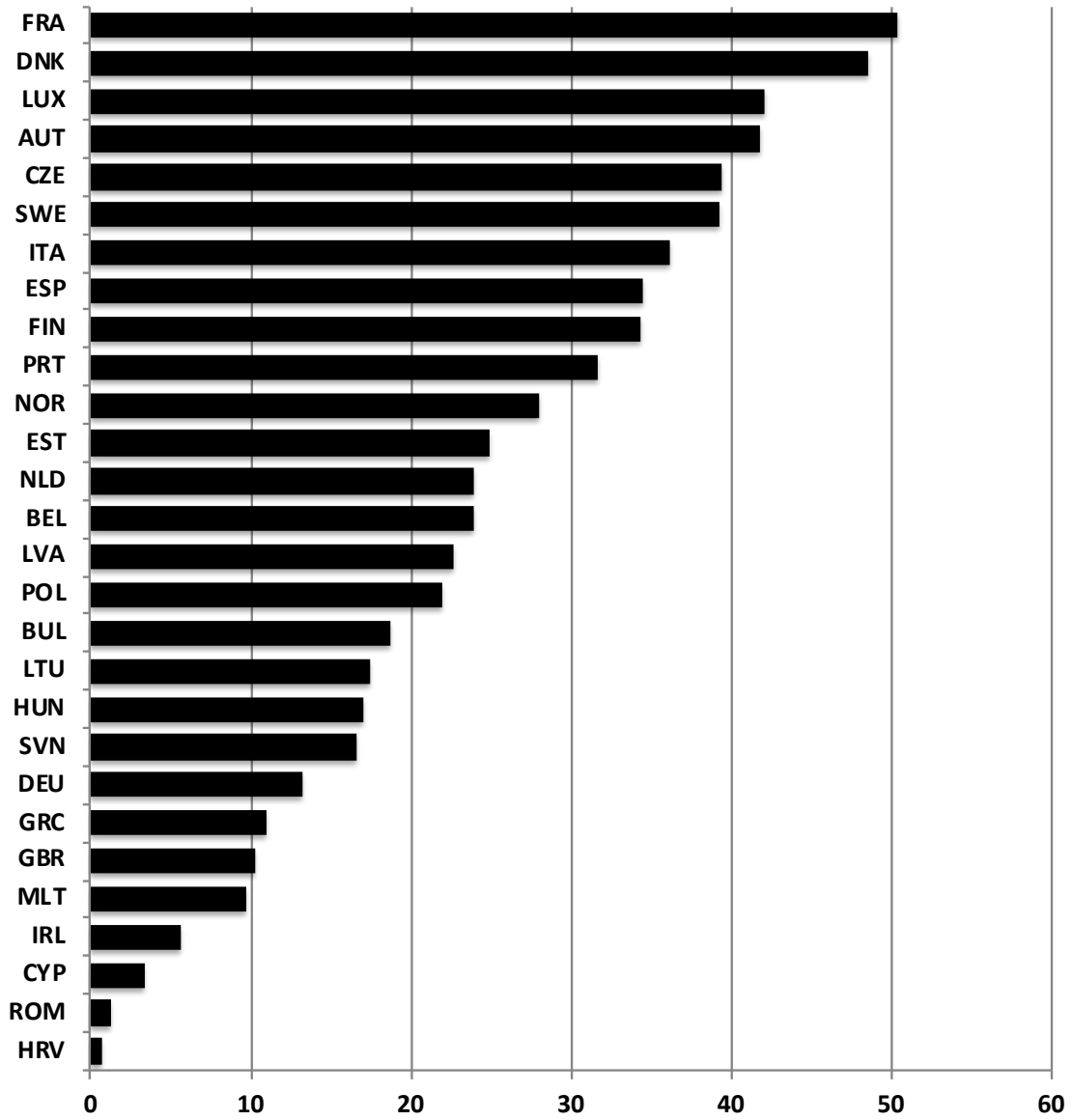
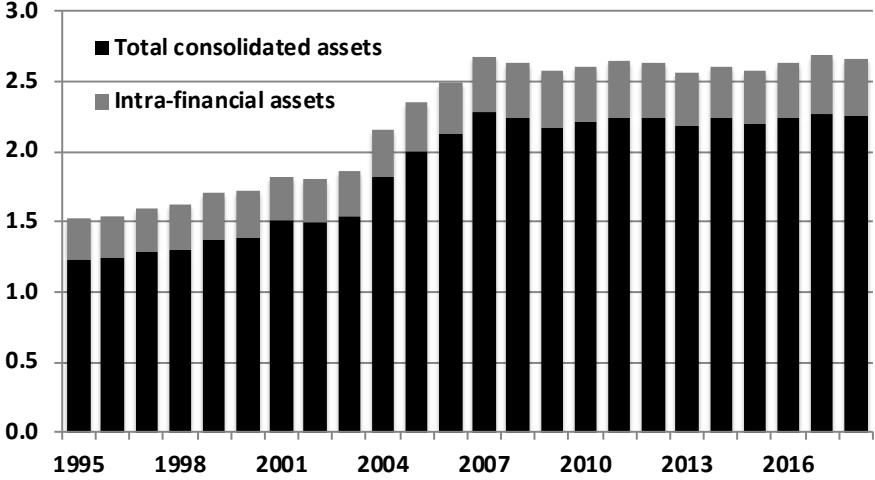


Figure 6: Total consolidated and intra-financial assets scaled by credit provided to the non-financial sectors - sample average (ex Luxembourg)



*Note: The non-financial sectors are non-financial corporations, households and the general government, and credit is the sum of bond and loan liabilities.*

**Table 1: Data availability - national financial accounts**

	<b>Period</b>	<b>Missing breakdown</b>
AUT	1995-2018	-
BEL	1995-2018	-
BUL	1995-2018	-
CYP	1995-2018	-
CZE	1995-2018	CB, MFI, OMFI, OFI, NMMF, IPCF (2017-2018)
DEU	1995-2018	-
DNK	1995-2018	-
ESP	1995-2018	-
EST	1995-2018	-
FIN	1995-2018	-
FRA	1995-2018	-
GBR	1995-2018	CB, OMFI
GRC	1995-2018	-
HRV	2001-2018	-
HUN	1995-2018	-
IRL	2001-2018	-
ITA	1995-2018	-
LTU	1995-2018	-
LUX	1999-2018	-
LVA	1995-2018	NMMF, ICPF (1995-2000)
MLT	1995-2018	-
NLD	1995-2018	-
NOR	1995-2018	-
POL	1995-2018	-
PRT	1995-2018	-
ROM	1995-2018	-
SVN	1995-2018	-
SWE	1995-2018	-

**Table 2: Data availability - Control variables**

	<b>Real GDP</b>	<b>Inflation</b>	<b>Interest rate</b>	<b>REER</b>	<b>Population</b>
AUT	1996-2018	1996-2018	1995-2018	1995-2018	1995-2018
BEL	1996-2018	1996-2018	1995-2018	1995-2018	1995-2018
BUL	1996-2018	1998-2018	1995-2018	1995-2018	1995-2018
CYP	1996-2018	1997-2018	1997-2018	1995-2018	1995-2018
CZE	1996-2018	1996-2018	1995-2018	1995-2018	1995-2018
DEU	1995-2018	1996-2018	1995-2018	1995-2018	1995-2018
DNK	1995-2018	1996-2018	1995-2018	1995-2018	1995-2018
ESP	1996-2018	1996-2018	1995-2018	1995-2018	1995-2018
EST	1996-2018	1996-2018	1996-2018	1995-2018	1995-2018
FIN	1995-2018	1996-2018	1995-2018	1995-2018	1995-2018
FRA	1995-2018	1996-2018	1995-2018	1995-2018	1995-2018
GBR	1995-2018	1996-2018	1995-2018	1995-2018	1995-2018
GRC	1996-2018	1996-2018	1995-2018	1995-2018	1995-2018
HRV	1996-2018	1999-2018	1995-2014	1995-2018	1995-2018
HUN	1996-2018	1996-2018	1995-2018	1995-2018	1995-2018
IRL	1996-2018	1996-2018	1995-2018	1995-2018	1995-2018
ITA	1996-2018	1996-2018	1995-2018	1995-2018	1995-2018
LTU	1996-2018	1996-2018	1996-2018	1995-2018	1995-2018
LUX	1996-2018	1996-2018	1999-2018	1995-2018	1995-2018
LVA	1996-2018	1997-2018	1998-2018	1995-2018	1995-2018
MLT	2001-2018	1997-2018	2001-2018	1995-2018	1995-2018
NLD	1996-2018	1997-2018	1995-2018	1995-2018	1995-2018
NOR	1995-2018	1996-2018	1995-2018	1995-2018	1995-2018
POL	1996-2018	1997-2018	1995-2018	1995-2018	1995-2018
PRT	1996-2018	1996-2018	1995-2018	1995-2018	1995-2018
ROM	1996-2018	1996-2018	1995-2018	1995-2018	1995-2018
SVN	1996-2018	1996-2018	1995-2017	1995-2018	1995-2018
SWE	1995-2018	1996-2018	1995-2018	1995-2018	1995-2018

**Table 3: Descriptive statistics**

	Obs	Mean	St Dev	Min	Max
<i>Control variables</i>					
GDP pc	667	9.95	0.75	8.05	11.47
GDP growth	646	2.60	3.43	-14.80	25.20
Inflation	634	3.28	7.73	-1.70	154.90
Interest rate	649	4.69	9.43	-0.70	119.88
REER change	644	0.65	4.37	-20.99	31.10
<i>Financial sector variables</i>					
$\Delta TA^{FC}$	628	8.61	11.93	-59.65	147.62
$\Delta TA^B$	603	6.91	11.31	-68.52	59.89
$\Delta TA^{NB}$	620	13.55	29.95	-68.67	418.01
$\Delta IFA^{FC}$	624	8.38	20.63	-143.92	135.14
$\Delta IFA^B$	599	3.35	28.66	-175.31	173.88
$\Delta IFA^{NB}$	622	10.96	28.93	-212.77	211.12
<i>Credit variables</i>					
$\Delta NFC^L$	628	6.67	12.47	-83.29	76.68
$\Delta NFC^B$	624	7.95	44.00	-388.67	236.38
$\Delta HH^L$	628	10.31	20.38	-209.82	254.97
$\Delta GG^L$	631	5.81	20.39	-45.13	236.84
$\Delta GG^B$	631	6.85	36.53	-394.09	721.75

**Table 4: Correlation of control variables**

	GDP pc	GDP growth	Inflation	Interest rate	REER change
GDP pc	1				
GDP growth	-0.11	1			
Inflation	-0.33	-0.03	1		
Interest rate	-0.38	-0.00	0.85	1	
REER change	-0.25	0.01	0.32	0.26	1

Table 5: Financial sector and credit - non-financial corporations loans and bonds

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$\Delta NFC^L$	$\Delta NFC^L$	$\Delta NFC^L$	$\Delta NFC^L$	$\Delta NFC^L$	$\Delta NFC^L$	$\Delta NFC^B$	$\Delta NFC^B$	$\Delta NFC^B$	$\Delta NFC^B$	$\Delta NFC^B$	$\Delta NFC^B$
GDP pc (-1)	-23.196*** (7.020)	-23.388*** (6.975)	-24.039*** (7.861)	-23.231*** (6.595)	-23.618*** (6.799)	-22.919*** (6.610)	22.424 (28.473)	20.947 (28.356)	21.117 (31.689)	27.240 (22.569)	20.008 (16.890)	28.847 (22.660)
GDP growth (-1)	0.721*** (0.181)	0.580*** (0.177)	0.839*** (0.168)	0.796*** (0.181)	0.802*** (0.171)	0.804*** (0.181)	1.298 (1.846)	1.619 (2.102)	1.369 (1.810)	1.017 (1.832)	1.391 (1.603)	0.980 (1.775)
Inflation (-1)	0.329*** (0.088)	0.333*** (0.093)	0.307*** (0.086)	0.780*** (0.197)	0.798*** (0.215)	0.775*** (0.193)	0.795 (0.543)	0.710 (0.540)	0.799 (0.515)	3.828*** (1.243)	3.634*** (1.267)	3.814*** (1.247)
Interest rate (-1)	-0.567*** (0.137)	-0.541*** (0.141)	-0.597*** (0.140)	-0.781*** (0.196)	-0.788*** (0.208)	-0.793*** (0.195)	-0.729 (0.601)	-0.756 (0.628)	-0.765 (0.577)	-2.439*** (0.883)	-2.303*** (0.891)	-2.466*** (0.886)
REER change (-1)	-0.161* (0.090)	-0.223** (0.103)	-0.105 (0.097)	-0.214* (0.105)	-0.198 (0.126)	-0.198 (0.104)	0.580 (0.578)	0.883 (0.777)	0.526 (0.498)	0.241 (0.476)	0.250 (0.582)	0.259 (0.448)
$\Delta TAF^C$ (-1)	0.170*** (0.060)						0.188 (0.271)					
$\Delta TA^B$ (-1)		0.249*** (0.061)						-0.114 (0.308)				
$\Delta TAN^B$ (-1)			0.033*** (0.010)					0.125 (0.088)				
$\Delta IFA^C$ (-1)				0.035** (0.015)						0.067 (0.072)		
$\Delta IFAB$ (-1)					0.026* (0.014)						0.093* (0.052)	
$\Delta IFAN^B$ (-1)						0.014 (0.012)						0.058 (0.046)
Observations	585	562	580	581	558	580	584	561	579	580	557	579
R-squared	0.450	0.466	0.436	0.450	0.461	0.449	0.062	0.061	0.065	0.081	0.079	0.081
Number of countries	28	27	28	28	27	28	28	27	28	28	27	28

$NFC^L$  is credit provided to NFCs in the form of loans and  $NFC^B$  in the form of bonds.  $HH^L$  is credit provided to households in the form of loans.  $GG^L$  is credit provided to the general government in the form of loans and  $GG^B$  in the form of bonds.  $TAF^C$ ,  $TA^B$  and  $TAN^B$  are total assets of, respectively, financial corporations, banks and non-banks.  $IFA^C$ ,  $IFAB$  and  $IFAN^B$  are intra-financial assets of, respectively, financial corporations, banks and non-banks. Robust standard errors, clustered at the country level, in parenthesis. \*\*\*, \*\*, \* denote significance at 1, 5 and 10 percent levels respectively.

Table 6: Financial sector and credit - household loans

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta HH^L$	$\Delta HH^L$	$\Delta HH^L$	$\Delta HH^L$	$\Delta HH^L$	$\Delta HH^L$
GDP pc (-1)	-45.194*** (9.160)	-45.283*** (8.956)	-44.377*** (10.613)	-47.560*** (9.950)	-46.400*** (10.555)	-47.111*** (10.032)
GDP growth (-1)	1.318*** (0.294)	1.097*** (0.277)	1.517*** (0.314)	1.558*** (0.327)	1.470*** (0.312)	1.524*** (0.317)
Inflation (-1)	0.450*** (0.104)	0.464*** (0.114)	0.420*** (0.095)	0.474 (0.312)	0.522 (0.332)	0.469 (0.309)
Interest rate (-1)	-0.501*** (0.135)	-0.468*** (0.127)	-0.544*** (0.145)	-0.598** (0.264)	-0.611** (0.279)	-0.607** (0.254)
REER change (-1)	-0.434 (0.258)	-0.575* (0.317)	-0.335 (0.231)	-0.294 (0.230)	-0.297 (0.279)	-0.300 (0.235)
$\Delta TAF^C$ (-1)	0.278** (0.105)					
$\Delta TAB$ (-1)		0.389*** (0.099)				
$\Delta TANB$ (-1)			0.041*** (0.014)			
$\Delta IFAF^C$ (-1)				0.014 (0.029)		
$\Delta IFAB$ (-1)					0.017 (0.022)	
$\Delta IFANB$ (-1)						0.026** (0.012)
Observations	585	562	580	581	558	580
R-squared	0.576	0.587	0.549	0.547	0.547	0.550
Number of countries	28	27	28	28	27	28

$NFC^L$  is credit provided to NFCs in the form of loans and  $NFC^B$  in the form of bonds.  $HH^L$  is credit provided to households in the form of loans.  $GG^L$  is credit provided to the general government in the form of loans and  $GG^B$  in the form of bonds.  $TAF^C$ ,  $TAB$  and  $TANB$  are total assets of, respectively, financial corporations, banks and non-banks.  $IFAF^C$ ,  $IFAB$  and  $IFANB$  are intra-financial assets of, respectively, financial corporations, banks and non-banks. Robust standard errors, clustered at the country level, in parenthesis. \*\*\*, \*\*, \* denote significance at 1, 5 and 10 percent levels respectively.



Table 7: Financial sector and credit - general government loans and bonds

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$\Delta GG^L$	$\Delta GG^L$	$\Delta GG^L$	$\Delta GG^L$	$\Delta GG^L$	$\Delta GG^L$	$\Delta GG^B$	$\Delta GG^B$	$\Delta GG^B$	$\Delta GG^B$	$\Delta GG^B$	$\Delta GG^B$
GDP pc (-1)	17.792** (7.848)	16.696* (8.403)	17.601** (8.428)	20.519** (8.178)	18.361** (8.389)	18.749** (8.733)	-20.734** (7.727)	-19.712** (7.860)	-16.077** (8.262)	-18.073** (7.150)	-18.537** (7.220)	-19.736** (6.957)
GDP growth (-1)	-0.655 (0.442)	-0.575 (0.487)	-0.704 (0.427)	-0.770* (0.413)	-0.762* (0.418)	-0.670* (0.388)	1.249 (1.006)	1.360 (1.026)	1.059 (0.969)	1.223 (1.048)	1.106 (1.013)	1.219 (1.039)
Inflation (-1)	0.289 (0.206)	0.252 (0.201)	0.293 (0.199)	1.138 (0.669)	1.082 (0.656)	1.147 (0.674)	-0.054 (0.180)	-0.097 (0.191)	-0.015 (0.162)	-0.285 (0.659)	-0.375 (0.662)	-0.269 (0.646)
Interest rate (-1)	0.084 (0.160)	0.080 (0.166)	0.093 (0.153)	-0.344 (0.417)	-0.316 (0.412)	-0.326 (0.423)	-0.142 (0.307)	-0.124 (0.322)	-0.070 (0.308)	0.134 (0.568)	0.231 (0.573)	0.177 (0.576)
REER change (-1)	0.340 (0.229)	0.397 (0.275)	0.302 (0.217)	0.195 (0.228)	0.115 (0.233)	0.213 (0.215)	0.255 (0.189)	0.402** (0.195)	0.107 (0.176)	0.183 (0.171)	0.166 (0.153)	0.131 (0.147)
$\Delta TAF^C$ (-1)	-0.031 (0.074)						-0.209 (0.145)					
$\Delta TA^B$ (-1)		-0.127 (0.135)						-0.268** (0.122)				
$\Delta TA^{NB}$ (-1)			0.011 (0.036)						-0.012 (0.028)			
$\Delta IFAF^C$ (-1)				-0.023 (0.038)						-0.119* (0.067)		
$\Delta IFAB$ (-1)					-0.033 (0.026)						0.021 (0.024)	
$\Delta IFAN^B$ (-1)						-0.072* (0.035)						-0.064** (0.029)
Observations	585	562	580	581	558	580	585	562	580	581	558	580
R-squared	0.140	0.151	0.141	0.142	0.149	0.151	0.075	0.076	0.072	0.076	0.075	0.074
Number of countries	28	27	28	28	27	28	28	27	28	28	27	28

$NFC^L$  is credit provided to NFCs in the form of loans and  $NFC^B$  in the form of bonds.  $HH^L$  is credit provided to households in the form of loans.  $GG^L$  is credit provided to the general government in the form of loans and  $GG^B$  in the form of bonds.  $TA^FC$ ,  $TA^B$  and  $TA^{NB}$  are total assets of, respectively, financial corporations, banks and non-banks.  $IFAF^C$ ,  $IFAB$  and  $IFAN^B$  are intra-financial assets of, respectively, financial corporations, banks and non-banks. Robust standard errors, clustered at the country level, in parenthesis. \*\*\*, \*\*, \* denote significance at 1, 5 and 10 percent levels respectively.

**Table 8: Financial sector and credit - non-financial corporations loans and bonds (excluding financial centres)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$\Delta NFC^L$	$\Delta NFC^L$	$\Delta NFC^L$	$\Delta NFC^L$	$\Delta NFC^L$	$\Delta NFC^L$	$\Delta NFC^B$	$\Delta NFC^B$	$\Delta NFC^B$	$\Delta NFC^B$	$\Delta NFC^B$	$\Delta NFC^B$
GDP pc (-1)	-20.152*** (6.670)	-19.806*** (6.488)	-20.653*** (7.607)	-20.379*** (6.244)	-20.458*** (6.466)	-19.979*** (6.431)	15.063 (29.738)	15.958 (30.128)	11.096 (31.301)	23.020 (22.861)	16.093 (17.576)	25.122 (22.919)
GDP growth (-1)	0.606** (0.227)	0.542** (0.214)	0.859*** (0.201)	0.843*** (0.218)	0.905*** (0.217)	0.864*** (0.213)	1.446 (2.832)	1.236 (2.843)	1.176 (2.412)	0.637 (2.494)	1.138 (2.145)	0.549 (2.394)
Inflation (-1)	0.360*** (0.095)	0.374*** (0.102)	0.327*** (0.099)	0.911*** (0.210)	0.898*** (0.220)	0.899*** (0.204)	0.591 (0.502)	0.615 (0.498)	0.638 (0.499)	3.783*** (1.318)	3.503*** (1.299)	3.751** (1.318)
Interest rate (-1)	-0.573*** (0.143)	-0.577*** (0.147)	-0.614*** (0.145)	-0.872*** (0.202)	-0.871*** (0.205)	-0.889*** (0.198)	-0.645 (0.568)	-0.618 (0.562)	-0.646 (0.549)	-2.348** (0.977)	-2.160** (0.950)	-2.398** (0.967)
REER change (-1)	-0.171 (0.111)	-0.216* (0.106)	-0.072 (0.127)	-0.193 (0.132)	-0.149 (0.135)	-0.167 (0.135)	0.837 (0.841)	0.739 (0.842)	0.614 (0.671)	0.165 (0.665)	0.205 (0.640)	0.166 (0.603)
$\Delta TAF^C$ (-1)	0.272*** (0.079)						-0.209 (0.357)					
$\Delta TAF^B$ (-1)		0.313*** (0.060)					-0.059 (0.331)					
$\Delta TAN^B$ (-1)			0.049*** (0.017)					0.026 (0.116)				
$\Delta IFA^C$ (-1)				0.060*** (0.017)						0.109 (0.103)		
$\Delta IFA^B$ (-1)					0.031** (0.014)						0.109* (0.053)	
$\Delta IFA^{NB}$ (-1)						0.020 (0.015)						0.106 (0.062)
Observations	448	447	443	446	443	445	447	446	442	445	442	444
R-squared	0.591	0.603	0.573	0.598	0.598	0.593	0.070	0.069	0.068	0.097	0.094	0.098
Number of countries	21	21	21	21	21	21	21	21	21	21	21	21

$NFC^L$  is credit provided to NFCs in the form of loans and  $NFC^B$  in the form of bonds.  $HH^L$  is credit provided to households in the form of loans.  $GG^L$  is credit provided to the general government in the form of loans and  $GG^B$  in the form of bonds.  $TAF^C$ ,  $TAF^B$  and  $TAN^B$  are total assets of, respectively, financial corporations, banks and non-banks.  $IFA^C$ ,  $IFA^B$  and  $IFAN^B$  are intra-financial assets of, respectively, financial corporations, banks and non-banks. Robust standard errors, clustered at the country level, in parenthesis. \*\*\*, \*\*, \* denote significance at 1, 5 and 10 percent levels respectively.

Table 9: Financial sector and credit - household loans (excluding financial centres)

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta HH^L$	$\Delta HH^L$	$\Delta HH^L$	$\Delta HH^L$	$\Delta HH^L$	$\Delta HH^L$
GDP pc (-1)	-43.191*** (8.938)	-43.614*** (8.862)	-42.706*** (11.141)	-46.615*** (10.256)	-45.559*** (10.707)	-46.060*** (10.317)
GDP growth (-1)	1.131*** (0.294)	1.246*** (0.269)	1.702*** (0.332)	1.824*** (0.320)	1.768*** (0.300)	1.767*** (0.318)
Inflation (-1)	0.497*** (0.141)	0.493*** (0.121)	0.435*** (0.118)	0.406 (0.341)	0.459 (0.348)	0.399 (0.338)
Interest rate (-1)	-0.431*** (0.148)	-0.463*** (0.129)	-0.507*** (0.172)	-0.515* (0.290)	-0.548* (0.289)	-0.531* (0.276)
REER change (-1)	-0.656* (0.327)	-0.623* (0.337)	-0.424 (0.268)	-0.338 (0.267)	-0.310 (0.284)	-0.354 (0.271)
$\Delta TAF^C$ (-1)	0.524*** (0.142)					
$\Delta TAB$ (-1)		0.432*** (0.116)				
$\Delta TANB$ (-1)			0.058* (0.028)			
$\Delta IFAF^C$ (-1)				0.021 (0.047)		
$\Delta IFAB$ (-1)					0.016 (0.023)	
$\Delta IFANB$ (-1)						0.040* (0.020)
Observations	448	447	443	446	443	445
R-squared	0.629	0.618	0.588	0.585	0.578	0.589
Number of countries	21	21	21	21	21	21

$NFC^L$  is credit provided to NFCs in the form of loans and  $NFC^B$  in the form of bonds.  $HH^L$  is credit provided to households in the form of loans.  $GG^L$  is credit provided to the general government in the form of loans and  $GG^B$  in the form of bonds.  $TAF^C$ ,  $TAB$  and  $TANB$  are total assets of, respectively, financial corporations, banks and non-banks.  $IFAF^C$ ,  $IFAB$  and  $IFANB$  are intra-financial assets of, respectively, financial corporations, banks and non-banks. Robust standard errors, clustered at the country level, in parenthesis. \*\*\*, \*\*, \* denote significance at 1, 5 and 10 percent levels respectively.

Table 10: Financial sector and credit - general government loans and bonds (excluding financial centres)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$\Delta GG^L$	$\Delta GG^L$	$\Delta GG^L$	$\Delta GG^L$	$\Delta GG^L$	$\Delta GG^L$	$\Delta GG^B$	$\Delta GG^B$	$\Delta GG^B$	$\Delta GG^B$	$\Delta GG^B$	$\Delta GG^B$
GDP pc (-1)	21.839*** (6.668)	20.760*** (6.913)	24.241*** (7.317)	23.997*** (7.239)	22.692*** (7.341)	23.313*** (7.215)	-18.834* (9.490)	-18.235* (9.623)	-13.028 (9.743)	-15.953* (9.226)	-16.415* (9.152)	-17.424* (8.994)
GDP growth (-1)	-0.546 (0.609)	-0.390 (0.622)	-0.643 (0.560)	-0.584 (0.512)	-0.506 (0.500)	-0.522 (0.517)	0.689 (0.598)	0.561 (0.616)	0.181 (0.620)	0.347 (0.626)	0.238 (0.608)	0.379 (0.635)
Inflation (-1)	0.360 (0.214)	0.339 (0.215)	0.361* (0.201)	1.422** (0.633)	1.360** (0.625)	1.419** (0.643)	-0.047 (0.146)	-0.037 (0.154)	0.017 (0.125)	-0.052 (0.557)	-0.036 (0.530)	-0.027 (0.551)
Interest rate (-1)	0.093 (0.181)	0.067 (0.182)	0.101 (0.162)	-0.500 (0.419)	-0.481 (0.417)	-0.496 (0.423)	-0.311 (0.233)	-0.283 (0.245)	-0.210 (0.222)	-0.144 (0.454)	-0.119 (0.427)	-0.102 (0.459)
REER change (-1)	0.428 (0.294)	0.501 (0.302)	0.377 (0.240)	0.287 (0.286)	0.273 (0.234)	0.313 (0.269)	0.472** (0.192)	0.425** (0.199)	0.197 (0.138)	0.251 (0.157)	0.173 (0.154)	0.227 (0.154)
$\Delta TAF^C$ (-1)	0.089 (0.158)						-0.352** (0.127)					
$\Delta TAB$ (-1)		-0.032 (0.131)						-0.252** (0.116)				
$\Delta TAN^B$ (-1)			0.084* (0.046)					0.008 (0.045)				
$\Delta IFA^C$ (-1)				0.016 (0.044)					-0.111** (0.051)			
$\Delta IFAB$ (-1)					-0.029 (0.022)					0.016 (0.022)		
$\Delta IFAN^B$ (-1)						-0.030 (0.025)						-0.078*** (0.026)
Observations	448	447	443	446	443	445	448	447	443	446	443	445
R-squared	0.196	0.197	0.203	0.204	0.201	0.207	0.185	0.174	0.159	0.177	0.161	0.175
Number of countries	21	21	21	21	21	21	21	21	21	21	21	21

$NFC^L$  is credit provided to NFCs in the form of loans and  $NFC^B$  in the form of bonds.  $HH^L$  is credit provided to households in the form of loans.  $GG^L$  is credit provided to the general government in the form of loans and  $GG^B$  in the form of bonds.  $TAF^C$ ,  $TAB$  and  $TAN^B$  are total assets of, respectively, financial corporations, banks and non-banks.  $IFA^C$ ,  $IFAB$  and  $IFAN^B$  are intra-financial assets of, respectively, financial corporations, banks and non-banks. Robust standard errors, clustered at the country level, in parenthesis. \*\*\*, \*\*, \* denote significance at 1, 5 and 10 percent levels respectively.

Table 11: Financial sector and credit - non-financial corporations loans and bonds (excluding banking crises)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$\Delta NFC^L$	$\Delta NFC^L$	$\Delta NFC^L$	$\Delta NFC^L$	$\Delta NFC^L$	$\Delta NFC^L$	$\Delta NFC^B$	$\Delta NFC^B$	$\Delta NFC^B$	$\Delta NFC^B$	$\Delta NFC^B$	$\Delta NFC^B$
GDP pc (-1)	-23.818*** (7.496)	-22.621*** (7.304)	-25.346*** (8.254)	-22.998*** (6.949)	-23.258*** (7.121)	-22.605*** (6.913)	40.131 (27.096)	38.697 (28.329)	30.326 (30.369)	44.914** (20.264)	37.483** (16.266)	48.221** (19.859)
GDP growth (-1)	0.763*** (0.219)	0.612*** (0.220)	0.862*** (0.207)	0.807*** (0.212)	0.844*** (0.210)	0.806*** (0.217)	-0.433 (1.565)	-0.354 (1.628)	-0.186 (1.498)	-0.632 (1.493)	0.026 (1.237)	-0.648 (1.415)
Inflation (-1)	0.342*** (0.094)	0.358*** (0.098)	0.320*** (0.091)	0.903*** (0.222)	0.911*** (0.237)	0.897*** (0.219)	0.660 (0.462)	0.615 (0.473)	0.596 (0.406)	3.885*** (1.110)	3.611*** (1.138)	3.834*** (1.124)
Interest rate (-1)	-0.599*** (0.137)	-0.573*** (0.141)	-0.627*** (0.138)	-0.881*** (0.196)	-0.881*** (0.205)	-0.889*** (0.195)	-0.614 (0.540)	-0.630 (0.564)	-0.720 (0.475)	-2.525*** (0.768)	-2.377*** (0.763)	-2.588*** (0.767)
REER change (-1)	-0.145 (0.105)	-0.217* (0.119)	-0.097 (0.111)	-0.217* (0.127)	-0.185 (0.142)	-0.207 (0.125)	0.428 (0.526)	0.544 (0.581)	0.538 (0.486)	0.152 (0.470)	0.260 (0.515)	0.227 (0.432)
$\Delta TAF^C$ (-1)	0.146** (0.059)						0.459 (0.277)					
$\Delta TA^B$ (-1)		0.269*** (0.073)						0.318 (0.214)				
$\Delta TAN^B$ (-1)			0.030*** (0.009)						0.151 (0.097)			
$\Delta IFA^C$ (-1)				0.023 (0.020)						0.178** (0.083)		
$\Delta IFAB$ (-1)					0.027* (0.015)						0.059 (0.053)	
$\Delta IFAN^B$ (-1)						0.016 (0.015)						0.131** (0.063)
Observations	482	466	478	478	462	478	481	465	477	477	461	477
R-squared	0.461	0.474	0.453	0.469	0.471	0.469	0.075	0.067	0.073	0.099	0.084	0.099
Number of countries	28	27	28	28	27	28	28	27	28	28	27	28

$NFC^L$  is credit provided to NFCs in the form of loans and  $NFC^B$  in the form of bonds.  $HH^L$  is credit provided to households in the form of loans.  $GG^L$  is credit provided to the general government in the form of loans and  $GG^B$  in the form of bonds.  $TAF^C$ ,  $TA^B$  and  $TAN^B$  are total assets of, respectively, financial corporations, banks and non-banks.  $IFA^C$ ,  $IFAB$  and  $IFAN^B$  are intra-financial assets of, respectively, financial corporations, banks and non-banks. Robust standard errors, clustered at the country level, in parenthesis. \*\*\*, \*\*, \* denote significance at 1, 5 and 10 percent levels respectively.

Table 12: Financial sector and credit - household loans (excluding banking crises)

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta HH^L$	$\Delta HH^L$	$\Delta HH^L$	$\Delta HH^L$	$\Delta HH^L$	$\Delta HH^L$
GDP pc (-1)	-45.597*** (9.439)	-44.223*** (9.108)	-46.485*** (11.152)	-48.386*** (10.416)	-47.199*** (10.787)	-47.905*** (10.408)
GDP growth (-1)	1.447*** (0.410)	1.184*** (0.371)	1.671*** (0.438)	1.706*** (0.455)	1.600*** (0.437)	1.657*** (0.440)
Inflation (-1)	0.474*** (0.108)	0.506*** (0.110)	0.440*** (0.103)	0.522 (0.369)	0.588 (0.383)	0.524 (0.361)
Interest rate (-1)	-0.528*** (0.141)	-0.494*** (0.118)	-0.580*** (0.150)	-0.646*** (0.301)	-0.667*** (0.313)	-0.654*** (0.286)
REER change (-1)	-0.429 (0.280)	-0.605* (0.337)	-0.325 (0.253)	-0.280 (0.251)	-0.297 (0.293)	-0.300 (0.259)
$\Delta TAF^C$ (-1)	0.279** (0.115)					
$\Delta TAB$ (-1)		0.450*** (0.116)				
$\Delta TANB$ (-1)			0.038*** (0.013)			
$\Delta IFA^{FC}$ (-1)				-0.005 (0.032)		
$\Delta IFA^B$ (-1)					0.017 (0.025)	
$\Delta IFANB$ (-1)						0.025* (0.013)
Observations	482	466	478	478	462	478
R-squared	0.574	0.587	0.552	0.544	0.540	0.546
Number of countries	28	27	28	28	27	28

$NFC^L$  is credit provided to NFCs in the form of loans and  $NFC^B$  in the form of bonds.  $HH^L$  is credit provided to households in the form of loans.  $GG^L$  is credit provided to the general government in the form of loans and  $GG^B$  in the form of bonds.  $TAF^C$ ,  $TAB$  and  $TANB$  are total assets of, respectively, financial corporations, banks and non-banks.  $IFA^{FC}$ ,  $IFA^B$  and  $IFANB$  are intra-financial assets of, respectively, financial corporations, banks and non-banks. Robust standard errors, clustered at the country level, in parenthesis. \*\*\*, \*\*, \* denote significance at 1, 5 and 10 percent levels respectively.

Table 13: Financial sector and credit - general government loans and bonds (excluding banking crises)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$\Delta GG^L$	$\Delta GG^L$	$\Delta GG^L$	$\Delta GG^L$	$\Delta GG^L$	$\Delta GG^L$	$\Delta GG^B$	$\Delta GG^B$	$\Delta GG^B$	$\Delta GG^B$	$\Delta GG^B$	$\Delta GG^B$
GDP pc (-1)	17.484** (8.319)	17.461* (8.628)	19.422** (8.019)	21.207** (9.033)	19.898** (8.928)	20.092** (8.989)	-18.513 (11.176)	-18.972 (11.205)	-13.401 (11.576)	-17.283 (11.145)	-17.646 (11.357)	-17.571 (11.203)
GDP growth (-1)	-0.010 (0.396)	0.104 (0.439)	-0.066 (0.390)	-0.142 (0.382)	-0.075 (0.379)	-0.079 (0.377)	-0.216 (0.290)	-0.141 (0.270)	-0.244 (0.337)	-0.253 (0.301)	-0.231 (0.324)	-0.209 (0.295)
Inflation (-1)	0.276* (0.142)	0.229 (0.145)	0.293* (0.148)	0.939* (0.488)	0.830* (0.463)	0.934* (0.493)	0.056 (0.118)	0.035 (0.135)	0.074 (0.106)	0.203 (0.465)	0.199 (0.486)	0.199 (0.478)
Interest rate (-1)	0.130 (0.120)	0.138 (0.130)	0.156 (0.112)	-0.156 (0.327)	-0.102 (0.312)	-0.136 (0.327)	-0.353** (0.147)	-0.361** (0.153)	-0.316** (0.133)	-0.347 (0.327)	-0.351 (0.333)	-0.343 (0.334)
REER change (-1)	0.176 (0.233)	0.319 (0.281)	0.119 (0.212)	0.024 (0.229)	0.038 (0.214)	0.035 (0.210)	0.265 (0.170)	0.341 (0.207)	0.193 (0.157)	0.172 (0.141)	0.203 (0.163)	0.193 (0.141)
$\Delta TAF^C$ (-1)	-0.081 (0.062)						-0.004 (0.087)					
$\Delta TAB$ (-1)		-0.165 (0.147)						-0.065 (0.152)				
$\Delta TAN^B$ (-1)			-0.009 (0.029)					0.026 (0.022)				
$\Delta IFA^C$ (-1)				-0.024 (0.035)					0.012 (0.039)			
$\Delta IFA^B$ (-1)					-0.013 (0.024)					0.013 (0.023)		
$\Delta IFAN^B$ (-1)						-0.052** (0.024)						-0.016 (0.027)
Observations	482	466	478	478	462	478	482	466	478	478	462	478
R-squared	0.103	0.107	0.102	0.099	0.095	0.106	0.120	0.121	0.117	0.119	0.119	0.119
Number of countries	28	27	28	28	27	28	28	27	28	28	27	28

$NFC^L$  is credit provided to NFCs in the form of loans and  $NFC^B$  in the form of bonds.  $HH^L$  is credit provided to households in the form of loans.  $GG^L$  is credit provided to the general government in the form of loans and  $GG^B$  in the form of bonds.  $TAF^C$ ,  $TAB$  and  $TAN^B$  are total assets of, respectively, financial corporations, banks and non-banks.  $IFA^C$ ,  $IFA^B$  and  $IFAN^B$  are intra-financial assets of, respectively, financial corporations, banks and non-banks. Robust standard errors, clustered at the country level, in parenthesis. \*\*\*, \*\*, \* denote significance at 1, 5 and 10 percent levels respectively.