

Public credit and the financial cycle^{*}

Victor Degorce[†]

Princeton University

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Abstract

This paper studies the role of credit granted by state-led institutions (i.e. public credit) in the financial cycle. By drawing on central banks' archives and statistical reports for thirteen major economies over the post-war period, I build the first dataset on public credit. The dataset is quarterly and covers the 1950-2020 period. I put forward three main findings. First, public credit accounts for a large share of total credit (22% across my sample). Second, public credit is immune to the Global Financial Cycle. Following a US monetary policy tightening, private credit contracts while public credit is not affected. Finally, in financially liberalized economies, public credit is countercyclical: it contracts during private booms and expands during busts. In liberalized economies, the expansion of public credit during private busts compensates on average for 15% of the contraction in private credit.

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[†]**Correspondence:** Julis-Rabinowitz Center for Public Policy and Finance (JRCPPF), Princeton University; degorce@princeton.edu.

1 Introduction

Credit fluctuations are an important driver of business cycles (Mian et al., 2017; Jordà et al., 2017). Rapid increases in credit often culminate in severe contractions (i.e. busts) which destabilize the financial system (Schularick and Taylor, 2012; Sufi and Taylor, 2022) and depress economic activity (Mian et al., 2017; Richter et al., 2019; Müller and Verner, forthcoming). The recent macro-finance literature focuses on credit granted by private banks. While the majority of credit to firms and households comes from private banks, this article demonstrates that a second type of credit plays an important role in the financial cycle: public credit. Public credit is the credit granted by state-led institutions to the private sector. State-led institutions share two defining characteristics: they are owned by the state and are not-for-profit. Most of these institutions are not considered as banks and are thus excluded from existing long-run series of credit (Dembiermont et al., 2013; Jordà et al., 2017; Monnet and Puy, 2021; Müller and Verner, forthcoming).

By digging into central banks' archives and statistical reports, I assemble the first long-run series of public credit for a group of 13 major economies, both developed and emerging.¹ The data are quarterly and reach back to the 1950s. Based on these new long-run series, I investigate the role of public credit in the financial cycle. I put forward three main findings.

First, public credit accounts for a large share of total credit. Overall, public credit represents on average 22% of total credit to the private sector across the sample, and is considerably higher in emerging (32%) than in developed (18%) economies. Historically, the share of public credit reached its climax during the postwar period and declined starting in the 1990s. Since the early 2000s, the share of public credit in total credit has stabilized at around 16% across my sample (10% in developed economies and 25% in emerging economies).

Second, public credit is immune to the Global Financial Cycle. In countries with open capital accounts and fixed exchange rates, an increase in the US interest rate leads to a contraction of private credit but does not affect public credit. This result holds both for emerging and developed countries, and across sub-periods. Through public credit institutions, states can thus control the allocation of credit to certain sectors of

¹The sample includes Austria, France, Germany, Greece, Indonesia, Italy, Japan, Mexico, Norway, United-States, South-Korea, Spain, and Thailand. These 13 countries account for 44% of world GDP today, and 9 of them are among the world's 20 largest economies.

the economy independently of world financial conditions.

Third, in financially liberalized economies, public credit tends to expand during busts of private credit and to contract during booms. On the other hand, before financial liberalization, public credit is strongly procyclical: it expands during private booms and contracts during busts. To measure financial liberalization, I rely on the index of [Abiad et al. \(2010\)](#) which captures the intensity of state regulation on financial markets. I use the index to distinguish between two broad sub-samples: pre and post-financial liberalization. My estimates suggest that, in the post-liberalization sub-sample, the variation of public credit during private busts *compensates* on average for 15% of the contraction in private credit. In the bust that followed the 2008 Great Financial Crisis in the US, public credit compensated for 39% of the contraction in private credit.² This is particularly impressive since, at the beginning of the crisis, public credit accounted for only 8% of total credit.

On the other hand, in the pre-liberalization sub-sample, the variation of public credit during private busts *reinforces* the contraction of private credit by 17%. Ignoring public credit thus amounts to having an omitted variable when studying the impact of credit cycles on the business cycle. The bias resulting from this omitted variable varies depending on the level of financial liberalization. One consequence of this bias is that the effect of private credit busts on output in liberalized economies might be *larger* than previously thought.

Drawing on these results, I conclude that public credit is a key component of the financial cycle: (a) it is not affected by global financial spillovers, and (b) it expands during busts and contracts during booms. While the former is unconditional, the latter is true only in financially liberalized economies. Importantly, these patterns can only be seen clearly through a long-run sample, like the one assembled here.

While the historical and political science literature has emphasized the important role of public credit in the financial system ([Verdier, 2000](#); [Amsden, 2001](#); [Musacchio et al., 2017](#); [Monnet, 2018, 2023](#)), this paper is the first to build a comprehensive dataset and study the role of public credit for macroeconomic fluctuations. [Lucas \(2016\)](#) and [Jiménez et al. \(2018\)](#) present first evidence that public loans helped mitigate the decline in output during the 2008 crisis in the US and Spain respectively. [Lucas \(2016\)](#) use

²In the US, public credit is the sum of direct loans to firms and households by the Federal government and by state and local governments. Loans granted by Government Sponsored Enterprises (Fannie Mae, Freddie Mac, Farm Credit System...) are not considered as public credit since Government Sponsored Enterprises are privately owned. See Appendix C.1.

aggregate data and a theoretical model to identify the effect of public loans on output, while Jiménez et al. (2018) rely on bank and firm-level data. Both studies are focused on a short-time span and a single country.

The stabilizing properties of public credit have been neglected by macroeconomists, in great part due to the absence of data. Data on public credit institutions are particularly difficult to find because most of these institutions are not banks. In national and international statistics, banks are defined as financial institutions with short-term liabilities. Most public credit institutions do not fit this definition. Public funds (e.g. Mexico's Fideicomiso de Fomento Mineiro) are funded directly through fiscal receipts. Specialized credit institutes (e.g. France's Credit National) and most development banks are funded primarily through long-term bonds or central bank loans. None of these institutions qualify as banks. Likewise, loans by government agencies (e.g. US' Small Business Administration) and direct loans from the Treasury or the central bank do not appear in banking statistics. In many countries, bank-like public credit institutions have become more common following financial liberalization, but they remain the exception rather than the rule.³

Using central banks archives and statistical reports, I managed to collect long-run series of public credit for a sample of 13 countries. Sample selection was dictated by the quality and consistency of statistical reporting, rather by the size of the public credit sector. Even in countries where public credit accounts for a relatively large share of total credit (e.g. Brazil), sources were often too incomplete to assemble a continuous series.⁴ Today, public credit institutions are still active in many countries. For most of these countries, however, constructing long-run series of public credit is not possible.

My results speak to the growing literature on credit cycles. Particularly related with my work are papers on the Global Financial Cycle (Rey, 2013; Miranda-Agrippino and Rey, 2020; Obstfeld et al., 2019; Mian et al., 2017), and on the link between credit cycles and the business cycle (Jordà et al., 2013, 2017; Mian and Sufi, 2015; Mian et al., 2017; Müller and Verner, forthcoming). Studying the properties of public credit is important for this literature because public credit represents a significant share of total credit (particularly in developing countries). More importantly, public credit is used to finance borrowers who are below or close to the credit constraint (e.g. households,

³In France, Italy, South-Korea, Spain, and Thailand most public credit institutions are considered as banking institutions in national and international statistical reports (e.g. IMF Financial Statistics) since the 1980s and 1990s.

⁴Focusing on the post-Great Financial Crisis period in Brazil, Bonomo et al. (2016) estimate that between one third and one half of total loans to the private sector are government loans.

SMEs, students... see Appendix C.1). These borrowers play a disproportionate role in the transmission of credit shocks to the real economy (Eggertsson and Krugman, 2012; Guerrieri and Lorenzoni, 2017; Mian and Sufi, 2018). Understanding the macroeconomic properties of public credit, and identifying the circumstances for public credit to behave countercyclically is therefore particularly relevant.

Second, my finding on the link between financial liberalization and public credit cycles echoes the literature on fiscal policy cycles. The main result of this literature is that government spending tends to be strongly procyclical in emerging economies and countercyclical in developed economies (Kaminsky et al., 2004; Ilzetzki and Végh, 2008). Frankel et al. (2013) find evidence of countries overcoming procyclicality and becoming countercyclical. My results suggest that a similar pattern holds for public credit. Two main explanations have been put forward to rationalize fiscal policy cycles. First, emerging countries tend to have limited access to international credit markets, particularly in “bad” times (Cuadra et al., 2010; Bianchi et al., 2023). This constrains the ability of governments to conduct countercyclical policies. Second, political incentives and institutional weaknesses in emerging countries encourage excessive public spending in “good” times (Alesina et al., 2008). Both of these explanations could help rationalize the behavior of public credit.

Third, my findings also inform the debate on government ownership of credit institutions. This debate has been framed mostly along the following question: do government banks allocate funds efficiently? The “political” view is that the allocation of public loans is politically motivated and inefficient (Shleifer and Vishny, 1994; La Porta et al., 2002). A second view is that public credit institutions address market failures and improve the allocation of financial resources (Stiglitz, 1993). This paper takes a different perspective focusing on public credit’s effect on macroeconomic fluctuations rather than on its contribution to long-term growth.

A more recent expression of the political view can be found in Herrera et al. (2020), who reveal that governments in developing economies tend to “ride” private booms. That is, they abstain from regulating the boom because doing so might be politically costly. The model put forward in Herrera et al. (2020) can also explain why public credit is strongly procyclical in less financially liberalized economies, inasmuch as many of these countries have weak or unstable governments (e.g. as in Thailand or Indonesia).

The paper is organized as follows. Section 2 provides an historical perspective on public credit. It also introduces the sources and the methodology used to assemble the

database. The third and fourth Sections examine the behavior of public credit in the financial cycle. Section 3 studies its reaction to foreign interest rate shocks. Section 4 looks at its behavior during episodes of boom and bust of private credit. Section 5 discusses the policy implications of my findings, and Section 6 concludes.

2 Public credit in historical perspective

2.1 Public credit institutions

Public credit institutions share two defining characteristics. First, they are owned by the state. State ownership means that a government unit (central, regional, or local) owns more than 50% of the institution's capital. Second, they are not-for-profit. Public credit institutions have a mandate from the state to fulfill economic, political, social, or developmental objectives. This second criteria excludes nationalized commercial banks, which generally operate on a for-profit basis (see e.g. [Monnet \(2018\)](#)).

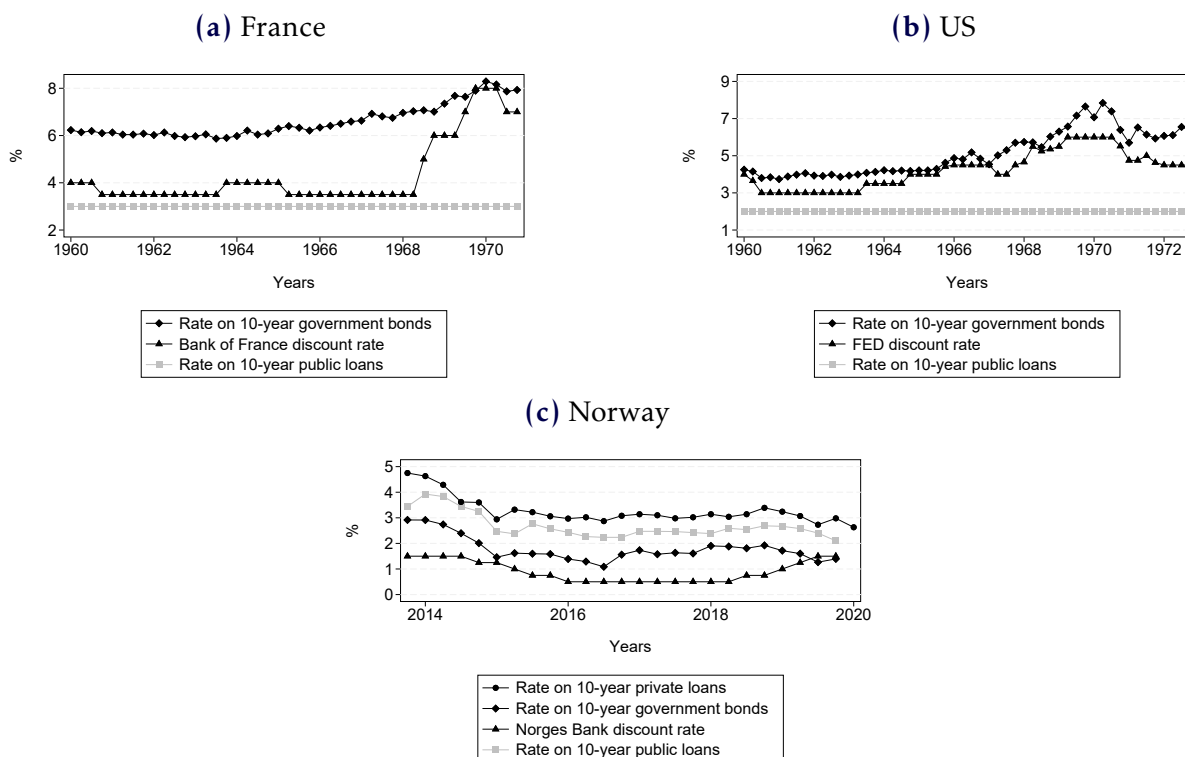
Most public credit institutions are funded through long-term debt, and do not qualify as banks. During the pre-financial liberalization era, public credit was financed through special financial circuits. These circuits were characterized by a significant degree of regulation, segmentation from the rest of the financial market, and substantial government subsidy ([Hodgman, 1973](#); [Zysman, 1983](#); [Monnet, 2018](#)). Their main objective was to guarantee public credit institutions a constant flow of funds at a low and stable rate of interest.⁵ Different types of circuits existed. Long-term loans from the central bank or the treasury are one example. Some public credit institutions tapped into the flow of households savings through the Post Office (e.g. Japan's Fiscal Loan Fund and France's Caisse des Dépôts et Consignations), or drew their funds directly from the market by issuing state-backed long-term bonds ([OECD, 1980](#)). In the latter case, the price of the bonds was kept artificially high by requiring private commercial banks to invest a significant share of their assets in public bonds (liquidity ratios were also used as monetary policy tools and for the management of public debt, see [Monnet and Vari \(2023\)](#) and [Reinhart and Sbrancia \(2015\)](#)). Often, the interest rate cost was subsidized by the government.⁶ These sources of cheap funding enabled public credit institutions

⁵See e.g. [EEC \(1977, p54\)](#) "In order to provide agriculture with a regular flow of credit and protect it from interest fluctuations, active government intervention is required and this takes place either by allocating budget revenue to the [public credit] institutions in question or by issuing State-guaranteed bonds on these institutions."

⁶In Belgium, the Société Nationale du Logement (SNL) for example paid an interest rate of 1.5% on its

to lend at below-market interest rates. In addition, the rate on public loans were often completely disconnected from private rates (see panels (a) and (b) in Figure 1).⁷

Figure 1: Public and private interest rates



Notes: This Figure compares the interest rate on 10-year public loans (i.e. loans granted by public credit institutions) to the interest rate on 10-year government bonds, the central bank discount rate, and (when available) to the rate on 10-year private loans (i.e. loans granted by private banks). The comparison is done for three countries: France (panel (a)), the US (panel (b)) and Norway (panel (c)). Public loans are agricultural loans by the Caisse Nationale de Crédit Agricole for France, loans to local administrations by the Rural Electrification Administration (REA) for the US, and housing loans by the Husbanken (State Housing Bank) for Norway.

Sources: Data on the central bank's discount rate and on 10-year government bonds' rate are drawn from the IMF International Financial Statistics. Data on public loans' interest rate are drawn from the annual reports of the Caisse Nationale de Crédit Agricole for France, from the annual reports of the Rural Electrification Administration (REA) for the US, and from the annual reports of the Husbanken (State Housing Bank) for Norway. Data on private loans' interest rate for Norway are drawn from Statistics Norway's website (<https://www.ssb.no/en/statbank/table/10748>).

One of the consequences of financial liberalization was the dismantling of these special financial circuits. Public credit institutions therefore turned to the market for funds. The move towards market-based funding translated into a higher reliance on bonds and,

bonds. The cost accruing from the difference between the market rate and the rate paid by the SNL was covered by the state (EEC, 1963, p15).

⁷It is particularly difficult to find information on the maturity of public loans. Yet, this information is needed to compare interest rates between loans of similar maturity. For this reason, Figure 1 includes the only example for which reliable information on the maturity of public loans was found.

occasionally, on medium and short-term funds (Musacchio et al., 2017). In some countries, this transformation into bank-like institutions was endorsed by law. In France, the 1984 banking code abolished the distinction between bank and non-bank financial institutions (the latter had been a synonym for “public credit institutions” until then) (Bank of France, 1987, p45). Public credit institutions were then grouped into a new category. The same happened in 1993 in Italy, when the “specialization” of credit was officially terminated (De Bonis et al., 2012). This time, remaining public institutions were privatized or merged with commercial banks. Still, even today, the majority of public credit institutions remain non-banks.⁸

Borrowing directly from the market did not affect the ability of public credit institutions to keep their lending rates below market levels. Although explicit subsidies are no longer in use, public credit institutions still enjoy an implicit subsidy in the form of government guarantee on their debt. State-guaranteed bonds sell at a premium, and this allows public credit institutions to keep their lending rates close to the rate on government debt, and below market rates for private loans (see panel (c) in Figure 1).

2.2 A database on public credit

Data on public credit are particularly hard to find precisely because most public credit institutions are not banks. Non-bank public credit institutions are usually not supervised by the banking authority, and are not required to publish regular balance sheets. By digging into central banks’ archives and statistical publications, I managed to overcome this limitation for a sample of 13 countries. Data availability prevented me from extending the sample any further. In most countries, the statistical record of public credit is indeed patchy or altogether inexistent; even when public institutions play a prominent role in credit allocation.

In the 13 countries of my sample, quarterly data on public credit institutions were collected by the central bank, but not always published. Whenever the data were published, I use historical editions of the central bank’ statistical reports or the central bank’s online database. Otherwise, I rely on the central bank’s archives. In a few occasions, the data were sent to me by the central bank. A country-by-country list of the sources used to construct my series is provided in Appendix C.2. Importantly, the

⁸This is true of US government agencies, of the French Caisse des Dépôts et Consignations, of Japan’s Fiscal Loan Fund and government financial institutions, of Mexico’s development banks and fondos de fomento, of Norway’s state lending institutions, and of South-Korea’s main development banks.

sources systematically provide *aggregated* data. That is, public credit institutions are already grouped by the central bank under a distinct category. Institutions found in this category share two essential attributes: state ownership, and a public mandate.⁹ While the former can be defined with a simple criteria, the latter involves an element of judgment on the part of the central bank. For example, it has been argued that Germany’s state-owned Landesbanken and Sparkassen were used by local governments to fulfill public policy objectives (Deeg, 1999; Behn et al., 2015). Yet, they are not included among Germany’s public credit institutions by the Bundesbank. While the concept of “public mandate” is open to debate, the central bank is in the best position to make the call. Table 1 gives an overview of the institutions considered as public credit institutions, for each country of the sample. As we would expect, nationalized commercial banks operating on a for-profit basis are systematically excluded.

In addition to loans by public credit institutions, I also include credit to firms and households by the central bank and the treasury, which are often reported separately in the sources. In Japan, South-Korea, and in the US, loans by government agencies are an important source of public credit (see e.g. Park (2011) on Japan Fiscal Investment Loan Program and Quinn (2019) on lending by the US federal government). Historically, several central banks were also involved in direct credit to the economy.¹⁰ Public credit institutions, similar to the ones listed in Table 1, were widespread during the post-war period and are still active today in many countries.¹¹ For most of these countries, however, constructing long-run series of public credit is not possible.

This is the first time long-run series of public credit are assembled. To date, the only attempt at compiling comprehensive data on public credit institutions is Verdier (2000). Verdier collected data on the total assets of public credit institutions at irregular points in time over the last 150 years, for 20 countries. In contrast to Verdier’s approach, most studies adopt micro-level analyses, focusing on small samples of public banks and limited time spans (Iannotta et al., 2007; Micco and Panizza, 2006). Importantly, these stud-

⁹In Austria and South-Korea, a few private special-purpose institutions are included in the same category as public credit institutions (see Appendix C.1).

¹⁰Until the early 2000s, the Bank Indonesia extended direct loans to firms and households (see the Indonesian Financial Statistics, published by the Bank Indonesia).

¹¹In Canada, for example, federal and provincial crown corporations (e.g. Business Development Bank of Canada, Farm Credit Canada) increased their share of total credit in recent years (Statistics Canada, <https://www150.statcan.gc.ca/t1/tb11/en/tv.action?pid=3610058001>). In Brazil, lending by development banks (e.g. BNDES) and development agencies accounts for one third of total credit (Banco Central do Brasil, <https://www3.bcb.gov.br/sgpspub/localizarseries/localizarSeries.do?method=prepararTelaLocalizarSeries>, series code 2007).

Table 1: Public credit institutions

Country	Type of institution
Austria	Special credit institutions
France	Non-bank financial institutions (later named specialized financial institutions)
Germany	Banks with special, development and other central support tasks
Greece	Specialized credit institutions
Indonesia	Central bank State banks Regional development banks
Italy	Special credit institutions
Japan	Fiscal Loan Fund Government financial institutions
Mexico	Development banks Development funds
Norway	State lending institutions
US	Government (federal, state, and local)
South-Korea	Government (central) Specialized banks Development institutions
Spain	Official Credit Institute
Thailand	Specialized financial institutions

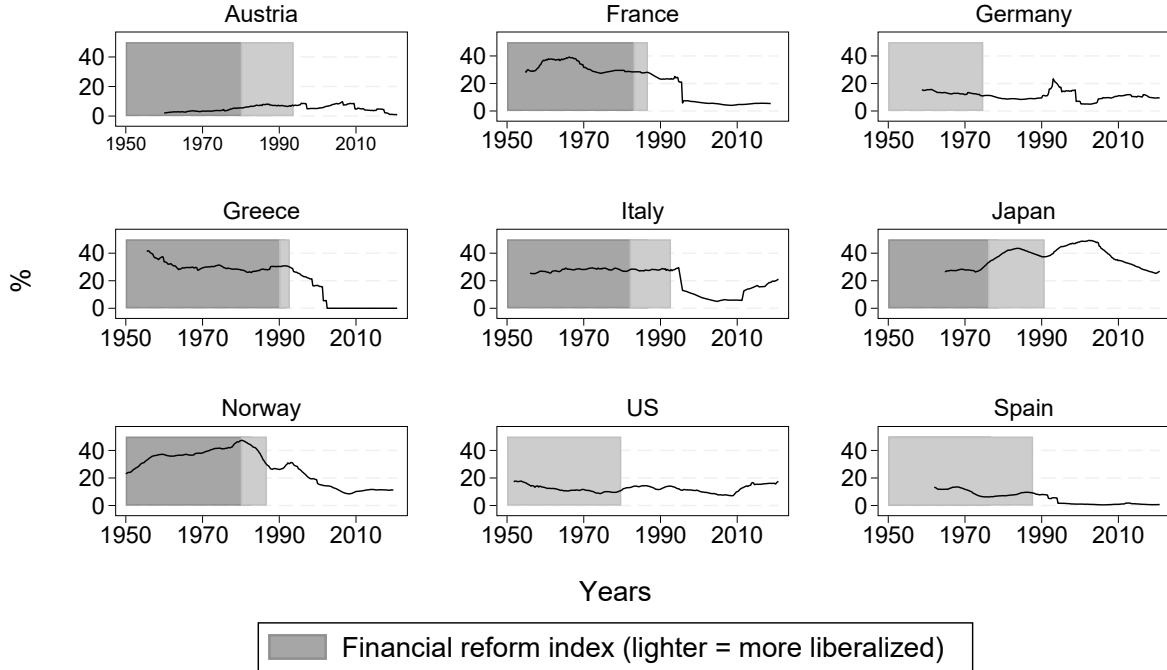
Notes: This table lists public credit institutions for every country in my database. In Italy, the distinction between special (public) credit institutes and private banks is abolished in 1993, and most special credit institutes are privatized shortly after. From 1994 onwards I focus on loans by the Cassa Depositi e Prestiti (CDP). In France, data on specialized financial institutions are no longer reported after 1995. From December 1995 onwards, I focus on loans by the Caisse des Dépôts et Consignations (CDC). See Appendix C.1 for a more detailed presentation of each country's public credit institutions.

Sources: See Appendix C.2.

ies do not distinguish between for-profit and not-for-profit public credit institutions. My definition of public credit institutions diverges from theirs by focusing on institutions that are simultaneously state-owned and non-profit. This distinction is crucial. Since profit expectations are a key driver of credit cycles (Richter and Zimmermann, 2019), for-profit public banks might tend to lend procyclically. Relying on the central bank's classification allows me to exclude commercially oriented public credit institutions.

In terms of time coverage, my database competes with existing long-run quarterly

Figure 2: Public credit in % of total credit - Developed Economies



Notes: This Figure shows public credit in % of total credit for the 9 developed countries in my database. Total credit is the sum of private and public credit. Private credit data are drawn from [Monnet and Puy \(2021\)](#). From 1995 onwards, only biannual public credit data are available for Italy, I therefore exclude these observations from the empirical analysis (Sections 3 and 4). In Greece, the share of public credit drops to 0 in 2002 (see Appendix C.1). For Greece, public credit is equal to 0 after 2002. The shaded area represents different values of a financial liberalization index. I use the index from [Abiad et al. \(2010\)](#) (extended until 2013 by [Omori \(2022\)](#)). The index takes its values between 0 and 21. I use the index to distinguish between three stages of financial liberalization: low ($0 < index \leq 7$), medium ($7 < index \leq 14$), and high ($14 < index$). Dark grey shading represents low financial liberalization, light grey represents medium liberalization, and no shading indicates high liberalization. The index is available from 1973 to 2013. I assume that the index is constant after 2013 and before 1973. *Sources:* See Appendix C.2.

databases of private credit ([Dembiermont et al., 2013](#); [Monnet and Puy, 2021](#); [Müller and Verner, forthcoming](#)). The most comprehensive database, compiled by Müller and Verner, has data reaching back to the 1940s for 117 countries. In line with most empirical works on credit, I use the IMF International Financial Statistics “claims on the private sector from domestic banks” as my definition of private credit ([Monnet and Puy, 2021](#)). This definition is equivalent to the BIS’ “bank credit to the private non-financial sector” ([Dembiermont et al., 2013](#)). Both the IMF and the BIS database report credit granted by domestic banks. The same holds for the Müller-Verner database, and the Jordà-Schularick-Taylor Macrohistory database.

Since a small fraction of public credit institutions are banks, public and private credit overlap (i.e. loans by bank-like public credit institutions appear both in public and

private credit aggregates). To minimize this overlap, I subtracted credit by bank-like public credit institutions from private credit whenever possible.¹² Doing so required going through the International Financial Statistics documentation to understand which public institutions were included in private credit, and for what period. In many cases, the documentation was too imprecise to implement any correction on the data. Some minimal overlap therefore remains.

Figure 2 and 3 gives us a first glimpse of the data. Figure 2 plots the share of public credit in total credit for developed countries, over the 1950-2020 period. Figure 3 does the same for emerging countries. Total credit is calculated as the sum of private and public credit. It should be kept in mind that these figures slightly *underestimate* the true share of public credit due to some remaining overlap between public and private credit.

I compare the size of the public credit sector to the extent of financial liberalization. Hereafter, I use the financial reform index from [Abiad et al. \(2010\)](#) (extended until 2013 by [Omori \(2022\)](#)) as my measure of financial liberalization. The index captures the intensity of state regulations on domestic banks and financial markets (i.e. stock and bond markets). The [Abiad et al. \(2010\)](#) index is one the most widely used indexes of financial liberalization and it is available for the longest time span (1973 onwards). I use the index to distinguish between three different stages of financial liberalization: low (dark grey shading), medium (light grey shading) and high (no shading).

Two main stylized facts emerge from Figures 2 and 3. First, the share of public credit in total credit declined markedly starting in the 1990s, both in developed and emerging economies. In some countries, as in France (1995), Italy (1994) or Spain (1994), the decline is strikingly sudden.¹³ In each of these episodes, the drop in public credit is due to a change in statistical reporting by the central bank, whereby most of the country's public credit institutions are reclassified as private bank-like institutions.¹⁴ Interestingly, the decline in the share of public credit levelled off in recent years. Since the early 2000s, the share of public credit is broadly constant around 16% across my sample (10% for developed economies and 25% for emerging economies).

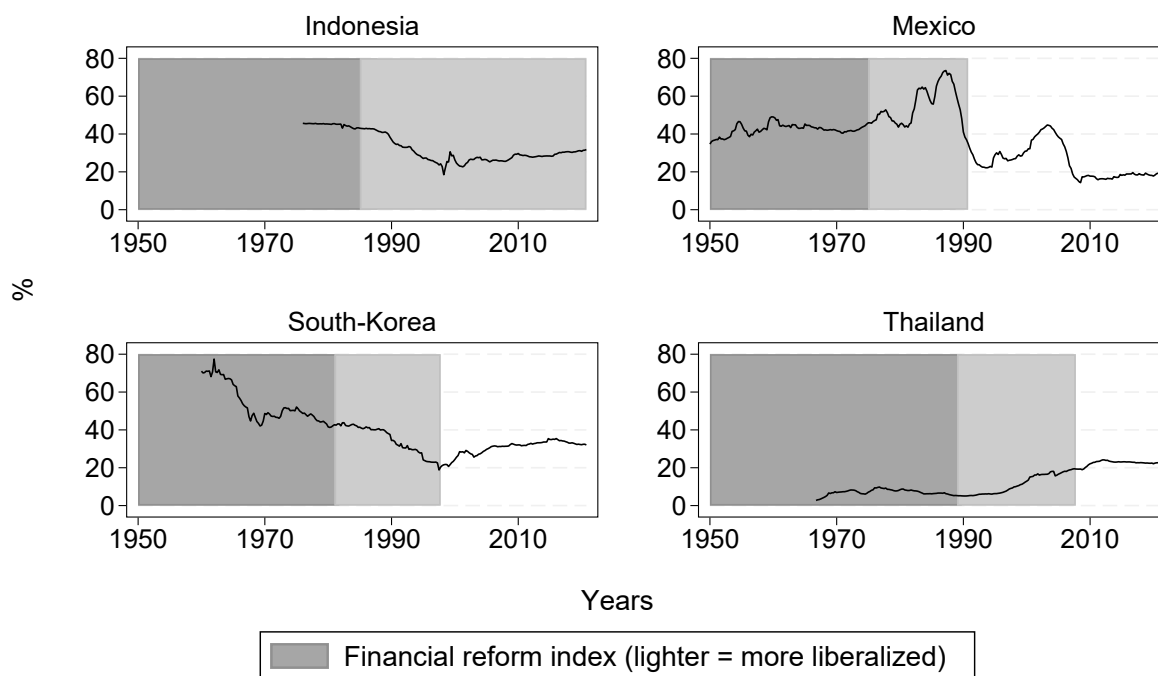
Second, public credit represents a larger share of total credit in emerging economies than in developed economies. This was the case before the 1990s when the share of public credit in total credit was 39% on average in emerging economies and 23% in

¹²I did so for Austria, Germany, South-Korea, and Thailand. See Appendix C.1.

¹³The empirical analysis (Sections 3 and 4) is carried out with break-adjusted series but all the results can be replicated using the unadjusted series.

¹⁴In all three countries, most public credit institutions are privatized, merged with private commercial banks or terminated during the 1990s.

Figure 3: Public credit in % of total credit - Emerging Economies



Notes: This Figure shows public credit in % of total credit for the 4 emerging countries in my database. For Indonesia, public credit data start in 1966, but private credit data are available only from 1976 onwards. See Figure 2 for additional details.
Sources: See Appendix C.2.

developed economies, and it is still the case today.

One takeaway from these broad trends is that the share of public credit tends to be higher in less financially liberalized economies, both in the time series and in the cross-section. Historically, public credit reached its climax during the postwar decades at a time when the state intervened massively in the financial system. Where state regulation was relatively mild, the postwar period was not associated with a large public credit sector. The United States, where public credit credit accounted for only 12% of total credit in 1970, is a paradigmatic example. In countries where private financial markets were more strictly regulated, the share of public credit was higher (e.g. 32% in France, 28% in Italy and in Japan in 1970), but it declined markedly following financial liberalization.

Public credit is relatively large in less-financially liberalized economies because most medium and long-term credit in these economies is public. During the postwar period, the rise of the public credit sector was part of a broader policy package designed to direct savings flows towards strategic sectors of the economy (Wade, 1990; Amsden, 2001; Musacchio et al., 2017; Monnet, 2018). It went hand in hand with a tight regulation of

banks and private financial markets. Public and private credit markets were highly segmented: medium and long-term credit markets were the prerogatives of public credit institutions, while private banks focused on short-term credits. The removal of restrictions on commercial banks and financial markets (i.e. financial liberalization) freed up alternative sources of long-term finance. As a result, public credit institutions were made redundant, and many were closed-down or merged with commercial banks. Yet, demand for public credit did not dry out. Today, demand for public loans comes from sectors with no (or irregular) access to private finance: households (mortgage loans), Small and Medium Enterprises, agriculture, and students. Appendix C.1 indicates the principal sector of activity of some of the main public credit institutions in each country.

3 Public credit and the Global Financial Cycle

Uncovering aggregate data on public credit allows me to examine its *macroeconomic* behavior. I begin by studying the reaction of public credit to foreign interest rate shocks. Interest rates in the United States affect capital flows, credit growth, bank leverage, and asset prices worldwide (Calvo et al., 1996; Rey, 2013; Miranda-Agrippino and Rey, 2020). This is a concern for policymakers because it can lead to excessive credit creation or retrenchment, and destabilize the financial system. Developing economies are particularly vulnerable to the Global Financial Cycle. This vulnerability is explained by a range of structural weaknesses: higher reliance on foreign debt (in particular on foreign-currency denominated debt), fear-of-floating, less-developed financial markets... (Gourinchas and Obstfeld, 2012). At the country level, borrowers near their funding constraint are the most vulnerable to foreign interest rate shocks.

Macroeconomists have neglected the role of public credit in the Global Financial Cycle. My hypothesis is that public credit markets are not sensitive to global financial conditions. The main reason behind this hypothesis is that public credit institutions enjoy an explicit or implicit subsidy on their debt. This allows them to lend at below-market rates (see Figure 1). Since the rate on public loans is not binding on borrowers, public credit institutions can control the quantity of credit extended independently of interest rate changes (see e.g. Bonomo et al. (2016) on Brazil's public banks).

In addition, public credit institutions face different incentives than private institutions. In particular, they are not rewarded for extending more (or less) loans because

their profits are absorbed by the state. Lower (higher) US short-term rate need not translate into higher (lower) leverage and risk exposure on the part of public institutions (Bruno and Shin, 2015). Last, public credit markets are likely less sensitive to the credit channel of international monetary policy transmission (Bernanke and Gertler, 1995; Cesa-Bianchi and Sokol, 2022). The credit channel operates through borrowers' balance sheet. An increase in the Fed's rate leads to a deterioration of borrowers' net worth. As a result, credit supply contracts. Providing credit to borrowers with inadequate collateral and low net worth (low-income households, students, SMEs, agriculture...) is precisely the aim of most public credit institutions today. For these reasons, I suspect that public credit is independent from foreign monetary shocks.

I use as benchmark the reaction of private credit to world interest rate shocks in countries with open capital accounts *and* fixed exchange rates (henceforth, I will refer to countries with fixed exchange rates as “pegs”). This setting, derived from the sacrosanct Mundell-Fleming model (Fleming, 1962; Mundell, 1963), is widely used in international economics (Shambaugh, 2004; Frankel et al., 2004; Obstfeld et al., 2005; Bluedorn and Bowdler, 2010; Klein and Shambaugh, 2015; Aizenman et al., 2016; Jordà et al., 2015, 2020). Focusing on countries with both open capital accounts and fixed exchange rates is a way to stack the odds against my hypothesis: I choose the setting where the domestic financial system is the *most* exposed to foreign spillovers. Flexible exchange rates indeed provide some insulation (albeit imperfect) from the Global Financial Cycle (Obstfeld et al., 2019; Han and Wei, 2018). In addition, looking through the lenses of the trilemma is more consistent with a long-run sample like mine, since the Global Financial Cycle is a recent phenomenon.

The first step in my analysis is to identify countries whose currency serves as anchor for pegs (i.e. “base” countries). In line with Jordà et al. (2020), I treat the US as the base for all countries during the Bretton Woods period (1950-1973) and for non-European countries during the post-Bretton Woods period. For European countries, I treat Germany as the base during the post-Bretton Woods period.

Then, I define open-pegs as non-base countries with both fixed exchange rates and open capital accounts. To do so, I rely on two indicators. First, I use the exchange rate flexibility indicator from Ilzetzki et al. (2019) to identify countries with fixed exchange rates.¹⁵ Second, I rely on Quinn and Toyoda (2008) and on Chinn and Ito (2008) (and

¹⁵In line with the literature, I define as “pegged” countries with an exchange rate flexibility index inferior or equal to 9.

updates thereto) to define capital account openness.¹⁶ As in [Obstfeld et al. \(2019\)](#), I consider as “open” countries with at least partially open capital accounts.

Table 2: The sub-sample of open-pegs

Country	Open-pegs	Average share of public credit
Austria	1962Q1-1968Q4 1970Q1-2020Q4	5%
France	1956Q3-2020Q4	21%
Germany	1954Q2-1972Q4	13%
Greece	1962Q1-1981Q2 1984Q3-2020Q4	18%
Indonesia	1978Q4-1997Q2 2007Q3-2010Q4	37%
Italy	1956Q1-1975Q3 1983Q1-2020Q4	24%
Japan	1960Q1-1977Q3	29%
Mexico	1950Q1-1981Q4 1989Q1-1994Q4	41%
Norway	None	.
US	Base	.
South-Korea	1981Q2-1997Q3	35%
Spain	1963Q1-2020Q4	7%
Thailand	1956Q1-1964Q4 1968Q1-1969Q4 1990Q1-1996Q4	6%

Notes: Pegs are countries with an exchange rate flexibility index inferior or equal to 9 ([Ilzetzi et al., 2019](#)). To define capital account openness, I rely on [Quinn and Toyoda \(2008\)](#) and [Chinn and Ito \(2008\)](#) (and updates thereto). The index is scaled from 0 to 4. I consider as “open” countries with an index superior or equal to 2. This is equivalent to dropping the 25% of observations with the lowest index. Norway is never pegged and open at the same and is thus not included in the sub-sample. The third column calculates the average share of public credit in total credit, for each country, over the period when the country is both pegged and open.

As can be seen from Table 2, the sub-population of open-pegs cuts across the pre and post-financial liberalization. Historically, public credit and capital controls were both

¹⁶The indicator is scaled from 0 to 4. I select observations associated with a capital account openness index superior or equal to 2. In effect, this amounts to eliminating the bottom 25% of the index sample distribution.

part of the same policy package. Yet, the most severe restrictions on capital flows were dropped quite early in the postwar. This allows me to study the reaction of public credit before and after financial liberalization.

The last step in the empirical strategy is to construct a measure of interest rate shocks for base countries. For each of the base country in the sample, I isolate unpredictable variations in the domestic three-month interest rate. This unpredictable component is defined as the residual from a simple regression of the first difference in the country's three-month interest rate on a broad set of domestic macroeconomic controls (as in [Jordà et al. \(2020\)](#)). Specifically, I control for up to four lags of the growth rate of CPI prices, real GDP, real house prices, real stock prices and of the first-difference in long-term interest rate, dollar exchange rate, and private credit to GDP ratio. Regressions also include up to four lags of the dependent variable.

Using the unpredictable component in the base country's short-term rate is useful to simulate a situation where countries in the periphery are, *on average*, at steady state when hit by the interest rate shock. This is particularly crucial because private and public credit aggregates might behave differently during upturns and downturns. In particular, public credit institutions might lend countercyclically to tame excessive variations in the business cycle ([Cerutti and Bosshardt, 2020](#)). Since my focus is on financial shocks, I need to control for economic cycles. Variations in the base country's interest rate are likely to be correlated with economic fundamentals in the periphery for two reasons: (a) if national economic cycles are synchronized (i.e. if there is some degree of co-movement between inflation and output in the base and in the periphery, independently of interest rate changes), and (b) due to spillover effects (i.e. if changes in the base's short-term rate impact the periphery through channels other than the interest-rate channel). Accounting for (a) and (b) is crucial for my identification strategy. Policy surprises are, by definition, orthogonal to economic fundamentals in the base country. Working with policy surprises thus reduces the risk that world cycle effects contaminate my results. To control for spillover effects, all my specifications include world GDP and domestic exports and imports on the right-hand side. Note that controlling for world GDP should also absorb potential world cycle effects. As a further precaution, I use variations of the base country's interest rate at time $t - 1$ (rather than at time t). Results using contemporaneous policy shocks are reported in [Appendix A](#).

One limitation of my approach is that I do not control for the information available to policymakers when setting the interest rate. Information-robust measures of policy

shocks are only available for the US and for a limited time span. For this reason, I do not use them in my baseline estimations.

Equipped with my measure of foreign policy shocks, I compare the reaction of private and public credit using Jorda's (2005) Local Projections. I run the following sequence of quarterly regressions at horizons $h \in [0, 1, \dots, 8]$ quarters, where $Credit_{i,t+h}$ is the growth rate of a real credit aggregate (private, public or total) between $t-1$ and $t+h$, and $R_{i,t-1}$ denotes unpredictable movements in the short-term interest rate of country i 's base country at time $t-1$:

$$Credit_{i,t+h} = \alpha_i^h + \gamma^h Sample_{i,t-1} + \lambda^h R_{i,t-1} + \beta^h Sample_{i,t-1} \times R_{i,t-1} + \theta^h (L) X_{i,t} + \kappa^h trend_t + \epsilon_{i,t+h} \quad (1)$$

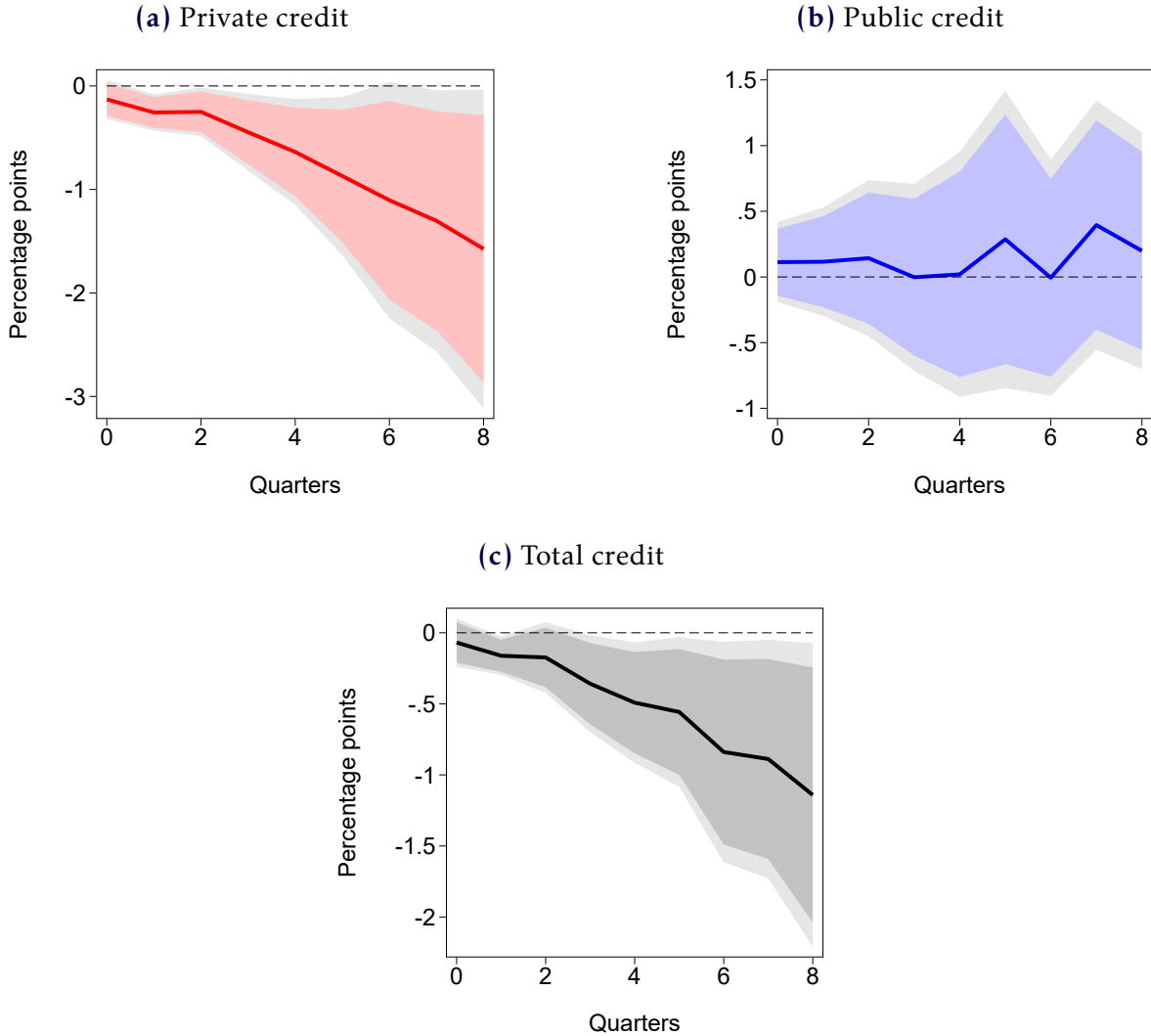
The variable $Sample_{i,t-1}$ is defined over the sample of non-base currencies and is used to identify open-pegs. It takes the value 1 when country i is both pegged and open at time t , and 0 otherwise. The effect of $R_{i,t-1}$ on real credit growth for countries that are both pegged and open is thus given by the sum of λ^h and β^h . The regressions control for country fixed effects α_i^h , a time trend, and for lags L of a vector of macroeconomic variables $X_{i,t}$.¹⁷ As is standard in Local Projections, I control for lags of both the impulse and response variables. In line with the recommendation in Montiel Olea and Plagborg-Møller (2021), I choose a conservative lag length of 6 quarters. I run three sets of regressions with the growth rate of three different credit aggregates as response variable: private credit, public credit, and total credit. As in Figure 2 and 3, total credit is calculated as the sum of private and public credit. Importantly, the vector of control variables $X_{i,t}$ is the same across the three sets of regressions such that the foreign interest rate shocks are strictly identical when using private, public or total credit as response variable. The sample is also identical across the three sets of regressions.

Figure 4 presents the results of estimating Equation 1 with standard errors clustered at the country level. Panel (a), (b), and (c) show the response of private, public and total credit.

I find (reassuringly) that private credit is sensitive to foreign monetary shocks. Two years after the shock, the real growth rate of private credit is 1.6pp below its normal

¹⁷ $X_{i,t}$ includes the growth rate of real world GDP, of domestic real GDP, of real exports and imports, of CPI prices, of real private, public and total credit; and the first difference of the dollar exchange rate and private credit to GDP ratio.

Figure 4: Public credit and the trilemma - Partially open economies

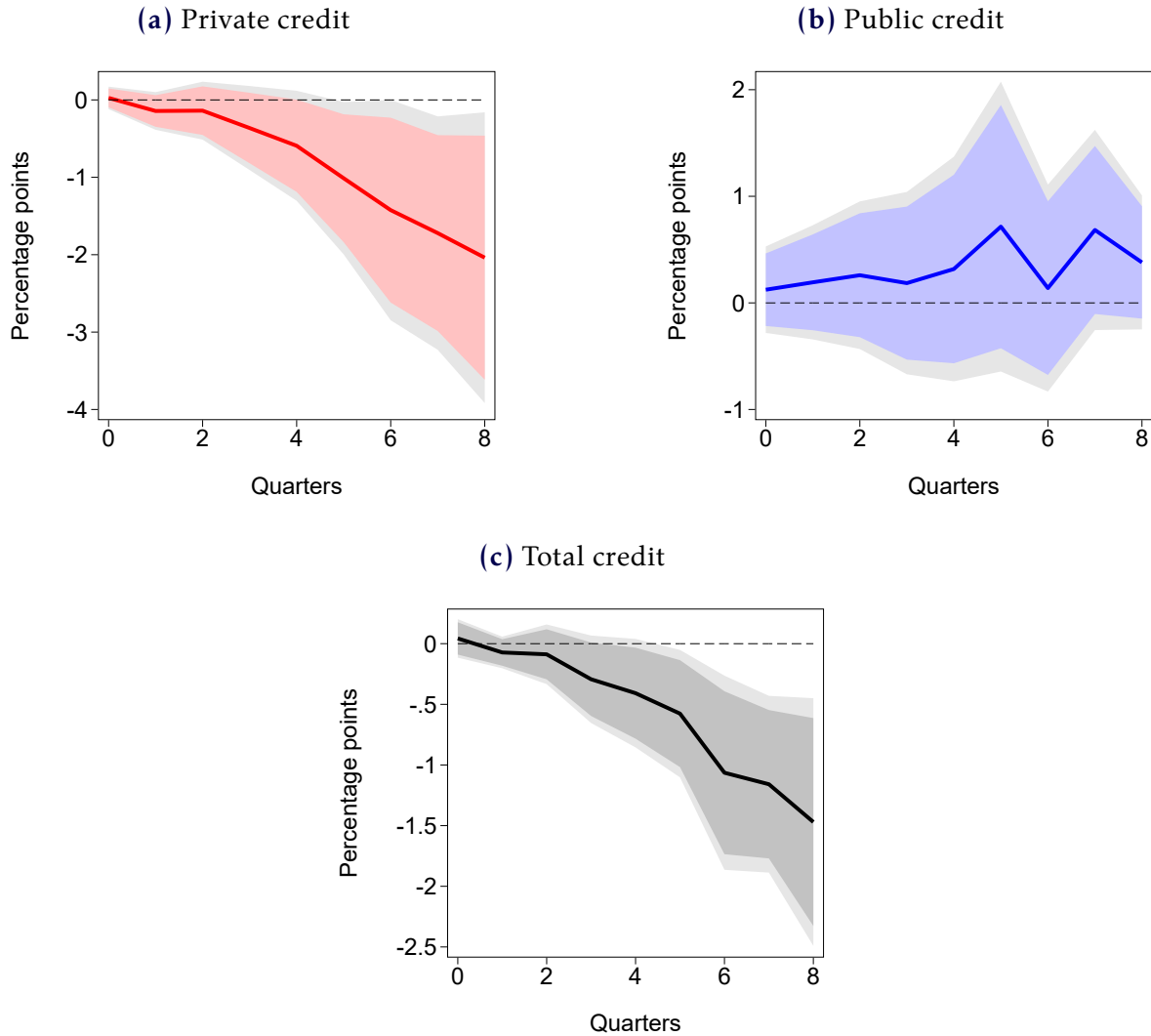


Notes: Cumulative response of the growth rate of real credit to a 1pp shock on the short-term interest rate in the base country at time $t - 1$. Countries with partially open capital accounts and fixed exchange rates (see Table 2). Panels (a), (b), and (c) show the response of private, public, and total credit respectively. Shaded areas denote 95% and 68% confidence intervals. Standard errors are clustered at the country level.

level. I do not find any effect on public credit (panel (b)). In panel (b), the standard error band is centered around 0 and spans across both positive and negative values. Panel (c) shows that the response of total credit is weaker than that of private credit (-1.1pp in panel (c) against -1.6pp in panel (a)). These results are robust to the inclusion of additional control variables, lags, or to using robust standard errors.

I then bid up the stakes by using a stricter definition of capital account openness. Figure 5 shows the updated results. As expected, the response of private credit is larger

Figure 5: Public credit and the trilemma - Open economies



Notes: Cumulative response of the growth rate of real credit to a 1pp shock on the short-term interest rate in the base country at time $t - 1$. Countries with open capital accounts and fixed exchange rates. Panels (a), (b), and (c) show the response of private, public, and total credit respectively. I work with a stricter definition of capital account openness than in Figure 4, by selecting observations associated with a capital account openness index superior or equal to 2.5. 35% of observations fall below this threshold. The definition of pegs is the same as in Figure 4. Shaded areas denote 95% and 68% confidence intervals. Standard errors are clustered at the country level.

than before. The cumulative effect of a 1pp increase in foreign interest rate on the growth rate of real private credit reaches -2pp after 8 quarters (against -1.6pp in Figure 4). Public credit remains unaffected but the standard error band is mostly centered on positive values. The wedge between the response of private and total credit is the same as in Figure 4. Importantly, since all specifications controls for lags of the credit to GDP ratio and of the growth rate of private credit, the effect of foreign monetary shocks on domestic

credit is independent of national credit cycles.

Appendix A provides two sets of robustness checks. First, I use contemporaneous (rather than lagged) interest rate shocks. Results are reported in Figure A.1. Once again the response of private credit slopes downward (to reach -1.5pp after 8 quarters) and I do not detect any effect on public credit. Second, I explicitly control for heterogeneity in the response of public credit. I successively interact my measure of foreign policy shocks with three different dummy variables to compare the reaction of public credit across the following sub-samples: pre and post-financial liberalization, emerging and developed countries, and economic recessions and expansions. I find the effect to be not statistically different from zero in each sub-sample (see Table A.1).

Public credit markets are thus immune to foreign policy shocks. As I discuss in Section 5, this result has important policy implications. In the next Section, I study the behavior of public credit aggregates during booms and busts of private credit.

4 Public credit and national credit cycles

Credit booms have large negative real effects. Many end in financial crises ([Gourinchas and Obstfeld, 2012](#); [Schularick and Taylor, 2012](#); [Sufi and Taylor, 2022](#)) or in severe recessions ([Mian et al., 2017](#); [Dell’Ariccia et al., 2020](#)). During the bust, higher leverage is translated into lower aggregate demand, as constrained borrowers cut spending to pay-off existing debt ([Fisher, 1933](#); [Guerrieri and Lorenzoni, 2017](#)). Consequently, more credit-intensive expansions tend to be followed by deeper recessions ([Jordà et al., 2013](#)). As evidenced by [Mian and Sufi \(2009\)](#) and [Mian et al. \(2017\)](#), households (in particular poor households) play a key role in the process.

In a bust, public credit can be used to provide debt-relief to borrowers below or near their funding constraint. [Jiménez et al. \(2018\)](#) show that public loans had large positive real effects in the aftermath of the 2008 financial crisis in Spain. Ideally, public credit would contract during private booms and expand during busts to smooth shocks on the credit constraint. However, countercyclical lending should not be taken for granted. In countries with weak political institutions, governments could be tempted to use public credit institutions to “ride” the boom ([Herrera et al., 2020](#)). Public institutions could also suffer more during the bust, since they tend to have riskier portfolios (and higher default rates) than private institutions.

4.1 Private and public credit cycles: Some descriptive statistics

My long-run dataset allows me to study public credit cycles across different macro-financial environments. Identifying the circumstances for public credit to behave countercyclically is crucial to improve the response to financial shocks. I begin with some descriptive statistics on public and private booms. To identify credit booms, I follow the procedure outlined in Richter et al. (2021). First, I use the Hamilton (2018) filter to extract the cyclical component of credit. The Hamilton filter consists in a regression of credit on its four most recent values at date $t - h$. As Richter et al. (2021), I choose $h = 3$ years (or, equivalently, $h = 12$ quarters).¹⁸ Thus, for each country, I regress the log of real (private or public) credit y_t on its past values y_{t-12} , y_{t-13} , y_{t-14} and y_{t-15} :

$$y_t = \beta_0 + \beta_1 y_{t-12} + \beta_1 y_{t-13} + \beta_1 y_{t-14} + \beta_1 y_{t-15} + \varepsilon_t \quad (2)$$

The cyclical component of credit is the residual of Equation 2 ε_t . A boom occurs when the log of real credit exceeds expectations by more than a specific amount, which is defined in terms of the country specific standard deviation of ε_t . Formally, the period t is considered as a boom period if $\varepsilon_t - \lambda \times \sigma(\varepsilon_t) > 0$, where $\sigma(\varepsilon_t)$ is the standard deviation of ε_t . As Richter et al. (2021), I set $\lambda = 0.75$.

When two booms are separated by a non-boom period lasting less than 4 quarters, the non-boom period is also categorized as boom. “Bad” private booms are defined as booms followed either by a financial crisis or by a severe recession (as in Dell’Ariccia et al. (2020), see the notes to Table 3 for a more precise description).

Table 3 presents some preliminary statistics on the number of private and public booms, their average length, and the number of “bad” private booms for each country in the sample. Three comments are in order. First, most private booms are “bad”. In the sample, I find that 74% of booms are “bad” booms. This is in line with the findings of Dell’Ariccia et al. (2020), who study a large sample of developed and emerging economies covering the 1970-2014 period. Dell’Ariccia et al. (2020) report that two thirds of booms lead to financial crises or recessions. Second, public and private booms are virtually indistinguishable when one looks at the frequency or the duration of the boom. Nor is there a clear difference in the data between emerging and developed economies.

Looking at the *timing* of the booms, however, reveals an interesting pattern. Figure

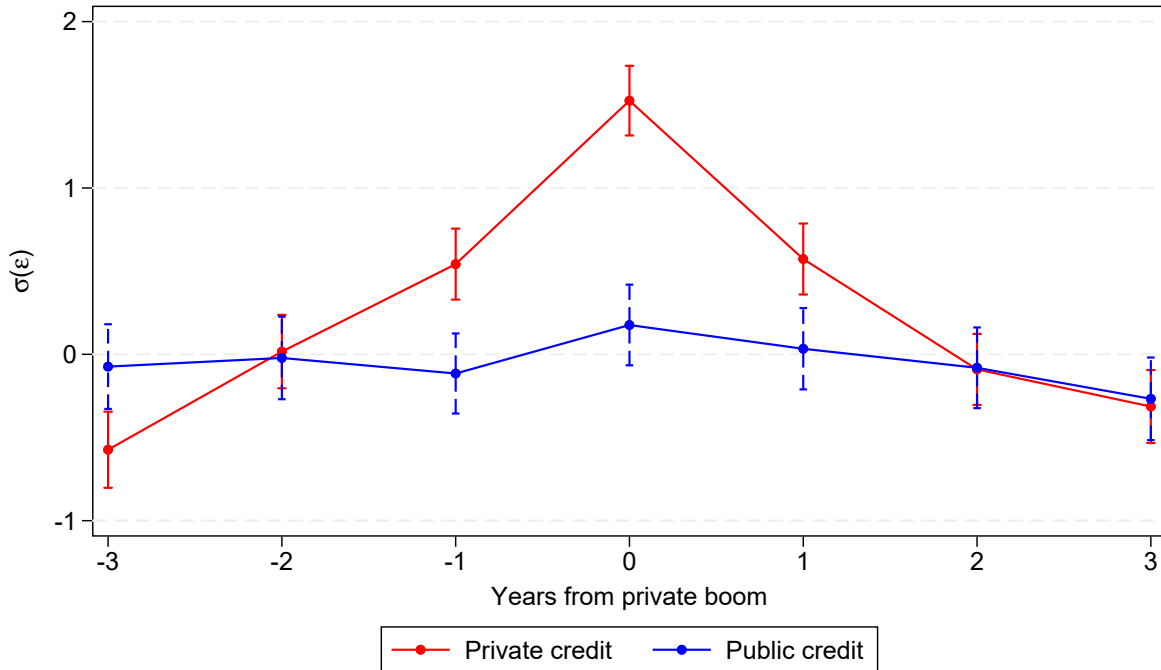
¹⁸The choice of h affects the number of credit booms in the sample but does not affect my results on the countercyclical properties of public credit (see below).

Table 3: Credit booms - Private and public (1950-2020)

Country	Nb of private booms	Nb of public booms	Avg length private boom	Avg length public boom	Nb of “bad” private booms
Austria	7	3	2.5 years	3.25 years	4 (57%)
France	8	5	2.25 years	3 years	7 (87%)
Germany	4	4	2.25 years	2.25 years	3 (75%)
Greece	6	5	3 years	2.25 years	4 (66%)
Indonesia	5	6	1.25 years	1.5 years	2 (40%)
Italy	8	5	2.25 years	2 years	7 (87%)
Japan	6	10	2 years	1.25 years	5 (83%)
Mexico	5	6	2 years	2.25 years	5 (100%)
Norway	5	9	2.75 years	1.5 years	5 (100%)
US	8	7	2 years	2.25 years	6 (75%)
South-Korea	3	3	4 years	4.5 years	2 (66%)
Spain	7	3	2.75 years	2.75 years	5 (71%)
Thailand	8	5	2.25 years	2.75 years	4 (50%)
Total number & average length	80	71	2.5 years	2.5 years	59 (74%)

Notes: In the last column, the number in parentheses is the % ratio of “bad” private booms to total private booms. To identify credit booms, I rely on the two-steps procedure introduced in [Richter et al. \(2021\)](#). First, for each country, I de-trend the log of real credit (public or private) y_t by regressing it on its own lagged values $y_{t-12}, y_{t-13}, y_{t-14}, y_{t-15}$ where t is in quarters (see Equation 2). The cyclical component of credit (public or private) is given by the residual ε_t of this regression. Second, I code the period t as a boom period if $\varepsilon_t - 0.75 \times \sigma(\varepsilon_t) > 0$ where $\sigma(\varepsilon_t)$ is the standard deviation of ε_t . In other words, a boom occurs when the log of real credit exceeds expectations by more than a specific amount, which is defined in terms of the country specific standard deviation of ε_t . I refer to the local maximum value of ε_t during a specific boom period (i.e. conditional on Credit Boom=1) as the peak of the credit boom. A “bad” credit boom is a boom followed by either a financial crisis or a severe recession within three years of the boom’s end. The coding of financial crises follows [Schularick and Taylor \(2012\)](#) and [Laeven and Valencia \(2020\)](#). Severe recessions are identified through the same two-steps procedure.

Figure 6: Event study - Public credit and private booms



Notes: To construct this figure, I start with the residual of Equation 2 ε_t . I scale ε_t by its country-specific standard deviation $\sigma(\varepsilon_t)$. I then average out the result across the sample, for event-3, event-2,..., event+3 (where “event” indicates the date of the peak of the private boom). The numbers on the Y axis can thus be interpreted in terms of $\sigma(\varepsilon_t)$ of public and private credit. I present 95% confidence bands.

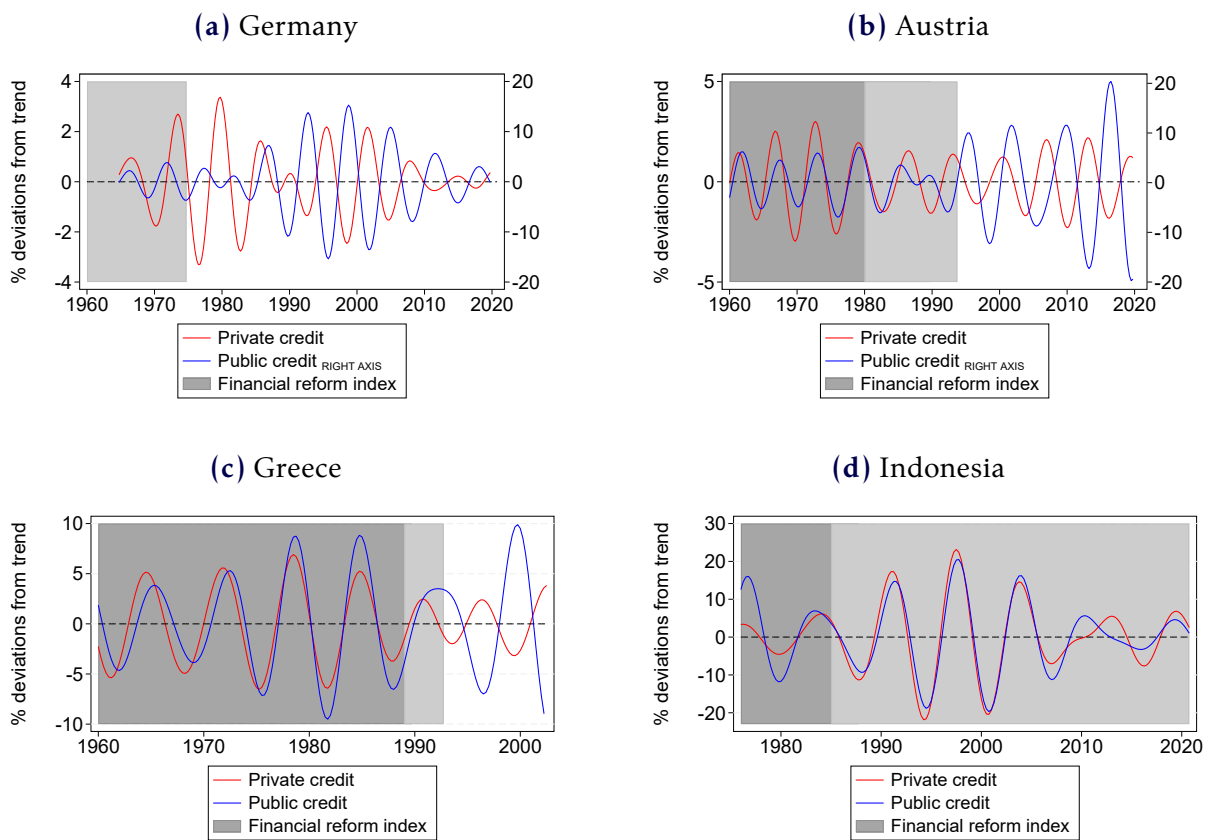
6 presents an event study of the cyclical behavior of public and private credit around the peak of a private credit boom. I look at the path of ε_t (the residual of Equation 2) through a 6 years window around the peak of a private boom. To make comparisons across countries possible, I scale ε_t by its country-specific standard deviation $\sigma(\varepsilon_t)$. I then average out the result across the sample for event-3 years, event-2 years,..., event+3 years (where “event” indicates the quarterly date of the peak of the private boom).

Interestingly, during the 6-years window around the peak of a private boom (Year=0), public credit is stationary (i.e. the ratio ε_t to $\sigma(\varepsilon_t)$ is very close to 0). During the peak, public credit goes through a (very) moderate expansion. This first result suggests that public booms are not synchronized with private booms.

Country case studies, however, reveal considerable heterogeneity both across and within countries. In fact, the blue line in Figure 6 averages out two distinct behaviors. Before financial liberalization, public credit tends to be extremely procyclical. After financial liberalization, public credit becomes clearly countercyclical. Figure 7 presents four country case studies. Each time, I look at the cyclical component of public and

private credit across time. To generate this cyclical component, I temporarily depart from the method of Hamilton (2018) by using a Christiano and Fitzgerald (2003) filter. This allows me to filter out within-cycle variations in credit which makes for a better visualisation. Specifically, I filter out cycles at periods smaller than 20 quarters (5 years). I choose this particular value because it is twice the average length of a private boom in the sample (see Table 3).

Figure 7: Public credit cycles and financial liberalization



Notes: The red and blue lines show the cyclical component of private and public credit respectively. The cyclical component is generated with the Christiano and Fitzgerald (2003) filter. I filter out cycles with periods smaller than 20 quarters (5 years). I choose this particular value because it is equal to twice the length of a private boom in the sample (see Table 3). As in Figure 2 and 3, the shaded area represents different values of a financial liberalization index, with lighter shading indicating more liberalized economies (see Figure 2 for additional details). For Greece, public credit is equal to 0 after 2002. For Indonesia, private credit is available only starting in 1976.

As in Figure 2 and 3 I measure financial liberalization using the financial reform index from Abiad et al. (2010) (extended until 2013 by Omori (2022)), with lighter shading indicating more liberalized economies. I focus on four countries that experienced financial liberalization at different times in their postwar history. Liberalization was carried

out relatively early in Germany, around the 1990s in Austria and Greece, and has not yet been fully completed in Indonesia. The results reported in Figure 7 are quite striking. Each time, the transition from a procyclical to a countercyclical behavior of public credit closely tracks financial liberalization.

This finding echoes the literature on fiscal policy cycles. The main result of this literature is that government spending tends to be strongly procyclical in emerging economies and countercyclical in developed economies (Kaminsky et al., 2004; Ilzetzi and Végh, 2008). Frankel et al. (2013) find evidence of countries overcoming procyclicality and becoming countercyclical (a phenomenon dubbed “graduation”). Figure 7 suggests that a similar pattern holds for state-led credit.

A second important result from Figure 7 is that, in countries where public credit accounts for a relatively low share of total credit (e.g. Germany and Austria), the amplitude of public credit cycles can be extremely large (from 4 to 10 times higher than the amplitude of private cycles). This will be particularly important when examining the effect of public credit expansions on total credit during private busts (see Section 4.3).

4.2 An econometric test

To formalize the results presented in Figure 7, I use the method introduced in Meller and Metiu (2017). I start off with the cyclical component of public and private credit aggregates, identified with a Hamilton filter (I then replicate my results using the Christiano and Fitzgerald (2003) filter). I generate two variables: $Public_{i,t}$ and $Private_{i,t}$ which I use to map out public and private cycles. $Public_{i,t}$ takes a value 1 when public credit is in expansionary phase (when the cyclical component of public credit is positive) and -1 when it is in contractionary phase (when the cyclical component of public credit is negative). $Private_{i,t}$ does the same for private credit. I then take the product of these variables, which I call $Sync_{i,t}$ ($Sync_{i,t} = Public_{i,t} \times Private_{i,t}$). The variable $Sync_{i,t}$ takes on two different values: 1 if private and credit cycles are in the same phase and -1 if private and credit cycles are in the opposite phase (for country i at time t). $Sync_{i,t} = 1$ occurs when $Public_{i,t} = 1$ and $Private_{i,t} = 1$; or when $Public_{i,t} = -1$ and $Private_{i,t} = -1$. $Sync_{i,t} = -1$ occurs when $Public_{i,t} = 1$ and $Private_{i,t} = -1$; or when $Public_{i,t} = -1$ and $Private_{i,t} = 1$.

Intuitively, if public and private credit are perfectly negatively synchronized, then $\mathbb{E}[Sync_{i,t}] = -1$, if public and private are perfectly positively synchronized then $\mathbb{E}[Sync_{i,t}] = 1$, and non-synchronization is defined by $\mathbb{E}[Sync_{i,t}] = 0$ (that is, public and private

credit are equally likely to be in the same phase or in the opposite phase). To estimate the average value of $Sync_{i,t}$, I run the following panel regression:

$$Sync_{i,t} = \beta_0 + \beta_1 Liberalization_{i,t} + \varepsilon_{i,t} \quad (3)$$

The variable $Liberalization_{i,t}$ is used to map out the pre and post-liberalization sub-samples. It takes the value 1 when the financial reform index of country i at time t is above its sample median and 0 otherwise. In effect, for the 4 countries studied in Figure 7, the pre-liberalization sub-sample (roughly) corresponds to the shaded area. The mean of $Sync_{i,t}$ in the pre-liberalization sub-sample is thus given by β_0 , while the mean of $Sync_{i,t}$ in the post-liberalization sub-sample is given by $\beta_0 + \beta_1$. Results are presented in Table 4. The synchronization variable $Sync_{i,t}$ and therefore $\varepsilon_{i,t}$ may be prone to serial correlation, as they inherit their serial dependence structure from the underlying time series. As Meller and Metiu (2017), I therefore use Newey and West (1987) standard errors for inference.¹⁹

Table 4: The synchronization of private and public credit cycles

	Hamilton	Christiano-Fitzgerald
Pre-liberalization (β_0)	0.256*** (0.033)	0.393*** (0.031)
Post-liberalization ($\beta_0 + \beta_1$)	-0.145*** (0.044)	-0.315*** (0.043)
Observations	2786	2981

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

Notes: This table presents the results from estimating Equation 3. In the first column, the variable $Sync_{i,t}$ is generated with the residuals obtained from the Hamilton filter (see Equation 2). In the second column, $Sync_{i,t}$ is generated with the residuals obtained from the Christiano-Fitzgerald filter. The pre (post)-liberalization sub-sample groups all the observations associated with a financial reform index inferior or equal (superior) to its sample median. I use the index from Abiad et al. (2010) (extended until 2013 by Omori (2022)). I assume that the index is constant after 2013 and before 1973. Newey–West standard errors are given in brackets. I allow two lags to be considered in the auto-correlation structure.

In the first column, the variable $Sync_{i,t}$ is generated with the residuals obtained from the Hamilton filter. In the second column, $Sync_{i,t}$ is generated with the residuals obtained from the Christiano-Fitzgerald filter. The first row shows the average value of

¹⁹I allow two lags to be considered in the auto-correlation structure. But results are robust to different lags.

$Sync_{i,t}$ over the pre-liberalization sub-sample (β_0). The second row shows the average value of $Sync_{i,t}$ over the post-liberalization sub-sample ($\beta_0 + \beta_1$). In both sub-samples, the average of $Sync_{i,t}$ is significantly different from zero. It is positive before financial liberalization (first row) and turns negative after liberalization (second row).

The coefficients in the first column suggest that, before liberalization, public and private credit have a 37% probability of being in the opposite phase.²⁰ This probability increases to 58% after liberalization. The results are even more striking when using the Christiano-Fitzgerald filter (second column). This time, the probability that public and private credit are in the opposite phase is 30% pre-liberalization and 66% post-liberalization. In the Appendix, Table A.2 replicates this finding using the Hodrick and Prescott (1997) filter.

4.3 Does public credit matter in the bust?

How large is the effect of public credit fluctuations on total credit? In particular, during private contractions, how much of the decline in private credit is compensated for by the increase in public credit? To answer these questions, I focus on episodes where the contraction of private credit is the most severe (i.e. busts).

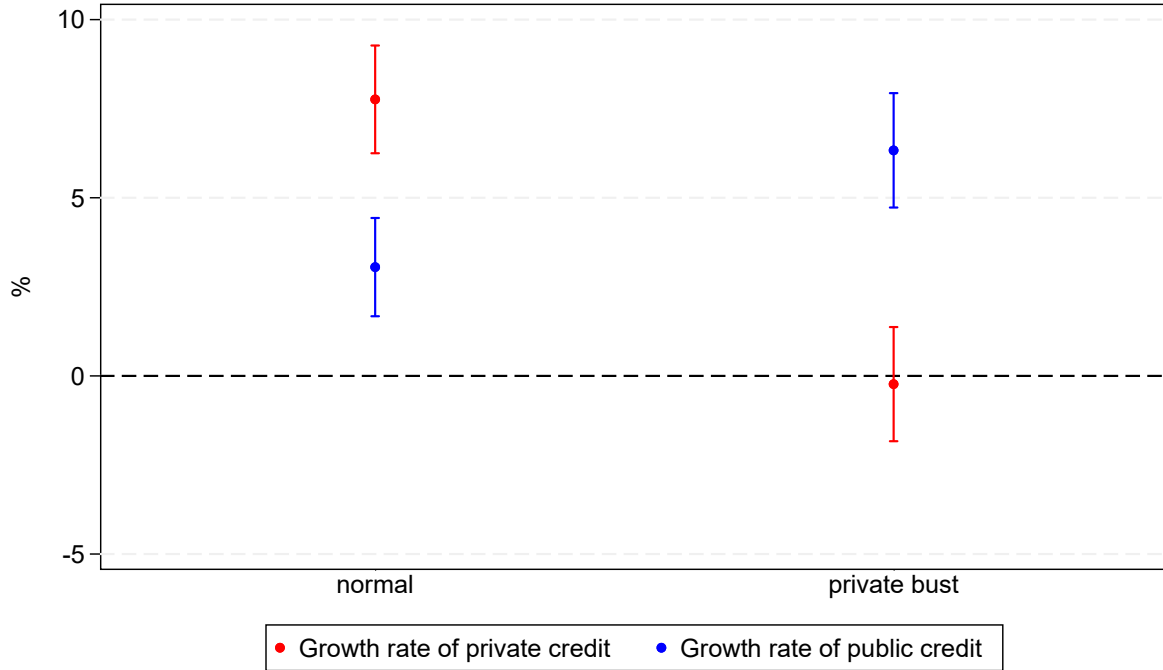
Credit busts have large and persistent effects on economic activity (Mian et al., 2017). Understanding the role of public credit during busts is thus of particular interest, both for academics and policymakers. To identify private busts, I use the Richter et al. (2021) method (as I did for booms, see Section 4.1). A bust is defined as a period when the log of real private credit falls below expectations by a specific amount.²¹ Applying this method to every country in my sample, I find a total of 87 private busts with an average length of 2 years. As a comparison, there are 80 private booms with an average length of 2.5 years (see Table 3). I first compare the evolution of private and public credit during and outside private busts. Figure 8 plots the average yearly growth rate of both private and public credit over the post-liberalization sub-sample. It distinguishes between private busts and “normal” periods (i.e. periods outside private busts).

Figure 8 reveals that in normal periods, the growth rate of private credit is more than twice that of public credit (7.8% against 3.2%). This is consistent with the marked decline in the share of public credit in total credit following liberalization (see Figures 2

²⁰Since $1 \times (1 - P) - 1 \times P = 0.256$. Where P is the probability that $Sync_{i,t} = -1$.

²¹Formally, the period t is considered as a bust period if $\varepsilon_t + \lambda \times \sigma(\varepsilon_t) < 0$, where ε_t is the residual of the Hamilton filter (see Equation 2) and $\sigma(\varepsilon_t)$ is the standard deviation of ε_t . λ is set to 0.75 such that booms and busts are defined symmetrically.

Figure 8: Comparing the growth rate of private and public credit - Post-liberalization

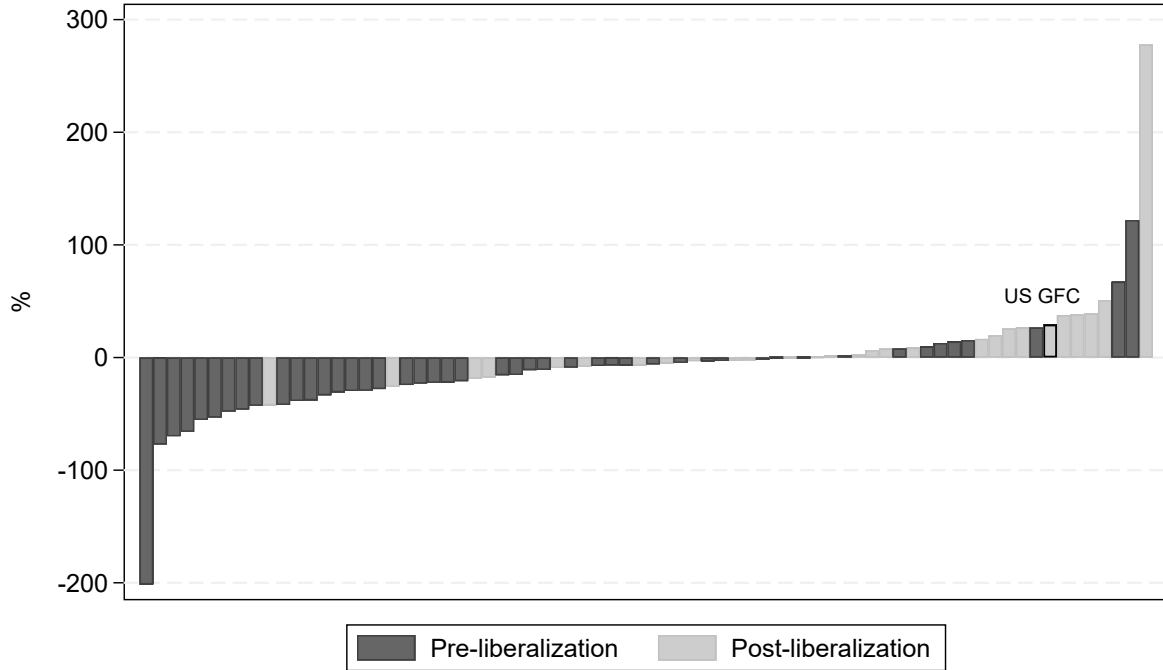


Notes: This Figure shows the average of the yearly growth rate of private credit (in red) and of public credit (in blue) over the post-liberalization sub-sample. It distinguishes between “normal” periods (i.e. periods outside private busts) and private bust periods. Private busts are identified using the Hamilton filter (see text). The post-liberalization sub-sample is defined as in Table 4. Vertical bars represent 68% confidence intervals.

and 3). During private busts, however, the growth rate of public credit becomes superior to that of private credit. This is driven both by a decline in the growth rate of private credit relative to normal periods (from 7.8% to -0.2%) and by an increase in the growth rate of public credit (from 3.2% to 6.4%). In the Appendix, Figure B.1 extends this comparison to the pre-liberalization sub-sample.

To quantify the variation in private and public credit during private busts, I use the residuals generated by the Hamilton filter (see Equation 2). The residuals represent the difference between the actual values of (log) real credit and the estimated trend. By exponentiating and then summing these residuals across each bust, I obtain an estimate of the contraction of private credit for each bust. I call this estimate $Private_b$ (where b indexes the bust). Note that by construction $Private_b$ is negative. Then, I repeat the same procedure for public credit. I thus define $Public_b$ as the sum of the exponentiated Hamilton residuals of public credit across private bust b . Unlike $Private_b$, $Public_b$ can be positive or negative. It is positive if public credit expands during bust b and negative if public credit contracts. I use $Private_b$ as a measure of the quantity of private credit

Figure 9: Public credit and private busts



Notes: This Figure plots the ratio $\frac{Public_b}{Private_b}$ in percentage for each private bust b in my sample (see text for definition). Each bar is associated with a bust of private credit. Busts are sorted in ascending order according to the value of the corresponding ratio. Dark and light grey bars denote busts taking place in the pre and post-liberalization sub-sample respectively. Busts are identified using the Hamilton filter (see text). The pre and post-liberalization are defined as in Table 4.

that is withdrawn from the economy during bust b .²² Likewise, $Public_b$ measures the quantity of public credit that is added to (or withdrawn from) the economy during bust b .

Figure 9 plots the ratio $\frac{Public_b}{Private_b} \times 100$ for each of the private bust for which public credit data are non-missing and not equal to zero. The ratio is multiplied by -1 such that a positive (negative) ratio indicates an expansion (contraction) of public credit. For example, a ratio of +100% indicates that the expansion of public credit is as large as the contraction in private credit. A ratio of -100% indicates that the contraction of public credit is as large as the contraction in private credit. Busts are sorted in ascending order according to the value of the corresponding ratio. Dark and light grey bars denote busts taking place in the pre and post-liberalization sub-sample respectively.

²²Note that, since GDP (both real and nominal) tends to contract during busts of private credit, $Private_b$ would tend to overestimate the quantity of private credit that is actually withdrawn from the economy. This would then lead me to underestimate the ratio $\frac{Public_b}{Private_b}$ (i.e. I would tend to minimize the role of public credit during busts).

Two main results emerge from Figure 9. First, positive (negative) ratios tend to be associated with busts occurring in the post (pre)-liberalization sub-sample. This is in line with the results presented in the previous Sections. In the post-liberalization sub-sample, public credit tends to rise above its trend during private busts. The opposite is true in the pre-liberalization sub-sample. Second, looking at the absolute size of the ratios reveals that public credit is quantitatively important during private busts. Focusing on positive ratios, I find the average ratio to be +33% (and +23% if I exclude the rightmost bust which stands as a clear outlier).²³ That is, public credit offsets on average one third of the contraction in private credit. Focusing on busts occurring in the post-liberalization sub-sample (including both negative and positive ratios), I find an average ratio of +15% (compared to -17% in the pre-liberalization sub-sample).

Among the busts associated with the largest positive ratios I find, for example, the bust following the 2008 Great Financial Crisis in the US. My estimate suggests that 39% of the contraction in private credit was offset by public credit during the bust. This is particularly striking since public credit accounts for a relatively small share of total credit in the US. In 2008, at the beginning of the crisis, the share of public credit in total credit was only 8%. During the 3 years and a half of the bust (2009Q4-2013Q1), however, public credit grew at an impressive annual rate of 19%. At the same time, private credit decreased at an annual rate of 1%. By the end of the bust, the share of public credit in total credit had risen to 16% (that is, to twice its pre-crisis value).

Negative ratios are also informative. During busts, public credit can *reinforce* the contraction of private credit. The average negative ratio is -26%, and I find several busts where the contraction of public credit is more than half as large as the contraction of private credit. All of these busts occur in the pre-liberalization sub-sample.

Importantly, results comparable to the ones presented in Figure 9 are obtained when using other time series filters to identify the trend of private and public credit. Results are also comparable when applying the filter to the series in level rather than in logs.

²³This bust occurred in the early 1990s in Germany. The contraction of private credit was relatively mild while public credit increased massively (in part to subsidize the East-German economy and facilitate its integration to the West, see Deeg (1999, p203-206)). The share of public credit in total credit jumped from around 12% of total credit in 1991 to 20% of total credit at the end of 1993.

5 Policy implications

This article puts forward two main results. First, public credit markets are immune to the different channels of international monetary policy transmission. Second, in financially liberalized economies, public credit is countercyclical: it contracts during private booms and expands during busts. Both results have important policy implications.

5.1 Public credit and the Global Financial Cycle

The first implication of my results is that limited monetary autonomy is possible, even in fixed exchange rate regimes with open capital accounts. Through public credit institutions, states control the allocation of credit to specific sectors of the economy, independently of world financial conditions. Public credit thus helps governments achieve a middle ground solution to the trilemma/dilemma (Klein and Shambaugh, 2015). This is the case in developing countries, where public credit is part of a policy-mix including limited controls on capital flows and exchange rate flexibility. It is also the case in developed economies, where public credit outlasted other forms of government intervention in the economy. In fact, the persistency of public credit can partly be attributed to the demise of other forms of state intervention. As economic and financial globalization deprived governments of traditional policy instruments, public credit institutions became increasingly used as a flexible tool to carry out industrial and social policies (Mertens et al., 2021).

Second, my results suggest that great care should be taken when implementing financial reforms (Diaz-Alejandro, 1985). Privatizing public credit increases the exposure of the domestic economy to the Global Financial Cycle. Scrapping down public credit institutions can be warranted when the allocation of public loans is inefficient (e.g. in countries with weak or unstable political institutions), but temporary capital controls should be allowed as a buffer against foreign shocks. On the other hand, efficiently run public credit institutions could serve as a substitute to controls on capital flows (i.e. by isolating certain segments of the credit market from the Global Financial Cycle).

5.2 Public credit and national credit cycles

In countries with liberalized financial systems, public credit has been used as a macroprudential tool. During private busts, public credit can prevent constrained borrowers

from being cut-off credit markets, and tame the real effects of negative credit shocks (Jiménez et al., 2018). In fact, public credit might help explain the puzzle raised by Schularick and Taylor (2012). Schularick and Taylor notice that the real effect of postwar financial crises is surprisingly low given the heavy financialization of the economy. Since, in their sample, all postwar financial crises occur in financially liberalized economies (where public credit is countercyclical), public credit might go a long way in explaining this result.

Schularick and Taylor's puzzle also shows up in my data. Figure B.2 in the Appendix compares the effect of a credit bust on the growth rate of real GDP in the pre and post-liberalization sub-samples.²⁴ Specifically, it looks at the yearly growth rate of real GDP outside busts (i.e. in normal times) and during busts (from the start of the bust to up to 4 years after the bust). I find that the path of output following a bust is surprisingly similar in both sub-samples. In both cases, the economy takes 2 to 3 years to recover from the bust.

This is particularly puzzling given the relative weight of private credit in the two samples (the average credit to GDP ratio is only 45% in the pre-liberalization sub-sample, against 73% in the post-liberalization sample). My results suggest that public credit could help explain the (relatively) low real effect of credit busts in financially liberalized economies.

6 Conclusion

This article uncovers a hidden segment of the financial market. Public credit accounts for a large share of total credit, and has stabilizing macroeconomic properties: it is not sensitive to the Global Financial Cycle, and its cycles are opposite to private credit cycles. While the former is unconditional, the latter is true only in financially liberalized economies.

Some studies have argued that cutting down the public credit sector would improve credit allocation (La Porta et al., 2002). On the other hand, the liberalization of credit markets has been shown to be associated with the increase in the frequency of financial crises (Diaz-Alejandro, 1985) but no previous work had discussed the impact of a decrease in the share of public credit on macroeconomic fluctuations. While there might

²⁴I focus on credit busts rather than on financial crises due to the relatively small number of financial crises in my sample (i.e. 18 according to the classification of Laeven and Valencia (2020) and Schularick and Taylor (2012)).

still be good reasons to limit the share of public credit, policymakers should be aware that doing so increases the sensitivity of the economy to foreign shocks

In countries with liberalized financial markets, however, my results show that public credit smooths negative credit shocks. This result opens up new avenues for research: how large are the effects of public credit on output in a credit crunch? Are the effects on output high enough to outweigh the fiscal costs of public credit, particularly when default rates are high? Existing research shows that the net social return of public credit during a crunch is positive and large (Jiménez et al., 2018), but additional evidence using bank-level data would be extremely insightful.

References

- Abiad, Abdul, Enrica Detragiache, and Thierry Tressel (2010) “A New Database of Financial Reforms,” *IMF Staff Papers*, 57 (2), 281–302.
- Aizenman, Joshua, Menzie D Chinn, and Hiro Ito (2016) “Monetary Policy Spillovers and the Trilemma in the New Normal: Periphery Country Sensitivity to Core Country Conditions,” *Journal of International Money and Finance*, 68, 298–330.
- Alesina, Alberto, Filipe R Campante, and Guido Tabellini (2008) “Why is Fiscal Policy Often Procyclical?” *Journal of the European Economic Association*, 6 (5), 1006–1036.
- Amsden, Alice Hoffenberg (2001) *The Rise of “The Rest”: Challenges to the West From Late-industrializing Economies*: Oxford University Press, USA.
- Bank of France (1987) “Bulletin Trimestriel,” March–April, 62.
- Behn, Markus, Rainer Haselmann, Thomas Kick, and Vikrant Vig (2015) “The Political Economy of Bank Bailouts,” Technical report, IMFS Working Paper Series.
- Bernanke, Ben S and Mark Gertler (1995) “Inside the Black Box: the Credit Channel of Monetary Policy Transmission,” *Journal of Economic Perspectives*, 9 (4), 27–48.
- Bianchi, Javier, Pablo Ottonello, and Ignacio Presno (2023) “Fiscal Stimulus Under Sovereign Risk,” *Journal of Political Economy*, 131 (9), 2328–2369.
- Bluedorn, John C and Christopher Bowdler (2010) “The Empirics of International Monetary Transmission: Identification and the Impossible Trinity,” *Journal of Money, Credit and Banking*, 42 (4), 679–713.

- Bonomo, Marco, Bruno Martins et al. (2016) “The Impact of Government-Driven Loans in the Monetary Transmission Mechanism: What Can we Learn from Firm-level Data,” *Banco Central do Brasil, Texto para Discussão*, 419.
- Bosworth, Barry P, Andrew S Carron, and Elisabeth Holmes Rhyne (1987) *The Economics of Federal Credit Programs*: Brookings Institution Press.
- Bruno, Valentina and Hyun Song Shin (2015) “Capital Flows and the Risk-Taking Channel of Monetary Policy,” *Journal of Monetary Economics*, 71, 119–132.
- Calvo, Guillermo A, Leonardo Leiderman, and Carmen Reinhart (1996) “Capital Flows to Developing Countries in the 1990s: Causes and Effects,” *Journal of Economic Perspectives*, 10 (2), 123–139.
- Cerutti, Mr Eugenio M and Joshua Bosshardt (2020) “Why Did Public Banks Lend More During the Global Financial Crisis?” Technical report, International Monetary Fund.
- Cesa-Bianchi, Ambrogio and Andrej Sokol (2022) “Financial Shocks, Credit Spreads, and the International Credit Channel,” *Journal of International Economics*, 135, 103543.
- Chinn, Menzie D and Hiro Ito (2008) “A New Measure of Financial Openness,” *Journal of Comparative Policy Analysis*, 10 (3), 309–322.
- Christiano, Lawrence J and Terry J Fitzgerald (2003) “The Band Pass Filter,” *International Economic Review*, 44 (2), 435–465.
- Cuadra, Gabriel, Juan M Sanchez, and Horacio Saprizza (2010) “Fiscal Policy and Default Risk in Emerging Markets,” *Review of Economic Dynamics*, 13 (2), 452–469.
- De Bonis, Riccardo, Fabio Farabullini, Miria Rocchelli, Alessandra Salvio, and Andrea Silvestrini (2012) “A Quantitative Look at the Italian Banking System: Evidence from a New Dataset Since 1861,” Technical Report 26, Banca d’Italia.
- Deeg, Richard (1999) *Finance Capitalism Unveiled: Banks and the German Political Economy*: University of Michigan Press.
- Dell’Ariccia, Mr Giovanni, Mr Ehsan Ebrahimy, Ms Deniz O Igan, and Mr Damien Puy (2020) “Discerning Good From Bad Credit Booms: The Role of Construction,” *International Monetary Fund, Staff Discussion Notes*.
- Dembiermont, Christian, Mathias Drehmann, and Siriporn 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*.

- Diaz-Alejandro, Carlos (1985) "Good-bye Financial Repression, Hello Financial Crash," *Journal of Development Economics*, 19 (1-2), 1–24.
- EEC (1963) "Le Coût du Crédit à la Construction des Logements Sociaux."
- (1977) "Credit to Agriculture in the E.C. Member States - A Comparative Analysis," *Commission of the European Communities: Information on Agriculture* (28).
- Eggertsson, Gauti B and Paul Krugman (2012) "Debt, Deleveraging, and the Liquidity Trap: A Fisher-Minsky-Koo Approach," *The Quarterly Journal of Economics*, 127 (3), 1469–1513.
- Fisher, Irving (1933) "The Debt-deflation Theory of Great Depressions," *Econometrica*, 337–357.
- Fleming, J Marcus (1962) "Domestic Financial Policies Under Fixed and Under Floating Exchange Rates," *IMF Staff Papers*, 9 (3), 369–380.
- Frankel, Jeffrey A, Carlos A Vegh, and Guillermo Vuletin (2013) "On Graduation from Fiscal Procyclicality," *Journal of Development Economics*, 100 (1), 32–47.
- Frankel, Jeffrey, Sergio L Schmukler, and Luis Servén (2004) "Global Transmission of Interest Rates: Monetary Independence and Currency Regime," *Journal of International Money and Finance*, 23 (5), 701–733.
- Gourinchas, Pierre-Olivier and Maurice Obstfeld (2012) "Stories of the Twentieth Century for the Twenty-first," *American Economic Journal: Macroeconomics*, 4 (1), 226–65.
- Guerrieri, Veronica and Guido Lorenzoni (2017) "Credit Crises, Precautionary Savings, and the Liquidity Trap," *The Quarterly Journal of Economics*, 132 (3), 1427–1467.
- Hamilton, James D (2018) "Why you Should Never Use the Hodrick-Prescott Filter," *Review of Economics and Statistics*, 100 (5), 831–843.
- Han, Xuehui and Shang-Jin Wei (2018) "International Transmissions of Monetary Shocks: Between a Trilemma and a Dilemma," *Journal of International Economics*, 110, 205–219.
- Herrera, Helios, Guillermo Ordonez, and Christoph Trebesch (2020) "Political Booms, Financial Crises," *Journal of Political Economy*, 128 (2), 507–543.
- Hodgman, Donald R (1973) "Credit Controls in Western Europe: An Evaluative Review," in *Credit Allocation Techniques and Monetary Policy*, 137–161: The Federal Reserve Bank of Boston.

- Hodrick, Robert J and Edward C Prescott (1997) "Postwar US Business Cycles: An Empirical Investigation," *Journal of Money, Credit, and Banking*, 1–16.
- Iannotta, Giuliano, Giacomo Nocera, and Andrea Sironi (2007) "Ownership Structure, Risk and Performance in the European Banking Industry," *Journal of Banking & Finance*, 31 (7), 2127–2149.
- Ilzetzki, Ethan, Carmen M Reinhart, and Kenneth S Rogoff (2019) "Exchange Arrangements Entering the Twenty-first Century: Which Anchor Will Hold?" *The Quarterly Journal of Economics*, 134 (2), 599–646.
- Ilzetzki, Ethan and Carlos A Végh (2008) "Procyclical Fiscal Policy in Developing Countries: Truth or Fiction?" Technical report, National Bureau of Economic Research.
- Jiménez, Gabriel, José-Luis Peydró, Rafael Repullo, and Jesus Saurina Salas (2018) "Burning Money? Government Lending in a Credit Crunch," *CEPR Discussion Paper*.
- Jordà, Òscar (2005) "Estimation and Inference of Impulse Responses by Local Projections," *American Economic Review*, 95 (1), 161–182.
- Jordà, Òscar, Moritz Schularick, and Alan M Taylor (2013) "When Credit Bites Back," *Journal of Money, Credit and Banking*, 45 (s2), 3–28.
- (2015) "Betting the House," *Journal of International Economics*, 96, S2–S18.
- (2017) "Macrofinancial History and the New Business Cycle Facts," *NBER Macroeconomics Annual*, 31 (1), 213–263.
- (2020) "The Effects of Quasi-random Monetary Experiments," *Journal of Monetary Economics*, 112, 22–40.
- Kaminsky, Graciela L, Carmen M Reinhart, and Carlos A Végh (2004) "When it Rains, it Pours: Procyclical Capital Flows and Macroeconomic Policies," *NBER Macroeconomics Annual*, 19, 11–53.
- Klein, Michael W and Jay C Shambaugh (2015) "Rounding the Corners of the Policy Trilemma: Sources of Monetary Policy Autonomy," *American Economic Journal: Macroeconomics*, 7 (4), 33–66.
- La Porta, Rafael, Florencio Lopez-de Silanes, and Andrei Shleifer (2002) "Government Ownership of Banks," *The Journal of Finance*, 57 (1), 265–301.

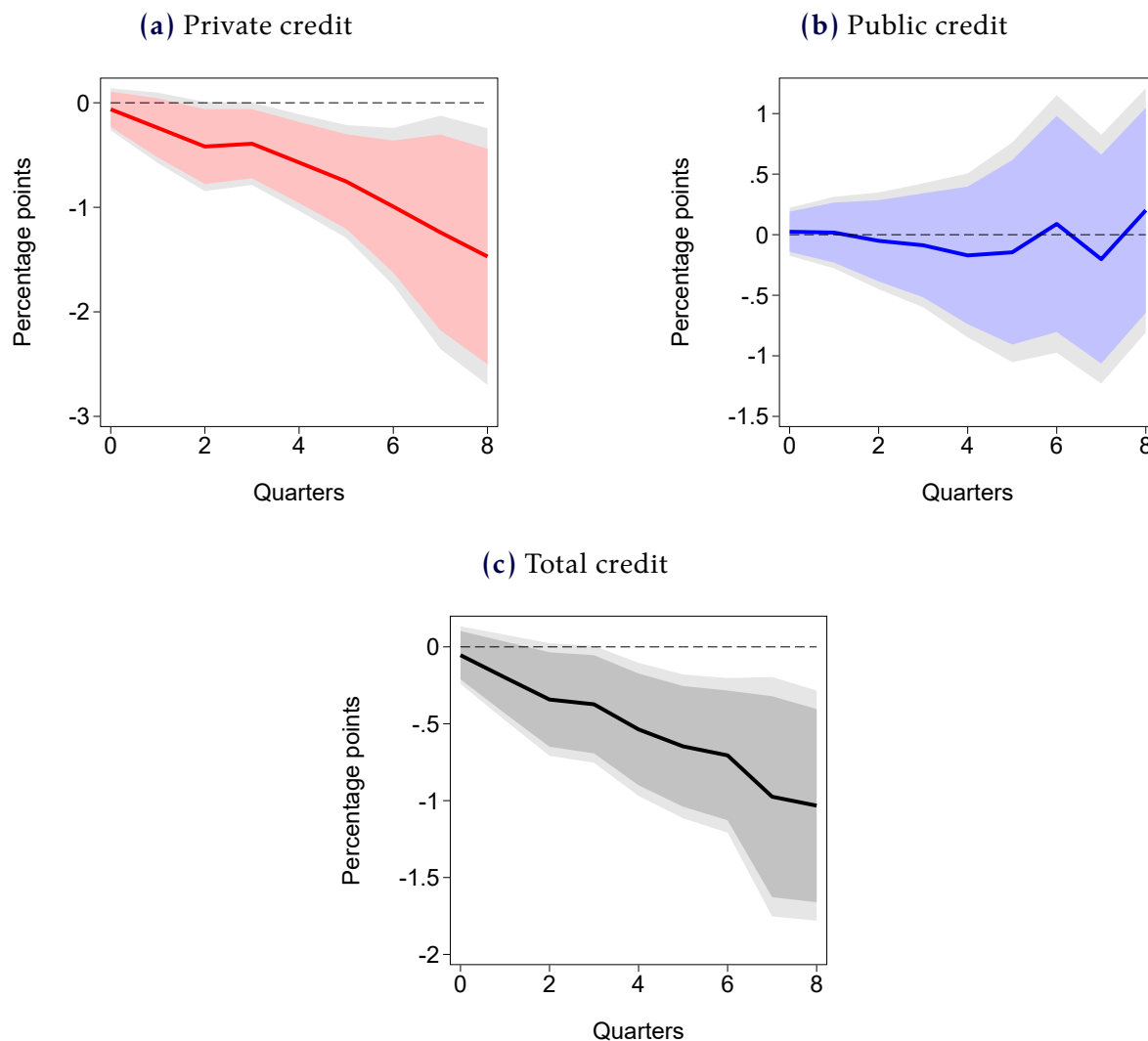
- Laeven, Luc and Fabian Valencia (2020) “Systemic Banking Crises Database II,” *IMF Economic Review*, 68 (2), 307–361.
- Lucas, Deborah (2016) “Credit Policy as Fiscal Policy,” *Brookings Papers on Economic Activity*, 2016 (1), 1–57.
- Martín-Aceña, Pablo, Joaquín Cuevas, and Yolanda Blasco (2016) *El Instituto de Crédito Oficial 1971-2015*: Dextra.
- Mauro, Paolo, Rafael Romeu, Ariel Binder, and Asad Zaman (2015) “A Modern History of Fiscal Prudence and Profligacy,” *Journal of Monetary Economics*, 76, 55–70.
- Meller, Barbara and Norbert Metiu (2017) “The Synchronization of Credit Cycles,” *Journal of Banking & Finance*, 82, 98–111.
- Mertens, Daniel, Matthias Thiemann, and Peter Volberding (2021) *The Reinvention of Development Banking in the European Union: Industrial Policy in the Single Market and the Emergence of a Field*: Oxford University Press.
- Mian, Atif and Amir Sufi (2009) “The Consequences of Mortgage Credit Expansion: Evidence from the US Mortgage Default Crisis,” *The Quarterly Journal of Economics*, 124 (4), 1449–1496.
- (2015) *House of Debt: How they (and you) Caused the Great Recession, and How we can Prevent it from Happening Again*: University of Chicago Press.
- (2018) “Finance and Business Cycles: The Credit-driven Household Demand Channel,” *Journal of Economic Perspectives*, 32 (3), 31–58.
- Mian, Atif, Amir Sufi, and Emil Verner (2017) “Household Debt and Business Cycles Worldwide,” *The Quarterly Journal of Economics*, 132 (4), 1755–1817.
- Micco, Alejandro and Ugo Panizza (2006) “Bank Ownership and Lending Behavior,” *Economics Letters*, 93 (2), 248–254.
- Miranda-Agrippino, Silvia and Hélène Rey (2020) “US Monetary Policy and the Global Financial Cycle,” *The Review of Economic Studies*, 87 (6), 2754–2776.
- Monnet, Eric (2018) *Controlling Credit: Central Banking and the Planned Economy in Postwar France, 1948-1973*: Cambridge University Press.
- (2023) “The State and Credit Policies: From the 19th Century Till Present,” *Stato e Mercato*, 43 (1), 3–28.

- Monnet, Eric and Damien Puy (2021) “One Ring to Rule Them All? New Evidence on World Cycles,” *CEPR Discussion Paper* (15958).
- Monnet, Eric and Miklos Vari (2023) “A Dilemma Between Liquidity Regulation and Monetary Policy: Some History and Theory,” *Journal of Money, Credit and Banking*, 55 (4), 915–944.
- Montiel Olea, José Luis and Mikkel Plagborg-Møller (2021) “Local Projection Inference is Simpler and more Robust than you Think,” *Econometrica*, 89 (4), 1789–1823.
- Müller, Karsten and Emil Verner (forthcoming) “Credit Allocation and Macroeconomic Fluctuations,” *The Review of Economic Studies*.
- Mundell, Robert A (1963) “Capital Mobility and Stabilization Policy Under Fixed and Flexible Exchange Rates,” *Canadian Journal of Economics and Political Science*, 29 (4), 475–485.
- Musacchio, Aldo, Sergio G Lazzarini, Pedro Makhoul, and Emily Simmons (2017) “The Role and Impact of Development Banks,” Technical report, World Bank.
- Newey, Whitney K. and Kenneth D. West (1987) “A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix,” *Econometrica*, 55 (3), 703–708, <http://www.jstor.org/stable/1913610>.
- Obstfeld, Maurice, Jonathan D Ostry, and Mahvash S Qureshi (2019) “A Tie that Binds: Revisiting the Trilemma in Emerging Market Economies,” *Review of Economics and Statistics*, 101 (2), 279–293.
- Obstfeld, Maurice, Jay C Shambaugh, and Alan M Taylor (2005) “The Trilemma in History: Tradeoffs Among Exchange Rates, Monetary Policies, and Capital Mobility,” *Review of Economics and Statistics*, 87 (3), 423–438.
- OECD (1980) “Methodological Supplement to the OECD Financial Statistics.”
- Omori, Sawa (2022) “Introducing the Revised and Updated Financial Reform Database,” *Journal of Financial Regulation*, 8 (2), 230–240.
- Park, Gene (2011) *Spending Without Taxation: FILP and the Politics of Public Finance in Japan*: Stanford University Press.
- Quinn, Dennis P and A Maria Toyoda (2008) “Does Capital Account Liberalization Lead to Growth?” *The Review of Financial Studies*, 21 (3), 1403–1449.
- Quinn, Sarah L (2019) *American Bonds: How Credit Markets Shaped a Nation*: Princeton University Press.

- Ravn, Morten O and Harald Uhlig (2002) "On Adjusting the Hodrick-Prescott Filter for the Frequency of Observations," *Review of Economics and Statistics*, 84 (2), 371–376.
- Reinhart, Carmen M and M Belen Sbrancia (2015) "The Liquidation of Government Debt," *Economic Policy*, 30 (82), 291–333.
- Rey, H el ene (2013) "Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence," Technical report, Proceedings - Economic Policy Symposium - Jackson Hole.
- Richter, Bj orn, Moritz Schularick, and Ilhyock Shim (2019) "The Costs of Macroprudential Policy," *Journal of International Economics*, 118, 263–282.
- Richter, Bj orn, Moritz Schularick, and Paul Wachtel (2021) "When to Lean Against the Wind," *Journal of Money, Credit and Banking*, 53 (1), 5–39.
- Richter, Bj orn and Kaspar Zimmermann (2019) "The Profit-credit Cycle," Technical report, Available at SSRN 3292166.
- Schularick, Moritz and Alan M Taylor (2012) "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008," *American Economic Review*, 102 (2), 1029–61.
- Shambaugh, Jay C (2004) "The Effect of Fixed Exchange Rates on Monetary Policy," *The Quarterly Journal of Economics*, 119 (1), 301–352.
- Shleifer, Andrei and Robert W Vishny (1994) "Politicians and Firms," *The Quarterly Journal of Economics*, 109 (4), 995–1025.
- Stiglitz, Joseph E (1993) "The Role of the State in Financial Markets," *The World Bank Economic Review*, 7 (suppl_1), 19–52.
- Sufi, Amir and Alan M Taylor (2022) "Financial Crises: A Survey," *Handbook of International Economics*, 6, 291–340.
- Verdier, Daniel (2000) "The Rise and Fall of State Banking in OECD Countries," *Comparative Political Studies*, 33 (3), 283–318.
- Wade, Robert (1990) *Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization*: Princeton University Press.
- Zysman, John (1983) *Governments, Markets, and Growth: Financial Systems and the Politics of Industrial Change*: Cornell University Press.

A Robustness checks

Figure A.1: Public credit and the trilemma - Partially open economies



Notes: Cumulative response of the growth rate of real credit to a 1pp shock on the short-term interest rate in the base country at time t (contemporaneous interest rate shock). Countries with partially open capital accounts and fixed exchange rates (see Table 2). Panels (a), (b), and (c) show the response of private, public, and total credit respectively. Shaded areas denote 95% and 68% confidence intervals. Standard errors are clustered at the country level.

Table A.1: Public credit and the Global Financial Cycle - Testing for heterogeneity

	(1) Pre VS post-liberalization	(2) Emerging VS developed	(3) Recessions VS expansions
$Dummy_{i,t} = 0$	-.217 (.584)	.859 (.793)	.508 (1.022)
$Dummy_{i,t} = 1$	3.539 (3.122)	-.652 (.616)	-.825 (.876)
Δ	3.756 (2.921)	-1.51 (.992)	-1.333 (1.474)
Observations	2420	2420	2412

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

Notes: Coefficients are in percentage points. Numbers in parenthesis are standard errors clustered at the country level. See text for explanations.

I test for heterogeneity in the response of public credit to variations in foreign interest rates (see Section 3). This is done by adding an interaction term to my baseline equation (see Equation 1). The updated equation is reported below:

$$\begin{aligned}
Credit_{i,t+h} = & \alpha_i^h + \beta_1^h Sample_{i,t-1} + \beta_2^h Dummy_{i,t-1} + \beta_3^h R_{i,t-1} \\
& + \beta_4^h Sample_{i,t-1} \times Dummy_{i,t-1} + \beta_5^h Sample_{i,t-1} \times R_{i,t-1} + \beta_6^h Dummy_{i,t-1} \times R_{i,t-1} \\
& + \beta_7^h Sample_{i,t-1} \times Dummy_{i,t-1} \times R_{i,t-1} + \theta^h(L) X_{i,t} + \kappa^h trend_t + \epsilon_{i,t+h}
\end{aligned} \tag{4}$$

As in Equation 1, the response variable is the real growth rate of public credit between $t - 1$ and $t + h$, while the impulse variable $R_{i,t-1}$ denotes unpredictable movements in the short-term interest rate of country i 's base country at time $t - 1$.

The variable $Dummy_{i,t}$ is used to map out different sub-samples. I run three successive sets of regression with three alternative definition of $Dummy_{i,t}$. In the first set

of regressions $Dummy_{i,t}$ equals 1 when country i is financially liberalized at time t and 0 otherwise (the definition of financial liberalization is the same as in Table 4). In the second set of regressions $Dummy_{i,t}$ equals 1 when country i is developed and 0 otherwise (for these regressions I drop the country-fixed effects).²⁵ In the third set of regressions $Dummy_{i,t}$ equals 1 when country i is in economic expansion at time t and 0 otherwise. Economic expansions and recessions are defined using the Hamilton (2018) filter. Specifically, an expansion (recession) occurs when the residual of a regression of log real GDP on its lagged values at time $t - 8$, $t - 9$, $t - 10$ and $t - 11$ (with t in quarters) is positive (negative).

For all three sets of regressions, I fix $Sample_{i,t-1} = 1$ and I compare the response of public credit when $Dummy_{i,t-1} = 0$ and $Dummy_{i,t-1} = 1$. To improve readability, I focus on the last horizon of the projections $h = 8$.²⁶ Results are presented in Table A.1. The first row of Table A.1 reports the effect of foreign interest rate shocks when $Dummy_{i,t-1} = 0$ (it is given by $\beta_3 + \beta_5$ in Equation 4). The second row reports the effect of foreign interest rate shocks when $Dummy_{i,t-1} = 1$ (it is given by $\beta_3 + \beta_5 + \beta_6 + \beta_7$). The third row reports the difference between the coefficients estimated in the first two rows (it is given by $\beta_6 + \beta_7$). As can be seen from Table A.1, none of the coefficients are significantly different from zero. Using a different definition of financial liberalization or of economic recessions and expansions does not affect the results.²⁷

²⁵Developed countries are Austria, France, Germany, Greece, Italy, Japan, Norway, United States, and Spain. Emerging countries are Indonesia, Mexico, South-Korea and Thailand.

²⁶Results for lower horizons yield identical conclusions and are available upon request.

²⁷Specifically, I defined the pre and post-liberalization periods using country-specific thresholds. I also used a stricter definition of expansions and recessions.

Table A.2: The synchronization of private and public credit cycles

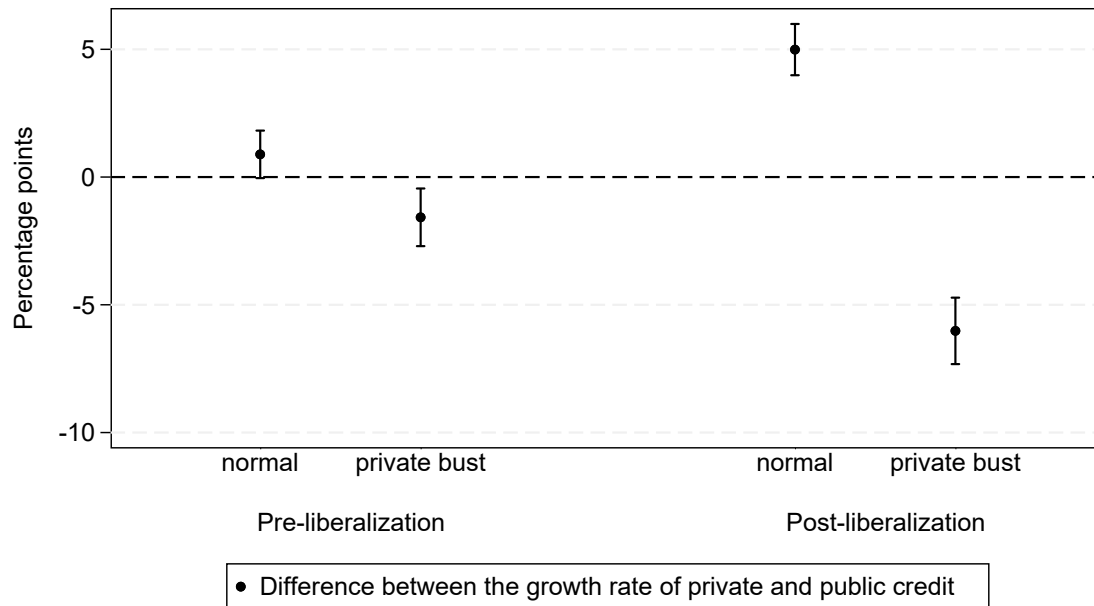
	Hodrick-Prescott
Pre-liberalization (β_0)	0.327*** (0.029)
Post-liberalization ($\beta_0 + \beta_1$)	-0.134*** (0.042)
Observations	2981

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

Notes: This table presents the results from estimating Equation 3. The cyclical component of private and public credit is generated using a Hodrick-Prescott filter with smoothing parameter $\lambda = 1600$ (in line with the Ravn-Uhlig rule, see [Ravn and Uhlig \(2002\)](#)). Newey-West standard errors are given in brackets. I allow two lags to be considered in the auto-correlation structure.

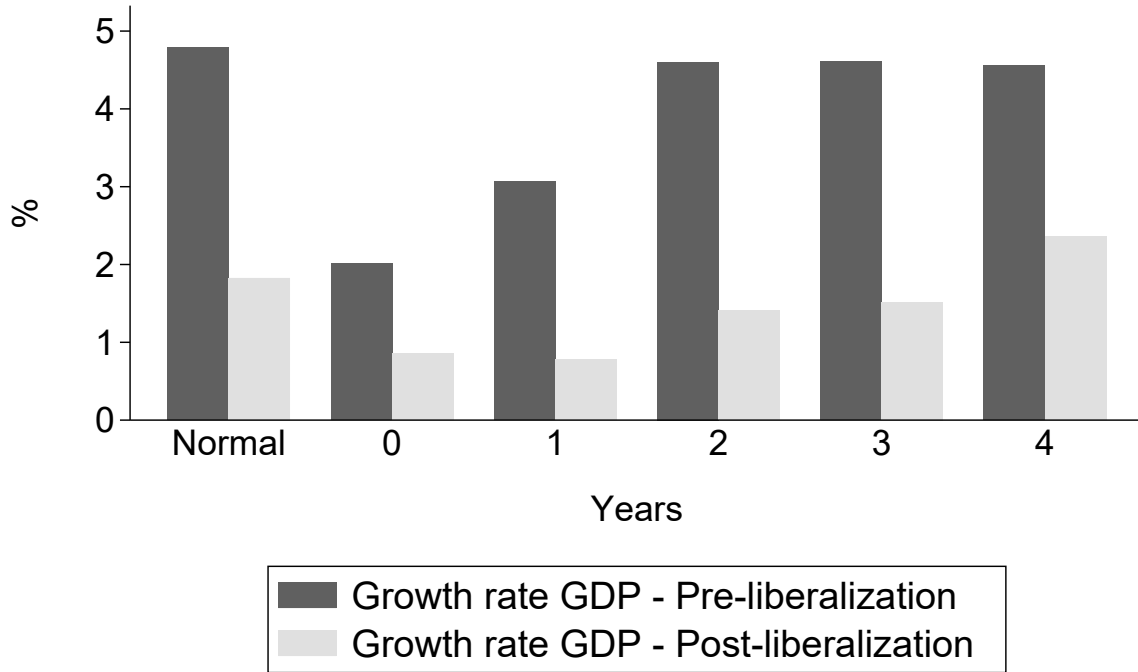
B Additional graphs

Figure B.1: Comparing the growth rate of private and public credit



Notes: This Figure shows the average of the difference between the yearly growth rate of private credit and public credit over the pre and post-liberalization sub-samples. A positive (negative) difference indicates that the growth rate of private credit is superior (inferior) to that of public credit. As in Figure 8, I distinguish between “normal” periods (i.e. outside private busts) and private bust periods. Private busts are identified using the Hamilton filter (see Section 4.3). The pre and post-liberalization sub-samples are defined as in Table 4. Vertical bars represent 68% confidence intervals.

Figure B.2: The real effect of private busts



Notes: This Figure compares the yearly growth rate of real GDP at the start of a private bust (Year 0) and up to 4 years after the start to the “normal” growth rate. It distinguishes between two sub-samples: pre and post-liberalization. Private busts are identified using the Hamilton filter (see Section 4.3). The pre and post-liberalization sub-samples are defined as in Table 4.

C A database on public credit

To compile this database, I relied on the help and expertise of researchers, archivists, and statisticians. I would like to thank, without implicating: Kilian Rieder, Thomas Matzinger, Yolanda Blasco, Silvia Mastrantonio, Andrea Silvestrini, Paolo Piselli, Riccardo De Bonis, Federico Barbiellini Amidei, Augusto Rojas Alvarez, Eirin I. Brynstad, Kamila Sommer, Michael Batty, Jun-woo Jeong, Seung-hyun Moon, Yongho Lee, Seong Hyuck Heo, Shunichiro Bessho and Sofia Stefanaki.

C.1 Public credit institutions

Public credit institutions share two main characteristics: state ownership, and a mandate from the state to fulfill economic, social, or political objectives (e.g. for-profit public credit institutions are excluded). To identify public credit institutions, I rely on the categorization used by the central bank.

The following section provides a country-by-country overview of the data used to construct my series of public credit. It includes information on the lenders (public credit institutions), the borrowers, and the type of instrument. Insofar as possible, I focus strictly on credit to the resident non-financial sector. Credit includes loans but excludes debt securities (i.e. holding of bonds and short-term paper). Loan guarantees are also excluded.

For each-country, I list some of the main public credit institutions. The list is non-exhaustive and includes institutions that are no longer in operation. For each institution, I indicate the main sector of activity (housing, agriculture, small and medium enterprises, export industries, student loans, or loans to local administrations/public infrastructure). The mention “other” signals that the institution is either not specialized or does not fall in any of the previous categories.

Austria: Direct loans by the special credit institutions (sonderkreditunternehmungen) to domestic non-banks. Loans by the special credit institutions are also included in the IMF private credit series for the whole sample.

Public credit institutions: Osterreichische Kommunalkredit AG (public infrastructure), Osterreichische Investitionskredit AG (SMEs), Osterreichischer Exportfonds (export industries). The special credit institutions also include privately owned special-purpose institutions. Unfortunately, netting out the loans by these institutions from the total of public credit is not possible.

France: Up to 1984Q4, credit to firms and households by non-bank financial institutions (this was the official terminology to designate the long-term credit banks under the authority of the state). In 1984, the distinction between banks and non-banks financial institutions was abolished, and the main public institutions were reclassified as institutions financières spécialisées (IFS) (specialized financial institutions). The Caisse des Dépôts et Consignations (CDC) (which controlled many of the IFS) had a special status, and was not included in the IFS. From 1985Q1 to 1995Q3, I take the sum of the credit to firms and households by the IFS and by the CDC. From 1995Q4 onwards, I focus on housing loans by the CDC (data for the IFS are not available after 1995, but IFS credit to the economy is negligible and decreasing starting in the late 1990s).

Public credit institutions: Crédit National (SMEs), Caisse des Dépôts et Consignations (housing), Crédit Foncier de France (housing), Comptoir des Entrepreneurs (SMEs), Crédit Hôtelier Commercial et Industriel (SMEs), Caisse Nationale des Autoroutes (public infrastructure), Sociétés de Développement Régional (public infrastructure), Caisse Nationale de l'Énergie (public infrastructure).

Germany: Lending to domestic non-banks by banks with special, development and other central support tasks. For-profit public banks (e.g. Landesbanken and Sparkassen)

are not included in this category. Loans by banks with special, development and other central support tasks are also included in the IMF private credit series for the whole sample.

Public credit institutions: Kreditanstalt für Wiederaufbau (SMEs, housing), Landwirtschaftliche Rentenbank (agriculture), LfA Förderbank Bayern (SMEs), Investitionsbank Berlin (SMEs).

Greece: Total credit to the private sector by specialized credit institutions. This category disappears in the early 2000s, as most institutions are either privatized (e.g. Agricultural Bank in 2000, Postal Savings Bank in 2006) or merged with commercial banks.

Public credit institutions: Agricultural Bank (agriculture), Consignments and Loans Fund (housing, public infrastructure), National Investment Bank for Industrial Development (SMEs), Hellenic Industrial Development Bank (SMEs), National Housing Bank (housing).

Indonesia: Sum of credit outstanding in rupiah by state banks and regional development banks, and of direct credit by Bank Indonesia (which is discontinued in the early 2000s).

Public credit institutions: regional development banks (established and owned by the local provincial government), and four state banks: Bank Mandiri (other), Bank Negara Indonesia (other), Bank Rakyat Indonesia (other), and Bank Tabungan Negara (housing).

Italy: Up to 1994Q4, credit to the resident non-financial sector by the istituti di credito speciale (special credit institutions). This category was officially terminated by the 1993 Banking Code. Following the 1993 reform, most public credit institutions were privatized. A few public credit institutions remained, the largest being the Cassa Depositi e Prestiti (CDP). From 1995Q1 onwards, I focus on CDP loans to the private sector.

Public credit institutions: the istituti di credito speciale were divided between four sub-

groups according to their area of specialization: istituti di credito agrario (agriculture), sezioni opere pubbliche (public works), istituti di credito mobiliare (SMEs), and istituti di credito fondiario (housing, agriculture).

Japan: Loans by public financial institutions. Public financial institutions include the Fiscal Loan Fund, and government financial institutions.

Public credit institutions: Development Bank of Japan (SMEs), Japan Finance Corporation (SMEs), Okinawa Development Finance Corporation (public infrastructure), Japan Student Services Organization (student loans).

Mexico: Total credit by development banks to the resident non-banking sector. Starting in 1985Q3, total credit by the “fondos de fomento” (development funds) to the resident non-banking sector is added.

Public credit institutions: Nacional Financiera (other), Banco Nacional de Obras y Servicios Públicos (public infrastructure), Banco Nacional de Comercio Exterior (export industries), Sociedad Hipotecaria Federal (housing), Banco del Bienestar (other), Banco Nacional del Ejército, Fuerza Aérea y Armada (other), Fondo Nacional de Habitaciones Populares (housing), Fondo Especial para Financiamientos Agropecuarios (agriculture). The last two institutions are development funds (Fideicomisos Públicos de Fomento Económico), the others are development banks.

Norway: Loans and advances by state lending institutions.

Public credit institutions: Fiskarbanken (agriculture), Husbanken (housing), Hypotekbanken (agriculture), Industribanken (SMEs), Kommunalbanken (local administration), Statens lånekasse for utdanning (student loans).

United States: Sum of direct loans by the Federal government and by state and local governments. Government sponsored enterprises (Farm Credit System, Fannie Mae, Freddie Mac...) are privately held and are thus excluded from the series. For an history

of government credit programs in the US, see [Bosworth et al. \(1987\)](#).

South-Korea: Sum of loans by specialized banks and development institutions, and of government loans. Starting in the early 2000s, development institutions (Korea Development Bank and Import-Export Bank) are reclassified as specialized banks. Loans by specialized banks are also included in the IMF private credit series for the whole sample. *Public credit institutions:* Korea Development Bank (other), Export-Import Bank of Korea (export industries), Industrial Bank of Korea (SMEs), Citizens National Bank (SMEs), Korea Housing Bank (housing). Specialized banks also include the National Agricultural Cooperatives Federation and the National Federation of Fisheries Cooperatives, established in 1961 and 1962 respectively. While tightly regulated by the state, the two federations are privately owned. Netting out their loans from the total of public credit is not possible for most of the sample.

Spain: Loans of the Instituto de Credito Oficial (ICO) to the domestic non-financial sector. Until the early 1990s, the ICO includes the Entidades Oficiales de Credito (EOCs) (see chapters 4 and 5 of [Martín-Aceña et al. \(2016\)](#)).

Public credit institutions: Instituto de Credito Oficial (other), Banco Hipotecario de España (housing, agriculture), Banco de Credito Industrial (SMEs), Banco de Credito Local (public infrastructure), Banco de Credito Agrícola (agriculture), Credito Social Pesquero (agriculture). These institutions were all part of the Entidades Oficiales de Credito (EOCs), which were privatized in the 1990s. Today, only the Instituto de Credito Oficial remains.

Thailand: Loans by specialized financial institutions. This series is included in the IMF private credit series from December 1994 onwards.

Public credit institutions: Government Saving Bank (other), Government Housing Bank (housing), Bank for Agriculture and Agricultural Cooperatives (agriculture), Export Im-

port Bank of Thailand (export industries), Small and Medium Enterprises Development Bank of Thailand (SMEs), Islamic Bank of Thailand (other), Small Industry Finance Corporation (SMEs), Industrial Finance Corporation (SMEs).

C.2 Coverage and sources

Austria: 1960Q1-2020Q4. Up to 1995Q3, I relied on the Annual Reports of the Oesterreichische Nationalbank (OeNB). From 1989Q1 to 1995Q3, gaps in the Annual Reports are filled using the Statistische Monatshefte of the OeNB. From 1995Q4 onwards, data are available on the OeNB's website at the following address: <https://www.oenb.at/dam/jcr:39726279-c023-4d3b-a787-daacc1ea2bc9> (accessed March 2024).

France: 1954Q4-2018Q4. Up to 1984Q4, data are drawn from the Annual Reports of the Conseil National du Crédit. From 1985Q1 to 1995Q3, I collected the data from the Bank of France's (BoF) archives (using three monthly statistical publications by the BoF: "Statistiques Monétaires Mensuelles", "Statistiques Monétaires Provisoires" and "Statistiques Monétaires Définitives"). From 1995Q4 onwards, the data were no longer published by the BoF, I therefore relied on the BoF's internal database (the data can be requested by email from the following address: 2503-acces-donnees-ut@banque-france.fr).

Germany: 1958Q4-2020Q4. The data can be downloaded from the time-series database of the Bundesbank: <https://www.bundesbank.de/en/statistics/time-series-databases> (accessed March 2024). The series code is: BBBK1.M.OU0425. Before 1964Q4, only biannual data are available.

Greece: 1955Q3-2020Q4. Data are drawn from the Monthly Statistical Bulletin of the Bank of Greece. Public credit is equal to 0 starting in 2002Q2 (see Appendix C.1.).

Indonesia: 1966Q1-2020Q4. Up to 2000Q2, I collected the data from paper editions

of the Indonesian Financial Statistics published by the Bank Indonesia. From 2000Q3 onwards, data are available on the Bank Indonesia's website: <https://www.bi.go.id/en/statistik/ekonomi-keuangan/seki/Default.aspx> (accessed March 2024).

Italy: 1956Q1-2020Q4. Up to 1994Q4, I relied on the Bollettino of the Banca d'Italia. From 1995Q1 onwards, I used the Annual Reports of the Cassa Depositi e Prestiti (CDP), which provide biannual data.

Japan: 1964Q4-2020Q4. The data can be downloaded from the Bank of Japan (BoJ) time series database: https://www.stat-search.boj.or.jp/index_en.html (accessed March 2024). Starting in 1999Q2, I relied on series FF'FOF_FFAS180A200 (which is calculated according to the 2008 SNA). I then retropolated this series before 1999Q2 using series FF'FFSA140A270 (which follows the 1968 SNA).

Mexico: 1950Q1-2020Q4. Up to 1980Q3, I used the Informe Annual of the Banco de Mexico. For the 1980Q4-2020Q4 period, the data was sent to me by the Banco de Mexico (data starting in 1994 is also available on the Banco de Mexico's Economic Information System (SIE)).

Norway: 1950Q1-2020Q4. For the 1950Q1-2001Q3 period, I collected the data based on different publications of Statistics Norway. Up to 1960Q4, I used the Statistisk Meddelelser. Then, I relied on the Statistisk Manedshefte up to 1997Q3, and on the Bank- og Kredittstatistikk up to 2001Q3. From 2001Q4 onwards, I downloaded the data from Statistics Norway's StatBank: <https://www.ssb.no/en/statbank/table/06718/> (accessed March 2024).

United States: 1951Q4-2020Q4. The data can be downloaded from the Data Download Program of the Federal Reserve: <https://www.federalreserve.gov/datadownload/> (accessed March 2024). I take the sum of the two following series: Z1/Z1/FL314023005.Q and Z1/Z1/FL403069305.Q.

South-Korea: 1960Q1-2020Q4. For development banks and specialized banks, I used the Bank of Korea's Economic Statistics Yearbook up to 1999Q4, and the Financial Supervisory Service (FSS) database from 2000Q1 onwards: <http://efisis.fss.or.kr/fss/fsiview/indexw.html> (accessed March 2024). For government loans, the data are available in the ECOS database of the Bank of Korea from 1975Q1 onwards: <https://ecos.bok.or.kr/> (accessed March 2024). The series calculated according to the 2008 SNA is retroplated over the SNA 1993 and the SNA 1968 series.

Spain: 1962Q1-2020Q4. The data can be downloaded from the Banco de Espana's website: <https://www.bde.es/webbde/es/estadis/infoest/bolest4.html> (accessed March 2024). I use the following series "EC y EFC. Créditos. Del ICO. A OSR" in table 4.11.

Thailand: 1966Q4-2020Q4. Up to 1993Q4, I collected the data from the Quarterly Bulletin of the Bank of Thailand. From 1994Q1, the data are available on the Bank of Thailand's website: <https://www.bot.or.th/en/statistics/monetary-statistic.html> (accessed March 2024). I use files EC_MB_013 and EC_MB_013_S2, and I take the sum of "loans to other non-financial corporations" and "loans to other resident sectors".

D Other macroeconomic variables

Capital control index: Quinn and Toyoda (2008) and Chinn and Ito (2008) (and updates thereto).

CPI: Monnet and Puy (2021). For Indonesia, I use the IMF International Financial Statistics.

Exchange rate flexibility index: Ilzetzki et al. (2019).

Exchange rates: Ilzetzki et al. (2019).

Exports and Imports: Main Economic Indicators, OECD. For Indonesia and Mexico, I extend the OECD's series back in time using the IMF International Financial Statistics. For Thailand, I rely exclusively on the IMF International Financial Statistics.

Financial crisis dummy: Schularick and Taylor (2012) and Laeven and Valencia (2020).

Financial reform index: Abiad et al. (2010), extended until 2013 by Omori (2022).

House price index: BIS database.

Long-term interest rate: Monnet and Puy (2021). For Austria, Greece, South-Korea, Mexico, Spain and Thailand I rely on the IMF Financial Statistics.

Nominal GDP: Quarterly National Accounts, OECD. For Thailand, I use data from the National Economic and Social Development Board (available from 1994Q1 onwards), and data from the IMF International Financial Statistics before 1994Q1. For Indonesia, I use data from the OECD Main Economic Indicators (available from 1990Q1 onwards), and data from the IMF International Financial Statistics before 1990Q1. The data from the IMF International Financial Statistics are annual, so I convert them into quarterly data using quadratic interpolation.

Private credit: Monnet and Puy (2021). For Indonesia, I use data from Dembiermont et al. (2013).

Public debt to GDP ratio: IMF Public Finances in Modern History database (see [Mauro et al. \(2015\)](#)).

Real GDP: [Monnet and Puy \(2021\)](#). For Indonesia, I use data from the IMF International Financial Statistics (available from 2000Q1 onwards). For Thailand, I use data from the National Economic and Social Development Board (available from 1994Q1 onwards).

Share price index: [Monnet and Puy \(2021\)](#). For Greece, Indonesia and South-Korea, I rely on the OECD Monthly Monetary and Financial Statistics.

Short term interest rate: Bundesbank time series database for the German and euro-zone interest rates, and FRED (Federal Reserve Economic Data) for the US interest rate.