Virtuous or Vicious? Development Banks in Europe

Abstract

In the aftermath of the economic and financial crisis, European policy makers have manifested a renewed interest on the role played by development banks in mitigating market failure by supporting financial programs set up to reverse the low level of investment by EU firms and stimulating innovation paths. This interest is coupled with an increasing awareness of the need to ensure the financial sustainability of these institutions, by securing reasonable levels of efficiency.

In this paper, we analyze the performance and self-sustainability of European development banks with the aim of assessing whether they pursue their mandate retaining financial soundness without entailing an undesirable absorption of public resources.

The empirical analysis leverages on a unique manually collected dataset including all the development banks headquartered in Europe. We introduce specific regression models aimed at quantifying the difference in financial performances between development banks and the banking industry, also investigating their different responses across the business and political cycles.

Our main finding is that the profitability of development banks over the period 2000-2015 is only slightly lower than that of their benchmark. However, the difference is not statistically significant when focusing on Western Europe or on the period after the 2008 crisis. Besides, development banks appear to be more resilient when the economy slows down, while in Eastern Europe they also play a countercyclical role. During election years, differences exist between development banks in Western and Eastern

Europe, with the former virtuous and the latter still accommodating. A battery of robustness tests confirms our results.

These new findings point to the characteristics of contemporary development banks in Europe and provide insights to member states that are evaluating to provide additional financial funds to development banks or to promote the setting up of new promotional banks.

Keywords
Development Banks; Ownership; Performance; Electoral Cycle; Europe

JEL Codes
G21; O16; O52; L32

Highlights

- The paper analyzes the performance and self-sustainability of European development banks (DBs).

- The empirical analysis leverages on a unique manually collected dataset including all the development banks headquartered in Europe.

- DBs have a profitability slightly lower than commercial banks. The difference is not significant when focusing on Western Europe only.

- DBs are more resilient when the economy slows down, and in Eastern Europe they also play a countercyclical role.

- During election years, differences exist between development banks in Western and Eastern Europe, with the former virtuous and the latter still accommodating.

Virtuous or Vicious? Development Banks in Europe

1. Introduction

The purpose of this paper is to analyze the performance of European development banks and to assess whether they pursue their mandate retaining financial soundness and without dissipating public resources.

The relevance of profitability and financial sustainability of development banks has already been stressed by Diamond in his seminal paper (1957), where it is pointed out that to pursue their goals development banks should follow sound risk management and internal control procedures, with a professional management of the operational banking activity, self-financing growth, and securing a reasonable level of strength and stability, thus supporting the economy while not losing money.

In the aftermath of the economic and financial global crisis, this issue has attracted a renewed interest given the attention manifested by European policy makers on the role played by development banks in mitigating market failures by supporting and implementing financial instruments and programs recently set up to reverse the low level of investment by EU firms, in particular start-ups and SMEs (European Commission, 2015a).

Indeed, the European Fund for Strategic Investments and the European Investment Advisory Hub,[1] which are the two strategic pillars of the 2014 Investment Plan for

[1] See Regulation 2015/1017 (June 25, 2015) of the European Parliament and of the Council on the European Fund for Strategic Investments, the European Investment Advisory Hub and the European Investment Project Portal. See also Proposal for a Regulation of the European Parliament and of the Council amending Regulations (EU) No 1316/2013 and (EU) 2015/1017 as regards the extension of the

Europe (so-called "Junker Plan"; European Commission, 2014), are co-sponsored and managed by the European Investment Bank (EIB), the world's largest multilateral bank. Furthermore, a relevant number of national development banks, such as the Kreditanstalt fuer Wiederaufbau (KfW), Caisse des Dépôts et Consignations (CDC), the Cassa Depositi e Prestiti (CDP), the Istituto de Credito Oficial (ICO), the Powszechna Kasa Oszczędności Bank Polski (PKO BP) are already cooperating with the EIB to mobilize investments and provide technical assistance at national and regional level, given their particular expertise and their knowledge of the local context, as well as national policies and strategies (European Commission, 2015b; European Parliament, 2016). Cooperation between development banks and European authorities is also taking the form of investment platforms, such as the Marguerite Infrastructure Fund and the European Energy Efficiency Fund.

The interest by European policy makers in development banks is such that the European Commission (2015b) specifies "*Member States that do not yet have a national promotional bank may consider setting one up*." This interest is coupled with the awareness that development banks have to adopt proper policies and best practices to enhance their welfare role while preventing negative side effects (European Commission, 2015b; European Parliament, 2016): "*National Promotional Banks prove to work best where they focus on economically viable projects and operate with sufficient profitability (albeit below private operators' cost of equity) to maintain financial soundness without continued capital injections by the government (profits mostly being retained to bolster future lending capacity)*" (European Commission, 2015b). Moreover, the relevance of economic and financial sustainability is explicitly

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duration of the European Fund for Strategic Investments as well as the introduction of technical enhancements for that Fund and the European Investment Advisory Hub, COM (2016) 597.

stated as a key principle in the statute of many development banks (e.g. CDP, Nordic Investment Bank, NRW.Bank). Indeed, although development banks have goals that go beyond profitability, they need to combine their socio-economic goals with conditions of efficiency and profitability, in order to "stand on their own feet" and secure a reasonable level of financial strength and stability. Furthermore, strengthening the economics of projects can also leverage additional financing for public-private partnership arrangements, which are attracting a growing interest as a way to develop solutions for the delivery of long-term public goals (EIB, 2004, 2018).

It is in the light of this renewed interest in development banks that we frame our study and contribute to the debate on the role these institutions can play in modern economies by mobilizing resources for development and promoting economic and social goals while ensuring financial sustainability.

The empirical analysis leverages on a unique manually collected dataset that includes all the development banks headquartered in Europe. Financial information is benchmarked with a selected sample of more than 4,800 financial institutions, for the period 2000-2015.

We first estimate a set of baseline models to shed light on the different characteristics of development banks in terms of efficiency and profitability. We then explore, using a second set of models, their behavior during election years and across different economic cycles, to investigate whether their response – given their state-owned ownership – is affected by political influences which may misallocate investments and destroy value. Indeed, according to the so-called *political view* of government bank ownership, perverse effects such as misallocation of resources and inefficient management may prevail on the desirable contribution of government ownership to

promote socially valuable projects (e.g. La Porta, Lopez-de-Silanes, & Shleifer, 2002; Shleifer & Vishny, 1994, 1997).

Our main finding is that the profitability of European development banks is only slightly lower than that of their benchmark. However, the difference is not statistically significant when focusing on Western Europe or on the period after the 2008 crisis. Besides, development banks appear to be more resilient when the economy slows down, while in Eastern Europe they also play a countercyclical role. During election years, differences exist between development banks in Western and Eastern Europe, with the former virtuous and the latter still accommodating. A battery of robustness tests confirms our results.

To the best of our knowledge, this is the first comprehensive empirical study on contemporary development banks, which is quite surprising, given the role development banks are acquiring on the global scene. "The inadequacy of the printed material on development banks is particularly surprising in view of the fact that they are not a new device, they exist throughout the world and there is a tremendous and continuing interest in them" (Diamond, 1957). Although 60 years have passed since Diamond's statement, development banks still lie substantially outside the academic scene. Little is known about development banks, and apart from theoretical contributions discussing their role and existence, empirical studies on their firm-level characteristics and on the impact of their activity are scant and mainly focused on single institutions such as the European Investment Bank (Clifton, Diaz-Fuentes, & Revuelta, 2014; Tuijnman, 2009), the Brazilian BNDES (Lazzarini, Musacchio, Bandeire-De-Mello, & Marcon, 2015), and the Asian Development Bank (Feeny & Vuong, 2017).

The remainder of the paper is organized as follows. Section 2 analyzes extant literature. Section 3 focuses on development banks in Europe. In Section 4 we describe

our sample, set out our hypotheses, and describe the methodology. In Section 5, the results are discussed, while Section 6 concludes.

2. Literature review

Development banks – also referred to as development financial institutions, state investment banks, promotional banks – are public sector or government-invested legal entities with an explicit policy mandate to promote socio-economic goals in a region, sector or specific market segment (De Luna-Martinez & Vicente, 2012).[2] The theoretical framework where the existence of development banks is discussed is the Market Failure Theory (Bator, 1958). Within this framework, the rationale for the existence of development banks is that institutions with a public policy mandate are better placed than private operators to overcome market failures (De Aghion, 1999; Diamond, 1957). Indeed, development banks typically fund high risk projects that private banks are not willing to finance (De Olloqui et al., 2013; De Luna-Martinez & Vicente, 2012; Eslava & Freixas, 2016; Mazzuccato & Penna, 2016), provide "patient" capital to fund projects that are socially valuable but financially unprofitable, at least in the short-run (Foray, Mowery, & Nelson, 2012; Musacchio & Lazzarini, 2014; Yeyati et al., 2004), and play a countercyclical role by sustaining growth and employment

[2] Alternative definitions of development bank include: "An institution to promote and finance enterprise in the private sector" (Diamond, 1957); "Development banks are government-sponsored financial institutions concerned primarily with the provision of long-term capital to industry" (De Aghion, 1999); "Financial institutions that are primarily concerned with offering long-term capital finance to projects that are deemed to generate positive externalities and hence would be underfinanced by private creditors" (Yeyati, Micco, & Panizza, 2004).

during periods of recession (De Luna-Martinez & Vicente, 2012; Gutierrez, Rudolph, Homa, & Beneit, 2011; Yeyati, Micco, Panizza, Detragiache, & Repetto, 2007).

While there is a general consensus on the role of development banks in mitigating market failures, the issue traditionally raised is whether it is convenient that market failures are fixed with a state intervention, or whether political interference and inefficiencies misallocate investments and destroy value (Hart, Schleifer, & Vishny, 1997; Kornai, 1979; La Porta et al., 2002; Shleifer & Vishny, 1994, 1997).

Extant empirical literature has already analyzed the relationship between ownership and performance, not only with reference to publicly traded companies around the world (e.g. Lazzarini & Musacchio, 2018) but also with a specific reference to the banking industry.

Results highlight that state-owned banks have a poorer performance compared to private banks in Latin America (Berger, Clarke, Cull, Klapper & Udell, 2005; Yeyati et al., 2007), in China (Lin and Zhang, 2009; Jiang, Yao, & Feng, 2013), in Taiwan (Chen and Liu, 2013), and in Far Eastern countries, although there is evidence that differences reduce over time (Cornett, Guo, Khaksari, & Tehranian, 2010).

As far as European countries, Chakravarty and Williams (2006) and Altunbas and Marques (2008) find that state-owned banks in Germany have cost and profit advantages over private banks, while Yildirim and Philippatos (2007) find, for Eastern Europe, higher profitability but lower cost efficiency. Bacchiocchi, Ferraris, Florio, & Vandone (2017) find that European state-owned banks that are active in the market for corporate control are at least as efficient and profitable as their private benchmarks. In contrast, Iannotta, Nocera, & Sironi (2007), for a sample of banks from 15 European countries, find that government banks have lower profitability and loan quality and higher insolvency risk than private banks.

Micco, Panizza, & Yanez (2007) use a sample of banks from 179 countries across the world, and find that state-owned banks operating in developing countries tend to have lower profitability, lower margins, and higher overhead costs than private banks. However, for developed countries the relationship between ownership and performance is much weaker, showing that state-owned banks are not necessarily less profitable than private banks.

Some empirical literature also investigates specifically the role of politics on the behavior of state-owned banks during election years, with the aim to assess whether their activity is possibly influenced by political considerations as supposed by the *political view* of government bank ownership.

Dinc (2005) empirically analyzes whether political motivations influence government-owned banks, although the focus is on their lending activity rather than performance. The dataset contains the 10 largest banks in 43 countries across the world and covers the period 1994-2000. The authors find that the variable that isolates political influences for state-owned banks compared to private banks has a positive and statistically significant influence on lending activity within developing countries, while it has a negative and insignificant influence within developed economies.

Micco et al. (2007) also investigate in depth the role played by politics on the relationship between ownership and bank performance. Specifically, they analyze the effect of political elections and find that state-owned banks in developing countries tend to be less profitable in election years and this result is driven by a lower interest margin rather than higher overhead costs. Conversely, elections do not affect profitability of state-owned banks in industrial countries. The authors also analyze the relation between loan growth and politics and find that state-owned banks located in developing countries increase loans during election years while state-owned banks in developed

countries do not, consistently with Dinc (2005). Interestingly, the empirical results of our paper refer to the years 2001-2015, thus covering a period that immediately follows the 1995-2002 period considered by Micco et al. (2007).

Overall, the general conclusion is that in developing countries state-owned banks are less profitable and less cost efficient than private banks, and the situation is worse during periods of political election. In developed countries differences with private benchmarks are less evident or not relevant, and politics seems less influential.

However, the existing literature has so far focused only on commercial state-owned banks or has considered state-owned banks as if they belonged to the same type. Conversely, there are clear differences between development and state-owned banks, in terms of mission, business models, type of activity, and targeted market segments (Bacchiocchi et al., 2017; De Luna-Martinez & Vicente, 2012; Lazzarini et al., 2015; Schmit, Denuit, Gheeraert, & Warny, 2011; Yeyati et al., 2004), since commercial state-owned banks typically do not have an explicit public policy mandate, and operate like private banks offering a wide variety of banking and financial services targeted to retail as well as corporate customers and covering deposits and accounts, credit cards, loans, stock market services, insurance, and asset management. Moreover, "although development and state-owned commercial banks should be subject to the same types of political pressure, development banks display a distinct dynamic because they are usually involved in large-scale industrial projects" (Lazzarini et al., 2015).

Lazzarini et al. (2015) is the only empirical paper directly testing the political view on development banks. Specifically, the authors build a unique dataset of firms publicly traded on the Sao Paulo Stock Exchange that have received loans and equity investments from the Brazilian BNDES during 2002-2009. Firms' profitability is measured by ROA, EBITDA/Assets, and Tobin's q while the political influence is

measured by the firms' campaign donations to candidates. Results highlight that BNDES allocations do not provide evidence for a *development view* (or *industrial policy view*), according to which development banks should remedy market failures, enhance economic growth, and play a positive role on firms' profitability. At the same time, the *political view* is also not supported since the BNDES does not appear to systematically channel funds to underperforming firms. Although we aim to test the effects predicted by the political view on development banks, our setting is different from that of Lazzarini et al. (2015) since we compare the performances of a cross-country sample of banks as in Micco et al. (2007) rather than the performances of firms receiving financial support.

3. Development banks in Europe: main characteristics

Our empirical overview of development banks in Europe starts from the identification and mapping of these financial intermediaries since there is not a readily available list of development banks. We started the selection of development banks by referring to the banks' classification available within the Orbis Bank Focus database, produced by Bureau Van Dijk (BvD). Specifically, the majority of European development banks are identified among those institutions classified as *Multi-lateral governmental banks* or *Specialized governmental credit institutions*. Other development banks are identified thanks to the available information on banks' characteristics and their textual descriptions in Orbis Bank Focus. We then devoted considerable effort to refine the initial selection of European development banks

through manual inspection, online research, and a general review of annual reports and publicly available information.[3]

We finally identified 132 development financial institutions in 35 European countries, also including entities that are not in the Orbis Bank Focus dataset but can still be retrieved from the Orbis dataset.[4] These institutions are quite heterogeneous in terms of business size and geographical reference. Indeed, they include:

i. very large multilateral development banks operating at a supranational level and set up by a group of sovereign states that are their ultimate shareholders (e.g. the European Investment Bank EIB, the European Bank for Reconstruction and Development EBRD, and the Nordic Investment Bank NIB);
ii. national development banks (e.g. the German Kreditanstalt fur Wiederaufbau KfW, the Italian Cassa Depositi e Prestiti CDP, and the French Caisse des Dépôts et Consignations CDC;
iii. smaller regional promotional banks (e.g. Hamburgische Investitions- und Foerderbank, Institut Catala de Finances, and Finlombarda Spa).

In addition, some development financial institutions are very old, such as CDP founded in Italy in 1850 or the KfW founded in Germany in 1948, while others have

[3] In particular, we also classify as development banks all those institutions that are members of specific European associations such as the European Development Financial Institutions (EDFI), an association of export credit agencies mainly focused on the development of private enterprises in developing and emerging economies with the mandate to foster growth in sustainable business, and the Network of European Financial Institutions for SMEs (NEFI), whose public mission is to facilitate access to finance growth and internationalization of SMEs by offering them financial services and expertise.

[4] While Orbis Bank Focus is specifically dedicated to banks, Orbis contains information on companies associated to all the possible types of industries and activities, including financial institutions that are not specifically recorded as banks.

been recently founded, such as the Instituicao Financeira do Desenvolvimento (IFD) launched in Portugal in 2014, or the Banque Publique d'Investissement (BPI) founded in France in 2012.

Although they share their public nature and the common mission to promote development, development banks may also differ with respect to their main objectives and specific target sectors. In recent years, a growing number of them are more explicitly focusing on innovation in the fields of renewable energy, resource efficiency, and food security.[5] However, investments are also targeted to SMEs, education, research, transport, living conditions, social housing, and international trade. These differences also affect the governance systems of development banks and the degree of formal and informal influence exerted by member states on their activity (Humphrey & Michaelowa, 2013; Strand & Zappile, 2015). Accordingly, development banks also differ in their profiles related to their business model and to the range of products and

[5] Some examples of relevant investments in environmentally-friendly projects are: the Nordic Investment Bank has issued since 2011 a total of EUR 2.1 billion green bonds to finance projects with a positive impact on the environment. Some examples of target investments are a water pipeline for drinking water from Lake Mälaren in Sweden; R&D in plant breeding and grass biotechnology in Denmark; a waste-to-energy plant in the Helsinki Metropolitan Area to convert garbage into energy and heat. The KfW launched several investment programs in climate and environment protection, such as the "KfW Energy Efficiency Program," that offers SMEs favorable financing for energy efficiency measures or the "KfW Environmental Protection Program" which is aimed at financing measures aimed at improving resource efficiency as well as waste avoidance and recycling. Similarly, the European Bank for Reconstruction and Development (EBRD) invested a total amount of Euro 2.5 billion in 2015 in the power sector for renewable or low-carbon energy generated by wind, solar or hydropower, biogas, biomass, or geothermal technology. The recently established Britain's Green Investment Bank has a dedicated focus on promoting investments in green infrastructure and technologies.

services they typically offer.[6]

With reference to liabilities, development banks typically rely on a mix of funding sources, such as loans from other financial development institutions, debt instruments issued on capital markets, budget allocations from governments, and funding from European programs.[7] They are usually not allowed to raise funds directly via retail deposits, although there are some exceptions, such as the Bulgarian Development Bank (BDB),[8] and, to a different extent, the Italian CDP, which indirectly relies on deposit funding raised via postal saving products.

In terms of distribution by country, the highest number of development financial institutions are found in Germany (18), followed by Italy (10), France (10), and Belgium (10). The number of development financial institutions that operate at a supranational level is equal to 8. In terms of total assets (average 2013-2015), development banks located in Germany account for 31.3% of the European

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[6] In recent years, development banks have set up equity instruments, such as venture capital and seed funds, to finance start-up and young firms, as well as strategic equity investments in companies of national interest. For example, the Instituto de Credito Oficial (Spain) has a venture capital firm named Axis, which provides enterprises with capital and quasi-capital instruments to finance their growth and participate as a shareholder in the Spanish Development Corporation COFIDES. Similarly, CDP (Italy) holds controlling stakes in utilities of national relevance such as Italgas, Terna, Eni, Posteitaliane, and promotes venture capital with the platforms ITATech and Social Impact Italia.

[7] For example, together with the European Commission, in 2015 the EIB launched the European Fund for Strategic Investments (EFSI) with the aim to mobilize private financing for strategic investments and addressing the market failure in risk-taking by supporting investment and increasing access to finance for SMEs and mid-cap companies. By June 2016, the EFSI approved 262 operations for a financing amount of Euro 17.45 billion, which represents a total investment mobilized of 104.75 billion Euro.

[8] See Art. 3 of the Bulgarian Development Bank Act.

development banks' total assets, followed by supranational development institutions (24.5%), institutions located in Italy (13.2%), and in France (11.4%). This incidence is strongly affected by the different average size of development banks within each country. For example, in Italy there is a large national promotional bank – i.e. Cassa Depositi e Prestiti (whose average total assets amount to approximately € 380,000 mln within the period 2013-2015) – and some much smaller regional entities (the largest of which is the Banca del Mezzogiorno – Mediocredito Centrale, with about € 2,060 mln of total assets within the same period). A similar situation can be observed in France, where CDC (about € 152,700 mln of total assets) coexists with other national institutions operating on a much lower scale. The case is different in Germany, where KfW (about € 485,600 mln) is accompanied by the presence of some other institutions of considerable size such as NRW.Bank (with about € 143,500 mln of total assets).

Table 1 highlights the dimensional heterogeneity of the sample, both in terms of total assets and employees. On average, the 33 development financial institutions that we identify in Eastern Europe are much smaller than the 91 institutions identified in Western Europe in terms of total assets, but they are larger for number of employees. At the same time, the smallest institutions in terms of both total assets and number of employees are concentrated in Western Europe, where regional promotional banks cohabit with large national institutions. Conversely, all the institutions identified in Eastern Europe have a national dimension. Finally, supranational institutions are much larger than other European institutions in terms of total assets, but relatively small for number of employees. This is likely to reflect the fact that supranational institutions mainly operate at a centralized level with a less widespread network of branches.

Table 1 – Total assets and employees across European development financial institutions

By region	Size	Based on 2013-2015 averages				
		Mean	St.Dev.	Min	Median	Max
WE countries (N=91)	Tot. Assets (€ mln)	25,884.3	73,388.1	9.5	1,691.8	485,600.0
	Employees	1,091.9	4,621.0	4.0	97.5	31,435.3
EE countries (N=33)	Tot. Assets (€ mln)	6,000.5	12,331.8	86.8	2,333.7	61,847.3
	Employees	2,584.0	7,185.3	35.3	346.0	34,703.7
Supranational (N=8)	Tot. Assets (€ mln)	90,367.0	204,818.7	340.1	23,402.1	595,417.7
	Employees	856.3	1,050.6	104.7	241.3	2,517.3
Total (N=132)	Tot. Assets (€ mln)	25,360.4	81,438.4	9.5	2,017.5	595,417.7
	Employees	1,465.7	5,300.2	4.0	171.5	34,703.7

Source: Our elaborations on financial items obtained from Orbis Bank Focus and Orbis (BvD)

In the following sections, we specifically analyze the firm-level characteristics of the European development banks using the banking industry at the aggregate level as a benchmark. Within the banking industry, we also make a distinction between private-owned and state-owned banks in order to allow a further comparison between public banks with a specific mandate (i.e. development banks) and other public banks that carry out purely commercial activities. In our opinion, this further comparison could provide further points of interest for contextualizing the analysis of this paper within the existing debate on ownership and performance.

4. Data

4.1 Sample

Our sample of data includes banks headquartered in Europe and with financial information available within the reference period 2000-2015. The dataset leverages on information coming from the bank balance sheet and income statement data from the Orbis Bank Focus database (BvD). Since the Orbis Bank Focus dataset is currently restricted to only 3-5 years of data, we recovered historical financial data from the Bankscope database that BvD published until December 2016. By accessing historical

disks from Bankscope (BvD), we recovered financial data on our sample of banks dating from 1987. The merging of historical and current financial information from BvD is complicated by the fact that the *BvD ID* number, by which BvD identifies each bank, may change over time. Therefore, before the merge, we replaced the old IDs with the most recent ones.[9]

Orbis Bank Focus contains observations relating to about 34,000 active banks. Just over 7,000 of them are based in Europe. Our empirical analysis focuses on the time interval 2000-2015 since we have very few available observations before this period. Indeed, available observations significantly increase after 2002, when they are still around 50% of the available observations in the most recent years. For the purposes of our study, we exclude those banks with very specific specializations (e.g. central banks, Islamic banks, securities firms, micro-financing institutions, etc.). Second, we exclude countries with a very small number of banks (less than five in all years). Finally, when the BvD database reports both consolidated and unconsolidated accounts, we use the consolidated ones. In order to avoid double counting, we exclude from the sample the subsidiaries of those parent companies whose accounts are consolidated.[10] After all these steps, we obtained a final sample of 4,821 banks across 41 countries.[11]

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[9] By referring to the *BvD ID Change Lookup* tool, it is possible to obtain the list of BvD ID changes that involved our sample of banks within the reference period. For a similar merging procedure on Orbis data, see also Kalemli-Ozcan, Sorensen, Villegas-Sanchez, Volosovych, & Yesiltas (2015).

[10] Subsidiaries are only excluded when the ownership share is larger than 50%, approximately assuming this as the minimum percentage of ownership that is needed for consolidation.

[11] Including: 28 members of the EU as of 2017; 3 EFTA countries (Iceland, Norway, Switzerland); 6 CEFTA countries (Albania, Bosnia and Herzegovina, Macedonia, Moldova, Montenegro and Serbia); 3 members of the Commonwealth of Independent States Free Trade Area (Russia, Ukraine, Belarus) and also Turkey, which has a bilateral Customs Union arrangement with the EU.

Of the total of 132 development financial institutions individuated in Section 3, only those 85 development banks whose balance sheet data are included in Orbis Bank Focus are included in the final sample for the empirical analysis of the next sections. Indeed, only data extrapolated from Orbis Bank Focus are reported in a financial format that is fully comparable to that of commercial banks. In the final sample, development banks represent less than 2% of the total, but they account for approximately 6.6% of total assets and 3% of total employment. The exclusion of development institutions not reported in Orbis Bank Focus is almost insignificant in terms of total assets, since they are very small institutions and they would account for only 0.3% of total assets in the subsample of development banks (0.02% of total assets in the whole sample). Consequently, their exclusion is not expected to affect the main empirical results of the paper, especially considering that they are obtained through weighted regressions with weights based on banks' total assets.

As anticipated in the previous section, we want to distinguish state-owned banks from commercial private-owned banks within our sample. To this aim, we refer to the BvD Ownership database that provides information on the ownership structure of each firm. We indicate as state-owned those banks whose Global Ultimate Owner (GUO) is a public authority. To identify the ultimate owner of a corporate group, we fixed at 25.01% the minimum percentage that must characterize the (direct or indirect) ownership path from a subject bank up to its ultimate owner.[12] Since bank ownership can change over time (transitions can occur across private-owned and state-owned banks), it was necessary to face the time-consuming task of collecting yearly

[12] This is the percentage usually regarded as granting control or at least a large influence in decision-making (see Christiansen & Kim, 2014). When the GUO is not available, we base our classification on the type of entity corresponding to the Top Shareholder of each bank.

information on the ownership of each bank, once again referring to historical disks from Bankscope (BvD). We find that state-owned banks represent 3.8% of the sample and they account for about 12% and 18% of total assets and total employment respectively. Furthermore, 66 banks accounting for 6.4% of total assets were nationalized during the period, passing from private to state-owned banks, while 15 banks accounting for about 0.3% of total assets were privatized during the period, with a transition in the opposite direction.

Figure 1 highlights the evolution of the incidence of development banks and state-owned banks on total assets of the whole European banking system. The chart shows that the weight of state-owned banks increased by about 5 percentage points as a consequence of the crisis, due to nationalizations and deleveraging among private-owned banks. Nationalizations are concentrated in two distinct phases: 2008-2009 with the global financial crisis and 2012-2014 with the sovereign debt crisis. The weight on total assets has progressively grown for development banks as well, suggesting that they played a notable countercyclical role in response to financial crisis. Indeed, since the development banks belong permanently to the same cluster (as no significant changes affect their public ownership and their mandate during the reporting period), their rising weight within the banking system is just due to a greater resilience of their activity compared to private banks in the crisis years.

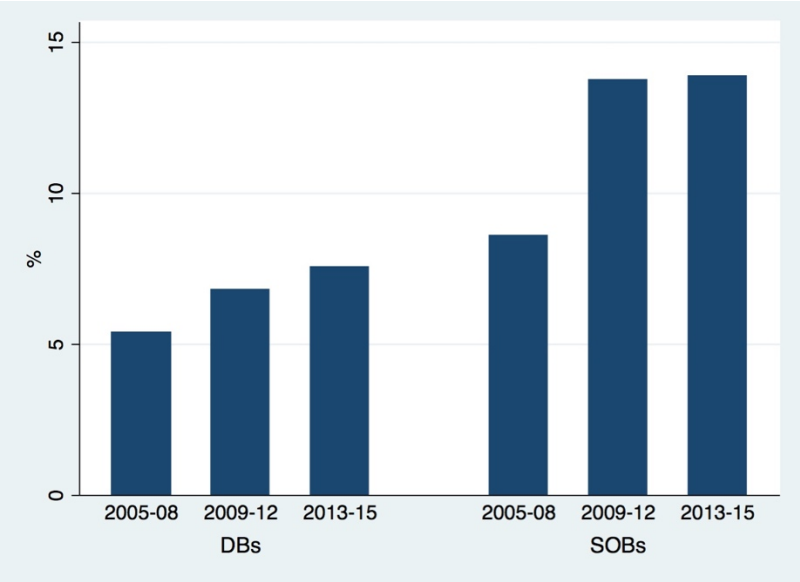

Figure 1 – Incidence of development banks (DBs) and commercial state-owned banks (SOBs) on total assets of the banking system

Before moving on to the empirical analysis, further data cleaning is carried out in order to prevent the analysis from being distorted by unwanted factors. First, we drop the top and bottom 2% of firm-year observations with respect to the Asset Growth variable since these observations are likely to be affected by M&As, de-merger or other structural (non-operating) changes. Second, in order to make sure that our results are not driven by the transition from one ownership structure to another, we drop all the bank-year observations in which there is a change in ownership (that is a transition across state-owned and private-owned banks). Finally, since it is preferable to work with comparable samples when introducing different dependent variables in our regressions (see Section 5), we drop all firm-year observations with missing values for Operating Profitability (i.e. Operating Profit Before Taxes over Total Assets), Asset Utilization (i.e. Net Operating Revenues over Total Assets), Overheads over Total

Assets or Asset Growth.[13] We remain with an unbalanced panel of 48,913 bank-year observations, referring to 4,821 banks across 41 countries.

4.2 Bank characteristics

In this section, we show some descriptive statistics comparing development banks with other European financial institutions. In particular, weighted averages and median values were computed for financial ratios that are typically used to measure bank performances and their decomposition. For each ratio and within each year, we applied a winsorizing procedure that replaces values above the 98th percentile and below the 2nd percentile respectively with the 98th percentile and the 2nd percentile. Secondly, for each bank we computed the weighted average of each ratio within the reference period. Weights are based on total assets at the beginning of each year (i.e. lagged total assets). Finally, we computed weighted averages and median values by cluster.

The starting point for assessing bank profitability is the computation of return on equity (ROE) and return on assets (ROA), that is the ratio of net profit to shareholders' equity and total assets respectively.[14] The higher the ratios, the higher the bank's overall returns given its size. Tables also report the banks' capitalization (Equity over Total Assets), measuring the percentage of banks' assets that are not leveraged. The lower

[13] Regressions in Section 5 also introduce Impairment over Total Assets, Loans Growth, and Interest Income over Earning Assets as relevant dependent variables. We decided to not restrict the sample to banks with data available on these ratios because this procedure would unnecessarily exclude too many observations.

[14] As a rule, in order to limit the inconsistency between numerator (measured as an annual flow) and denominator (measured as a stock at the end of each year), we compute the denominator as the average of the beginning and end of the year amounts from the balance sheet.

the capitalization (i.e. the higher the leverage), the larger the ROE in absolute value for a same level of ROA. We also decompose the ROA into ratios that indicate what factors contribute more to explain differences in banks' profitability. Finally, we also computed a few additional ratios to describe the activity and characteristics of the banks (customer deposits over total funding, loans over total assets, impaired loans over gross loans, employees over total assets).

Tables from 2.A to 2.E show the financial performances of development banks (DBs) alongside those of commercial private-owned (POBs) and state-owned banks (SOBs). Descriptive statistics are reported with a general reference to the whole sample (Table 2.A), but also with a specific reference to Western Europe (Table 2.B) and Eastern Europe (Table 2.C) as well as the pre-crisis years (2001-2007, Table 2.D) and the crisis and post-crisis years (2008-2015, Table 2.E).

Tables 2.A-2.E – Descriptive statistics across clusters (based on weighted average values by bank)

Table 2.A – All countries, whole period 2001-2015

	Weighted Mean			Median		
	DBs	POBs	SOBs	DBs	POBs	SOBs
ROE and ROE Decomposition:						
ROE (= Net Income / Avg. Equity), %	5.89	6.44	2.58	4.27	4.36	4.56
ROA (= Net Income / Avg. Assets), %	0.42	0.32	0.19	0.46	0.38	0.46
Equity/TotalAssets, %	8.71	5.36	5.28	12.20	8.85	10.32
ROA Decomposition:						
Tax Efficiency (= Net Income / Profit before Taxes), %	82.38	77.61	70.40	84.97	70.98	80.58
Incidence of Non-Oper. Inc. (= Profit before Taxes / Oper. Profit), %	116.62	102.56	101.90	100.00	100.00	100.00
Oper. Profitability (=Operating Profit / Avg. Assets), %	0.46	0.45	0.31	0.62	0.65	0.66
Operating Profitability Decomposition:						
Impairment / Pre-Impaiment Oper. Profit, %	21.21	39.61	51.46	25.68	28.45	23.00
Cost-to-Income (= Oper. Expenses / Oper. Revenues), %	49.04	66.88	68.55	47.50	71.48	65.70
Asset Utilization (= Oper. Revenues / Avg. Assets), %	1.64	2.48	2.33	2.52	3.39	3.66
Asset Utilization Decomposition:						
NIRA (= Net Interest Revenues / Avg. Assets), %	0.86	1.35	1.38	1.60	2.38	2.20
Fees and Commissions / Avg. Assets, %	0.08	0.65	0.38	0.14	0.67	0.61
Other Oper. Income / Avg. Assets, %	0.41	0.48	0.48	0.26	0.26	0.40
NIRA Decomposition:						
Earning Assets / Total Assets, %	94.38	91.52	92.46	95.80	95.53	91.13
Interest Bearing Liabilities / Earning Assets, %	89.58	94.81	98.49	87.55	94.25	96.06
Interest Income / Avg. Earning Assets, %	4.27	3.75	4.41	4.43	4.37	5.20
Interest Expense / Avg. Interest Bearing Liabilities, %	3.64	2.39	2.93	3.37	1.88	2.64
Additional Info:						
Impaired loans / Gross loans , %	2.78	4.52	6.71	6.49	3.41	6.38
Customer deposits / Total Funding, %	22.25	52.02	52.87	12.33	78.91	65.41
Loans / Total Assets, %	43.21	45.90	48.46	51.49	60.43	55.59
Employees per bln Assets	76.10	125.42	160.89	84.11	237.77	211.14
Total Assets, € bln	28.56	6.22	28.11	3.30	0.28	1.14
Loans, € bln	12.70	2.86	13.47	2.07	0.17	0.54
Number of employees, th.	1.66	1.01	4.66	0.30	0.10	0.38

Table 2.B – Western Europe, whole period 2001-2015

	Weighted Mean			Median		
	DBs	POBs	SOBs	DBs	POBs	SOBs
ROE and ROE Decomposition:						
ROE (= Net Income / Avg. Equity), %	6.53	6.35	1.15	5.06	4.23	4.62
ROA (= Net Income / Avg. Assets), %	0.37	0.30	0.02	0.30	0.33	0.42
Equity/TotalAssets, %	7.22	5.17	4.46	9.92	7.89	8.16
ROA Decomposition:						
Tax Efficiency (= Net Income / Profit before Taxes), %	83.28	77.49	69.64	87.72	69.08	78.78
Incidence of Non-Oper. Inc. (= Profit before Taxes / Oper. Profit), %	114.61	102.54	101.59	100.00	100.00	100.00
Oper. Profitability (=Operating Profit / Avg. Assets), %	0.42	0.42	0.10	0.48	0.60	0.61
Operating Profitability Decomposition:						
Impairment / Pre-Impaiment Oper. Profit, %	21.95	39.49	52.49	25.54	27.32	16.27
Cost-to-Income (= Oper. Expenses / Oper. Revenues), %	52.21	67.11	70.87	46.30	70.55	64.51
Asset Utilization (= Oper. Revenues / Avg. Assets), %	1.49	2.36	1.76	1.77	3.19	2.12
Asset Utilization Decomposition:						
NIRA (= Net Interest Revenues / Avg. Assets), %	0.73	1.27	0.98	0.90	2.25	1.40
Fees and Commissions / Avg. Assets, %	0.06	0.64	0.29	0.10	0.65	0.42
Other Oper. Income / Avg. Assets, %	0.38	0.44	0.38	0.13	0.21	0.19
NIRA Decomposition:						
Earning Assets / Total Assets, %	94.25	91.66	93.26	96.68	96.01	94.49
Interest Bearing Liabilities / Earning Assets, %	89.38	94.72	98.38	87.68	94.20	94.77
Interest Income / Avg. Earning Assets, %	3.88	3.59	3.59	3.94	4.11	3.53
Interest Expense / Avg. Interest Bearing Liabilities, %	3.43	2.32	2.62	3.33	1.73	1.85
Additional Info:						
Impaired loans / Gross loans , %	2.76	4.42	6.80	4.32	3.13	3.43
Customer deposits / Total Funding, %	26.63	51.51	49.63	11.64	81.40	65.10
Loans / Total Assets, %	39.67	45.61	46.41	53.48	61.89	54.66
Employees per bln Assets	57.17	109.65	68.51	47.51	218.26	68.48
Total Assets, € bln	34.50	7.77	44.89	4.90	0.36	2.82
Loans, € bln	14.43	3.55	20.89	3.39	0.22	1.39
Number of employees, th.	1.51	1.01	3.11	0.24	0.09	0.23

Table 2.C – Eastern Europe, whole period 2001-2015

	Weighted Mean			Median		
	DBs	POBs	SOBs	DBs	POBs	SOBs
ROE and ROE Decomposition:						
ROE (= Net Income / Avg. Equity), %	1.89	9.80	12.42	3.61	5.64	4.50
ROA (= Net Income / Avg. Assets), %	0.52	1.18	1.34	0.80	0.94	0.58
Equity/TotalAssets, %	18.06	12.23	10.91	19.24	16.09	13.24
ROA Decomposition:						
Tax Efficiency (= Net Income / Profit before Taxes), %	84.21	82.13	75.63	80.07	75.67	82.85
Incidence of Non-Oper. Inc. (= Profit before Taxes / Oper. Profit), %	99.86	103.27	104.04	100.00	100.00	100.00
Oper. Profitability (=Operating Profit / Avg. Assets), %	0.68	1.44	1.73	1.01	1.32	0.93
Operating Profitability Decomposition:						
Impairment / Pre-Impaiment Oper. Profit, %	71.70	44.10	44.35	44.35	36.04	39.69
Cost-to-Income (= Oper. Expenses / Oper. Revenues), %	48.98	58.67	52.63	54.15	79.29	68.70
Asset Utilization (= Oper. Revenues / Avg. Assets), %	5.00	7.01	6.21	4.06	12.07	5.99
Asset Utilization Decomposition:						
NIRA (= Net Interest Revenues / Avg. Assets), %	3.11	3.99	4.11	3.15	4.80	3.68
Fees and Commissions / Avg. Assets, %	0.36	1.11	0.98	0.23	0.99	0.97
Other Oper. Income / Avg. Assets, %	1.56	1.82	1.12	0.74	5.35	1.14
NIRA Decomposition:						
Earning Assets / Total Assets, %	91.74	86.27	86.98	92.90	84.60	84.13
Interest Bearing Liabilities / Earning Assets, %	87.41	98.06	99.19	84.47	95.23	98.18
Interest Income / Avg. Earning Assets, %	8.20	9.63	10.05	5.84	11.21	8.76
Interest Expense / Avg. Interest Bearing Liabilities, %	5.06	4.83	5.05	3.43	5.00	3.84
Additional Info:						
Impaired loans / Gross loans , %	10.99	8.13	6.10	12.81	4.40	12.04
Customer deposits / Total Funding, %	33.29	70.61	75.08	21.67	57.23	65.55
Loans / Total Assets, %	56.40	56.44	62.54	46.78	55.39	56.15
Employees per bln Assets	496.42	736.33	802.86	280.06	1546.15	962.92
Total Assets, € bln	4.38	0.71	6.74	2.21	0.08	0.46
Loans, € bln	2.44	0.40	4.17	0.79	0.04	0.17
Number of employees, th.	2.27	0.99	6.95	0.33	0.24	0.52

Table 2.D – All countries, sub-period 2001-2007

	Weighted Mean			Median		
	DBs	POBs	SOBs	DBs	POBs	SOBs
ROE and ROE Decomposition:						
ROE (= Net Income / Avg. Equity), %	5.70	12.73	6.31	5.74	5.95	6.48
ROA (= Net Income / Avg. Assets), %	0.44	0.59	0.36	0.60	0.44	0.74
Equity/TotalAssets, %	7.97	4.81	4.07	10.98	7.43	10.30
ROA Decomposition:						
Tax Efficiency (= Net Income / Profit before Taxes), %	82.38	74.81	75.65	81.53	68.56	77.55
Incidence of Non-Oper. Inc. (= Profit before Taxes / Oper. Profit), %	125.03	105.73	102.51	100.00	100.00	100.00
Oper. Profitability (=Operating Profit / Avg. Assets), %	0.52	0.76	0.50	0.80	0.74	1.01
Operating Profitability Decomposition:						
Impairment / Pre-Impaiment Oper. Profit, %	13.28	21.41	27.69	18.94	32.15	20.10
Cost-to-Income (= Oper. Expenses / Oper. Revenues), %	45.59	63.92	65.36	45.11	68.10	61.87
Asset Utilization (= Oper. Revenues / Avg. Assets), %	1.51	2.69	2.08	2.55	3.69	3.98
Asset Utilization Decomposition:						
NIRA (= Net Interest Revenues / Avg. Assets), %	0.79	1.40	1.24	1.57	2.68	2.39
Fees and Commissions / Avg. Assets, %	0.08	0.80	0.36	0.15	0.70	0.77
Other Oper. Income / Avg. Assets, %	0.37	0.49	0.32	0.24	0.24	0.37
NIRA Decomposition:						
Earning Assets / Total Assets, %	90.80	91.44	95.63	95.60	95.21	93.57
Interest Bearing Liabilities / Earning Assets, %	89.09	93.24	96.07	88.38	95.37	92.20
Interest Income / Avg. Earning Assets, %	5.04	4.72	5.55	5.29	5.33	5.64
Interest Expense / Avg. Interest Bearing Liabilities, %	4.29	3.45	4.21	4.23	2.65	3.48
Additional Info:						
Impaired loans / Gross loans , %	2.93	2.34	3.32	3.38	2.05	4.11
Customer deposits / Total Funding, %	24.88	48.81	37.83	7.85	75.13	60.90
Loans / Total Assets, %	36.53	44.53	45.95	53.02	62.48	51.84
Employees per bln Assets	61.18	137.36	167.83	76.95	269.82	197.85
Total Assets, € bln	24.45	5.98	19.40	1.96	0.28	0.92
Loans, € bln	9.50	2.65	8.96	1.32	0.18	0.34
Number of employees, th.	1.25	1.03	4.68	0.20	0.10	0.38

Table 2.E – All countries, sub-period 2008-2015

	Weighted Mean			Median		
	DBs	POBs	SOBs	DBs	POBs	SOBs
ROE and ROE Decomposition:						
ROE (= Net Income / Avg. Equity), %	5.86	2.95	1.95	4.06	3.93	4.04
ROA (= Net Income / Avg. Assets), %	0.40	0.17	0.17	0.39	0.34	0.43
Equity/TotalAssets, %	8.99	5.37	5.48	12.86	9.04	10.36
ROA Decomposition:						
Tax Efficiency (= Net Income / Profit before Taxes), %	82.68	79.35	71.67	85.55	70.85	81.28
Incidence of Non-Oper. Inc. (= Profit before Taxes / Oper. Profit), %	111.15	100.10	99.83	100.00	100.00	100.00
Oper. Profitability (=Operating Profit / Avg. Assets), %	0.45	0.28	0.28	0.53	0.66	0.62
Operating Profitability Decomposition:						
Impairment / Pre-Impaiment Oper. Profit, %	23.22	41.61	56.00	25.11	22.38	23.09
Cost-to-Income (= Oper. Expenses / Oper. Revenues), %	48.24	69.98	67.88	50.86	72.43	66.77
Asset Utilization (= Oper. Revenues / Avg. Assets), %	1.66	2.30	2.33	2.63	3.28	3.54
Asset Utilization Decomposition:						
NIRA (= Net Interest Revenues / Avg. Assets), %	0.87	1.30	1.39	1.51	2.26	2.15
Fees and Commissions / Avg. Assets, %	0.07	0.58	0.38	0.13	0.66	0.60
Other Oper. Income / Avg. Assets, %	0.42	0.40	0.49	0.27	0.26	0.39
NIRA Decomposition:						
Earning Assets / Total Assets, %	95.15	91.81	92.30	95.82	95.74	90.24
Interest Bearing Liabilities / Earning Assets, %	90.11	95.50	98.74	87.09	93.78	96.74
Interest Income / Avg. Earning Assets, %	3.98	3.32	4.39	3.80	3.92	4.90
Interest Expense / Avg. Interest Bearing Liabilities, %	3.28	1.96	2.87	2.79	1.55	2.22
Additional Info:						
Impaired loans / Gross loans , %	2.78	4.98	6.65	6.01	3.45	5.86
Customer deposits / Total Funding, %	21.48	52.91	54.36	14.79	80.04	65.67
Loans / Total Assets, %	43.21	45.64	50.01	47.83	60.26	57.74
Employees per bln Assets	74.73	112.88	147.35	85.00	222.62	210.46
Total Assets, € bln	31.73	7.42	29.60	3.79	0.31	1.29
Loans, € bln	14.23	3.38	14.85	2.22	0.19	0.57
Number of employees, th.	1.92	1.07	4.86	0.29	0.11	0.38

Within the whole sample (Table 2.A), average ROE of DBs is about 5.9%, only 0.5 percentage points lower than for POBs, as a result of a slightly higher ROA but also lower levels of leverage (i.e. higher capitalization). When looking at the ROA decomposition, both the tax component and the incidence of non-operating income contribute to explain the relatively good performance of DBs with respect to other financial institutions. However, descriptive statistics confirm the good behavior of DBs even without these contributions. Indeed, operating profitability (i.e. operating profit before taxes, divided by total assets) among DBs is nearly 0.5%, still in line with that of POBs. This is mainly due to significantly higher cost efficiency (measured by the cost-to-income ratio) and lower incidence of provisions for loan losses (measured by the ratio of impairment over pre-impairment operating profit), while asset utilization (net operating revenues divided by total assets) is always lower than for POBs.

DBs have a larger average size than POBs in terms of total assets, but a significantly lower number of employees per asset volume. This contributes to explain their higher cost efficiency. Descriptive statistics also confirm that DBs are characterized by better asset quality, measured by the impaired loans to gross loans ratio. By contrast, the relatively lower asset utilization of DBs reflects both lower net fees and commissions and lower net interest margin. The latter seems to be mainly due to higher interest expenses over interest bearing liabilities, probably reflecting the different composition of DBs' funding, that scarcely relies on short-term retail deposits and is mainly based on long-term securities issued on international capital markets. Indeed, available observations confirm that the weight of retail funding on the overall funding activity is much lower for DBs (22.25%) than for SOBs (52.87%) and POBs (52.02%).

We also provide separate results for Western Europe (Table 2.B) and Eastern Europe (Table 2.C), in order to assess whether previous evidences are confirmed across

countries that are significantly different in terms of their institutional characteristics and their level of economic and financial development. The Western countries are those mainly influencing the whole sample since they have by far the largest number of banks (3,722 banks and 40,784 bank-year observations, corresponding to 83.4% of the total). Interestingly, when we focus on Eastern European countries, we find more evident underperformance of DBs with respect to POBs in terms of operating profitability. Indeed, in Eastern Europe the operating profitability of DBs is lower than among POBs and SOBs, due to a lower asset utilization and a higher incidence of provisions for loan losses that are not sufficiently compensated by a lower cost-to-income ratio as in Western Europe.

Finally, we are interested to assess whether performance differences between DBs and other financial institutions are stable over time or they differ across the business cycle. We start by assessing the financial performances of European DBs and other financial institutions within two main sub-periods: the pre-crisis years 2001-2007 (Table 2.D) and the crisis and post-crisis years 2008-2015 (Table 2.E). On average, DBs have a lower operating profitability than POBs before the crisis, but a higher profitability in the aftermath of the crisis, revealing much higher resilience to the crisis. The higher resilience of DBs is mainly explained by the lower relative increase of provisions for loan losses since 2008. Indeed, descriptive statistics confirm the better asset quality of DBs even after the crisis, when the average value of impaired loans over gross loans remains lower than 3% for DBs, while it increases to almost 5% for POBs and more than 6.6% for SOBs. As far as SOBs are concerned, inspection of individual data suggests that the low quality of their loan portfolios is likely burdened by non-performing loans of private banks rescued and nationalized after the crisis for

restructuring purposes, such as Dexia Credit Local, Royal Bank of Scotland, Piraeus Bank and Caixa.

Comparisons based on operating profitability tend to be more explanatory than those based on ROA and ROE since they are not affected by considerations on tax efficiency and non-operating profits. Operating profitability is also better equipped than ROE for a cross-country analysis of banks since it is not affected by differences in levels of capitalization and leverage that are possibly relevant across countries (Athanasoglou, Brissimis, & Delis, 2008; Rivard & Thomas, 1997). For this reason, the empirical analysis of the next sections will focus on operating profitability and its decomposition into three main components: (a) net operating revenues, (b) overheads and (c) loans and securities impairment charges. Figure 2 shows the different behavior over time of these items, normalized by total assets, with respect to the aggregate banking system (i.e. considering all bank-year observations). For each year t of the investigation period, Figure 2 shows the annual weighted average of each ratio, with weights assigned based on total assets at time $t-1$. The GDP growth of the EU-28 is taken as a reference for the business cycle in Europe.

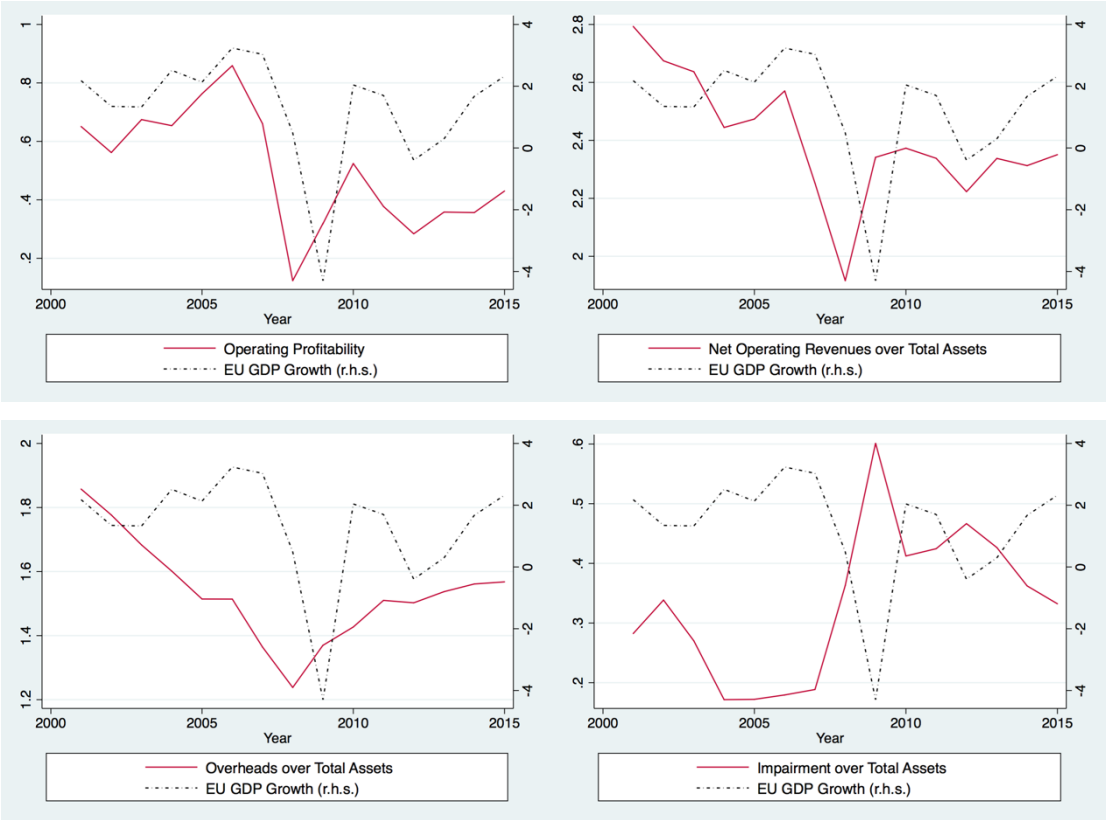

Figure 2 – Operating profitability (and its main components) over the business cycle

Considering the whole banking system as represented in our sample, we find, as expected, that economic growth is positively correlated with operating profitability and net operating revenues (as a percentage of total assets) and negatively correlated with impairment of assets. Overheads are relatively slow to adjust across the business cycle, so their percentage over total assets tend to decrease before the crisis (when assets growth is high) and to increase after the crisis (when assets growth abruptly declines).

The analysis on bank performances can also be accompanied by a focus on the development of quantities and prices. Figure 3 shows the behavior across the business cycle of assets and loans growth (the quantities) and of the interest rate charged by banks (the price), proxied by the ratio of interest income over earning assets. The annual growth rate of assets and loans is higher than 10% in the years preceding the crisis, but it almost falls to zero since 2009 and struggles to recover when the GDP starts to grow

again. At the same time, available data reveal a progressive and continuous decrease of active interest rates that is perfectly in line with the expansionary monetary policies that central banks implemented after the global financial crisis.

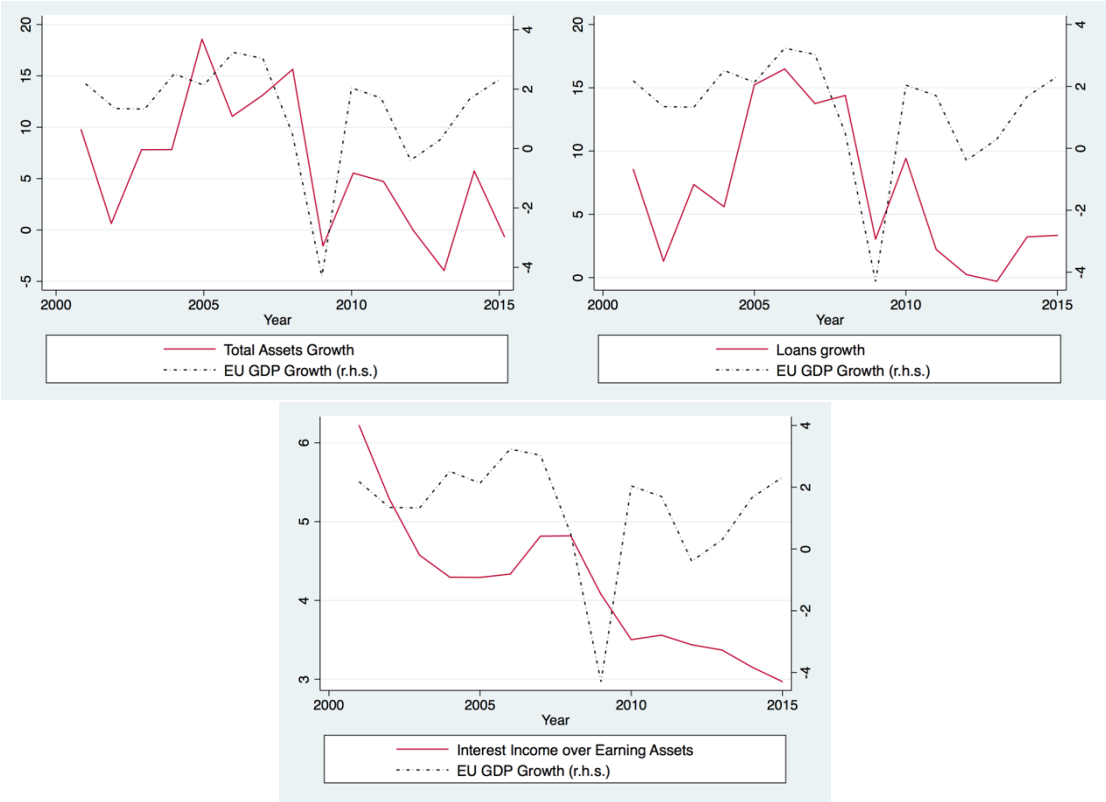

Figure 3 – Assets and Loans Growth over the business cycle

It is just against these aggregate behaviors of the banking system that we want to differentiate the performances of the DBs across the business cycle. Unfortunately, descriptive statistics are inevitably influenced by the fact that observations by cluster are differently distributed with respect to countries and years. In fact, it may happen that a cluster is favored by a greater concentration of observations in countries and years with greater profitability of the whole banking system. Therefore, in the next section we move away from descriptive statistics and focus on econometrics with the aim to better disentangle the performances of the DBs from those of SOBs and POBs, as well

as their different behavior with respect to the business and electoral cycles.

4.3 Models

In order to meet the aim of this study, the first step of our econometric analysis is dedicated to quantifying the difference in financial performances between development banks and the rest of the banking industry, also distinguishing among the main components of profitability. Following this preliminary analysis, we move on to investigate the different reactions of development banks and other financial institutions to periods of economic and political change. In particular, in line with Micco et al. (2007), we want to test the null hypothesis that differentials in performance between development banks and commercial banks are not affected by business and electoral cycles.[15] The rejection of the null hypothesis, together with the type and sign of the deviations, may contribute to signal the virtuous or vicious behavior of development banks compared to that of the main banking industry.

Within this analysis, we are therefore interested in making two further distinctions. Firstly, we want to understand if, and how, the main results differ depending on the geographical area of reference, distinguishing Western Europe and Eastern Europe. This is relevant since we expect institutional variables to play an important role in the financial attitude of development banks. Secondly, we separately investigate the behavior of commercial state-owned banks (SOBs) in order to provide an additional specific benchmark for development banks (DBs) in addition to the more general comparison with private-owned banks (POBs).

According to this logical framework, we start by introducing a baseline regression

[15] Differently from Micco et al. (2007), who focus on the comparison between private-owned, state-owned, and foreign-owned banks, this paper introduces a specific focus on development banks.

model with the aim to compare DBs' performances with the rest of the banking industry. Our baseline model is the following:

$$PERF_{i,c,t} = \alpha \cdot DB_{ict} + \beta \cdot SOB_{ict} + X'_{ict}\delta + \theta_{ct} + \varepsilon_{ict}$$

where DB_{ict} and SOB_{ict} are dummy variables that take value one if in year t bank i is a development bank or a state-owned bank respectively. Since POBs is the omitted cluster, the coefficients α and β represent the difference in performance of development banks and commercial state-owned banks with respect to commercial private banks. Following Micco et al. (2007), the model also incorporates a set of dummies for country-year (θ_{ct}) specific effects that permits us to compare the 'conditional' mean of performances across the clusters (DBs, POBs, and SOBs), after controlling for unobserved country characteristics that are allowed to vary over time.

In line with the existing empirical literature (e.g. Molyneux & Thornton, 1992), we include in our regressions other time-variant bank-specific characteristics, represented by matrix X'_{ict}. In our main model specification, matrix X'_{ict} includes two variables targeted at capturing size (lagged logarithm of total assets) and capitalization (lagged equity-to-assets ratio) of bank i at time t. Bank size may result to be positively related to profitability, due to economy of scale, better diversification opportunities, and the lower cost of funding of larger banks compared with smaller banks (Berger et al., 2005; Bikker & Hu, 2002; Demirguc-Kunt & Huizinga, 1999; Goddard, Molyneux & Wilson, 2004). Capitalization is also assumed to positively affect profitability, since a higher capital buffer reduces the probability of financial distress resulting in a lower cost of funding. Moreover, banks with relatively high capital should have lower incentives to make high-risk loans that are possibly associated to higher potential returns but also higher probability of default and losses (Dermirguc-Kunt & Huizinga, 1999; Goddard et al., 2004; Keeton & Morris, 1987; Mehran & Thakor, 2011).

We prefer not to include other bank characteristics as regressors since these characteristics could in turn depend on the type of bank we are considering. Indeed, the objective of our estimations is to assess the profitability and self-sustainability of development banks with respect to their overall characteristics, and not after controlling for specific features that possibly distinguish the clusters (e.g. business model, asset composition, funding strategy).[16]

In addition, since we are mainly interested to compare the DBs group with banking industry at an aggregate level, we weight each bank-year observation by the bank's share of lagged total assets in the whole dataset within the same year, so that the weight for bank i at time t is given by $\frac{TA_{i,t-1}}{\sum_{j=1}^{N} TA_{j,t-1}}$. This weighting scheme assigns a higher weight to larger banks, which indeed have a greater influence on the actual aggregate performance of their own reference cluster. The same scheme has also the advantage to take into account the different number of observations in different years. Finally, it should produce more precise estimates if higher bank size is associated to lower measurement errors, as suggested in Micco et al. (2007) and Yeyati and Micco (2003).

Finally, standard errors from the pooled OLS estimation are corrected for clustering on banks, since error ε_{ict} is likely to be correlated over time for a given bank i.

To sum up, this first step is useful in order to assess how development banks differ from commercial banks in terms of profitability and efficiency. The same analysis may also give some relevant indication to evaluate whether state-owned banks can be treated as a unique entity or, by contrast, development banks are different from commercial state-owned banks not only in terms of their mission, but also in terms of financial

[16] Similarly, Mian (2003) do not control for bank characteristics when comparing performances across ownership groups (private domestic banks, foreign banks, and government banks).

ratios.

Next, as mentioned above, we introduce a second specification model in order to investigate the differentials in banks' performances over the business and electoral cycles and to understand whether DBs' performances are more or less resilient to recessions and political considerations.

To this aim, we estimate the following equation:

$$PERF_{i,c,t} = DB_{ict} \cdot (\alpha_1 + \alpha_2 \cdot Growth_{ct} + \alpha_3 \cdot Elect_{ct})$$

$$+SOB_{ict} \cdot (\beta_1 + \beta_2 \cdot Growth_{ct} + \beta_3 \cdot Elect_{ct}) + X'_{ict}\delta + \theta_{ct} + \varepsilon_{ict}$$

where $Growth_{ct}$ measures real GDP growth in country c and year t, and $Elect_{ct}$ is a dummy variable that takes value one when elections take place at time t in country c.[17] The effect of economic growth and elections on POBs is captured by the country-year fixed effect θ_{ct}. As already clarified in Micco et al. (2007), the inclusion of country-year fixed effects prevent us from measuring the aggregate effects of specific country-year events (GDP growth and political elections) on the banking system as a whole, but it has the desirable advantage to compare the differential effects on DBs and other financial institutions after reducing biases possibly due to omitted macroeconomic and regulatory variables (inflation, changes in exchange rates, fiscal and monetary policies, etc.). In addition, in this second stage of analysis, it is also possible to replicate the regression estimates after including bank fixed effects γ_i in order to control for unobserved bank characteristics and their different distribution across countries and years.

[17] As in Micco et al. (2007), we refer alternatively to presidential or legislative elections depending respectively on the presidential or parliamentary form of government prevailing at the national level.

Given the above, the coefficients α_2 and α_3 on the interaction terms ($DB_{ict} \cdot Growth_{ct}$ and $DB_{ict} \cdot Elect_{ct}$) are those of main interest for this analysis, since they measure the differential effect of economic growth and electoral years on the performances of DBs. Negative values of α_2 in the (operating) profitability regression would signal lower sensitivity of DBs to economic fluctuations with respect to commercial banks, and *vice versa*. This lower sensitivity may have several explanations. On the one hand, it may be attributed to higher resilience to crises, due to better asset quality and lower impairment when the economy declines (positive value of α_2 in the impairment regression, signaling provisions falling relatively less when GDP growth goes up, and raising relatively less when GDP growth goes down). On the other hand, it may be attributed to a pro-cyclical role of DBs, granting loans at relatively higher interest rates and making investments with relatively higher expected returns when the economy slows down (negative value of α_2 in the net operating revenues regression). At the same time, negative values of α_3 in the profitability and net revenues regressions would justify a political view of development banks, as well as positive values in the overheads regression.

The coefficients β_2 and β_3 have a corresponding meaning for SOBs and allow to understand whether the two clusters (DBs and SOBs) have a similar behavior or, by contrast, it is preferable to treat them as completely separate entities despite the common influence of the public sector.

Once again, standard errors are corrected for clustering on banks.

5. Empirical results

5.1 Ownership and performance

In Table 3.A, we show the results obtained from our baseline estimations, based on

the time interval 2000-2015. For each dependent variable, three columns are shown referring respectively to the whole sample (WH), the Western Europe sub-sample (WE) and the Eastern Europe sub-sample (EE).

The coefficients on the control variables are broadly in line with the previous literature on the determinants of banks' performances. The effect on profitability of bank capitalization, $(Equity/TotAss)_{t-1}$, is positive as expected with very small differences across the two European regions. At the same time, the coefficients on $Ln(TotAss)_{t-1}$ signal that an increase in the bank size is positively related to its profitability within the Eastern Europe sub-sample, where larger size positively affects cost efficiency more than compensating for a relatively lower asset utilization. By contrast, in Western Europe an increase in bank size is accompanied by both lower asset utilization and higher levels of the overheads over total assets, but the negative impact on profitability remains small in absolute value.

Now, let's focus our attention on the significance of the coefficients related to the DB dummy. When looking at operating profitability, the coefficient on DB is significantly lower than zero, revealing lower profitability of development banks with respect to private commercial banks. However, when splitting the sample by geographical area, we find that the difference is significant and economically relevant (more than 1 percentage point) only in Eastern Europe. Even in Western Europe, where DBs' profitability is similar to that of POBs, ROA decomposition reveals completely different characteristics leading to this final evidence. When looking at the asset utilization (net operating revenues over total assets), DBs perform worse than POBs by about 1.2 percentage points. The difference between DBs and POBs increase to almost 3 percentage points when considering only Eastern Europe. This underperformance in terms of asset utilization is offset in large part by the higher cost-efficiency (lower

overheads over total assets) of DBs with respect to commercial banks. The lower profitability of DBs in Eastern Europe is also explained by higher levels of impairment over total assets with respect to the POBs.

Interestingly, regressions by sub-period (Table 3.B and Table 3.C) reveal that in Western Europe DBs are less profitable than POBs before 2008, but they become as profitable as POBs after the global financial crisis. By contrast, DBs in Eastern Europe are significantly more affected by the crisis since they suffer a higher increase than POBs in the level of the impairment over total assets. This increases their underperformance with respect to POBs.

Our results also suggest that commercial state-owned banks (SOBs) are less profitable than their private benchmarks, but the difference is very small (about 0.1 percentage points). These findings are in line with recent literature on state-owned enterprises suggesting that contemporary government-led enterprises are increasingly more market oriented compared to the past and they find themselves competing more and more with private enterprises (Aivazian, Ge, & Qiu, 2005; Birch, 1988; Bozec & Breton, 2003; Florio, 2014; Levesque, 2003). International development banks, in particular, have been induced to progressively accept greater transparency and accountability enabling the citizens to evaluate their actions and performances (Nelson, 2001). At the same time, the relative underperformance of SOBs with respect to POBs is more stable than that of DBs. Indeed, as a consequence of the crisis, the underperformance of SOBs does not disappear as for DBs in Western Europe nor does it increase as for DBs in Eastern Europe. This may be consistent with the fact that commercial state-owned banks in Europe do not have a developmental role as DBs and they increasingly behave as private banks independently from the business cycle.

These results recognize that state-owned banks are not a monolith and, in particular,

that development banks have specific features and operate in a way not completely examined in the extant literature. Moreover, development banks behave differently within different countries, probably depending on institutional factors and financial development exerting a significant influence on their business model, their market orientation, and their risk propensity.

Table 3.A – Baseline regressions

	Operating Profitability			Impairment over Total Assets			Overheads over Total Assets			Net Op.Rev over Total Assets		
	WH	WE	EE	WH	WE	EE	WH	WE	EE	WH	WE	EE
DBs	-0.20**	-0.16	-1.19***	-0.10	-0.13	0.48*	-0.89***	-0.83***	-2.34***	-1.19***	-1.12***	-2.97***
	[0.10]	[0.10]	[0.24]	[0.08]	[0.09]	[0.26]	[0.20]	[0.19]	[0.39]	[0.15]	[0.14]	[0.53]
SOBs	-0.08*	-0.11***	-0.19	-0.04	-0.03	-0.07	-0.54***	-0.52***	-0.18	-0.60***	-0.59***	-0.63
	[0.04]	[0.04]	[0.20]	[0.03]	[0.03]	[0.12]	[0.13]	[0.13]	[0.51]	[0.13]	[0.14]	[0.45]
$Ln(TotAss)_{t-1}$	-0.02***	-0.02***	0.17***	-0.02***	-0.02***	0.01	-0.09***	-0.07***	-0.52***	-0.12***	-0.11***	-0.30**
	[0.01]	[0.01]	[0.06]	[0.01]	[0.01]	[0.03]	[0.02]	[0.02]	[0.12]	[0.02]	[0.02]	[0.12]
$(Equity/Ass)_{t-1}$	0.05***	0.06***	0.05***	0.01**	0.01	0.00	0.05***	0.06***	0.02	0.12***	0.13***	0.09***
	[0.00]	[0.00]	[0.01]	[0.00]	[0.00]	[0.01]	[0.01]	[0.01]	[0.02]	[0.01]	[0.01]	[0.02]
Country-Year effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	48,913	40,784	8,024	46,070	39,858	6,123	48,913	40,784	8,024	48,913	40,784	8,024
r2	0.60	0.57	0.56	0.62	0.59	0.56	0.39	0.32	0.28	0.56	0.44	0.36

Notes: Cluster-robust standard errors in brackets. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3.B – Baseline regressions: Pre-crisis Period (2001-2007)

	Operating Profitability			Impairment over Total Assets			Overheads over Total Assets			Net Op.Rev over Total Assets		
	WH	WE	EE	WH	WE	EE	WH	WE	EE	WH	WE	EE
DBs	-0.35***	-0.34***	-0.52	-0.02	-0.02	0.04	-0.95***	-0.93***	-2.18***	-1.30***	-1.26***	-2.99***
	[0.09]	[0.09]	[0.36]	[0.06]	[0.06]	[0.17]	[0.21]	[0.21]	[0.36]	[0.16]	[0.16]	[0.48]
SOBs	-0.10**	-0.10**	-0.43	-0.05	-0.07*	0.32	-0.81***	-0.84***	-0.33	-0.90***	-0.93***	-0.75
	[0.05]	[0.05]	[0.30]	[0.04]	[0.04]	[0.19]	[0.15]	[0.15]	[0.48]	[0.15]	[0.16]	[0.46]
$Ln(TotAss)_{t-1}$	0.01	0.00	0.26***	-0.05***	-0.05***	-0.05	-0.07**	-0.07**	0.10	-0.11***	-0.11***	0.33***
	[0.01]	[0.01]	[0.07]	[0.01]	[0.01]	[0.05]	[0.03]	[0.03]	[0.13]	[0.03]	[0.03]	[0.11]
$(Equity/Ass)_{t-1}$	0.07***	0.07***	0.05***	-0.00	-0.00	0.01	0.05***	0.06***	0.02	0.13***	0.13***	0.12***
	[0.01]	[0.00]	[0.01]	[0.00]	[0.00]	[0.01]	[0.01]	[0.02]	[0.03]	[0.01]	[0.02]	[0.03]
Country-Year effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	17,111	15,285	1,783	16,540	14,795	1,706	17,111	15,285	1,783	17,111	15,285	1,783
r2	0.67	0.62	0.65	0.38	0.35	0.36	0.57	0.50	0.41	0.68	0.60	0.63

Notes: Cluster-robust standard errors in brackets. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3.C – Baseline regressions: Post-crisis Period (2008-2015)

	Operating Profitability			Impairment over Total Assets			Overheads over Total Assets			Net Op.Rev over Total Assets		
	WH	WE	EE	WH	WE	EE	WH	WE	EE	WH	WE	EE
DBs	-0.08	-0.00	-1.35***	-0.17	-0.23*	0.56*	-0.85***	-0.75***	-2.27***	-1.10***	-1.01***	-2.80***
	[0.12]	[0.11]	[0.28]	[0.12]	[0.12]	[0.34]	[0.21]	[0.20]	[0.44]	[0.19]	[0.18]	[0.65]
SOBs	-0.08	-0.13**	-0.14	-0.02	0.00	-0.18	-0.35***	-0.29**	-0.05	-0.40***	-0.35**	-0.52
	[0.07]	[0.05]	[0.20]	[0.04]	[0.04]	[0.14]	[0.13]	[0.14]	[0.55]	[0.15]	[0.16]	[0.49]
$Ln(TotAss)_{t-1}$	-0.03***	-0.04***	0.16**	0.00	0.01	0.03	-0.10***	-0.07***	-0.66***	-0.13***	-0.11***	-0.44***
	[0.01]	[0.01]	[0.06]	[0.01]	[0.01]	[0.04]	[0.02]	[0.02]	[0.12]	[0.02]	[0.02]	[0.13]
$(Equity/Ass)_{t-1}$	0.04***	0.05***	0.05***	0.02***	0.02***	-0.00	0.06***	0.07***	0.04**	0.11***	0.13***	0.08***
	[0.01]	[0.01]	[0.01]	[0.00]	[0.01]	[0.01]	[0.01]	[0.02]	[0.02]	[0.01]	[0.02]	[0.03]
Country-Year effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	31,802	25,499	6,241	29,530	25,063	4,417	31,802	25,499	6,241	31,802	25,499	6,241
r2	0.51	0.48	0.48	0.67	0.65	0.57	0.31	0.22	0.28	0.48	0.32	0.28

Notes: Cluster-robust standard errors in brackets. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5.2 The role of business cycle and politics

The previous section showed that DBs in Western Europe are less profitable than POBs before the crisis, while their performances become similar since 2008. By contrast, the underperformance of DBs in Eastern Europe significantly expands after the crisis. This section specifically analyzes how the performances of DBs and other financial institutions react to periods of economic and political change, to test whether the behavior of DBs is more consistent with the reasons underlying the political or the industrial view. To this aim, we estimate the regression coefficients of the second linear model presented in Section 4.3.

As mentioned above, the inclusion of country-year fixed effects prevents us from measuring the aggregate effects of specific country-year events (GDP growth and political elections) on the performances of POBs, i.e. the omitted cluster that serves as a benchmark for our analysis. Before estimating the coefficients of our main regression model, we estimated the coefficients of a simplified equation without country-year effects and limited to the POBs subsample. In this way, we can have a better idea of the behavior of commercial private banks over the cycles, before commenting on the deviations of DBs and SOBs from the benchmark. In line with the evidences of Figures 2 and 3 in Section 4.2, these support estimates (see Appendix) confirm that the operating profitability of POBs has a significant positive correlation with GDP growth, as well as their assets and loans growth. Impairment over total assets is the component that contributes the most to the strong correlation between profitability and GDP growth. At the same time, elections do not affect profitability and assets growth of commercial private banks in Western Europe, but they are associated with lower profitability (by about 0.2 percentage points) and lower loans growth (by about 3.8 percentage points) in Eastern Europe. This may signal negative effects of political

instability on economic activity, also involving the banking system.

Taking this into consideration, we can interpret the next estimations as deviations of DBs and SOBs from the behavior of private commercial banks. Results reported in Table 4 reveal that DBs have lower sensitivity than POBs to economic fluctuations in terms of their profitability, as indicated by the significant and negative coefficient on the interaction term $DB_{ict} \cdot Growth_{ct}$. This lower sensitivity can be attributed to the relatively higher resilience of Western DBs to the economic decline, as suggested by the negative coefficient on the same interaction term when considering the impairment regression. When GDP growth declines, impairment and provisioning of DBs rise relatively less than in POBs. By contrast, the lower sensitivity to the business cycle seems not to be justified by a pro-cyclical role of DBs, since this would suggest a significant negative coefficient on the interaction term $DB_{ict} \cdot Growth_{ct}$ in the net operating revenues regression. This is not the case. At the same time, non-negative coefficients on the interaction term $DB_{ict} \cdot Elect_{ct}$ in the profitability and net revenues regressions (as well as non-significant coefficients in the overheads regression) do not provide support for a political view of development banks.

When considering the different geographical areas, we find that the lower sensitivity of DBs to economic fluctuations is not confirmed in Eastern Europe. In this area the underperformance of DBs (as suggested by the significant and negative coefficient on DB_{ict}) remains stable over the business cycle (the coefficient on the interaction term $DB_{ict} \cdot Growth_{ct}$ is equal to zero). By contrast, in Western Europe, DBs perform better than POBs in periods of recession, and in particular, when GDP growth is lower than -1.3% (= -0.11/0.08).

Table 4 – Bank Performances and Interactions with GDP Growth and Electoral Years

	Operating Profitability			Impairment over Total Assets			Overheads over Total Assets			Net Op.Rev over Total Assets		
	WH	WE	EE	WH	WE	EE	WH	WE	EE	WH	WE	EE
DBs	-0.16	-0.11	-1.21***	-0.14	-0.20**	0.58**	-0.94***	-0.91***	-2.23***	-1.20***	-1.17***	-2.79***
	[0.10]	[0.10]	[0.26]	[0.10]	[0.10]	[0.29]	[0.16]	[0.14]	[0.35]	[0.15]	[0.14]	[0.62]
DBs * GDP Growth	-0.07***	-0.08***	0.00	0.05**	0.07***	-0.02	-0.01	0.01	-0.04	-0.03	0.01	-0.12
	[0.02]	[0.02]	[0.03]	[0.02]	[0.02]	[0.03]	[0.02]	[0.01]	[0.04]	[0.04]	[0.02]	[0.13]
DBs * Elections	0.12*	0.09*	-0.15	-0.04	0.03	-0.27**	0.25	0.28	-0.35**	0.16	0.19*	-0.21
	[0.07]	[0.05]	[0.13]	[0.05]	[0.04]	[0.12]	[0.19]	[0.20]	[0.16]	[0.14]	[0.11]	[0.59]
SOBs	-0.12**	-0.10**	-0.35*	-0.03	-0.01	-0.03	-0.56***	-0.51***	-0.24	-0.63***	-0.54***	-0.85**
	[0.05]	[0.05]	[0.21]	[0.04]	[0.04]	[0.17]	[0.14]	[0.15]	[0.44]	[0.15]	[0.16]	[0.43]
SOBs * GDP Growth	0.02	-0.01	0.08***	-0.01	-0.02	-0.02	0.01	-0.01	0.05	0.02	-0.03	0.12***
	[0.01]	[0.02]	[0.02]	[0.01]	[0.01]	[0.02]	[0.02]	[0.02]	[0.04]	[0.02]	[0.02]	[0.04]
SOBs * Elections	0.05	0.02	-0.24***	0.03	0.01	0.08	0.06	0.02	-0.23*	0.04	-0.04	-0.33
	[0.04]	[0.04]	[0.08]	[0.03]	[0.03]	[0.11]	[0.07]	[0.08]	[0.14]	[0.11]	[0.12]	[0.20]
$Ln(TotAss)_{t-1}$	-0.02***	-0.02***	0.18***	-0.02***	-0.02***	0.01	-0.09***	-0.07***	-0.51***	-0.12***	-0.11***	-0.29**
	[0.01]	[0.01]	[0.06]	[0.01]	[0.01]	[0.03]	[0.02]	[0.02]	[0.12]	[0.02]	[0.02]	[0.12]
$(Equity/Ass)_{t-1}$	0.05***	0.06***	0.05***	0.01*	0.01	0.00	0.05***	0.06***	0.02	0.12***	0.13***	0.10***
	[0.00]	[0.00]	[0.01]	[0.00]	[0.00]	[0.01]	[0.01]	[0.01]	[0.02]	[0.01]	[0.01]	[0.02]
Country-Year effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	48,913	40,784	8,024	46,070	39,858	6,123	48,913	40,784	8,024	48,913	40,784	8,024
r2	0.60	0.58	0.57	0.63	0.59	0.56	0.39	0.32	0.29	0.56	0.44	0.37

Notes: Cluster-robust standard errors in brackets. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5 shows the results obtained from the same regression model after including bank fixed effects γ_i in order to control for all the time-invariant differences between DBs and POBs. Results of Table 4 are confirmed, but now the estimates also show a significant and negative coefficient on the interaction term $DB_{ict} \cdot Elect_{ct}$ in the profitability regression for Eastern Europe. This suggests that the political view of DBs may find some empirical support in this reference area.

Estimates from this regression model also confirm the different behavior of DBs and SOBs over the business and electoral cycles. In Western Europe, the profitability of SOBs as well as the profitability of DBs is not affected by elections, but it does not show the same resilience with respect to recession years. When the economy declines, SOBs behave similarly to POBs. In Eastern Europe, the profitability of SOBs is negatively affected by elections as well as the profitability of DBs, and it is even more sensitive to economic fluctuations.

Finally, the empirical analysis focuses on quantities and prices, by introducing assets and loans growth and the interest rate charged by banks (proxied by the ratio of interest income over earning assets) as dependent variables. Table 6 shows that, in Western Europe, assets and loans growth behave similarly across the cluster. By contrast, in Eastern Europe, DBs behave differently from both POBs and SOBs. On the one hand, they reveal a more countercyclical stance in terms of loans growth (a significant and negative coefficient on the interaction term $DB_{ict} \cdot Growth_{ct}$). On the other hand, it seems to confirm the significant role played by politics in the lending decisions of DBs (a significant and strongly positive coefficient on the interaction term $DB_{ict} \cdot Elections_{ct}$). Indeed, DBs in Eastern Europe increase their lending in election years, differently from private banks. These results are in line with those obtained from Dinc (2005) and Micco et al. (2007) for state-owned banks in emerging countries since their

lending stance is shown to become significantly more accommodating in election years. Interestingly, this behavior seems to be true for DBs but not any more for SOBs. Once again, this is consistent with the consideration that nowadays DBs represent just those state-owned banks where vices and virtues of state intervention can materialize more clearly. By contrast, commercial state-owned banks (SOBs) behave in an increasing similar way to commercial private-owned banks.

Table 5 – Bank Performances and Interactions with GDP Growth and Electoral Years – Bank-specific fixed effects

	Operating Profitability			Impairment over Total Assets			Overheads over Total Assets			Net Op.Rev over Total Assets		
	WH	WE	EE	WH	WE	EE	WH	WE	EE	WH	WE	EE
DBs	.	.	.	.	.	.	.	.	.	.	.	.
	[.]	[.]	[.]	[.]	[.]	[.]	[.]	[.]	[.]	[.]	[.]	[.]
DBs * GDP Growth	-0.03***	-0.03***	0.01	0.02	0.04***	-0.05	0.01	0.01	0.02	-0.01	0.01	-0.09
	[0.01]	[0.01]	[0.03]	[0.02]	[0.01]	[0.04]	[0.01]	[0.01]	[0.04]	[0.03]	[0.01]	[0.12]
DBs * Elections	0.19**	0.18**	-0.51***	-0.06	-0.01	0.11	0.34	0.39	-0.32	0.18	0.21	-0.37
	[0.10]	[0.09]	[0.19]	[0.07]	[0.06]	[0.11]	[0.33]	[0.35]	[0.21]	[0.21]	[0.21]	[0.44]
SOBs	-0.23**	-0.21**	0.14	-0.01	-0.01	0.01	-0.16*	-0.09	-0.62***	-0.39***	-0.31***	-0.49
	[0.09]	[0.09]	[0.33]	[0.06]	[0.06]	[0.24]	[0.08]	[0.08]	[0.20]	[0.11]	[0.11]	[0.37]
SOBs * GDP Growth	0.01	-0.00	0.05***	-0.02*	-0.02**	-0.01	0.02*	-0.00	0.08**	0.02*	-0.01	0.10***
	[0.01]	[0.02]	[0.02]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.03]	[0.01]	[0.01]	[0.03]
SOBs * Elections	0.04	0.02	-0.22**	0.03	0.02	0.05	0.08*	0.04	-0.08	0.08	0.02	-0.21
	[0.04]	[0.04]	[0.10]	[0.03]	[0.03]	[0.12]	[0.05]	[0.05]	[0.11]	[0.06]	[0.05]	[0.18]
$Ln(TotAss)_{t-1}$	-0.35***	-0.35***	-0.37	0.06	0.03	0.21	-0.55***	-0.51***	-0.83**	-0.75***	-0.75***	-1.00***
	[0.06]	[0.06]	[0.27]	[0.05]	[0.05]	[0.17]	[0.08]	[0.08]	[0.34]	[0.09]	[0.09]	[0.31]
$(Equity/Ass)_{t-1}$	0.03***	0.03***	0.02	0.00	-0.01	0.03***	0.03**	0.05***	-0.02	0.07***	0.07***	0.06**
	[0.01]	[0.01]	[0.02]	[0.01]	[0.01]	[0.01]	[0.01]	[0.02]	[0.03]	[0.02]	[0.02]	[0.03]
Bank fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country-Year effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	48,913	40,784	8,024	46,070	39,858	6,123	48,913	40,784	8,024	48,913	40,784	8,024
r2	0.57	0.59	0.58	0.51	0.52	0.53	0.26	0.28	0.24	0.41	0.42	0.41

Notes: Cluster-robust standard errors in brackets. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6 – Asset and Loans Growth and Interactions with GDP Growth and Electoral Years – Bank-specific fixed effects

	Asset Growth			Loans Growth			Interest Income over Earning Assets		
	WH	WE	EE	WH	WE	EE	WH	WE	EE
DBs	.	.	.	.	.	.	.	.	.
	[.]	[.]	[.]	[.]	[.]	[.]	[.]	[.]	[.]
DBs * GDP Growth	-0.79	-0.63	-1.63***	-0.70	-0.54	-1.94***	-0.03	-0.03	-0.00
	[0.54]	[0.60]	[0.27]	[0.68]	[0.76]	[0.53]	[0.03]	[0.03]	[0.08]
DBs * Elections	0.50	0.66	0.00	-1.34	-1.69	12.28**	-0.26*	-0.30**	-0.07
	[1.75]	[1.72]	[3.11]	[2.32]	[2.30]	[5.28]	[0.15]	[0.15]	[0.23]
SOBs	-9.71*	-9.57*	4.31	-7.27*	-7.38*	1.10	-0.19	-0.22	0.09
	[5.12]	[5.09]	[2.97]	[4.18]	[4.15]	[3.34]	[0.26]	[0.29]	[0.74]
SOBs * GDP Growth	-0.40	-0.63	-0.19	-0.55	-0.76	-0.21	0.05	0.06	0.03
	[0.51]	[0.70]	[0.30]	[0.50]	[0.68]	[0.32]	[0.06]	[0.09]	[0.03]
SOBs * Elections	-3.72*	-4.60*	1.15	-2.80	-3.43	0.15	-0.46***	-0.45***	-0.24**
	[2.26]	[2.51]	[2.60]	[2.90]	[3.18]	[2.05]	[0.16]	[0.14]	[0.12]
Ln(TotAss)_{t-1}	-11.08***	-11.34***	-11.80***	-7.56***	-8.17***	-9.89***	-0.40*	-0.43*	0.46
	[2.26]	[2.40]	[2.62]	[2.83]	[2.91]	[2.59]	[0.23]	[0.23]	[0.47]
$\text{(Equity/Ass)}_{t-1}$	-0.34	-0.46*	0.02	-0.82**	-1.27***	0.33	0.01	0.02	0.01
	[0.21]	[0.26]	[0.13]	[0.41]	[0.48]	[0.22]	[0.02]	[0.02]	[0.05]
Bank fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country-Year effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	48,913	40,784	8,024	48,646	40,618	7,938	48,892	40,764	8,023
r2	0.52	0.52	0.49	0.32	0.31	0.57	0.65	0.66	0.71

Notes: Cluster-robust standard errors in brackets. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5.3 Robustness checks

Finally, we check whether our results are robust to alternative specifications and sub-samples.

In order to assess the robustness of our empirical results, we tried to apply a different weighting strategy to our estimations. Our baseline specification is estimated weighting each observation by the bank's share of lagged total assets in the reference area ($w_{i,t} = TA_{i,t-1} \,/\, \sum_{j=1}^{N} TA_{j,t-1}$). As mentioned above, this weighting scheme should better reflect the behavior of the banking industry. However, our main results are confirmed when adopting alternative weighting schemes (e.g. $w_{i,t} = 1/N_t$) or avoiding any type of weighting.

Secondly, we also tried to modify the sample of banks included in the statistical analysis. In particular, we find that our main results still hold when excluding foreign banks from the sample or, alternatively, when excluding very small banks (by dropping all banks that have a share of total assets within their respective countries below 1%, as suggested in Micco et al., 2007). We also tried to apply the strategy used by La Porta et al. (2002), classifying as state-owned only those banks that are owned by the domestic government, excluding those that are owned by foreign governments (or considering them as POBs rather than SOBs). This tends to reveal relatively better performances of SOBs, but it does not contradict our conclusions.

Finally, we tried to repeat our estimations after introducing different specifications of the main regression model. When considering dynamic and selection effects (see Micco et al., 2007) to take into account the effects of changes in ownership (transitions from POBs to SOBs, and *vice versa*), results still confirm a different behavior of DBs with respect to SOBs. Therefore, differences are not simply due to different characteristics of POBs becoming SOBs after 2001 (e.g. because they are nationalized

after the crisis for restructuring purposes). Similarly, the main results are not significantly altered by the inclusion of additional control variables, such as the relative size of bank i at time t (i.e. the share of total assets of bank i over total assets in country c at time t).

In our main estimations, the fixed-effect model is used because it is the efficient estimator if the idiosyncratic error is *i.i.d.* However, the *within* estimator (which consists in subtracting the means of variables to eliminate the fixed effect) relies on the assumption of strict exogeneity. Relaxing this assumption in favor of an assumption of weak exogeneity would induce us to prefer a *first difference* estimator. This weaker assumption permits future values of the regressors to be correlated with the error, as will be the case if the regressor is correlated with the lagged dependent variable (as could be the case when considering total asset growth as the dependent variable). If we eliminated fixed effects by first differencing, the main results are unaffected.

6. Conclusions

Virtuous or vicious? The empirical findings of this paper shed light on specificities related to development banks, an understudied type of financial institution. From a policy point of view, these findings suggest that providing financial funds to development banks, or even promoting the setting up of new promotional banks, does not necessarily lead to an inappropriate and inefficient use of public resources and their consequent dispersion. In fact, the activity of existing development banks shows that they are able to operate at an average rate of profitability that is only slightly lower than that of commercial banks, or equal to when looking at Western countries or after the 2008 crisis. In general, development banks are characterized by lower asset utilization but also lower overheads over total assets with respect to private-owned banks. This

difference is fully acceptable if the objectives of economic development and social utility are taken into account. Moreover, our analysis finds strong support for the conjecture that differentials in performance between development banks and other financial institutions are not stable across the different phases of the business cycle. Development banks are less profitable than commercial banks when the economy grows at a comfortable pace but more resilient when the economy collapses or slows down, since they require lower impairment and provisioning when the economy declines. This evidence is confirmed after controlling for both country-specific as well as bank-specific effects. Furthermore, there is no clear evidence that policy makers tend to use development banks for electoral purposes, at least when considering the high-income countries in Western Europe.

In fact, the empirical evidence highlights that development banks behave differently across countries. In Eastern Europe, they are significantly less profitable than private banks and the differentials between clusters are quite stable across the business cycle. Moreover, they support the economy more than private banks in terms of loans growth when the real economy goes down, but they also increase lending more than commercial banks around elections. This result is in line with previous empirical evidence about political considerations possibly driving government-owned banks in developing economies. By contrast, high-income countries in Western Europe have higher institutional defenses against the distortions possibly arising from government ownership of the banks. This heterogeneity of results with respect to different geographical areas leads us to think carefully about the importance of financial development and the role of institutions for a proper functioning of development banks. In countries with less developed markets and institutions, the developmental and counter-cyclical role of development banks can be even more pronounced, but political

interference can play an equally significant negative role. This awareness suggests interesting further development of future research.

Finally, the paper also contributes to better frame the bank ownership and performance debate, recognizing the fact that state-owned banks are not a unique entity and strong differences exist between development banks and commercial state-owned banks.

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Appendix

Table 7 – Bank performances across the business cycle and electoral years – POBs

	Operating Profitability			Impairment over Total Assets			Overheads over Total Assets			Net Op.Rev over Total Assets		
	WH	WE	EE	WH	WE	EE	WH	WE	EE	WH	WE	EE
GDP Growth	0.07***	0.07***	0.07***	-0.06***	-0.06***	-0.08***	-0.01**	-0.01**	0.00	-0.00	-0.00	-0.02
	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.02]
Elections	0.01	0.01	-0.16**	-0.00	-0.00	0.03	0.01	0.01	0.02	0.01	0.02	-0.15
	[0.02]	[0.02]	[0.07]	[0.01]	[0.01]	[0.07]	[0.01]	[0.01]	[0.09]	[0.02]	[0.02]	[0.11]
$Ln(TotAss)_{t-1}$	-0.47***	-0.47***	-0.54***	0.07**	0.07**	0.04	-0.55***	-0.53***	-0.90***	-0.93***	-0.90***	-1.51***
	[0.06]	[0.06]	[0.12]	[0.03]	[0.03]	[0.13]	[0.07]	[0.07]	[0.15]	[0.11]	[0.11]	[0.21]
$(Equity/Ass)_{t-1}$	0.03**	0.03**	-0.01	-0.02**	-0.02**	0.03	0.10***	0.11***	0.05**	0.11***	0.11***	0.06*
	[0.01]	[0.01]	[0.02]	[0.01]	[0.01]	[0.02]	[0.02]	[0.03]	[0.03]	[0.03]	[0.03]	[0.04]
Bank fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country-Year effects	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Observations	46,093	39,061	7,032	43,532	38,335	5,197	46,093	39,061	7,032	46,093	39,061	7,032
r2	0.30	0.32	0.19	0.19	0.20	0.16	0.20	0.25	0.07	0.28	0.33	0.13

Notes: Cluster-robust standard errors in brackets. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8 – Assets and loans growth across the business cycle and electoral years – POBs

	Asset Growth			Loans Growth			Interest Income over Earning Assets		
	WH	WE	EE	WH	WE	EE	WH	WE	EE
GDP Growth	0.70**	0.69**	0.97***	1.31***	1.26***	1.98***	-0.00	0.01	-0.16***
	[0.33]	[0.35]	[0.19]	[0.36]	[0.38]	[0.19]	[0.02]	[0.02]	[0.03]
Elections	0.10	0.16	-2.07	-1.56	-1.52	-3.76**	0.23***	0.23***	0.26
	[1.04]	[1.06]	[1.58]	[1.43]	[1.47]	[1.59]	[0.06]	[0.06]	[0.18]
$Ln(TotAss)_{t-1}$	-8.82***	-8.75***	-9.51***	-6.25**	-6.00**	-10.47***	-1.87***	-1.88***	-1.66***
	[1.70]	[1.78]	[1.34]	[2.57]	[2.69]	[1.90]	[0.15]	[0.16]	[0.49]
$(Equity/Ass)_{t-1}$	-1.06*	-1.20*	-0.07	-1.07*	-1.21*	-0.34	-0.10**	-0.11**	-0.02
	[0.58]	[0.66]	[0.20]	[0.62]	[0.72]	[0.22]	[0.04]	[0.04]	[0.04]
Bank fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country-Year effects	NO	NO	NO	NO	NO	NO	NO	NO	NO
Observations	46,093	39,061	7,032	45,913	38,958	6,955	46,077	39,046	7,031
r2	0.09	0.09	0.24	0.07	0.07	0.31	0.36	0.37	0.21

Notes: Cluster-robust standard errors in brackets. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$