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What are public development banks and development financing institutions ? ——qualification criteria, stylized facts and development trends

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ABSTRACT

Public development banks and development financing institutions are experiencing renaissance worldwide, but systematic academic research is patchy. The bottleneck mainly boils down to the lack of data, which has constrained the meaningful research on the rationales of establishing PDBs and DFIs and reasons for their successes and failures. To fill the gap, we aim to answer the fundamental question of "what PDBs and DFIs are" by proposing five qualification criteria, i.e., being a stand-alone entity, using the fund-reflow-seeking financial instruments as main products and services; funding sources going beyond the periodic budgetary transfers; the proactive public policy orientation, and government steering of their corporate strategy. Furthermore, we have systematically identified over 500 PDBs and DFIs that meet the five qualification criteria worldwide. Based on the first-hand data collection, we present the stylized facts (including ownership structure, official mandate, geographical scope of operation, asset size, and income groups) and development trends of worldwide PDBs and DFIs. We hope that this first global database on PDBs and DFIs can lay the foundation for the original academic and policy research.

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1. Introduction

Public development banks (PDBs) and development financing institutions (DFIs)[1] are public financial institutions initiated by governments with an explicit official mission to fulfill public policy objectives. They are potentially useful policy instruments for fixing market failures, incubating markets, and promoting structural transformation in an equitable and sustainable manner. Yet little research is available to answer what they are, why governments establish them, what accounts for variation in their development effectiveness.

The paucity of research stands in sharp contrast with the burgeoning renaissance of PDBs and DFIs worldwide. Emerging economies, China in particular, are taking a leadership role in initiating new multilateral development banks such as the Asian Infrastructure Investment Bank to fill infrastructure financing gaps. Both developed and developing countries alike have recently established or are planning to build new national development banks to meet economic, social, and environmental development challenges (Xu et al., 2019; Xu et al., 2021).

To fill the gap, we are building the first global database on PDBs and DFIs worldwide. We aim to make three original contributions: (1) propose the qualification criteria and operational indicators of PDBs and DFIs to clearly distinguish them from other institutional arrangements, including (but not confined to) government credit programs, trust funds, special purpose vehicles, aid agencies, grant-executing agencies, state-owned commercial banks with policy functions, cooperative banks initiated by practitioners from specific sectors such as agriculture, forestry, animal husbandry, and fishery, and private financial institutions such as microfinance institutions initiated by private actors whose aim is in line with public policy objectives; (2) identify a comprehensive list of PDBs and DFIs currently active in every part of the world in a consistent manner on the basis of empirical evidence; and (3) collect the first-hand data on their basic information (such as official mandate, establishment year, ownership structure, and geographical scope of operation) and basic financial indicators (such as total assets) to identify stylized facts to reveal the vast diversity within the PDB and DFI family. We hope that this systematic effort to identify PDBs and DFIs worldwide will lay the foundation for rigorous academic research in the future.

Our key findings are summarized in the following five aspects. First, a set of five qualification criteria should be met simultaneously to qualify an entity as a PDB or DFI: being a stand-alone entity, using the fund-reflow-seeking financial instruments as main products and services; funding sources going beyond the periodic budgetary transfers; the proactive public policy orientation, and government steering of their corporate strategy. Second, PDBs and DFIs are prevalent worldwide. In total, we have identified 527 PDBs and DFIs worldwide from 150 countries. Third, PDBs and DFIs play an indispensable role in financing development as far as their weight is concerned. The aggregate total assets of all PDBs and DFIs are as large as $18.7 trillion, and their annual financing accounts for about 10% of the total world investment. Fourth, the establishment of PDBs and DFIs have experienced the rise, the plateau and the renaissance after the World War II, as their importance is increasingly recognized after the recent global financial crisis in 2008. Fifth, there are vast diversities within the PDB and DFI family as far as official mandate, ownership structure, geographical scope of operation, and asset size are concerned.

The rest of our paper proceeds as follows: in Section II we review the existing literature on the definitions of PDBs and DFIs, the efforts to identify PDBs and DFIs, and preliminary stylized facts of selected PDBs and DFIs; in Section III we propose the qualification criteria to distinguish PDBs and DFIs from other similar institutional arrangements; in Section IV we present the stylized facts and development trends of worldwide PDBs and DFIs based on the firsthand data collection; finally, we conclude with key findings and propose future plans for the database-building project.

2. Literature review

Scholars and practitioners have not reached the consensus on the definition of PDBs and DFIs. Because there is no common definition, there are only few piecemeal efforts to systematically identify PDBs and DFIs worldwide. As a result, the existing literature primarily focus on case studies or regression analyses of a few well-known PDBs and DFIs,[2] and is not able to identify the stylized facts of the full population of PDBs and DFIs worldwide or conduct the large-n studies across countries.

[1] No internationally agreed-upon terminology exists to refer to public financial institutions that perform development financing on behalf of governments. The commonly used terms include development banks, policy banks, development financing institutions, promotional banks, and public investment corporations. In short, they are all "mission-driven institutions," which use financial instruments to execute a public mandate on behalf of their governments. Although in Europe the term "development finance institution" (DFI) is used to refer to institutions that mainly finance private sector activities in developing countries are often called. But the term DFI is also used in a much broader sense by the associations of development financing institutions (DFIs), referring to a wider range of specialized financial institutions in pursuit of public policy objectives. Indeed, the World Federation of Development Financing Institutions (WFDFI) brings together other regional associations such as the Association of Development Financing Institutions in Asia and the Pacific (ADFIAP), and the Association of Development Financing Institutions in Latin America (ALIDE). Their members mostly include development banks, although membership is also open to nonbank financial institutions providing equity investments, guarantees, or insurance to achieve public policy goals. To avoid confusion, we use "development *financing* institution" instead of "development *finance* institution" as the generic term. This includes development banks as well as guarantee- and equity-focused financial institutions carrying out a public policy financing mission on behalf of the state. We use the terms "PDB" and "DFI" in parallel, primarily with the objective of designating all in the community, while highlighting PDBs as the main category in the DFI family.

[2] For pilot research in English academic journals and books, see Chen (2020); De Aghion (1999); Hainz and Kleimeier (2012); Griffith-Jones and Ocampo (2018); Gurara et al. (2020); Jouanjean et al. (2015); Lazzarini et al., (2015); Massa, Parra, and te Velde (2016); Odedokun (1996); Ru (2018).For the pilot academic research in Chinese, see Bai (2003), 2008; Bai et al. (2008); Bai and Qu (1993); Bai and Wang (2005); Bai et al. (2006); China Development Bank and Renmin University (2006); China Development Bank and Renmin University (2007); Li and Li (2010); Xu (2017).

2.1. A review of the existing definitions of PDBs and DFIs

There is a lack of consensus on what defines PDBs and DFIs, owing to the vast diversities within the family of PDBs and DFIs in terms of official mandates, ownership structure, financial instruments, business models, and governance structures. Researchers tend to use a narrow working definition of PDBs and DFIs according to their specific research topics. Practitioners are inclined to use a convenient definition that summarizes a specific type of PDBs and DFIs with which they are familiarized (see Table I–1 and I–2 in Appendix I for a review of the existing definitions). Consequently, these working definitions sometimes run contrary to each other or do not capture the whole picture. First, different definitions focus on different purposes. For instance, Association of European Development Finance Institutions (EDFI) defines DFIs as public financial institutions established by high-income country governments in support of private sector development in developing countries, whereas the Indian and Malaysian governments define DFIs as public financial institutions established by national governments in support of overall social and economic development. Second, divergent definitions emphasize distinctive business models. For example, some maintain that development banks should be state-owned (Fernández-Arias et al., 2020; Ferraz, 2017; Lazzarini et al., 2015), but others contend that they can be privately-owned (Diamond, 1957).

To systematically build the first global database on PDBs and DFIs, we need to answer the fundamental question of "what PDBs and DFIs are". This question boils down to the core features that distinguish PDBs and DFIs from other similar institutional arrangements such as government credit programs, aid agencies, and state-owned commercial banks with policy functions. Once we have a thorough analysis on the "what" question, the existing definitions may probably become a subcategory of our common definition.

2.2. The existing efforts to identify worldwide PDBs and DFIs and their limitations

Researchers and practitioners have not reached the consensus on the common definition of PDBs and DFIs, let alone systematic efforts to identify worldwide PDBs and DFIs. Diamond (1957) narrowly defined DFIs as "an institution to promote and finance enterprises in the private sector", and listed less than 100 development banks that provide financial and intellectual support for private sectors in the appendix. Bruck (1998) mentioned that there are over 550 DFIs worldwide, including 32 multilateral development banks and 520 national development banks, but failed to provide a clear qualification criterion or a comprehensive list. Musacchio and Lazzarini (2014) relied on the membership list of DFI associations and classified DFIs into four subcategories: 1) development agencies that provide training and technical assistance; 2) general development banks; 3) special-purpose development banks; and 4) commercial banks with development objectives. In total, they identified 288 DFIs.

But it is not rigorous to purely rely on the membership list of DFI associations to identify DFIs. At the first glance, self-identity appears to be a convenient qualification criterion for identifying PDBs or DFIs because it is straightforward enough to include those who claim themselves to be PDBs or DFIs and exclude those who identify themselves as commercial banks. Even so, it could make the list arbitrary. Because practitioners lack a common definition of DFIs, different organizations may refer to different features to classify themselves as DFIs or not. Self-identity is a subjective judgment by organizations themselves that may not be consistent over time or across institutions. For instance, some development agencies are members of DFI associations, but they do not even provide financial instruments; hence, it is far-stretched to define these development agencies as financial institutions, let alone DFIs. In short, self-identity is not a reliable criterion of qualifying DFIs. In addition, the membership list is not comprehensive. Not all DFIs choose to join international DFI associations. Accordingly, a pure reliance on the membership list of DFI associations cannot capture all DFIs worldwide.

2.3. Preliminary stylized facts of selected PDBs and DFIs

Owing to the lack of a comprehensive list of PDBs and DFIs, researchers have only managed to present preliminary stylized facts of a selected group of DFIs. Gallagher and Kring (2017) mentioned that the total assets of national development banks (NDBs) stands at $4.8 trillion, four times the size of the multilateral development bank (MDB) system. They also found that total assets of the top ten largest NDBs represent over 70% of those of all NDBs. The World Bank Group has conducted two surveys by sending out questionnaires to NDBs through the WFDFI in 2012 and 2017 and received 90 and 64 responses respectively (De Luna-Martínez et al., 2012, 2018). Below are highlights of stylized facts from the latest survey report. In terms of income groups, 78% of responses were from NDBs based in middle-income countries, 19% in high-income countries, and 3% in low-income countries. In terms of regional coverage, 21% of responses were from institutions based in Africa, 30% in Asia, 25% in Europe, 19% in Latin America and the Caribbean, and 5% in the Middle East. In terms of public versus private ownership, governments fully control and own 85% of NDBs surveyed, 10% of NDBs have minority private sector participation, and 5% of NDBs are controlled by private sectors. In terms of official mandates, 51% of NDBs have the general mandate; among those 49% that have narrow mandates, they focus on small and medium enterprises, infrastructure, agriculture; international trade, local governments, and housing in a descending order. But as both surveys relied on voluntary self-reporting by NDBs, they are far from a comprehensive list of NDBs, let alone of DFIs. Consequently, the above pattern may not hold if all DFIs are included in the analysis.

3. Qualification criteria of PDBs and DFIs

As scholars and practitioners have not reached the consensus on the definition of PDBs and DFIs, we need to answer the fundament question of what are key features that distinguish PDBs and DFIs from other institutional arrangements and then turn them into clear qualification criteria and measurable operational indicators of these criteria. This will help to identify PDBs and DFIs worldwide in a systematic manner.

Building on the existing efforts, we define PDBs and DFIs as financial institutions initiated and steered by governments with the official mission to proactively orient their operations to pursue public policy objectives. PDBs and DFIs are financial institutions that operate at the large frontier between state and market. Agencies and credit programs administered by government agencies or ministries exist toward the state end of the spectrum. These institutions are development-oriented and rely on regular funding support from governments. At the other end of the spectrum, toward the market, lie commercial banks, investment banks, venture capital firms, and equity investment funds aimed at maximizing profit. PDBs and DFIs lie at the intersection of state and market, because they are aimed at using market means to achieve development goals. Hence, the core task of defining PDBs and DFIs is to draw dividing lines distinguishing PDBs and DFIs from other institutional arrangements on the spectrum.

For the purpose of distinguishing PDBs and DFIs from similar institutional arrangements, we propose a set of five qualification criteria that should be met simultaneously to qualify an entity as a PDB or DFI: (1) being a stand-alone entity; (2) using the fund-reflow-seeking financial instruments as the main products and services; (3) funding sources going beyond the periodic budgetary transfers; (4) the proactive public policy orientation; and (5) government steering of their corporate strategy. Criterion 1 of being a stand-alone entity a prerequisite, which helps to distinguish PDBs and DFIs from government credit programs, trust funds, and special purpose vehicles. Criteria 2 and 3 take a step further to highlight the core features of PDBs and DFIs as financial institutions on both asset and liability parts. This helps to distinguish PDBs and DFIs from central banks, grant-executing agencies, and aid agencies. Criteria 4 and 5 further highlight that PDBs and DFIs are initiated and steered by governments to pursue public policy objectives. This helps to differentiate PDBs and DFIs from profit-driven financial institutions and development-oriented financial institutions created by grassroots such as microfinance institutions.

3.1. Being a stand-alone entity is a prerequisite

The first qualification criterion proposed is a stand-alone entity. This means that the entity should have a separate legal status, dedicated personnel, separate financial statements, and is not set up to accomplish a short-term, specific goal, thus distinguishing PDBs and DFIs from governments credit programs, trust funds, and special purpose vehicles.

The first operational indicator is that an entity has a separate legal personality, which means that it can contract or borrow in its own name, and can sue and be sued.[3] In judging whether an entity has a separate legal status, we determine whether it has articles of agreement (AA) or quasi-AA (which is not a legal document in a strict sense) upon its establishment to verify whether it has the separate legal status. This can help to distinguish PDBs and DFIs from government credit programs.

Another operational indicator of being a stand-alone entity is that the entity has its own dedicated staff, which helps to distinguish PDBs and DFIs from trust funds. Governments and PDBs may create “trust funds” to serve specific projects without their own dedicated staff, when financing a project that they want to isolate from their general course of business. For example, although the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA) have separate legal personalities, they share the same bank management and are two legs of the World Bank Group. The very reason for the IDA's creation was the need to separate the “banking activities” of the World Bank at cost, meaning with an operational margin on the cost of funds, from the “subsidized” activities dedicated to a short list of countries. For this reason, we merge IBRD and IDA as one PDB in our database. By contrast, InfraMed, created as an autonomous entity by the French Caisse des Dépôts et Consignations and the Italian Cassa Depositi e Prestiti to support investment in infrastructure around the Mediterranean area, has its own legal status, accounts, and staff, and can qualify as such as a full-fledged DFI.

A third operational indicator of being a stand-alone entity is that the entity has its own financial account. Owning a separate financial account implies that this entity is supposed to be accountable for its own financial performance. For that reason, there is a particular case for including sufficiently autonomous subsidiaries of PDBs themselves in our database. Several of these institutions, such as Proparco of France or DEG of Germany, have been created by their parent PDBs as specialized DFIs to finance private sector activities. In many instances, this activity is conducted mainly in other countries where financial markets are underdeveloped or where partnership for commercial or strategic interest is part of the government policy. The rationale for creating these subsidiaries is that private activities are the backbone of any economy, and the investment by the private sector in some countries may justify some public support and a less demanding return on the capital mobilized. A moral hazard may result from transferring grants or subsidies to private interests. What is more, a soft loan to a private entity is unlawful in Europe because it distorts fair competition between companies. In Europe, there are strict constraints on the use of public subsidies or grants when the customers are private entities, which might not be the case in other continents. For the aforementioned reasons, when these institutions have their own financial and legal structure and governance, they can be considered autonomous and should therefore be incorporated into the database.

A fourth operational indicator of being a stand-alone entity is that the entity is not set up to achieve short-term and specific goals. This helps to distinguish PDBs and DFIs from special purpose vehicles (SPVs). SPVs are government-financed special funds for investing in specific companies or infrastructure projects. Governments or PDBs themselves create these financial vehicles to focus on a specific activity. Though these special funds may have separate legal personalities and financial statements, they often expire after the mission has been accomplished. For example, the Banque Publique d'investissement (BPI) of France and the China Development Bank have set up a fund, the Sino French Midcap Fund I and II, to promote investments in innovative small and medium-sized enterprises (SMEs), focusing on boosting business between the two countries. It is simply a joint investment vehicle, which will disappear once its mission is accomplished, and, as such, it does not qualify as a DFI.

[3] Though state-owned public entities may possibly enjoy immunities, as a separate legal entity they can sue and be sued by others in principle.

3.2. Fund-reflow-seeking financial instruments as main products and services

PDBs and DFIs use fund-reflow-seeking financial instruments, rather than pure grants, as their main mode of intervention. This qualification criterion can help to distinguish PDBs and DFIs from other public entities, such as central banks, whose main products and services do not involve providing financial instruments although they pursue public policy objectives. This qualification criterion also helps to further distinguish PDBs and DFIs from grant-executing agencies. A PDB or DFI deploys financial instruments such as loans, equity investments, or guarantees to provide financial support for its customers, whose business model must permit some form of repayment, capital dividends, or risk premium, depending on the type of financing they have received. It should not simply offer outright grants only.

However, seeking reflows does not necessarily mean that repayments will have to cover all borrowing costs. Such an emphasis on clients' financial discipline does not prevent PDBs and DFIs from extending grants or soft loans with subsidized interest rates in their portfolios if they have governmental support to do so.

3.3. Funding sources go beyond periodic budgetary transfers

One important point in assessing the identity of PDBs and DFIs is to distinguish them from aid agencies. One salient feature of aid agencies is that they primarily rely on periodic budgetary transfers from governments to sustain their operations. By contrast, PDBs and DFIs rely on government support to use market means to mobilize resources, such as issuing bonds on capital markets or lines-of-credit mobilization from other banking sources. A proper financial institution should have diversified sources of funds in its liabilities. The constitution of a capital base and regular government budgetary transfers can be one of these sources. However, governments usually expect PDBs and DFIs to leverage the balance sheet by relying on various other sources of financing. Otherwise, it is hard to qualify an institutional arrangement as a financial institution if there is no financial liability on its own balance sheet.

Even though PDBs and DFIs may sometimes claim to be financially sustainable, financial sustainability is not a characteristic that helps distinguish PDBs and DFIs from aid agencies. Even though some PDBs and DFIs, such as the IBRD, may not receive any tangible fiscal transfers from governments, these PDBs and DFIs may rely on sovereign creditworthiness to issue bonds from capital markets. If we take into account the cost of risk that taxpayers and the general public bear in their role as equity holders, PDBs and DFIs cannot be financially sustainable because they are mandated to provide high-risk and long-term capital that private banks are unwilling to offer (Lucas 2012, 2014). Owing to different financing structures, some PDBs and DFIs may rely less on governments than others. Hence, financial sustainability is more of a modality than an identity.

3.4. Proactive public policy orientation

Unlike profit-maximizing commercial banks, PDBs and DFIs are initiated by governments to address market failures and incubate markets in a proactive manner. Here, the term *market failure* broadly means any circumstances preventing the market from backing socially beneficial projects (i.e., the value created by projects including positive externalities is greater than the cost). It covers the cases of poor repayment enforcement cutting off credit access to low-collateral firms, or risk aversion penalizing innovative and long-gestation projects. Even more relevant in the era of Sustainable Development Goals is the crucial question of externalities. The case of climate change exemplifies the necessity to account for social and environmental consequences apart from financial returns. The role of PDBs and DFIs is to provide or help mobilize the required financial support for productive investments of social and environmental value that the market fails to finance.

To operationalize the qualification criterion of proactive public policy orientation, we first code the official mission from the AA or mission statement, including both general development purposes and specific sector/segment focuses (such as infrastructure, agriculture, housing, and SMEs). Then, we add exclusion criteria including the aim of enhancing shareholder value, profit maximization, and an extensive network of household deposit-taking in direct competition with private commercial banks. Meeting any of the said exclusion criteria will help us exclude large deposit-taking, state-owned banks with an extensive network of agencies in which household deposits and individual accounts form the core of the business model in terms of commercial approach, or financial institutions with ambivalent identities that claims to both pursue development and maximize the shareholder value from our database.[4]

3.5. Government steering of corporate strategy

To distinguish PDBs and DFIs from grassroots initiatives in line with development goals such as microfinance institutions, it is important to ensure that governments play a steering role in setting the DFIs' corporate strategies. Owing to the government steering, PDBs and DFIs can operate in the public interest to address market failures or incubate markets that drive their mandate. The most

[4] In addition, we include, on a case-by-case basis, a few deposit-taking banks that meet the five qualification criteria, even though deposit-taking may be conventionally regarded as a core feature of commercial banks. After a thorough analysis and justification, we include banks taking deposits from specific customers, in the process of diversification of sources of funds, and deposits for guarantees or security purposes, or that take individual accounts for the purpose of financial inclusion in poor regions where private banks are not active. For instance, some public banks have the mandate to enhance financial inclusion by setting up branches in underdeveloped regions of their own country, such as the Banco de Fomento Agropecuario in El Salvador. This is certainly a public concern and a priority for social equality.

straightforward operational indicator is for the government to hold a majority of the capital and therefore control the board, nominate the CEO, and validate the overall strategies of PDBs and DFIs. However, government steering can be achieved via other means, such as guaranteed bond-issuing, low-interest or interest-free loans, liquidity guarantees, and preferential tax treatment. History shows that formal shareholding is not necessarily the only means by which governments can shape boards' decision-making. In the wake of World War II, the World Bank Group (WBG) supported the establishment of dozens of privately owned development finance companies (DFCs) with government support to provide industrial finance and foster entrepreneurship. DFCs are often privately owned but fulfill public policy objectives. The WBG allocated a substantial amount of its resources via these DFCs. Although governments did not formally own these DFCs, they provided lines of credit without a date of repayment that acted as equity capital. Hence, these DFCs were regarded as quasi-government institutions (Diamond 1965, 1968, 1973, 1974).

In a nutshell, our ultimate objective is to compile a credible list of PDBs and DFIs worldwide. Given the lack of consensus on the definition of PDBs and DFIs among scholars and practitioners, it is important that we convincingly justify our qualification criteria and then apply them in a consistent manner. Our attempt to build a comprehensive DFI list may include multifaceted institutions that fall in the gray areas. To ensure accuracy, we include entities in our database only when clear evidence shows that an entity meets all five qualification criteria (see Appendix II for principles of building a reliable and comprehensive list of PDBs and DFIs).

To identify a comprehensive and reliable list of PDBs and DFIs, we first compile a list of potential PDBs and DFIs by relying on the membership list of DFI and DFI-like associations (see Appendix III for the list of DFI and DFI-like associations) and consulting the official classification (such as specialized financial institutions) of national financial systems country by country, and then apply the five qualification criteria in a consistent manner. Only those that meet all the five qualification criteria can it be included in our database. In total, we have identified 527 PDBs and DFIs worldwide including 510 PDBs (97%), 4 (1%) equity investments funds, and 13 (2%) guarantee funds.[5]

4. Stylized facts and development trends of PDBs and DFIs

In this section, we present the stylized facts and development trends of worldwide PDBs and DFIs based on the first-hand data collection (see Appendix IV on data sources, data collection methodology and quality control methods). The stylized facts include ownership structure (who owns them), official mandate (what they aim to do), geographical scope of operation (where they operate), asset size (how big their total assets are), and income levels of their home countries (for national PDBs and DFIs, which income level their home country belongs to). Regarding development trends, we have collected the first-hand information on the establishment year of all currently active PDBs and DFIs, which the trend of rise, plateau and renaissance after the World War II.

4.1. On ownership structure

In this subsection, we classify PDBs and DFIs by the jurisdiction levels of ownership. According to which jurisdiction levels PDBs and DFIs' owners belong to, we classify them into three groups: multinational, national, and subnational. Then we take a step further to examine the geographical location of owners in terms of regions and subregions at each jurisdiction level. In addition, we explore the direct shareholder structure of PDBs and DFIs.

4.1.1. Jurisdiction levels of ownership

We first classify PDBs and DFIs into three categories according to their ownership structure: multinational, initiated and owned by entities from more than two countries; national, created and owned by a central government[6] (or national public entities), or private sectors in rare cases; and subnational, established and owned by a local government entity or jointly by several local governments. If not specified, we use "multinational/national/subnational PDBs and DFIs" to refer to the jurisdiction level of ownership of a specific PDB or DFI.[7]

As shown in the pie chart in Fig. 1, of the 527 PDBs and DFIs worldwide, the number of multinational PDBs and DFIs is 47, accounting for 9% of the total. This number may appear relatively small, but it is in fact surprisingly high. Apart from the most well-known group of multilateral banks at the international and regional level—i.e., the World Bank Group and regional development banks, such as the Inter-American Development Bank, the African Development Bank, the Asian Development Bank, the European Investment Bank, or the European Bank for Reconstruction and Development—many countries have collaborated to create their own multilateral PDBs and DFIs in their own subregions. We outline below that it is highly related to some more specific geographical scope, whereby a group of countries jointly create a common supranational institution by pooling resources to better leverage available resources. The multilateral bank acts as a pooled fund, with mutual counter guarantees of member states on the liabilities of the bank. This solidarity, legally binding and organized through a banking structure, permits easier access to international lines of credit and more credibility in some bond issuance. Examples are numerous, but the success of the model is embodied by institutions such as the Development Bank of

[5] As the business model of insurance companies differs from that of banks and equity funds, the present report temporarily excludes public policy-oriented insurance companies such as China Export & Credit Insurance Corporation and Korea Trade Insurance Corporation.

[6] If a PDB or DFI is set up by two central governments, we classify it as national, since under these circumstances it is easy to identify which country is the majority shareholder. Even if the two countries' shares are 50/50, we can use other indicators such as the headquarters, main customers, and operators to determine which country of the two is the "main character."

[7] Again, if entities from different levels jointly establish a PDB, we use 50% as the threshold to determine the level.

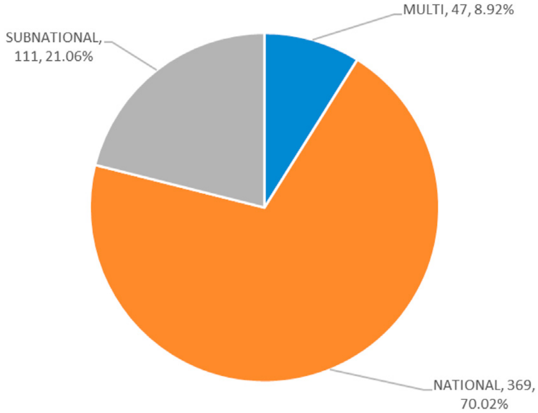

Fig. 1. Distribution of PDBs and DFIs by ownership level.

Central America (CABEI), the Development Bank of Latin America (CAF), the Trade and Development Bank (TDB) in East Africa, and the Black Sea Trade and Development Bank (BSTDB).

The most common model remains national PDBs and DFIs, whereby a central government or its public entities, sometimes inviting private investors around the table, have created an institution to transform public policy objectives into actual financing. We identified 369 national PDBs or DFIs, representing 70% of the total. The variety of these institutions is remarkable. The following sections will detail this diversity, in particular considering their size and mandate.

The third ownership category is banks owned by local governments. This can be any subnational political division of a country and/or decentralized government entity. The designation of such subnational entities may vary according to the territorial administrative structure of each country, e.g., states, regions, provinces, or cities. This category is probably the most unknown to the international financial community. Even though there are 111 such institutions—amounting to 21% of the total, a very significant figure—, they are usually quite small and have virtually no visibility in the international arena. Indeed, being subnationals, they have little legitimacy to participate in international debates.

4.1.2. Geographical region of owners

In this subsection, we identify the geographical regions of PDBs and DFIs' owners. Here we adopt the classification of geographical regions by the Statistics Division of the United Nations (UN). These geographical regions are based on continental regions, which are further subdivided into subregions and intermediary regions, drawn up so as to obtain greater homogeneity in population sizes, demographic circumstances, and so on.[8]

To reveal the diversity, we further classify the geographical regions of PDBs and DFIs according to the three categories mentioned above, namely, multinational, national, and subnational. Regarding multinational PDBs and DFIs, if a PDB or DFI is owned by more than two countries dispersed in different geographical regions, we classify it as "world"; if its membership structure is deliberately divided into distinctive categories such as regional and nonregional members, and regional members enjoy the majority shareholding of more than 50%, we classify it as "regional" or "subregional." In terms of subnational or national PDBs and DFIs, if their majority shareholders are from public or private entities of a specific country, we put them into the region or subregion where their countries are located.

As shown in Table 1, regarding multinational PDBs and DFIs, 5 (11%) are classified as "world," that is, their member states come from different regions. They include both established ones such as the World Bank (IBRD and IDA), the IFC and the MIGA from the World Bank Group, and the International Fund for Agricultural Development, and recent multilateral initiatives such as the New Development Bank. A vast majority (89%) of multinational PDBs and DFIs are primarily owned by member states from a particular region or subregion. At the regional level, apart from Oceania, most regions have their own regional development banks (RDBs), including the African Development Bank in Africa, the Asian Development Bank and the Asian Infrastructure Investment Bank in Asia, the European Investment Bank and the European Bank for Reconstruction and Development in Europe, and the Inter-American Development Bank in the Americas. In terms of the number of subregional development banks, Western Asia, Eastern Europe, and Eastern Africa make up the top three, with 7, 5, and 4 currently active multinational PDBs and DFIs respectively.

In terms of national PDBs and DFIs, they seem to be most popular in Southern Asia. We have identified 38 currently active national PDBs and DFIs in Southern Asia, accounting for 10% of total national ones. On average, each Southern Asian country has 4.2 national PDBs and DFIs. By contrast, in most subregions each country has 1 or 2 national PDBs and DFIs on average. As for subnational PDBs and DFIs, we have identified currently active ones mainly concentrated in South America (20%), South-eastern Asia (20%), and Northern America (17%).

[8] For further information on the UN's classification of geographical regions, see https://unstats.un.org/unsd/methodology/m49/.

Table 1
The distribution of PDBs and DFIs by geographical region at different ownership levels.

Continents and Sub-regions	Number of Multinational PDBs & DFIs (1)	Multinational (%) (2)	Number of National PDBs & DFIs (3)	National (%) (4)	Number of Sub National PDBs & DFIs (5)	Subnational (%) (6)	Number of Total PDBs & DFIs (7)	Total (%) (8)	Number of Countries (9)	Average Number of National PDBs & DFIs per Country (10)
World	5	10.64%	/	/	/	/	5	0.95%	/	/
Eastern Africa	4	8.51%	27	7.32%	0	0.00%	31	5.88%	18	1.50
Middle Africa	1	2.13%	8	2.17%	0	0.00%	9	1.71%	9	0.89
Northern Africa	2	4.26%	10	2.71%	0	0.00%	12	2.28%	6	1.67
Southern Africa	0	0.00%	23	6.23%	1	0.90%	24	4.55%	5	4.60
Western Africa	3	6.38%	24	6.50%	2	1.80%	29	5.50%	16	1.50
Africa	1	2.13%	0	0.00%	0	0.00%	1	0.19%	/	
Africa Total	**11**	**23.40%**	**92**	**24.93%**	**3**	**2.70%**	**106**	**20.11%**	**54**	**1.70**
Caribbean	1	2.13%	8	2.17%	1	0.90%	10	1.90%	13	0.62
Central America	1	2.13%	23	6.23%	0	0.00%	24	4.55%	8	2.88
Northern America	1	2.13%	9	2.44%	19	17.12%	29	5.50%	2	4.50
South America	3	6.38%	25	6.78%	22	19.82%	50	9.49%	12	2.08
America	2	4.26%	0	0.00%	0	0.00%	2	0.38%	/	/
Americas Total	**8**	**17.02%**	**65**	**17.62%**	**42**	**37.84%**	**115**	**21.82%**	**35**	**1.86**
Central Asia	0	0.00%	4	1.08%	0	0.00%	4	0.76%	5	0.80
Eastern Asia	0	0.00%	17	4.61%	1	0.90%	18	3.42%	5	3.40
South-eastern Asia	0	0.00%	34	9.21%	22	19.82%	56	10.63%	11	3.09
Southern Asia	0	0.00%	38	10.30%	14	12.61%	52	9.87%	9	4.22
Western Asia	7	14.89%	24	6.50%	1	0.90%	32	6.07%	17	1.41
Asia	2	4.26%	0	0.00%	0	0.00%	2	0.38%	/	/
Asia Total	**9**	**19.15%**	**117**	**31.71%**	**38**	**34.23%**	**164**	**31.12%**	**47**	**2.49**
Eastern Europe	5	10.64%	14	3.79%	1	0.90%	20	3.80%	10	1.40
Southern Europe	0	0.00%	20	5.42%	9	8.11%	29	5.50%	14	1.43
Northern Europe	2	4.26%	21	5.69%	5	4.50%	28	5.31%	8	2.63
Western Europe	1	2.13%	23	6.23%	12	10.81%	36	6.83%	11	2.09
Europe	5	10.64%	0	0.00%	0	0.00%	5	0.95%	/	/
Europe Total	**13**	**27.66%**	**78**	**21.14%**	**27**	**24.32%**	**118**	**22.39%**	**43**	**1.81**
Australia and New Zealand	0	0.00%	4	1.08%	0	0.00%	4	0.76%	2	2.00
Pacific Islands	1	2.13%	13	3.52%	1	0.90%	15	2.85%	14	0.93
Oceania	0	0.00%	0	0.00%	0	0.00%	0	0.00%	/	/
Oceania Total	**1**	**2.13%**	**17**	**4.61%**	**1**	**0.90%**	**19**	**3.61%**	**16**	**1.06**
Total	**47**	**100.00%**	**369**	**100.00%**	**111**	**100.00%**	**527**	**100.00%**	**195**	**1.89**

4.1.3. Public versus private ownership

According to the qualification criteria presented in Section III, governments play a steering role in setting the corporate strategies of PDBs and DFIs to ensure that they proactively pursue public policy objectives. The main tool for governments to steer PDBs and DFIs is through majority shareholding. To classify PDBs and DFIs by public or private ownership, we have collected the information on direct shareholders.[9] We classify direct shareholders into the following broad categories: governments (including central banks), PDBs and DFIs, other public entities, and private entities (including the general public). Governments can directly own PDBs and DFIs by inserting share capitals via government agencies such as finance ministries or central banks. Alternatively, governments can indirectly own PDBs and DFIs through state-owned PDBs and DFIs or other public entities such as state-owned enterprises or sovereign wealth funds. Here we use 50% as the cut-off point to distinguish state-owned entities from privately owned ones.

Table 2 and Table 3 show that majority shareholding is the main approach for governments to steer a PDB or DFI: of the total sample of 527 PDBs and DFIs, 501 (95%) have governments among their direct shareholders. Furthermore, among PDBs and DFIs with governments as direct shareholders, governments are the major shareholders in 496 cases (or 94% of all PDBs and DFIs), and 395 PDBs and DFIs (or 75% of all PDBs and DFIs) are wholly owned by government agencies.

Apart from direct shareholding, governments can also own PDBs and DFIs via state-owned PDBs and DFIs or other public entities. 25 PDBs and DFIs (5%) and 82 other public entities (16%) have injected share capital in other PDBs and DFIs. For instance, AFD set up the Société de Promotion et de Participation pour la Coopération Economique (Proparco) in 1977 and currently owns 78% of its shares. The Development Bank of the Philippines established the Al-Amanah Islamic Investment Bank of the Philippines in 1973 and owns 99.90% of its shares. It is worth exploring the implications of indirect government ownership, compared with direct government ownership, on the governance of PDBs and DFIs.

Private participation as the direct shareholder is less common but not rare, with 58 institutions (11%) including direct private shareholders. However, in terms of majority shareholders, only 8 PDBs and DFIs (1.5%) are controlled by private sectors; 2 PDBs and DFIs (0.38%) are fully owned by private sectors, namely, the Industrial Development Bank of Turkey (TSKB) and the Development Bank of Austria (OeEB). Even for those privately owned PDBs and DFIs, governments still steer their corporate strategies in other ways to ensure that PDBs and DFIs are development-oriented, such as guaranteeing their liabilities as in the case of the OeEB and the TSKB, or enjoying super voting rights as in the case of the Infrastructure Bank PLC in Nigeria and the Foreign Trade Bank of Latin America.

4.2. Geographical operation

In this subsection, we classify PDBs and DFIs based on their geographical operation. Regarding the geographical scope of their operations, PDBs and DFIs can operate at four levels: international, regional, national, and subnational. To enrich our database, we have collected information on whether PDBs and DFIs restrict their operations to specific areas within and beyond national boundaries. For any single PDB or DFI, international and regional are marked as mutually exclusive, as an institution that can operate internationally can, by definition, also operate in its own geographical region. We apply the same exclusion rule between national and subnational, to

Table 2
Types of direct shareholders.

Types of Direct Shareholders	Observation	Mean	Min	Max	Std	Median
Government Agencies	501	93.69%	0.10%	100%	17.33%	100%
PDBs and DFIs	25	49.25%	1.49%	100%	26.85%	38.38%
Other Public Entities	82	38.04%	0.01%	100%	37.86%	27.55%
Private Entities (including general public)	58	25.63%	0.01%	100%	24.05%	20.05%

Table 3
Majority shareholding.

Types of Direct Shareholders	Government-owned		Privately owned	
	Number of PDBs and DFIs (1)	Of which, fully owned by governments (2)	Number of PDBs and DFIs (3)	Of which, fully privately owned (4)
Government Agencies	496	396	5	0
PDBs and DFIs	23	0	2	0
Other Public Entities	80	0	2	0
Private Entities (including general public)	50	0	8	2
Total PDBs and DFIs	519	395	8	2

[9] The reason why we focus on direct shareholders rather than tracing the ownership chain is that in most cases governments fully own PDBs and DFIs, or act as the majority shareholder. Hence, we can usually make the judgment on whether PDBs and DFIs are state-owned or not without the need of tracing the ownership chain.

Table 4
Distribution of PDBs and DFIs by geographical operations at different ownership levels.

Geographical Ownership	Geographical Operation	Number (1)	Percentage (2)
Multinational	INTERNATIONAL	8	1.52%
	REGIONAL	39	7.40%
Sub Total	–	**47**	**8.92%**
NATIONAL	Only NATIONAL	290	55.03%
	INTERNATIONAL/NATIONAL	51	9.68%
	INTERNATIONAL	23	4.36%
	Others	5	0.95%
	Sub Total	**369**	**70.02%**
SUBNATIONAL	SUBNATIONAL	106	20.11%
	NATIONAL	5	0.95%
Sub Total	–	**111**	**21.06%**
Total	**-**	**527**	**100%**

identify institutions that are allowed to operate only in a specific territory within national boundaries. If a PDB or DFI can invest in any country without restricting its operation to particular regions or areas, we classify it as "international." As most multinational PDBs and DFIs are established to finance developing countries, they can be classified as "international" as long as they do not restrict their operation to certain regions or areas within the developing world. Otherwise, we classify those that confine their operations to certain regions or areas as "regional." Here "regional" does not necessarily refer to geographical continents or subregions; it can also refer to restriction in geographical operations due to political or religious reasons, such as only operating in Islamic countries. By the same token, if PDBs and DFIs can operate in any area within national boundaries, they are classified as "national"; otherwise, if they can only operate in certain areas within national territories, they are classified as "subnational."

To group similar entities into one subcategory, we tabulate geographical operation with the jurisdiction levels of their ownership, namely, multinational, national, and subnational, to obtain a more homogeneous set of institutions in each subcategory (see Table 4).

1. **Multinational PDBs and DFIs** have two types of geographical operation: one is a global operational scope and the other is a regional operational scope. Of the 47 (9%) multinational PDBs and DFIs, 8 (1.5%) operate without geographical restriction, whereas 39 (7.5%) focus their operations on certain regions.
   A. **Multinational PDBs and DFIs with a global operational scope**, whose operation is not limited to specific regions or areas in developing countries. Below are some examples:
      - The World Bank Group[10] has an international operational scope without restricting its activities to certain regions, though today it primarily focuses on developing countries, after having financed the reconstruction of developed countries in the wake of WWII.
      - The New Development Bank, known as the BRICS bank, which was founded by Brazil, Russia, India, China, and South Africa in 2014. The BRICS bank is currently seeking to enlarge its membership to all UN member countries. Though its current operation focuses on the BRICS countries, its articles of agreement allow it to operate in developing countries and emerging markets.
      - The International Fund for Agricultural Development (IFAD), a specialized agency of the United Nations, was founded in 1977 and carries out missions to finance agricultural development in developing countries.
      - The European Investment Bank (EIB) has shareholders from a certain region (i.e., the 27 members of the European Union), and its main activity is to finance public and private projects to the benefit of its shareholders. As a complement, the EIB is also compelled to have an international perspective and be the financial arm of the EU members in Africa, Asia, and Latin America.
   B. **Multinational PDBs and DFIs with a regional operational scope,** which concentrate their operations in a specific region. It is relevant to point out that most continents possess these kinds of banks, such as the African Development Bank, the Asian Development Bank, the Inter-American Development Bank, and the Development Bank of Latin America (CAF).

In addition, we also note that some public development banks, although not many, concentrate on a specific geographical space, which is not necessarily a subcontinent. Although not really "regional" from a geographical point of view, these institutions restrict their operations to certain areas and hence belong to this subcategory:

- The International Investment Bank (IIB), which is an institution that was established in 1970 by the Council for Mutual Economic Assistance (Comecon)—which was an economic organization from 1949 to 1991 under the leadership of the Soviet Union—and remains active today despite the fall of Communism.

[10] Though the IBRD focuses its operation mainly in MICs and the IDA concentrates its assistance primarily in LICs, we merge the two into the World Bank in our database, as explained in Section 3.1. Hence, the World Bank as a whole can provide financial support to both MICs and LICs.

- The Islamic Development Bank is also a particular case of a regional bank, as it extends credit only to Muslim-majority countries and ensures that financial instruments are compatible with Sharia, the Islamic law that is issued to verify the compatibility of the financing with the principles of the sacred Koran.

2. **National PDBs and DFIs: The geographical operation of national PDBs and DFIs can be divided into three main categories in descending order of frequency: primarily national, both national and international, and primarily international.**
   A. **Primarily national**: This category includes a vast majority of PDBs, as they are national banks extending financing exclusively to the benefit of the national territory and within its boundaries.
   B. **Both national and international**: These national PDBs and DFIs provide financial support to clients both within and beyond their national boundaries. Apart from promoting domestic development, they may execute international financing on behalf of their governments, such as KfW from Germany or CDB from China. They may also provide export financing to national investors and participate in international project finance when a national provider is involved.
   C. **Primarily international**: Some governments have created PDBs or DFIs to channel funds internationally by providing resources to other countries, especially developing countries. This is particularly the case of European Development Finance Institutions, which channel development financing, not always concessional, to developing countries. DEG from Germany and AFD from France[11] are cases in point.

Apart from the above three main categories of geographical operations, we have discovered three other rare subcategories, reflecting to some extent the varieties of PDBs and DFIs.

One rare subcategory is national PDBs and DFIs created by the national authorities to serve the needs of a particular subnational territory. For instance, the Bank of Northeast Brazil is owned by the central government. However, its operation is restricted to the Northeast region, one of the poorer regions of Brazil.

Another rare subcategory is national PDBs and DFIs that finance certain regions outside their national boundaries as well as providing financial support within their national territory. For example, the Development Bank of Southern Africa is wholly owned by the Government of South Africa, but it seeks to accelerate sustainable socio-economic development and improve the quality of life of the people of the Southern African Development Community.

Last but not least, governments have set up a series of funds that are dedicated to financing projects in specific regions abroad. The Albanian-American Enterprise Fund of the US is an example of a dedicated institution created to promote local investment in Albania.

3. Subnational PDBs and DFIs: Most subnational PDBs and DFIs concentrate their operations in their jurisdiction at the subnational level. However, in some notable cases, subnational governments have joined forces to create their own PDB to serve local governments throughout the national territory.
   A. **Subnational operational scope:** Given a lack of adequate finance for projects and investments in their own local jurisdiction, some local governments have created their own local DFI to boost local development. Brazil and Vietnam have established quite a few subnational development banks—19 and 18 respectively. For instance, Brazil has different kinds of subnational banks. The country is a federation divided into states, all of different sizes, demography, and levels of income. Most Brazilian states possess a type of development bank or agency that meets the qualification criteria of PDBs and DFIs established in this paper. The large and mature Banco de Desenvolvimento de Minas Gerais (BDMG) or the smaller Agência de Fomento do Amapá (AFAP) exemplify this case. But we can also identify the case of the Banco Regional de Desenvolvimento do Extremo Sul (BRDE), which was founded on the initiative of the three Brazilian states that comprise the South region of the country. Despite being an official geographical division of the country, the South region does not contain any official political administration at this level. Therefore, the bank was created by the union of different states, and because these are decentralized government entities the origin of the bank's capital is classified as local government. Alongside the major national institutions, these two countries have set up local banks that channel financing to subnational territories. In addition, the recent development of a network of so-called "green banks" in the US by local entities is following that same philosophy.
   B. **National:** As a rare but interesting case, local governments in five countries have jointly set up their own subnational PDBs and DFIs to operate in the entire territory to the benefit of sub-sovereign entities; this finances the local governments themselves. Just as countries within a region aggregate their forces in a regional bank to appear financially stronger than each member individually, local governments can do the same at the national scale. We identified only five institutions in this category: Iller Bankasi in Turkey, Agence France Locale in France, MuniFin in Finland, Kommuninvest in Sweden, and KommuneKredit in Denmark. At a time when decentralization is being highlighted as a potential key factor in order to efficiently manage, at the territorial level, the challenges of the transition toward the 2030 agenda, the small number of institutions dedicated to this specific mandate is probably questionable.

4.3. Asset size of PDBs and DFIs

As much as we have succeeded in identifying 527 PDBs and DFIs worldwide, the collection of key financial information, such as the

[11] AFD of France is devoted to international financing, but it also has the mandate to finance French overseas territories, which are formally administrative department or regions of France. Setting aside this idiosyncratic historical reason, we classify AFD into the subcategory of "primarily international financing."

size of their balance sheet, is still a challenge. For those banks publishing annual activity reports, or disclosing their annual accounts on their website, we conducted a systematic collection with the support of a team of analysts trained for this purpose. However, quite a few banks do not publish this information, or publish it with substantial delays. We identified 449 banks (85%) with proper data, which we will analyze in this subsection.

We use total assets as a criterion to classify PDBs and DFIs into five size categories: mega (more than $500 billion), large (more than $100 billion and less than or equal to $500 billion), medium (more than $20 billion and less than or equal to $100 billion), small (more than $500 million and less than or equal to $20 billion), and micro (less than or equal to $500 million).

It is particularly important to isolate the "mega" category, as their size could be predominant and cause a bias to our analysis. As a matter of comparison, according to the S&P Global Market Intelligence report, the number of private banks worldwide that have reported assets of more than $500 billion was only 57.[12]

Table 5 presents the distribution of PDBs and DFIs by asset size. It shows that the Pareto principle[13] is robust: a few (6%) mega and large banks possess 84% of total assets. A closer look at the distribution reveals that mega banks (representing just 2% of the sample) own 65% of total assets. Table 6 lists the top 10 PDBs and DFIs.

The relative size of PDBs and DFIs is as important as their absolute size. It could be possible that though the absolute size of certain PDBs and DFIs is modest, they have substantial weight in relative terms in their respective countries or regions. We use total assets as a percentage of GDP in a given country or region to evaluate the relative size of PDBs and DFIs. Table 7 indicates that even though in absolute terms many PDBs and DFIs are very small, in relative terms they may carry substantial weight in their respective countries or regions.

Note: Due to a lack of data about GDP at the subnational level, we exclude subnational PDBs and DFIs in the above analysis.

Table 5
Distribution of PDBs and DFIs by asset size.

Category of Absolute Size	Number of PDBs and DFIs (1)	Percentage (2)	Total Assets (billion USD) (3)	Percentage (4)
Mega	9	2.00%	12,118.26	64.83%
Large	18	4.01%	3547.29	18.98%
Medium	47	10.47%	2195.85	11.75%
Small	209	46.55%	803.59	4.30%
Micro	166	36.97%	26.40	0.14%
Total	**449**	**100%**	**18,691.39**	**100%**

Table 6
The top ten PDBs and DFIs.

Rank	Name of PDB	Country	Acronym	Establishment Year	Total Assets (billion USD)
1	Federal National Mortgage Association	US	Fannie Mae	1938	3503
2	China Development Bank	China	CDB	1994	2370
3	Federal Home Loan Mortgage Corp	US	Freddie Mac	1970	2203
4	Agricultural Development Bank of China	China	ADBC	1994	1007
5	Caisse des Dépôts et Consignations	France	CDC	1816	683
6	Export-Import Bank of China	China	ChinaExim	1994	656
7	European Investment Bank	–	EIB	1958	623
8	Kreditanstalt für Wiederaufbau	Germany	KfW	1948	568
9	Cassa de Depositi y Prestiti	Italy	CDP	1850	504
10	The World Bank	–	WB	1944	472

Table 7
Descriptive statistics of the relative size of PDBs and DFIs by categories of absolute size.

Category of Absolute Size	Observations	Average	Standard Deviation	Maximum	Minimum	Median
Mega	8	14.98%	7.60%	25.15%	4.60%	15.53%
Large	13	8.44%	5.78%	18.53%	2.38%	6.91%
Medium	33	5.34%	5.28%	24.44%	0.21%	3.53%
Small	152	2.83%	7.79%	13.60%	0.03%	0.99%
Micro	108	2.07%	5.32%	42.31%	0.00%	0.31%

[12] S&P Global Market Intelligence, "The World's 100 Largest Banks, 2020," April 7, 2020, https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/the-world-s-100-largest-banks-2020-57854079.

[13] The Pareto principle, or the 80–20 rule, stipulates that 80% of the effects are the product of 20% of the causes.

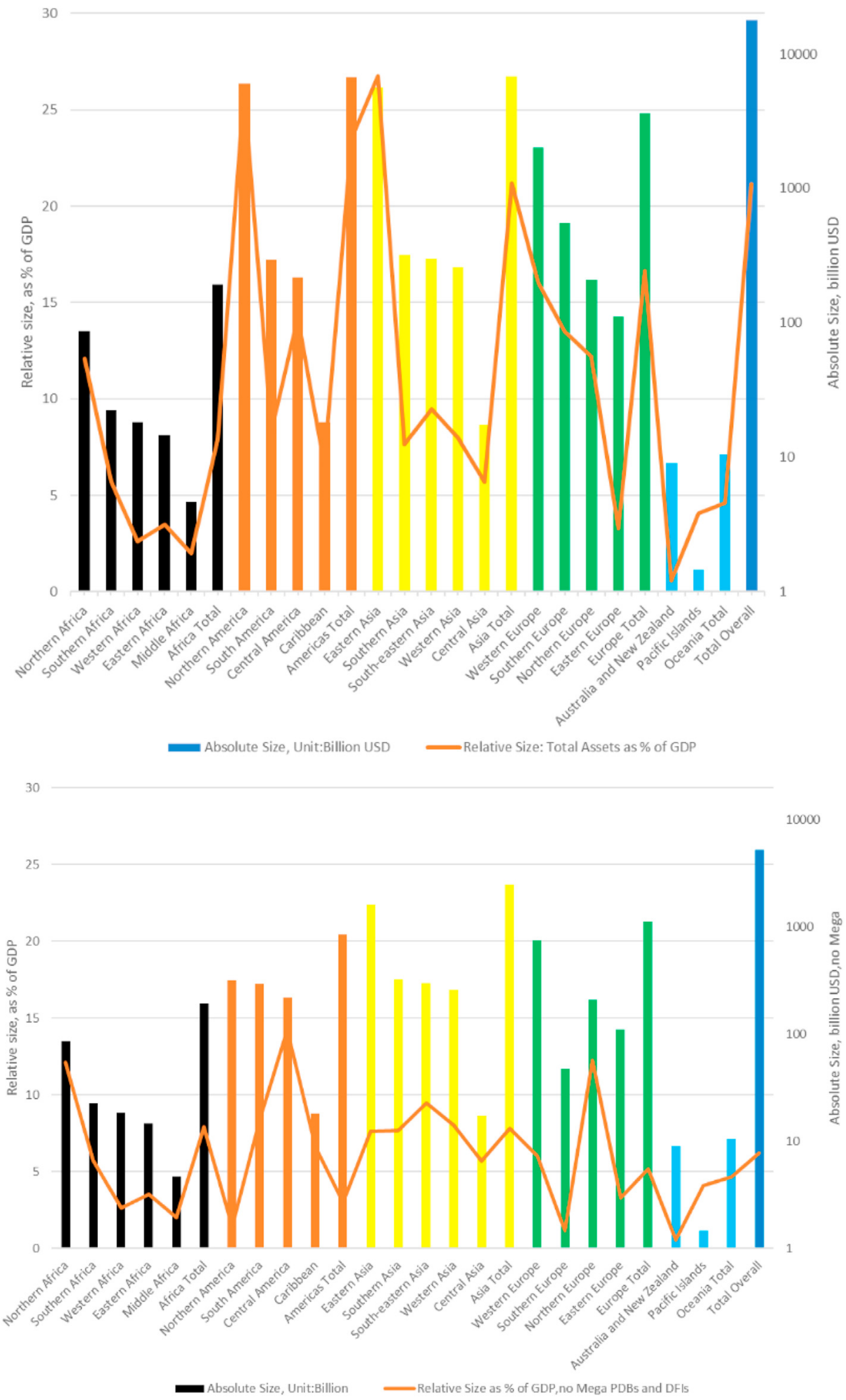

Fig. 2. Comparison between the Absolute Size and Relative Weight of PDBs and DFIs by Subregion (with and without mega PDBs and DFIs)
Note: The scale of absolute size is adjusted by common logarithm.

Furthermore, we would like to compare the absolute weight of PDBs and DFIs with the relative weight by subregion. To evaluate the relative weight of PDBs and DFIs in each region or subregion, we calculate the aggregate total assets of all PDBs and DFIs in a specific region or subregion divided by the total GDP of all countries in that region or subregion.

Fig. 2 compares the economic weight of PDBs and DFIs by subregion. The right axis presents in the bar chart the absolute size of assets—on a logarithmic scale to cope with the tremendous difference in size between banks—, while the left axis presents the relative weight (total assets as a percentage of GDP) by using the line chart. The inclusion of mega banks clearly shows that their weight is significant on a global scale, even in large economies such as the US or China. In the Northern America and Eastern Asia subregions, they account for 26% and 27% of the GDP of their respective subregion. The picture is dramatically different if we exclude mega banks. We then note that the relative weight is most significant in Central America, accounting for 14% of GDP, even though the absolute size is on a par with Northern America and South America. Another interesting conclusion can be drawn in Africa: although the continent concentrates some of the world's poorest countries, both the absolute size and the relative weight are small compared to the rest of the world. This is particularly compelling, as Africa is one of the regions in the world where the mandate and needs for PDB and DFI activities are most relevant, as compared to more mature economies with a lively private sector market. In the future, we can study what determines the weight of PDBs and DFIs in a given economy.

4.4. *Official mandate*

In this subsection, we use official mandates to classify PDBs and DFIs. The official mandate stands for the mission to fulfill a particular public policy that a PDB or DFI is mandated to carry out. These missions are often related to one or more financing needs for achieving the Sustainable Development Goals in a context in which private commercial banks or capital markets are not willing or able to fund such financing needs.

We first classify the official mandates into flexible or not. Flexible means that official mandates are not confined to a specific mission. It also includes a few PDBs and DFIs that focus on more than two sectors or segments. If they are not flexible, we further classify them by specific sectors or clients, including rural and agricultural development, promoting exports and foreign trade, social housing, infrastructure, international financing of private sector development, local government, and micro, small, and medium-sized enterprises. We have identified seven main types of mandates:

- **General Development (FLEX):** PDBs and DFIs with a flexible development mandate are mandated to support social, economic, and environmental development without confining their missions to specific sectors or clients. This type of PDB is usually very large. Representative cases include CDB in China, KfW in German, and many MDBs.
- **Rural and Agricultural Development (AGRI):** Agricultural development banks or financial institutions, with a specific mandate to support the agricultural industry and mostly concerned with small-scale family farming, since agriculture is certainly the key sector, while the price of agricultural products is volatile and the income of farmers is relatively low. Agricultural PDBs can be as big as the Agricultural Development Bank of China, with $1 trillion of total assets, or as small as the Banco Agropecuario in Peru, with a size of $96 million.
- **Promoting Exports and Foreign Trade (EXIM)**: Exim banks use financial facilities such as letters of credit, forfaiting, and export factoring to promote trade. Forty countries have established an Exim bank.
- **Social Housing (HOUS)**: This type of PDB or DFI specializes in financing buildings or housing, most often for underprivileged populations. To provide social housing, PDBs and DFIs utilize financial instruments both in the "primary market" with traditional mortgage lending and in the "secondary market" with mortgage-based securities and asset-based securities to facilitate the liquidity of the mortgage market. Two mega banks, Freddie Mac and Fannie Mae, fall into the latter category, with $2.2 trillion and $3.5 trillion in total assets respectively. See Box 6 for a brief analysis of Freddie Mac and Fannie Mae.
- **Infrastructure (INFRA)**: Infrastructure financing is often characterized by long-term, large-scale, and high-uncertainty projects, so commercial banks and private capital markets alone are unwilling or unable to fill the infrastructure financing gap. Specialized PDBs are DFIs are established to fill the infrastructure deficit. Typical cases are the Asian Infrastructure Investment Bank (AIIB) and PT Sarana Multi Infrastruktur in Indonesia.
- **International Financing of Private Sector Development (INTL):** This group of PDBs and DFIs specializes in financing private or public companies (commercially managed), rather than providing financial support to sovereign governments. A typical example is the International Finance Corporation at the World Bank Group. European countries in particular have created a strong network of DFIs to promote the private sector abroad or to accompany their own national actors in investing in emerging or low-income economies.
- **Local Government (LOCAL):** Considering the growing importance of the megalopolis and the role of cities in delivering infrastructure, transport, housing, jobs, and a decent life to many, it is worth identifying PDBs and DFIs that serve local governments. Local governments usually face more challenges compared with central governments in raising funds to finance key sectors such as primary education and municipal utilities. Some governments have established specialized financial institutions to finance municipalities, states, and local governments. Typical PDBs and DFIs include Iller Bankasi in Turkey, KommuneKredit in Denmark, and the Cities and Villages Development Bank in Jordan. Some international institutions also provide financing to local governments.
- **Micro, Small, and Medium-sized Enterprises** (**MSME**): This group of PDBs and DFIs is devoted to financing micro, small, and medium-sized enterprises. Typical cases include the Banque Publique d'investissement (BPI) in France, the Business Development Bank of Canada, the Industrial Bank of Korea, the Small Enterprise Finance Agency in South Africa, and the Small Industries Development Bank of India.

Fig. 3 presents the distribution of PDBs and DFIs by official mandate. PDBs and DFIs with FLEX mandate are the main type, accounting for 35%. In terms of single-mandate PDBs and DFIs, MSME mandate is the most popular one, accounting for 28%, followed by EXIM (9%), AGRI (8%), HOUS (8%), INTL (6%), INFRA (5%), and LOCAL (3%).

However, when total assets are factored in, the relative weight of PDBs and DFIs changes significantly for MSME and HOUS, with the former's share shrinking from 28% to 5%, and the latter's increasing from 8% to 36%. Given the gigantic size of mega banks, we exclude mega banks to analyze the relative weight of PDBs and DFIs by mandate. It turns out that the pattern still holds. This indicates that HOUS-focused PDBs and DFIs may have larger total assets on average (see Fig. 4).

Furthermore, we would like to analyze whether the size of total assets varies across different mandates. Table 8 shows that on average HOUS-focused PDBs and DFIs have the largest total assets, whereas INFRA, INTL, and MSME-focused PDBs and DFIs have modest total assets, at about 5% of that of HOUS-focused ones. Another interesting finding is that INFRA, INTL, and MSME-focused PDBs and DFIs have relatively small variation in their size within the subcategory, whereas HOUS, FLEX, and AGRI-focused PDBs and DFIs have relatively large variation in their size.

4.5. National PDBs and DFIs by income levels

In this subsection, we analyze whether national PDBs and DFIs from countries with different income levels present any distinctive patterns. Here we adopt the World Bank's income level classification, which classifies countries into four categories: high-income

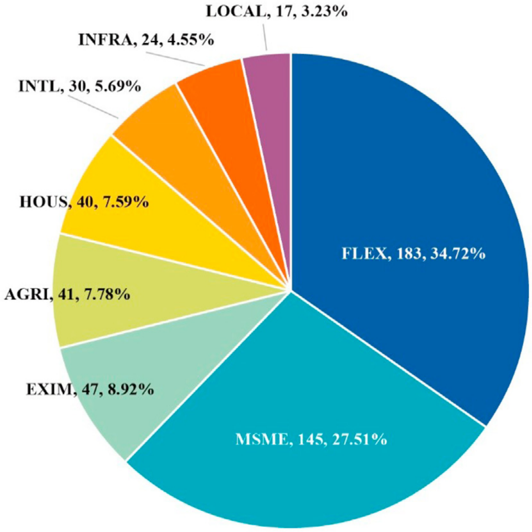

Fig. 3. Distribution of PDBs and DFIs by official mandate.

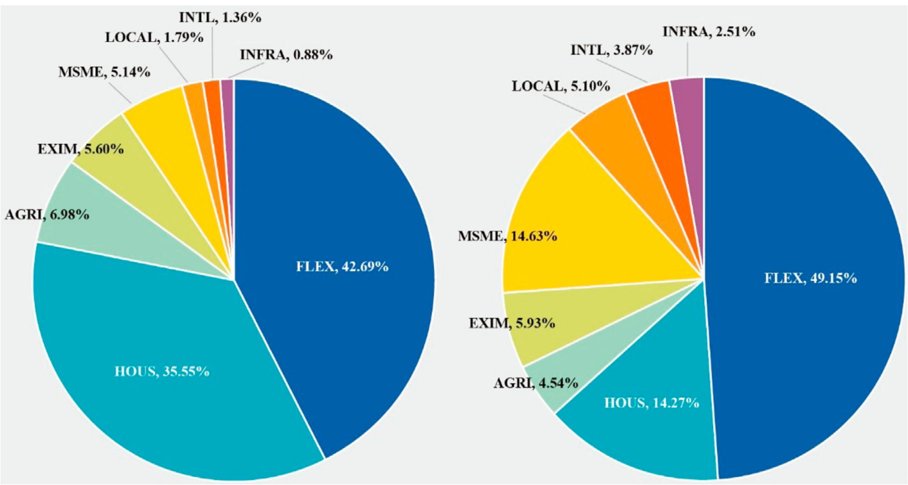

Fig. 4. Distribution of PDBs and DFIs' Assets by Official Mandate (with and without mega PDBs and DFIs).

Table 8
Summary statistics of PDBs and DFIs's total assets by official mandate.

Classifications		Official Mandate							
		FLEX	AGRI	EXIM	HOUS	INFRA	INTL	LOCAL	MSME
Panel A	Obs	157	34	43	35	18	28	15	119
Statistics (unit: Billion USD)	Mean	50.82	38.37	24.33	189.86	9.16	9.09	22.34	8.08
	Min	0.002	0.019	0.060	0.048	0.021	0.017	0.005	0.002
	Max	2370.31	1006.53	656.38	3503.32	50.75	99.26	83.97	275.53
	Std	215.86	172.59	99.89	686.03	16.86	22.73	27.23	32.86
	Median	1.41	1.20	3.42	5.32	0.96	1.32	4.89	0.54
Panel B	Mega	5	1	1	2	0	0	0	0
Number of PDBs and DFIs by Size	Large	12	1	0	3	0	0	0	2
	Medium	13	2	6	5	4	2	6	9
	Small	66	18	27	16	6	20	6	50
	Micro	61	12	9	9	8	6	3	58

countries (HICs), upper middle-income countries (UMICs), lower middle-income countries (LMICs), and low-income countries (LICs).

Table 9 shows that a majority of countries have established national PDBs and DFIs across different income levels. In terms of the average number of national PDBs and DFIs, LICs have 0.8 PDBs and DFIs, LMICs have 2.4, UMICs have 2.0, and HICs have 2.0. LICs have the lowest average number of national PDBs and DFIs. 29 LICs have just 18 PDBs and DFIs. This may imply that these countries may severely depend on bilateral and multilateral donors to enhance development rather than their own PDBs and DFIs. In terms of the relative weight of PDBs and DFIs at different income levels (as measured by total assets of PDBs and DFIs as a percentage of aggregate GDP in each income group), when including mega PDBs and DFIs, their weight is as high as 20% in HICs and UMICs, much higher than other income levels. But when excluding mega PDBs and DFIs, the relative weight is the highest in LMICs, accounting for 7%.

Table 10 shows that all mega and large national PDBs and DFIs come from HICs and UMICs, whereas LICs only have small and micro ones. It is worth noting that more than half of national PDBs and DFIs from LICs have not disclosed data on total assets. They are likely to be small in terms of their asset size.

Table 11 shows that INTL-focused national PDBs and DFIs are all from HICs, as it is one of the ways through which development finance is channeled, especially in Europe. One rationale may be that HICs are abundant in capital, but investing in emerging economies and developing countries entails greater uncertainty and higher risks. Hence, HICs established INTL-focused PDBs and DFIs to overcome the first-mover challenge. But there are very few AGRI-focused national PDBs and DFIs from HICs, as their cooperative systems are full-fledged, smallholder farms are being phased out, and private banks provide direct financing to large-scale agriculture. More than half of national PDBs and DFIs from LICs have flexible mandates, probably because there are various market failures at early development stages and such market failures evolve as LICs move to more advanced stages of economic development. MSME-focused national PDBs and DFIs are evenly distributed across HICs, UMICs, and LMICs, as MSMEs are everywhere the backbone of the economy. INFRA-focused

Table 9
Distribution of national PDBs and DFIs by income level.

Income Level (1)	Number of Countries (2)	Number of countries with PDBs or DFIs (3)	Percentage of countries with PDBs or DFIs (4)	Number of National PDBs and DFIs (5)	Number of National PDBs and DFIs per Country (6)	Economic Weight as % of GDP (7)	Economic Weight as % of GDP, no Mega PDBs and DFIs (8)
HICs	62	50	80.6%	122	2.0	19.6%	5.8%
UMICs	55	41	74.5%	108	2.0	19.2%	3.4%
LMICs	49	41	83.7%	116	2.4	6.7%	6.7%
LICs	29	18	62.1%	23	0.8	2.0%	5.8%
Total	**195**	**150**	**76.9%**	**369**	**1.9**	**18.5%**	**5.1%**

Table 10
Distribution of the number of national PDBs and DFIs (by income level) and multinational ones by size category.

Classification	Income Levels								Multinational	
	HICs		UMICs		LMICs		LICs			
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Mega	5	4.10%	3	2.78%	0	0.00%	0	0.00%	1	2.13%
Large	12	9.84%	1	0.93%	0	0.00%	0	0.00%	3	6.38%
Medium	16	13.11%	12	11.11%	5	4.31%	0	0.00%	8	17.02%
Small	51	41.80%	56	51.85%	41	35.34%	4	17.39%	27	57.45%
Micro	26	21.31%	29	26.85%	47	40.52%	6	26.09%	6	12.77%
Undisclosed	12	9.84%	7	6.48%	23	19.83%	13	56.52%	2	4.26%
Total	**122**	**100%**	**108**	**100%**	**116**	**100%**	**23**	**100%**	**47**	**100%**

Table 11
Distribution of the number of national PDBs and DFIs (by income level) and multinational ones by official mandate.

Classification	Income Levels								Multinational	
	HICs		UMICs		LMICs		LICs			
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
FLEX	30	24.6%	36	33.3%	37	31.9%	13	56.5%	21	44.7%
AGRI	4	3.3%	15	13.9%	16	13.8%	5	21.7%	1	2.1%
EXIM	21	17.2%	12	11.1%	8	6.9%	1	4.3%	5	10.6%
HOUS	14	11.5%	13	12.0%	10	8.6%	1	4.3%	1	2.1%
INFRA	1	0.8%	2	1.9%	9	7.8%	0	0.0%	4	8.5%
INTL	17	13.9%	0	0.0%	0	0.0%	0	0.0%	13	27.7%
LOCAL	4	3.3%	4	3.7%	3	2.6%	0	0.0%	0	0.0%
MSME	31	25.4%	26	24.1%	33	28.4%	3	13.0%	2	4.3%
TOTAL	**122**	**100.00%**	**108**	**100.00%**	**116**	**100.00%**	**23**	**100.00%**	**47**	**100.00%**

national PDBs and DFIs are more concentrated in LMICs. It is worth investigating in the future why and how the mandates of PDBs and DFIs in countries with different income levels may vary, as countries face different development challenges when they move toward more advanced stages.

4.6. Development trends of PDBs and DFIs

The rapid industrialization of continental Europe in the nineteenth century was fueled by prototypes of modern DFIs that provided large-scale and long-term finance (Diamond, 1957; Gerschenkron, 1962). One example is the Crédit Mobilier founded in 1852 in France, described as "a potent force for economic development" (Cameron, 1953, 488) in Europe providing much-needed infrastructure financing. It later became the model for similar government-supported financial institutions across Europe (Cameron, 1953; Collister, 2007).

The number of newly established PDBs and DFIs exhibits a rise, plateau, and peak pattern following World War II (see Fig. 5). PDBs and DFIs sprang up in the wake of WWII because developing countries in Asia, Africa, and Latin America were eager to achieve faster industrialization and create their own national development banks after gaining political independence. But this momentum stalled in the 1980s when development banks came under fire in the broader context of prevailing free-market-oriented neoliberalism. This plateau was followed by a peak in the 1990s when newly independent Eastern European countries established PDBs and DFIs after the collapse of the former Soviet Union to channel international financial support and generate confidence and accountability.

Recently, the world is witnessing a renaissance of PDBs and DFIs at both the international and national levels. To fill the vast infrastructure financing gaps in developing countries and shape the international development finance system (Xu, 2018), China has taken a leadership role in creating the Asian Infrastructure Investment Bank (AIIB) and the New Development Bank. Both developed countries and developing countries have recently established or plan to establish PDBs and DFIs. From 2019 to 2021, at least 8 new PDBs

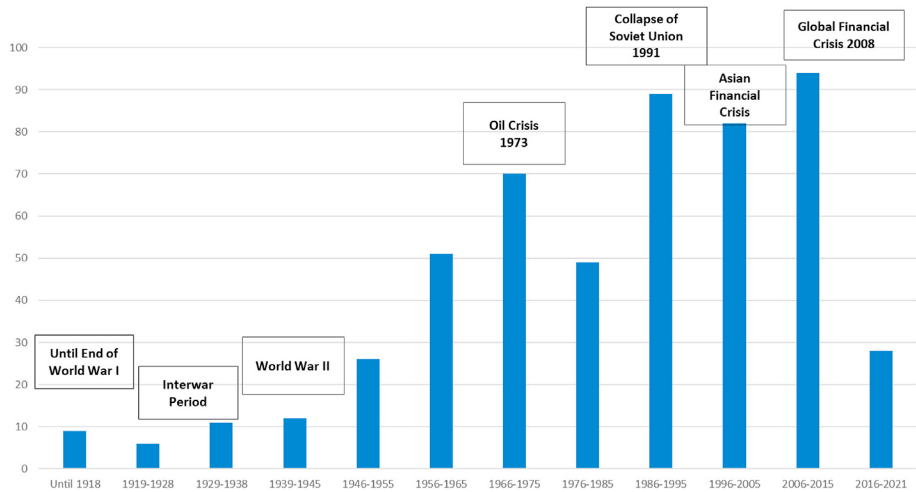

Fig. 5. Number of Newly Established PDBs and DFIs
Note:1. In terms of time periods, we have chosen the following divisions: i) until the end of World War I (WWI); ii) the interwar period, divided by decade; (iii) World War II (WWII); and iv) the period from the end of WWII in 1946 to the present day, divided by decade.
2. The graph above represents institutions that have remained active to the present day, meaning that development banks that were created and subsequently liquidated, for a variety of reasons, are not captured here.

and DFIs have been established. They are the U.S. International Development Finance Corporation (a consolidated agency that brings together the capabilities of the Overseas Private Investment Corporation and the U.S. Agency for International Development's Development Credit Authority), the Banco del Bienestar in Mexico, the Banque Nationale d'Investissement of Guinea, the Scottish National Investment Bank, the UK Infrastructure Bank, and the National Bank for Financing Infrastructure and Development in India. The European Union also emphasized the role of national public banks to facilitate growth and long-term investment, in particular to serve national development strategies (European Union, 2015).

Looking ahead, as policymakers are attaching more and more importance to PDBs and DFIs, it is of paramount importance to ensure that PDBs and DFIs, which are aimed at addressing market failures, are well designed and managed so that they can avoid government failures and steer clear of the pitfalls of past failures and realize their full potential.

5. Conclusion

To build the first global database on PDBs and DFIs, we propose five qualification criteria to distinguish PDBs and DFIs from similar institutional arrangements such as government credit programs, aid agencies, and state-owned commercial banks with policy functions. The five refined qualification criteria are: (1) being a stand-alone entity; (2) deploying fund-reflow-seeking financial instruments as the main products and services; (3) funding sources go beyond periodic budgetary transfers; (4) having a proactive public policy-oriented official mandate; and (5) government steering of corporate strategies.

In total, we have identified 527 PDBs and DFIs worldwide from 150 countries. This indicates that PDBs and DFIs are prevalent worldwide. We then take a step further to collect the firsthand data on the ownership structure (who owns them), geographical operation (where they operate), asset size (how large their total assets are), official mandate (what they aim to do), and income levels of their home countries (for national PDBs and DFIs, which income level their home country belongs to). This enables us to present the stylized facts of worldwide PDBs and DFIs for the first time and reveal the vast diversity within the PDB and DFI family.

Moving forward, we will periodically apply the five qualification criteria to identify PDBs and DFIs worldwide, and update the list to incorporate new ones and delete those that have been commercialized or abolished. Meanwhile, we plan to use diverse data collection methodologies—including manual data collection, machine learning, and expert verification—to collect and triangulate the publicly available quantitative variables such as financial indicators. We hope that our persistent effort to build the first global database on PDBs and DFIs will lay the foundation for rigorous academic and policy research in the future.

Declaration of competing interest

We declare no conflicting interests in producing the paper titled "What are Public Development Banks and Development Financing Institutions ?——Qualification Criteria, Stylized Facts and Development Trends".

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Appendix I. A Review of Existing Definitions

Tables I–1
DFI Definitions in the Academia

Author(s)	Definition of DFIs	Journal/Book	Year
Paul E. Roberts, Jr.		Economic Development and Cultural Change	1971

(continued on next page)

Tables I–1 (*continued*)

Author(s)	Definition of DFIs	Journal/Book	Year
	"Development banks are unique financial institutions in under-developed countries, specialized in providing high-risk, long-term financing for the purpose of industrialization."		
M. O. Odedokun	"Directed credit policies are those that affect the distribution of a given quantum of credit, through government intervention in the credit market, among different categories of borrowers … DFIs have been perhaps the most common means of directing credit."	Journal of Development Economics	1996
Beatriz Armendariz de Aghion	"Development banks are government-sponsored financial institutions concerned primarily with the provision of long-term capital to the industry."	Journal of Development Economics	1999
Christa Hainz; Stefanie Kleimeier	"Development banks provide a so-called 'political umbrella' that use their leverage to influence governmental decisions and deter adverse events that would negatively affect the projects outcome."	Journal of Financial Intermediation	2012
Sergio G. Lazzarini; Aldo Musacchio, Rodrigo Bandeira-De-Mello; Rosilene Marcon	"State-owned development banks are controlled by national governments and generally have a mandate to support local business activity."	World Development	2015
Ernani Torres; Rodrigo Zeidan	"National Development Banks (NDBs) were created for bridging long-term financing need in industrialized and less developed countries."	The Quarterly Review of Economics and Finance	2016
Joao Carlos Ferraz	"… development banks as the financial or banking institutions that are controlled by national states and have mandates over market segments or specific sectors and/or over specific regions to induce growth, development and structural change."	Efficiency, finance, and varieties of industrial policy	2017
Michael Brei; Alfredo Schclarek	"'development banks' refers to non-deposit-taking development banks that are owned by a local government"	The Future of National Development Banks	2018
Eduardo Fernández-Arias; Ricardo Hausmann; Ugo Panizza	"we define development banks as government-owned financial institutions that have the objective of fostering economic or social development by financing activities with high social returns."	Journal of Industry, Competition and Trade	2020

Tables I–2
DFI Definitions from the Perspective of Practitioners

Institutions	DFI Definitions
National Governments	
Indian Central Bank	"DFIs provide medium to long term finance to different sectors of the economy. These institutions have been set up to meet the growing demands of particular sectors, such as export, import, rural, housing and small industries, to cater to specific needs of various sectors of the economy."
Malaysian Central Bank	"DFIs established by the government with specific mandate to develop and promote key sectors that are considered of strategic importance to the overall socio-economic development objectives of the country, including agriculture, small and medium enterprises (SMEs), infrastructure, maritime, export-oriented sector as well as capital-intensive and high-technology industries."
International Organizations	
World Bank (Diamond, 1957)	The development bank is "defined as an institution to promote and finance enterprises in the private sector … In a privately-owned but governments-sponsored development bank, the profit motive may be diluted by more general objectives consistent with governmental policy."
World Bank (De Luna-Martínez and Vicente, 2012)	"a bank or financial institution with at least 30 percent state-owned equity that has been given an explicit legal mandate to reach socioeconomic goals in a region, sector or particular market segment"
World Bank (De Luna-Martínez et al., 2017)	"… the term DB [development bank] will refer to any type of financial institution that a national government fully or partially owns or controls and has been given an explicit legal mandate to reach socioeconomic goals in a region, sector, or market segment."
Inter-American Development Bank (Yeyati et al., 2007)	"… development banks are often described as 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."
UNCTAD (2015)	Development banks "have a clear mandate to support development-oriented projects that typically require long-term finance and a funding base whose liabilities are predominantly long term and thus aligned with their mandate."
EDFI	"Development Finance Institutions (DFIs) are specialized development organizations that are usually majority owned by national governments. DFIs invest in private sector projects in low and middle-income countries to promote job creation and sustainable economic growth."

Appendix II. Principles for Building a Reliable and Comprehensive List of PDBs and DFIs

To ensure that we build a credible list of PDBs and DFIs, we propose the following three principles: conceptual clarity of qualification criteria, implementation consistency of operational indicators, and case-by-case verification of difficult cases. We elaborate on each principle as follows.

First, the conceptual clarity of the qualification criteria is crucial in distinguishing PDBs and DFIs from other institutional arrangements. Grasping the core features of PDBs and DFIs helps avoid proposing a working definition that is so broad as to include institutional arrangements such as state-owned commercial banks with public policy functions in practice. We also want to avoid a definition so narrow that it excludes certain entities that possess essential PDB and DFI features but exhibit some characteristics that are atypical in conventional ones, such as deposit-taking financial institutions established by governments with an explicit development-oriented mandate, like financial inclusion. The analysis boils down to the fundamental question of what PDBs and DFIs are. To answer this question, we need to distinguish identity from modality. Identity refers to the defining features of PDBs and DFIs that distinguish them from other institutional arrangements, such as government credit programs, aid agencies, and state-owned commercial banks. Modality refers to different features within the PDB and DFI family that reveal their vast diversity. In the present paper, we use qualification criteria to capture the identity of PDBs and DFIs, which we explain in Section III. Then we use different analytical dimensions of modality to classify PDBs and DFIs into different subcategories in Section IV. In short, the conceptual clarity of the qualification criteria is crucial in distinguishing *identity* from *modality* and to avoid making an unduly broad or narrow list.

Second, it is important to ensure implementation consistency in applying the operational indicators of the qualification criteria to avoid arbitrary decisions on whether to include some entities in our database. One pitfall in building our database would be to include some entities from certain types of institutional arrangements but exclude others within the same type without providing justification. For instance, cooperative banks and microfinance institutions may often have development-oriented mandates, but not all of them are qualified as PDBs and DFIs if they are not initiated by governments. To avoid making such an error, we need to apply the qualification criteria in a consistent manner.

Finally, dealing with difficult cases requires case-by-case screening. Though it is important to apply the qualification criteria in a consistent manner, it is also misleading to apply these criteria in a mechanical way. Borderline or exceptional cases require a judgment call based on professional knowledge. In such circumstances, the decision to include or exclude from the PDB and DFI list needs justification when such a decision goes against the standardized operational criteria. This verification process helps ensure the transparency of our database-building procedure and encourages dialogue with experts and practitioners on ways to improve our database.

In summary, we follow the principles of conceptual clarity of qualification criteria, implementation consistency of operational indicators, and case-by-case verification of difficult cases to build a comprehensive list of PDBs and DFIs in a reliable manner. To the best of our knowledge, our effort is the first of its kind.

Appendix III. DFI and DFI-Like Associations

1. World Federation of Development Finance Institutions (WFDFI)

WFDFI was founded in 1979 and is made up of organizations from the AADFI, ADFIAP, ALIDE, and ADFIMI. WFDFI's mission is “to serve as the global focal point for institutions providing and promoting sustainable development finance.”

Source: https://wfdfi.net/, accessed May 13, 2019.

2. Association of African Development Finance Institutions (AADFI)

AADFI was founded in 1975 with support from the African Development Bank. The secretariat is located in Abidjan, Côte d’Ivoire, and it boasts 82 members. The mission of AADFI is to promote social and economic development of Africa through cooperation among DFIs and to accelerate economic integration and mutual learning.

Source: http://adfi-ci.org/, accessed April 27, 2019.

3. Association of Development Financing Institutions in Asia and the Pacific (ADFIAP)

ADFIAP was established in 1976 with support from the Asian Development Bank. It currently has 131 members in 45 countries. The secretariat is located in Manila, Philippines. The mission for ADFIAP is to promote sustainable development by enhancing the function of DFIs in the Asia-Pacific region.

Source: http://adfi-ci.org/, accessed April 27, 2019.

4. Association of National Development Finance Institutions in Member Countries of the Islamic Development Bank (ADFIMI)

ADFIMI was established in 1986 with support from the Islamic Development Bank. It is headquartered in Istanbul, Turkey. Currently it has 43 members in 17 countries. The mission of ADFIMI is to promote human development, trade, and economic development through the financial sector, especially by increasing the role of DFIs while respecting Islamic financial rules.

Source: https://www.adfimi.org/, accessed April 27, 2019.

5. Association of Development Finance Institutions in Latin America (ALIDE)

ALIDE was founded in 1968 with support from the Inter-American Development Bank. It represents DFIs in Latin American and the Caribbean, and its headquarters are located in Lima, Peru. It has 91 members in 22 countries. ALIDE is at coordinating the exchange of information among DFIs, which contributes to the economic development of the region and builds unity.

Source: http://www.alide.org.pe/en/alide/mision/, accessed April 27, 2019.

6. Association of Bilateral European Development Finance Institutions (EDFI)

EDFI was established in 1992 and represents 15 members in 14 countries in Europe. It is headquartered in Brussels, Belgium. EDFI aims to serve as a platform to facilitate knowledge sharing and cooperation among its members.

Source: https://www.edfi.eu/who-we-are/edfi/, accessed April 27, 2019.

7. Global Network of Export-Import and Development Finance Institutions (G-NEXID)

G-NEXID was launched in 2006 in Geneva. The mission of G-NEXID is to promote coordination of EXIM banks and trade in the Global South, which contributes to expanding the presence of developing countries in global value chains.

Source: https://gnexid.com/mission-statement/, accessed April 27, 2019.

8. International Development Finance Club (IDFC)

IDFC was established in 2011 at the annual meeting of the World Bank and IMF and with the support of DFIs such as AFD. The secretariat is located in Paris, France. The IDFC has 24 members and NDFIs in 17 countries, as well as regional DFIs in the Americas, Africa, Asia, and Europe. IDFC aims to be a platform that promotes SDGs and implements the Paris Climate Agreement agenda worldwide.

Source: https://www.idfc.org/, accessed April 27, 2019.

9. Southern African Development Community-Development Finance Resource Center (SADC-DFRC)

SADC was formed in 1980 as the Southern African Development Coordinating Conference (SADCC). In 1992, the SADCC transformed to SADC, with its secretariat located in Gaborone, Botswana. Currently SADC-DFRC has 41 members. The aim for SADC is to promote peace, security, poverty reduction, and the economic development of the region and to improve the lives of people in southern Africa.

Source: https://www.sadc.int/about-sadc/overview/, accessed April 27, 2019.

10. European Association of Guarantee Institutions (AECM)

AECM was established in 1992 with five founding countries – Belgium, France, Germany, Italy, and Spain. As of now, it contains 48 members covering 34 countries. The secretariat is located in Brussels, Belgium. "Its members are mutual, private sector guarantee schemes as well as public institutions, which are either guarantee funds or Development banks with a guarantee division." The mission of AECM members is "providing loan guarantees for SMEs who have an economically sound project but cannot provide sufficient bankable collateral."

Source: <u>http://aecm.eu/about/mission/,</u> accessed April 27, 2019

11. European Association of Public Banks (EAPB)

EAPB is comprised of "national and regional promotional banks, municipality funding agencies, and public commercial banks in Europe." EAPB members provide financial support to projects which contribute to the economic and social development of the continent and to a greener economy.

Source: <u>https://www.eapb.eu/who-we-are/our-mission.html,</u> accessed April 27, 2019.

12. Global Network of Guarantee Institutions (GNGI)

GNGI was formed in 2016 in order to alleviate the financing constraints of SMEs. The mission of GNGI is to promote guarantee institutions worldwide and to facilitate mutual learning and the exchange of experiences among members.

Source: <u>http://aecm.eu/wp-content/uploads/2017/08/3-Global-Network-of-Guarantee-Institutions-launching-declaration-revisionMadrid-01jun2017-final-to-be-signed.pdf,</u> accessed April 27, 2019.

13. Long-Term Investors Club (LTIC)

LTIC was founded in 2009 by KFW, Caisse des Dépots, Cassa Depositi e Prestiti, and the European Investment Bank. Currently it has 18 members covering 15 countries in Europe and Latin America. The secretariat is located in Luxembourg. The mission of LTIC is to promote coordination among international long-term investors for global economic development.

Source: <u>http://www.ltic.org/,</u> accessed April 27, 2019.

14. Network of European Financial Institutions for Small and Medium Sized Enterprises (NEFI)

NEFI was established in 1999 and represents 19 financial institutions in Europe. It is headquartered in Brussels, Belgium. "All NEFI members share a public mission to facilitate the access to finance for SMEs." NEFI aims to serve as a platform for mutual exchanges, knowledge transfers, access to finance for SMEs, and cooperation among its members.

Source: <u>http://www.nefi.eu/nefi/,</u> accessed April 27, 2019.

15. OECD Export Credit Agencies (OECD-ECA)

OECD-ECA represents 36 export credit agencies in 33 countries to facilitate the "[exchange of] information on members' export credits systems and business activities and [the discussion and coordination of] export credits policies." ECAs help "national exporters [compete] for overseas sales."

Source: <u>http://www.oecd.org/trade/topics/export-credits/,</u> accessed April 4, 2019.

16. Global Emerging Markets Risk Database Consortium (GEMs)

GEMs was established in 2009 as a joint initiative between the European Investment Bank (EIB) and the International Finance Corporation (IFC – World Bank Group). Since then, the GEMs consortium has grown to include 24 members comprised MDBs and DFIs. It aims to leverage data from Multilateral Development Banks and Development Finance Institutions to support investment and development.

Source: https://www.gemsriskdatabase.org/, accessed August 27, 2021.

Appendix IV. Data Sources, Data Collection Methodology, and Quality Control Methods

In this section, we describe data sources, data collection methodology, and quality control methods undertaken in our research. The aim is to ensure academic rigor throughout the data collection process and make the verification process as traceable as possible. This will lay the foundation for future original academic research.

IV.1 data sources

To collect data on PDBs and DFIs, we have relied primarily on official primary sources. Official primary sources include NDBs' official websites, annual reports, financial statements, charters, and other legal documents. To manually collect firsthand data from official primary sources, we have established a team of research assistants who are fluent in English, French, Portuguese, Spanish, Russian, Arabic, and other languages and who have backgrounds in finance and accounting.

IV.2 data collection methodology

Our data collection team consisted of (co-)principal investigator, research directors, a project manager, research assistants, and the research assistants' team leaders. This paper's manual data collection comprised the following steps:

1. Developing the data collection codebook. For each manually collected data point, we developed an indicator codebook, a data collection template, illustrative examples, and technical notes. The codebook provided a clear and precise definition of each variable and indicated the data sources and the collection method. The data collection template specified the content and the format that research assistants had to fill out. The illustrative examples used specific cases to show the data collection method and procedure as well as the collection result's presentation. The technical notes elaborated on core concepts and the requirements of filling out the template. Before developing the data collection manual for each data point, we held an in-depth discussion concerning the definitions and connotations of the indicators. We then selected representative cases for pretesting, which combined deductive and inductive approaches.
2. Training research assistants and pretesting data collection exercises. Before the formal data collection, we held a data collection training session for research assistants. This training covered the definitions and connotations of each variable, the collection methodology, the quality control methods, and the work plan. After the training, the research assistants conducted pretesting on, for example, 10 percent of the total number of NDBs. Those 10 percent were representative in terms of locations and development stages of their host countries and had complete public information. Immediately after pretesting, we held a feedback meeting to respond to questions the research assistants raised, to share experiences, and to sum up the common mistakes in the course of data collection to further improve the data collection codebook. This step helped ensure the data collection codebook fully took into account the heterogeneity of PDBs and DFIs to improve the quality of data collection.
3. Collecting data and conducting process tracing. During data collection, the research assistant must accurately record supporting evidence and report data sources using the format template to ensure each data point was verifiable, and the research directors monitored the research assistants' data collection process in real time so that they could respond promptly to any questions the research assistants raised.
4. Performing quality control of the data collection results. After the research assistants completed the data collection template, we summarized the data collected and performed four quality control steps, to be elaborated below.

IV.3 data quality control methods

To ensure the accuracy and reliability of the data collection process, we conducted four steps of data quality checks. In the first step, the project manager, who was responsible for monitoring the research assistants' data collection progress, checked whether the record of data sources and data formats was up to standard and ensured every data point had rigorously cited original data sources for verification. In the second step, the research assistant team leaders were responsible for verifying the accuracy of each data point collected by research assistants, and for double-checking whether "no information (NI)" on certain variables concluded by research assistants was true. The research directors performed the third step; they checked and evaluated the first two steps for pending data collection results and spot-checked the first two steps to ensure there were no problems with the data points. In the fourth step, the (co-) principal investigator comprehensively evaluated the results of the first, second, and third steps of the review process, then gave a final judgment on the pending cases.

Table 1 reports the distribution of PDBs and DFIs by geographical region at different ownership levels. Columns 1, 3, and 5 present the number of multinational, national, and subnational PDBs and DFIs respectively. Columns 2, 4, and 6 present the percentage of multinational, national, and subnational PDBs and DFIs in the total number of their respective subgroup. Columns 7 and 8 report the number of total PDBs and DFIs by geographical region and the respective percentage. Column 9 reports the number of countries in each geographical region. Column 10 reports the average number of national PDBs and DFIs per country.

Table 2 reports the summary statistics of different direct shareholders, including government agencies, PDBs and DFIs, other public entities, and private entities. Government agencies include ministries of central governments, local governments, and central banks. Private entities include the general public who own shares of PDBs and DFIs that are listed on stock markets.

Table 3 reports the summary statistics of majority shareholding by different types of direct shareholders. If PDBs and DFIs are owned by state-owned other public entities, which are often fully owned by governments, governments broadly defined act as their majority shareholder. Column 1 reports the number of PDBs and DFIs where the government owns more than 50% of their shares. Column 1 reports the number of PDBs and DFIs where the government fully owns their shares. Column 3 reports the number of PDBs and DFIs where privately-owned entities own more than 50% of their shares. Column 4 reports where privately-owned entities fully own their shares.

Table 4 reports the distribution of geographical operations of PDBs and DFIs grouped by different ownership levels. Column 1 reports the number of PDBs and DFIs that falls into each category. Column 2 reports the percentage of PDBs and DFIs in the full population.

Table 5 reports the distribution of PDBs and DFIs by asset size. We use total assets as a criterion to classify PDBs and DFIs into five size categories: mega (more than \$500 billion), large (between \$100 billion and \$500 billion – included), medium (between \$20 billion and \$100 billion), small (from \$500 million to \$20 billion), and micro (less than or equal to \$500 million). Note that the upper-bound value is included in each category. Column 1 reports the number of PDBs and DFIs that fall into each category. Column 2 reports the percentage of the number in the total. Column 3 reports the sum of total assets of PDBs and DFIs in each category, followed by the respective percentage in column 4.

Table 6 reports the top ten largest PDBs and DFIs in terms of their total assets. For multinational PDBs and DFIs, we leave the cell blank in the column on country.

Table 7 reports descriptive statistics of the relative size of PDBs and DFIs by the category of absolute size. The relative size is defined as the total assets of one national PDB or DFI as the percentage of the GDP of its home country. As some PDBs and DFIs do not disclose the information on their asset size, the observations do not sum up to the total number of national PDBs and DFI.

Table 8 reports the summary statistics of PDBs and DFIs's total assets by official mandate. Panel A reports the descriptive statistics of total assets of PDBs and DFIs in billions USD. Panel B reports the number of PDBs and DFIs by official mandate that fall into each category of absolute asset size. FLEX = general mandate; AGRI = Rural and agricultural development; EXIM = promoting exports and foreign trade; HOUS = social housing; INFRA = infrastructure; INTL = international financing of private sector development; LOCAL = local government; MSME = micro, small, and medium-sized enterprises.

Table 9 reports the distribution of national PDBs and DFIs by income level. Column 1 refers to country classification by income levels in line with the World Bank's criteria in the year of 2019. Column 2 reports the number of countries that falls into each income level. Column 3 reports the number of countries that have currently active PDBs and DFIs. Column 4 reports the percentage of countries that have PDBs and DFIs. Column 5 reports the number of national PDBs and DFIs in each income groups. Column 6 calculates the number of national PDBs and DFIs per country. Column 7 reports the sum of PDBs and DFIs' total assets as a percentage of aggregate GDP in each income group. Column 8 excludes mega PDBs and DFIs and then calculates the sum of remaining PDBs and DFIs' total assets as a percentage of aggregate GDP in each income group. HICs = high-income countries; UMICs = upper-middle income countries; LMICs = lower-middle income countries; LICs = low-income countries.

Table 10 reports the distribution of the number of national PDBs and DFIs (by income levels) and multinational ones by size category. HICs = high-income countries; UMICs = upper-middle income countries; LMICs = lower-middle income countries; LICs = low-income countries.

Table 11 reports the distribution of the number of national PDBs and DFIs (by income levels) and multinational ones by official mandate. HICs = high-income countries; UMICs = upper-middle income countries; LMICs = lower-middle income countries; LICs = low-income countries. FLEX = general mandate; AGRI = rural and agricultural development; EXIM = promoting exports and foreign trade; HOUS = social housing; INFRA = infrastructure; INTL = international financing of private sector development; LOCAL = local government; MSME = micro, small, and medium-sized enterprises.

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