

WHY DO COUNTRIES DEVELOP MORE FINANCIALLY THAN OTHERS? THE ROLE OF THE CENTRAL BANK AND BANKING SUPERVISION

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Abstract

We construct a new measure of financial development, through multivariate analysis, which includes several indicators of financial size and efficiency for 134 countries. Based on this broad measure, we assess empirically the determinants of financial development focusing on two factors not yet explored in the literature, namely the central bank role and bank regulation and supervision; and we explore the differences between emerging and industrial countries. The results show that a relatively large involvement of the central bank in the financial system contributes to financial development in all countries, other things given. In the industrial country group, both broader central bank objectives and a large LOLR mandate are found to be beneficial. For emerging countries, the central bank involvement in the payment system, as well as broader central bank objectives, seem to enhance financial development. Finally, high quality regulation and supervision, particularly supervisory independence, is beneficial in industrial countries. As for emerging ones, supervisory independence only contributes to financial development if a relatively solid institutional framework is in place

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1. INTRODUCTION

The renewed interest on the financial system reflects the view that its development helps countries achieve higher economic growth. In the last few years, the economic literature has made enormous progress in understanding the channels through which financial development fosters economic growth. However, large differences still exist on what is meant by financial development, because of the different dimensions that such concept can have (size, efficiency, etc) and the number of segments it may include (banking system, bond and stock markets, etc). While difficult to summarize all the information in a single indicator of financial development, it would nonetheless be useful for policymakers. This would allow them to take the measures fostering the financial system as a whole, and not specific sectors or aspects of it, perhaps in detriment of others. The first objective of the paper is, thus, to construct a comprehensive indicator of financial development, which includes all these different aspects.

In the same vein, there is still no single model of financial development, in terms of a widely accepted set of factors which contribute to it. This is particularly the case for institutional variables, due to the scarcity of underlying models formalizing the potential linkages between them and financial development, and the lack of data. Among the institutional factors which may influence the development of the financial sector, there are two which are potentially relevant but have hardly received any attention. One is the central bank, and the other is financial regulation and supervision. It can be easily argued that the central bank is the most important institution for the financial system, particularly if it is bank-based. Banks are largely affected by the way in which the central bank reacts not only when conducting monetary policy, but also when acting as lender of last resort, or when performing payments system functions; and this may be influenced by the objectives the central bank is to achieve. In addition, the way in which financial regulation and supervision is conducted is of crucial importance for financial institutions since they need to comply with that regulatory environment. The second objective of the paper is, thus, to assess empirically the role of these two institutional factors in fostering financial development.

The paper is organized as follows: After this short introduction, Section 2 reviews the existing literature on the definitions of financial development and its determinants, with particular attention to the role of the central bank and financial regulation and supervision. Section 3 sets out the objective of the paper. Section 4 describes the variables and data chosen. Section 5 presents the methodology used to construct this new definition of financial development and that of the regression analysis, as well as some stylized facts on the relation with the objective and the dependent variables. Section 6 describes the results and Section 7 draws some final conclusions.

2. THE DEFINITION OF FINANCIAL DEVELOPMENT AND ITS DETERMINANTS: A REVIEW OF THE LITERATURE

Financial development is a concept with several dimensions, some of which reflect the size of the financial system, and others its efficiency in intermediating funds. The literature has dealt with the former at length, and less so with the latter.

The **size of the financial system** can be measured in many different ways: the amount of funds it intermediates and processes, the number and range of firms and services it provides, and/or the economic resources it employs (World Bank 2001a). Existing definitions focus primarily on size, and have evolved from narrow to broader measures, as the variety of financial instruments and markets has increased. Among the narrowest definitions, the most widely used indicator for many years has been liquid liabilities (or M2) to GDP (McKinnon 1973). Another very commonly used definition of financial size and, to some extent, efficiency is the ratio of credit granted by the banking system to the

private sector relative to GDP (Levine and Zervos 1998, Levine, Loayza and Beck, 1999.)¹. In the same vein, the ratio of commercial bank to central bank assets measures to what extent funds are allocated productively, particularly in those emerging countries where the central bank is still a major player in the allocation of resources (King and Levine, 1993). Wider measures of financial size include the domestic capital markets (i.e. domestic bond issuance and stock market capitalization, Rajan and Zingales 1998). Although broad, the latter measure still misses some of the sources of financing, as inter-company financing², international financing (through interbank loans or bonds) and the informal financial sector³, but such data is not readily available for a large number of countries.

There is no single indicator of **financial efficiency** that can be applied to all markets. For the banking sector, the most widely used indicators are the net interest margin and the bank overhead cost, defined as the ratio of overhead costs to total assets (Demirguc-Kunt and Levine, 1999), and none of the two are perfect. The net interest margin is generally associated with tighter margins from greater competition, but also with low interest rates in developed countries, or macroeconomic volatility in emerging ones. Another more readily available indicator of bank efficiency is the inverse of the spread between banks' lending and deposit interest rates. Capital market efficiency is usually defined in terms of how much information is reflected in the prices of financial instruments (Fama and Sharpe, 1970). Ultimately, capital market efficiency depends on the depth, breadth and resilience of markets, which is very much related to their liquidity. The most frequently used measure of liquidity is the turnover, which gives the value of stock transactions relative to the size of the market (Demirguc-Kunt and Levine, 1996). In addition, the total value traded relative to GDP is also frequently used as a measure of market liquidity (Levine and Zervos, 1998), together with the bid-ask spreads. An additional variable may be the number of listed companies, which indicates the extent to which enterprises raise funds on the stock exchange (through IPOs).

As for the determinants of financial development, the literature has devoted most of the attention to macroeconomic and financial-system related ones, and much less so to institutional factors. However, institutions are key for the effective functioning of the financial system and its development since they affect their "infrastructure" and the environment in which they operate (World Bank, 2001a).

Among the many possibly relevant institutional factors, we consider two sets of particular importance, even if they have hardly received any attention. The first is the central bank, and the second financial regulation and supervision. While there is growing literature on the role of the **central bank** in macroprudential stability⁴, much less is known about its impact on the development of the financial system, other than indirectly by guarding price stability⁵. Among the central bank responsibilities, its involvement in the **payments system** appears as a key function for the functioning of the financial system in which the central bank should play a role (Sheppard 1996). For instance, the oversight function is widely accepted (BIS 2001) but not so much the direct operation of the payment system. Goodhart and Schoenmaker (1993) opine that the private sector can run the payment system, without any interference by the central bank, as long as it can obtain sufficient information with real-time monitoring to oversee financial institutions. In contrast, Summers (1991) argues in favor of an active role for the central bank in operating large value in payments system, because of the systemic risk involved, so that a safety net exists in case of malfunctioning of the system.

¹ There is another interesting twist to private credit: while its level reflects financial depth, its too rapid growth might be interpreted quite differently, being one of the most reliable indicators of financial crises in the empirical literature (McKinnon and Pill, 1997, Kaminsky and Reinhart, 1999).

² Demirguc-Kunt and Maksimovic (2001) find that firms tend to act more as providers of credit to their customers when the banking system is large and efficient and has a small proportion of public ownership of the banking system.

³ Informal finance is very important in many regions and, for certain groups, in almost all regions of the developing world (Besley, 1995).

⁴ García-Herrero (2002) assesses empirically the impact of the institutional setting of the central bank on bank unsoundness.

⁵ As will be mentioned later, price stability has been found to be beneficial for the development of the financial system.

The **LOLR functions** have also been analyzed mainly from a financial stability perspective, and not from a financial development one. Bagehot's basic principles are considered the benchmark for the LOLR functions that a central bank should have, namely that only solvent (although illiquid) institutions should have the right to receive funds. From that benchmark, the free-market school (Humphrey, 1975) argues that the importance of the LOLR is limited today by the development of the banking system, which allows illiquid banks to find funds without resorting to the central bank. At the other end of the spectrum, a relatively more interventionist school (De Cecco, 1999; He, 2000; and Das and Quintyn, 2002) advocates for temporary central bank assistance even to insolvent -but systemic- banks on the basis that it is impossible, in practice, to distinguish between insolvency and illiquidity in a short period of time.

The **central bank objectives** and, in particular, how broadly they are set, have received attention as a useful tool to achieve price stability (Cukierman, 1992) but less so for financial stability⁶. The latter is, ultimately, a question of whether synergies or trade-offs exist between price and financial stability, and thereby, financial development

As regards **financial regulation and supervision**, the literature has focused on its impact on the occurrence of crisis events. Barth, Caprio and Levine (2001b) show that good quality regulation and supervision reduce the likelihood of a banking crisis. More recently, Quintyn and Taylor (2002) have focused on the independence of supervisors, arguing that it is key for financial stability for the same reasons that central bank independence is important for monetary stability but they have not tested it empirically⁷.

Finally, the **involvement of the central bank in financial regulation and supervision**, as opposed to a separate agency, has attracted considerable attention - but no consensus - as several countries have decided to move this responsibility outside the central bank. However, the focus of the analysis has not been the development of the financial system but rather the achievement of price or financial stability.

We now review briefly which factors have been found to contribute to financial development, so as to shape the control variables for our empirical analysis. Among the **institutional factors**, the quality of the legal system seems key (Levine, Loayza and Beck, 1999), as well as more specific issues such as creditors' rights (Levine, Loayza and Beck, 1999; Johnson, McMillan and Woodruff, 1999)⁸. As for the role of the deposit insurance scheme (DIS), the evidence is mixed: Cull et al. (2000) consider it positive as long as it is explicit and limited and the institutional and regulatory environment is sound.

Among the **factors related to the financial system**, a balanced financial structure (defined as the weight that the banking system should have relative to the capital markets) is generally regarded superior since one segment can act as "spare tire" when the other gets in trouble (Greenspan, 1999) but no clear empirical result supports this thesis⁹. A relatively large share of foreign participation is generally considered beneficial on the grounds that it brings fresh capital into the banking system (Kroszner, 1998) and better management (Crystal et al., 2001) although there are also claims that foreign financial institutions can facilitate capital flight or limit the amount of credit granted. Public ownership has been associated, except for some isolated cases of success, with weaker financial systems as well as lower economic growth and productivity (La Porta et al., 2000) although the

⁶ García Herrero and Pedro del Río (2003) find empirical evidence that having central banks which narrowly focus on price stability fosters financial stability.

⁷ Barth, Caprio and Levine (2001a) find no strong connection between a large number of official supervisory indicators and bank performance and stability.

⁸ Creditor rights include the possibility to repossess collateral or liquidate firms in the case of default, to remove managers in corporate reorganizations, and to have a high priority relative to other claimants in corporate bankruptcy.

⁹ The empirical evidence finds that neither of the two models (bank-based or market-based) is preferred (La Porta et al., 1997; Levine, 1998; and Barth, Caprio and Levine, 2000).

evidence is weak¹⁰. A high concentration of the banking system should be, in principle, detrimental but the evidence is not clear for banks (Cetorelli and Gambera, 2001). Finally, the occurrence of banking crises should also be detrimental, particularly if caused by an excessively rapid and liberalization process, which leads to an unsustainable growth of the financial system, but there is no empirical evidence, to the best of our knowledge.

The most widely accepted **macroeconomic factors** affecting financial development are wealth (positively) and inflation (negatively). Jaffee and Levonian (2000) find that both GDP per capita and savings are positively associated with financial development. However, the causality is hard to determine since there could also be a positive impact of financial development on savings and GDP per capita, through higher economic growth. As regards inflation, Boyd, Levine and Smith (2000) and Demircuc-Kunt and Levine (1999) show empirical evidence that, at low-to-moderate rates of inflation, increases in inflation hamper financial development, in terms of lower volumes of bank lending to the private sector¹¹.

Finally, among the **economic policies**, the role of fiscal policy is controversial. An expansionary fiscal deficit, financed by government bonds and not by seignorage, will increase the size of the financial sector if defined in a broad sense. On the contrary, an increase in the government bonds held by domestic banks may crowd-out private credit, and thus have a negative impact on narrower definitions of financial development. The exchange rate regime is another important policy variable for which there is no consensus in the literature. While Frankel and Rose (1998) argue that fixed exchange rate regimes are likely to stimulate investment and trade, thus fostering economic growth, Levy-Yeyati and Sturzenegger (2002) find the opposite result for emerging countries.

3. OBJECTIVE OF THE PAPER

This paper has two main objectives: (i) improve upon existing measures of financial development by constructing a comprehensive indicator; and (ii) assess empirically the role of two potentially crucial institutions for the financial system: the central bank and financial regulation and supervision.

To construct a comprehensive definition of financial development, we shall focus on two main aspects: financial size and efficiency¹². The first measures *the amount* of funds intermediated. The second concentrates on *how* they are intermediated. In fact, an efficient financial system can be considered as one which wastes the least amount of resources possible in the intermediation process. In principle, financial size and efficiency should move together because of the economies of scale and scope that a larger size allows, contributing to higher efficiency. This is what Bossone and Lee (2002) find for the banking system. However there may be cases in which size and efficiency do not go hand in hand. For instance, engineering a too rapid growth of the financial system may lead to riskier behavior on the part of financial institutions and thus, to an inefficient allocation of funds. Also, the establishment or growth of state-owned banks, or the protection of national players on the basis of “infant industry” arguments may actually hinder the good functioning of the financial system. To add to the difficulty, countries vary widely in terms of financial instruments and habits, something that makes definitions hard to compare. The next section describes the way in which we have tackled these aggregation difficulties.

¹⁰ Note that La Porta et al. (2000) find a negative but not significant coefficient for share of state-owned banks.

¹¹ In addition, Khan et al. (2001) find that there is not only a level above which inflation negatively affect financial deepening (namely 6%) but also a minimum level of inflation (3%) below which the financial system may be hurt.

¹² Gelbard and Leite (1999) construct a comprehensive measure of financial development based on six aspects: the market structure and competitiveness of the system, the availability of financial products, the degree of financial liberalization, the institutional environment under which the system operates, the degree of integration with foreign financial markets, and the degree of sophistication of monetary policy instruments. We consider most of these aspects as potential determinants of the size and efficiency of the financial system, on which we concentrate.

As for the second objective, assessing the impact of the central bank and financial regulation and supervision, we choose the three main characteristics for each of them on the basis of their likely relation with the financial system. We now discuss the expected sign of each of the six variables, based on the previously reviewed literature.

Starting with the **central bank**, for many years the **payments system** were not considered to be a subject for active interest for financial economists but the massive increase in turnover and the much faster transfer of funds because of technological advances has given the payment system a pivotal role in the financial system. The fact that there are risks inherent to the functioning of the payments system which affect financial stability and the conduct of monetary policy, explain why the central bank may have a role to play. This can have different forms: the direct operation of the payments system, which includes carrying out the central bank own transactions and on behalf of its clients (particularly the public sector), and conducting open market operations through the payment system, so as to implement monetary policy. There are other functions, more directly related with financial stability that the central bank may perform, namely guarantying daily settlements and extending intraday credit into overnight credit. Its oversight functions imply arbitrating in the event of complaints and handling clearing procedures. Finally, there are less formal oversight function, such as promoting competitiveness, the security and safety of transactions, and encouraging the adoption of technical standards.

In sum, the potential benefits of the central bank running the system have to be weighed against moral hazard considerations. Whether a larger central bank involvement in the payments system fosters or hinders financial development will very much depend on how central banks perform payments as compared to private institutions. Since central banks are generally better equipped compared to the private sector in emerging countries, the a priori will clearly be positive in this case (Table A below summarizes the a priori signs for each objective variable).

The central bank **LOLR functions** have two main aspects: the provision of liquidity to illiquid but solvent institutions, and to insolvent institutions. As previously reviewed, the former is the standard case. As for the latter, there are circumstances such as the risk of contagion, which make it appealing at least for a strand of the literature. How broad the range of LOLR functions will crucially depend on the trade-off between fostering banking system stability and increasing moral hazard. Broader LOLR functions (i.e. the possibility to inject funds even to insolvent institutions if circumstances warrant it) will be beneficial for financial development in so far as they avoid systemic problems, which reduce the public's trust in the financial system. However, if that increases moral hazard because unsound institutions manage to continue to operate, the efficiency of the financial system will be hampered. Therefore, the expected sign of this variable is ambiguous.

The main issue in the design of **central bank objectives**, as far as financial development is concerned, is how broad or narrow those objectives are. Whether narrower objectives are preferred for financial development crucially depends on whether synergies, or else trade-offs, exist between price stability and financial stability (and thereby between price stability and financial development). If synergies exist, a central bank with a narrow objective (namely price stability) would still be able to contribute to financial development since both do not conflict. On the contrary, if there is a trade-off between the two, central banks may need to target other variables (apart from price stability) to better contribute to financial development. The expected sign of this variable is therefore ambiguous.

We also consider **financial regulation and supervision** since the existence of banks imply the existence of institutions regulating and supervising them. The inter-temporal nature of banks' business makes them vulnerable (World Bank, 2001a), prone to adverse selection and moral hazard problems and even to straightforward looting in the absence of an enabling regulatory framework. In addition, as banks are highly leveraged institutions, they may be tempted to maximize those returns through excessive risk taking. For all these reasons, well-designed bank regulation and supervision are crucial to limit moral hazard and ensure that banks have the right incentives to allocate their resources prudently. However, this is not easy to achieve. The absence of a clear sense of the relative

importance of the very many different regulatory standards is a problem particularly for emerging countries with a weaker institutional context. An additional problem is the implementation of prudential regulation and its enforcement, which involves acquiring the necessary supervisory skills and enough independence from potential lobbying.

Taking the above issues into account, we focus on three aspects of regulation and supervision: the **quality of regulation**, the **enforcement power** of supervisors and the **independence** of the responsible authorities. We choose these three dimensions for a few practical reasons. In the first place, regulation is at the base of the stability of any banking system, since it tends to limit insufficient capital, excessive risk-taking, or limited institutional capacity. Secondly, one of the most frequently mentioned weaknesses in this area is the lack of enforcement power, together with the late recognition of problems in bank balance sheets. Finally, lack of political will, political interference or inadequate staffing and budget are also considered important problems. We focus on political independence (rather than financial) for two main reasons. First, it is the starting point of the empirical literature on central bank independence¹³, and second, there are data limitations for other aspects of independence (such as quality of the staff, their remuneration and the agency's budget) for a large number of countries. The expected sign is obviously positive for the three variables pertaining to bank regulation and supervision. Finally, we control for the location of the responsibilities for regulation and supervision, which could potentially be related to the way in which the two are carried out.

Table A:
Objective variables: expected results

<i>(Expected sign)</i>	
Central bank	
Involvement in payments system	positive (particularly for emerging)
LOLR	ambiguous
Objectives	ambiguous
Regulation and supervision	
Quality of Regulation	positive
Supervisory Enforcement	positive
Independence of Supervisors	positive

4. CONSTRUCTION OF VARIABLES AND DATA AVAILABILITY

- **Dependent variable**

We construct the most comprehensive indicator of financial development on the basis of existing data for the largest possible number of countries, namely 134. We also construct separate summary indicators for the two main aspects of financial development: size and efficiency. Finally, we build an indicator of the development of the banking system (excluding capital markets), since our objective variables, the central bank functions and the design of bank regulation and supervision, should affect the banking system more directly.

We choose nine indicators of financial development. Four of them relate to the size of the financial system and five to its efficiency. The **four size variables** are: liquid liabilities of banks and other deposit-taking institutions, bank credit to the private sector, stock market capitalization, and bonds outstanding, all as a percentage of GDP¹⁴. The detailed definition and the data sources for all variables can be found in Appendix 1, and the main statistics in Table 1, Appendix 2. Among the **five efficiency variables**, three relate to the banking system: the inverse of the spread between banks' lending and deposit rates, the inverse of the net interest margin and the inverse of banks' overhead

¹³ Grilli, Masciandaro and Tabellini (1991)

¹⁴ This variable, as mentioned in the review of the literature, also reflects efficiency to the extent that it is more growth enhancing than bank credit to the public sector.

costs. The other two reflect the efficiency of the stock market: the turnover of the stock exchange and the number of companies listed in the stock exchange. Unfortunately, there is no indicator of the efficiency of the bond market for a sufficiently large enough number of countries. The year chosen to construct the dependent variable is 2000 whenever available¹⁵.

It seems quite clear that the above measures of financial development are difficult to aggregate. While those of financial size are generally expressed in terms of GDP, this is not the case for many of the efficiency measures. In addition, some of them might be more relevant than others, as is the case of bank credit to the private sector. The methodology used to aggregate them is described in the next section.

▪ **Objective variables**

Regarding the **payments system**, countries are ranked on the basis of five potential functions that their central banks may carry out: (i) the formal oversight of the system, (ii) the informal one¹⁶, (iii) the direct operation of the payment system, (iv) the coverage of credit and liquidity risks through the extension of intraday credit into overnight credit, and (v) the guarantee of settlement failure. This yields an index ranging from 0 to 5; where 0 means no involvement and 5 implies the maximum involvement possible. The data has been collected from different sources listed in Appendix 1, as for the rest of the variables.

We measure the broadness of the central bank LOLR functions through an index, which takes the value of 2 when the central bank's mandate envisages liquidity injections even to insolvent institutions (and not only to illiquid ones) either because of systemic risk or other reasons (we do not have enough information to distinguish between the two). The index takes the value of 1 when only illiquid, but solvent, institutions can receive funds and 0 in the rare cases where no institution, as a single entity, can obtain liquidity from the central bank.

For the **central bank objectives** we construct an index that increases the broader these objectives are and ranging from 0 to 1. Those central banks which have price stability as a major, or single, objective in the charter, are coded as narrowest, receiving a value of 0; those whose first priority is assigned to an objective generally not conflicting with price stability, such as an exchange rate anchor, are ranked as relatively narrow, with a value of 0,33; those with price or exchange rate stability are listed among the objectives but with other potentially conflicting objectives, such as economic growth and employment, receive a value of 0,66; and those where the exchange rate or price stability are not even mentioned in the list of their objectives take the value of 1.

Moving to the quality of financial regulation and supervision, the **quality of regulation** measures the stringency of regulation on capital adequacy on the basis of an index, ranging from 0 to 9, with higher values indicating greater stringency. The **enforcement power** of the supervisory authority measures (with an index ranging from a minimum value of 0 to 16) different aspects, such as to what extent the law establishes pre-determined levels of bank solvency deterioration that would force automatic intervention, as well as the power of supervisors to restructure and reorganize a troubled bank and to declare a deeply troubled bank insolvent. The degree of **independence** of the supervisory authority is based on the appointment and removal of the agency directors, and their accountability. The index ranges from a minimum 0 to 5; it takes the value 0 when supervisors are directly appointed by the Government, and 5 if appointed by, and accountable to, Congress¹⁷.

¹⁵ A few variables were available only for 1997, 1998 or 1999. In any event, data are always for the same year for each of the variables to avoid time differences. This is particularly relevant for the stock market capitalization and its turnover, which has experienced large trend over time worldwide.

¹⁶ This includes fostering competition and the implementation of standards through informal means, such as moral suasion.

¹⁷ To test the robustness of our results, we create another variable measuring the independence of the supervisors from a different database (Quintyn and Taylor, 2002). The relatively similar scope of the database, in terms of the questions asked allows for comparability of the indexes. The drawback is, however, that this

Finally, to control for the location of regulation and supervision, we use a dummy variable, which takes the value of 1 if the central bank is responsible for supervision and 0 otherwise. We do not differentiate between separate and government agencies because of data limitations. In any event, this should be reflected to same extent in the index of supervisory independence.

▪ **Control variables**

Among the potential control variables previously surveyed, we choose all for which a relatively large number of observations is available. The a-priori signs of each variable can be found below, on Table B. These are three general institutional variables and one specific of the financial system: (i) The rule of law (a low score indicating less tradition for law and order); (ii) a creditors' rights index (a low score standing for weak creditor protection); (iii) an index of economic freedom (increasing the more market oriented a country's economy); and (iv) the deposit insurance scheme, reflected in a dummy which takes the value of 1 when limited and explicit and 0 otherwise.

Four financial-system related variables are included: (i) the financial system structure, constructed as the absolute value of one minus the ratio of banks' liquid liabilities (in the numerator) to the stock market capitalization plus the bond market outstanding (in the denominator), all as a percentage of GDP; the closer to zero the difference the more balanced the financial structure will be; (ii) foreign participation in the banking system, measured as the percentage of foreign bank assets to total bank assets; (iii) bank concentration, defined as the share of the three largest banks' assets in total bank assets; and (iv) past banking crisis events stemming from too rapid financial liberalization¹⁸. It should be noted that the share of public ownership has been excluded from the empirical analysis because of lack of data for such a large number of countries.

The macroeconomic variables chosen are: (i) per capita GDP measured in terms of purchasing power parity (PPP); (ii) gross domestic saving as a share of GDP; and (iii) inflation, measured as the annual change in the consumer price index. Finally, two important policy variables are also included: (iii) the fiscal deficit, expressed as a share of GDP; and (ii) the exchange rate regime, for which a de-facto definition has been used which takes a higher value the more fixed the exchange rate regime is.

Table B
Control variables: expected results

		<i>(Expected sign)</i>
Institutional		
	Rule of law	positive
	Creditors' rights	positive
	Economic freedom index	positive
	Deposit Insurance Scheme	ambiguous
Financial system-related		
	Unbalanced financial structure	negative
	Foreign participation	broadly positive
	Bank concentration	broadly negative
	Financial crisis after liberalization	negative
Macroeconomic		
	GDP per capita	positive
	Domestic savings	positive
	Inflation	negative
Economic policies		
	Fiscal deficit	ambiguous
	Exchange rate regime	ambiguous

database is available for much fewer countries, namely 30 instead of 86 for the baseline database (Barth, Caprio and Levine 2001a). We, therefore, still need to use the information from Barth, Caprio and Levine (2001a) for many of the observations of this new index, not to lose too many degrees of freedom.

¹⁸ This variable is the interaction of two dummies: one which takes the value of one when a country experienced a banking crisis in the period 1994-97, and a liberalization dummy taking the value of 1 if a country has undergone a liberalization process in the years prior to the crisis, namely from 1985 to the early 1990s.

- **Data availability**

We have collected data for 134 countries and we have constructed a comprehensive indicator of financial development for all of them (the list of countries can be found in the different Graphs of Appendix 3). However, for the empirical exercise, we reduce the number to avoid a potential “small country” bias. Very small countries may not fulfill the necessary conditions to build their own institutions in the same way as relatively larger countries can, as argued by Bossone et al (2001), and tend to have much larger financial sectors, particularly if they operate as off-shore financial centers. We, thus, exclude countries whose GDP is less than 16 USD bn (in PPP terms) from the baseline regression – namely 55 - although robustness tests will be conducted including all 134 countries. The cut-off point has been chosen so as to exclude all off-shore financial centers such as Luxembourg, Cyprus, or Panama¹⁹. The number of observations for the baseline regression is, thus, 79 countries (21 industrial and 58 emerging).

It is worth noting in the summary statistics and Graphs 5 to 13 in Appendix 3 that some countries lack information for some of the variables with which we calculate principal components. The worst case is the bond market with only 52 countries. This missing data problem will be relatively less problematic in so far as it is of “ignorable” nature (Griliches, 1986). This means that data is not available for reasons unrelated to the fact that other observations in the sample are complete. There are several reasons to consider our case of “ignorable” nature: the data set is composed of surveys from different origin and, therefore, not related to each other. Some of these surveys are “global”, in the sense that they have been launched to virtually all countries, and have few missing observations. The fact that the countries for which there are missing observations in some questionnaires have answered to others reduces the chances that they wanted to hide relevant information, limiting, therefore, the risk of finding ourselves in the non-ignorable case. The other surveys are “selective” (i.e. they have only been launched for a specific group of countries) but the researcher generally tries to balance different types of countries to avoid sample selection problems. Having a non-ignorable type of missing data problem allows us to use simple extrapolation techniques rather than more complicated methods, and still obtain unbiased estimators (Little and Schenker, 1995). However, it should be noted that the gain in efficiency through these extrapolation techniques might be illusory, because there is no additional variation present in the predicted values.

Taking the nature of the missing data into account, for the definition of financial development we include countries for which data for year 2000 exists for at least 2 of the variables and fill the missing observations in several ways. In the case of the bank credit to the private sector, we extrapolate the information from their bank liquid liabilities. In the case of the bond outstanding, many missing observations are assigned a zero value since they refer to countries where these markets are known to be virtually, or literally, inexistent. For the other components of the dependent variable, missing data were given a value equal to the average of the country’s same income level group, based on Beck et al (1999) per capita income classification. In this way, we come up with a broad definition for as many as 134 countries, introducing the minimum distortions possible and robustness tests will be conducted to confirm this. Finally, missing observations in the control variables of the regression are completed with average of the total sample.²⁰

5. EMPIRICAL METHODOLOGY AND STYLIZED FACTS

- **Constructing the dependent variable: a comprehensive definition of financial development**

¹⁹ The list of countries, which have been dropped for the empirical exercise, is included in Appendix 2, Graph 5.

²⁰ Macroeconomic, economic policy and financial-system related variables are not necessarily influenced by the income group they belong to.

The heterogeneity of the available indicators of financial development (particularly as concerns efficiency) does not allow us to use a simple aggregation. We need multivariate analysis techniques. Among the different ones, we choose **principal components** (Jackson, 1991; and Peña, 1998) because it is one of the least restrictive to summarize the information contained in several variables. As a brief comparison, cluster analysis requires a subjective decision on the cut-off distance for grouping countries. In addition, factors analysis requires the variable to follow a normal distribution²¹. Finally, principal components analysis does require the variables to be positively correlated, so that the final summary variable can be easily interpreted as a weighted average. Our data fulfill this last condition.

The principal components technique uses a restricted set of variables, j , to describe other variables, k , where the j variables are a subset of the k ones ($j < k$). The subset of j variables (the principal components) is computed as a linear combination of the original k variables. Among the j principal components, there is one which best explains the variance of the original variables; this is the one with the highest eigenvalue, which necessarily has to be larger than one. The results of principal components applied to our data will be shown in the next section.

To obtain a comprehensive definition of financial development with principal components we use the nine variables previously described. These are: bank liquid liabilities, the inverse of interest rate spreads, the inverse of banks' overhead costs, the inverse of net interest margin, bank credit to the private sector, stock market capitalization, number of listed companies in the stock exchange, stock market turnover and bonds outstanding. Also, using principal components, we construct two separate indicators of financial size and financial efficiency. For the first one we take the first four variables mentioned above, and for financial efficiency the last five. Finally, we construct an indicator of banking sector development with the five relevant variables: bank liquid liabilities, bank credit to the private sector, the inverse of interest rate spreads, the inverse of banks' overhead cost and the inverse of the net interest margin. The weight that each variable has for each of the measures of financial development, as well as the country classification, is shown in the next section.

- **Regression methodology**

We test the relevance of the central bank and financial regulation in the development of the financial system using a **cross-section regression** for 79 countries. Panel regression is not an option because there is only one observation available for our objective variables. This is also true for some of the control variables (mainly the institutional ones). A panel would obviously imply an acceptable loss of observations.

We, thus, run OLS on a cross-section, and regress financial development (defined with principal components) on our objective and control variables, as shown in the equation below.

$$fdev_n = \sum_{i=1}^9 \pi_{in} y_{in} \quad n = 1, \dots, N.$$

$$fdev_n = c + \sum_{obj.var.type=1}^2 \left[\sum_{j=1}^3 \alpha_{1j} cb_j + \sum_{k=1}^3 \alpha_{2j} reg_k \right] + \sum_{cont.var.type=1}^4 \left[\sum_{l=1}^4 \beta_{1l} inst_l + \sum_{f=1}^4 \beta_{2f} fin_f + \sum_{m=1}^3 \beta_{3m} mac_m + \sum_{p=1}^2 \beta_{4p} pol_p \right]$$

Where:

- (i) y_i are the nine indicators of financial development to which the principal component analysis is applied.

²¹ See Hair et al (1998) for a review of the different techniques of multivariate analysis

- (ii) λ_i are the weights obtained from the principal component analysis for each of the nine indicators.
- (iii) $fdev_n$ is the comprehensive indicator of financial development.
- (iv) cb_j are the central bank-related objective variables and a_{1j} their coefficients.
- (v) reg_k are the regulation and supervision-related variables and a_{2j} are their coefficients.
- (vi) $inst_i$ are the four institutional control variables, and β_1 their coefficients.
- (vii) fn_j are the four control variables related to the financial system and β_2 their coefficients.
- (viii) mac_m are the three macro-related control variables and β_3 their coefficients.
- (ix) pol_p are the two policy-related control variables and β_4 their coefficients.

Given that countries are clearly heterogeneous in our sample of 79 countries, we break it into industrial and emerging countries (21 and 58 observations, respectively). Acknowledging the scarcity of observations, this separation allows finding potential differences in the role of our objective variables in clearly differentiated groups.

There are several issues to take into account in our regression exercise. The first is **heteroschedasticity**, given the structural differences between countries. We regress with robust standard errors to minimize this problem. We also control for **outliers**, by excluding awkward observations from the components of the dependent variable (barred lines in Graphs 5 to 13, in Appendix 3) and, in the case of inflation, taking the log (1+inflation) and excluding those values above 150%. **Collinearity** problems do not seem too large on the basis of relatively low correlations between regressors (Table 2 in Appendix 2). However, a very important limitation is the **small number of observations**. To minimize this problem, to the extent possible given the characteristics of the study, we only include income per capita as control variable in most of the regression exercises. Finally, **endogeneity** is another potential problem, which is particularly difficult to tackle in a cross section exercise such as this. We take data older than 2000 for all our regressors, as mentioned in the previous section, while maintaining year 2000 data for most all components of the dependent variable (for details as to the year chosen for each variable see Appendix 1). In addition, we conduct a robustness test with the level of the financial development in the past, as control variable.

- **Stylized facts**

Before conducting the regression, we look at the main statistics of our regressors in Table 1 (Appendix 2). The involvement of the central bank in the payment system is larger, on average, in industrial countries than in emerging ones and the central bank objectives are also broader. On the contrary, emerging countries' central banks have broader LOLR mandate, on average. Finally, the quality of regulation and supervision is higher, on average, in industrial countries, except for the enforcement power, which is also the variable with the largest standard deviation.

When looking at the correlation matrix between the dependent variable (the comprehensive definition of financial development) and the regressors (Table 2, Appendix 2), we find that the GDP per capita has the highest correlation with financial development, obviously positive, followed by some institutional variables (the rule of law and the degree of economic freedom), and the savings rate. Inflation is negatively correlated with financial development, in line with the economic literature. Financial-related regressors are all negatively correlated with financial development. Some are clearly expected from the literature, as for the unbalanced the financial structure (in terms of the share of the capital markets versus the banking system) and the occurrence of banking crises after a period of financial liberalization. Others much less so, as for the participation of foreign banks and the degree of concentration in the banking system. Finally, all our objectives variables are positively correlated, although in some cases with very low coefficients (LOLR and supervisory independence). These are obviously just bi-variable correlations from which no conclusions can be drawn.

We also conduct conditional probabilities, to find some stylized facts on the relation between our objective variables (central bank features and regulation and supervision) and the degree of financial development (results are available in Appendix 4). Aware of the marked differences between

industrial and emerging countries, we calculate conditional probabilities for the industrial and emerging country groups, as well as for the full sample. We separate each of the three samples in two equal groups: the best performers and the worst performers. To this end we compare their degree of financial development (measure with our summary indicator) with the median of the group.

We find the following general traits: (i) the involvement of the central bank in the payments system is slightly larger in the best performing group for the full sample and emerging countries. No clear trend is found for industrial countries. (see graphs in Set 1, Appendix 4). (ii) Best performing countries have central banks with large LOLR mandates in the three samples (see Set 2). (iii) As in the case of LOLR, best performers tend to have broader central bank objectives, both in industrial and emerging countries but not so much when we look at the total sample (see Set 3). (iv) The quality of regulation is slightly better in the best performing industrial countries than in the worst performing group, while it is very similar for all emerging countries and the full sample (see Set 4). (v) The enforcement power is clearly better in the best performing industrial countries, but no trend exists for emerging countries or the total sample (see Set 5). (vi) Finally, for the independence of supervisors there is no clear trend in the full sample but it is clearly higher in the best performing industrial countries and lower in emerging countries (see Set 6). In the latter case, there are fifty countries in the worst performing group with very large supervisory independence (ranking 4 out of 5) while there are other ten with extremely low independence (ranking 0). This is an interesting case, which will be further analyzed in the next section.

6. RESULTS

- **A comprehensive definition of financial development**

Applying principal components to the nine variables chosen, we obtain two relevant eigenvalues (i.e., larger than 1), the first being clearly superior since it explains 52% of the total variance, compared to 11% for the second (see table in the middle in Appendix 5). This is possible thanks to the relatively high positive correlations between the nine variables chosen for this comprehensive definition (upper table of same section). From this eigenvalue, we obtain the weights (or eigenvectors) of each of the nine components of the linear combination (see lower table, first column), which constitutes our summary dependent variable. Two things are worth noting: First, the variable bank credit to the private sector, generally considered as the most meaningful indicator of financial development, has the largest weight in that linear combination. Second, the sum of the weights of the four indicators of financial size is close to the sum of weights of the five indicators of financial efficiency (1,43 to 1,56). In other words, this summary definition is well balanced between size and efficiency.

The partial measures of financial development (financial size, efficiency and banking system development) are also obtained through principal components. There is only one relevant eigenvalue in each case. For financial size and banking system development, bank credit to the private sector is again the most relevant variable. For financial efficiency, the net interest margin carries the largest weight²².

The classification of the 134 countries in terms of the comprehensive definition of financial development can be found in Graph 1 (Appendix 3). There are a few unexpected countries among the best-performers, and more generally across our sample list. To clarify the reasons behind this ranking, we look into the two different components, size and efficiency.

We identify two emerging Asian countries (Malaysia and China) among the 15% best performing countries in terms of financial size. A number of small countries (namely Jordan, Malta, Cyprus or Bahamas) also show a relatively high level of financial size, higher even than industrial countries, such as Greece or Iceland (Graph 2). When looking at the different components of size, Malaysia and China rank high for very similar reasons: large banking sectors as measured by liquid liabilities to

²² Results are available upon request.

GDP (Graph 5), sizable domestic bond markets (Graph 13), and in the case of Malaysia, also a very large stock market capitalization (Graph 12). In the same vein, Jordan's high ranking is explained by its relatively large stock market capitalization in terms of GDP in our dataset. Finally, Malta, Cyprus and Bahamas share the common characteristic of being small countries. This feature has been documented by the literature as able to explain comparatively larger financial systems to larger countries of similar characteristics.

In the same vein, the unexpectedly high degree of financial efficiency explains certain surprising rankings in the summary indicator of financial development. Again Malaysia, but also Bahamas and the Slovak Republic perform better than industrial countries such as France or Italy because of very high stock market turnovers. Malaysia also has thin bank spreads (Graph 6), low overhead costs in the banking sector (Graph 7), and a large number of listed companies in the stock exchange (Graph 10). Finally, South Korea ranks first in terms of financial efficiency even having treated its extremely thin spreads (less than half the second best performer, Switzerland) as an outlier. As before, the case of Bahamas shows that small (off-shore) countries influence the classification. At the bottom of the classification, there are fewer surprises. Venezuela is probably one, surrounded by African countries. Looking at its classification in terms of size and efficiency, Venezuela appears low on both accounts: it has a small bank system and stock market, as well as high interest rate spreads and overhead costs

In sum, in our broad definition of financial development, a few Asian countries appear high in the ranking because of the size of their financial systems (China, Korea) but also in some cases because of their efficiency (Malaysia). Small countries are generally ranked high (for example Swaziland appears before Brazil, Mexico, Uruguay or Colombia) for reasons which in some cases may be directly related to their size and not . As mentioned before, small countries will be excluded from the baseline regression, in view of a potential "small-country" bias.

- **The role central bank and regulation and supervision on financial development**

We conduct different sets of regressions using robust standard error OLS for the full sample, as well as the emerging and industrial country groups, separately. In the baseline case (see equation above), we regress the comprehensive definition of financial development on the six objective variable and all the control variables. Because of the lack of degrees of freedom, we can only conduct the regression for the full sample and the emerging country group but not for industrial countries (only 21 available).

The cross-country regression for the full sample shows that a relatively large involvement of the central bank in the payment system is beneficial for financial development, other things given, at a 5% significance level, both for the full sample and for emerging countries (Table 1 below). Countries with broader central bank objectives perform also better in terms of financial development in the two samples. In addition, the joint significance test of the three central bank functions confirms that we cannot reject the hypothesis that the three central bank aspects, together, influence financial development. As for regulation and supervision, none of the variables (quality of regulation, supervisory enforcement and independence) significantly affect financial development.

Moving to the control variables we find evidence that stronger creditor rights and a larger degree of economic freedom foster financial development. In the case of creditor rights, the result is statically more significant for the sample of emerging countries, which would be expected in terms of economic significance. Also, an unbalanced financial structure (measured as the distance of each country's financial system from a situation where the banking system and the capital markets have equal weight) is found to hinder financial development both in the full sample and in that of emerging countries. This result is particularly interesting because, having a clearly a-priori in the literature, it had not been confirmed empirically yet. Banking crisis stemming from financial liberalization are also found detrimental for financial development, and in a more significant way in emerging countries, as would be expected. Finally, higher income per capita strongly contributes to financial development and inflation hinders it. In sum, using our summary definition of financial development, the results found for the control variables broadly confirm those where there is consensus in the

literature, except for the domestic saving rate and the foreign ownership of the banking system. The latter are economically but not statistically significant in our exercise.

Table 1. Baseline exercise with all control variables

	<i>All countries</i>		<i>Emerging countries</i>	
Number of obs	79		58	
F-test (p-value)	0.000 **		0.000 **	
R-squared	75.90%		68.61%	
Dependent	Robust		Robust	
Financial development principal component	Coefficient	t-test	Coefficient	t-test
Objective variables				
Central bank				
Involvement in payments system	0.3407 **	(2.01)	0.5098 **	(2.41)
LOLR	0.5685	(1.00)	0.4387	(0.78)
Objectives	1.3536 **	(2.24)	1.3377 **	(2.05)
Joint test for CB Objectives, payment system and LOLR	F-test (p-value)		0.020 **	
Regulation and supervision				
Quality of Regulation	-0.0186	(-0.21)	-0.0133	(-0.14)
Supervisory Enforcement	0.0408	(0.76)	0.0569	(0.77)
Independence of Supervisors	-0.0811	(-0.41)	-0.3763	(-1.38)
Joint test for quality regulation, enforcement power and supervisory independence	F-test (p-value)		0.877	
Control variables				
Institutional				
Rule of law	-0.0565	(-0.53)	-0.0599	(-0.40)
Creditors' rights	0.2651 *	(1.78)	0.5125 **	(2.22)
Economic freedom index	0.2524 **	(2.42)	0.2206 **	(2.06)
Deposit Insurance Scheme	-0.2427	(-0.67)	-0.1130	(-0.18)
Joint test for institutional variables	F-test (p-value)		0.023 **	
Financial system-related				
Unbalanced financial structure	-0.0287 **	(-2.20)	-0.0287 *	(-1.95)
Foreign participation	0.4633	(0.52)	1.2365	(1.00)
Bank concentration	-0.0166	(-1.50)	-0.0173	(-1.04)
Financial crisis after liberalization	-0.7251 *	(-1.89)	-0.9549 **	(-1.97)
Joint test for financial system related variables	F-test (p-value)		0.012 **	
Macroeconomic				
GDP per capita	1.2805 **	(4.59)	1.3733 **	(3.94)
Domestic savings	0.0289	(1.38)	0.0265	(1.05)
Inflation	-4.3758 **	(-2.99)	-3.3879 **	(-2.07)
Joint test for macroeconomic variables	F-test (p-value)		0.000 **	
Economic policies				
Fiscal deficit	0.0361	(0.82)	0.0348	(0.72)
Exchange rate regime	-0.1964	(-0.88)	-0.2526	(-1.14)
Joint test for economic policy variables	F-test (p-value)		0.534	
constant	-1.9748	(-0.91)	-2.0855	(-0.77)

As a second step, in order to gain some degrees of freedom, we exclude the control variables except for the income per capita, which is the most relevant, both in the economic literature and has the highest correlation with the dependent variable. This allows conducting separate regressions for industrial countries and will constitute the baseline of all robustness exercise. The results are similar as before, with one notable exception: the supervisory independence is now significant but with opposite signs in industrial and emerging countries: it is positive in the former at a 5% significance level and negative in the later at a 10% significance level (see Table 2 below). This result is not completely striking given the conditional probabilities previously shown, but it is not economically significant in the case of emerging countries. We will analyze it in more detail later.

Table 2. Baseline exercise

	All countries		Industrial countries		Emerging countries	
Number of obs	79		21		58	
F-test (p-value)	0.000 **		0.000 **		0.000 **	
R-squared	64.76%		70.60%		48.80%	
Dependent		Robust		Robust		Robust
Financial development principal component	Coefficient	t-test	Coefficient	t-test	Coefficient	t-test
Objective variables						
Central bank						
Involvement in payments system	0.3465 *	(1.87)	0.1860	(0.51)	0.4604 **	(2.29)
LOLR	0.3606	(0.74)	3.7240 **	(6.06)	0.0066	(0.01)
Objectives	1.0453 *	(1.79)	2.6475 **	(2.31)	0.9437	(1.23)
Joint test for CB Objectives, payment system and LOLR						
	F-test (p-value)		0.102		0.000 **	
Regulation and supervision						
Quality of Regulation	-0.1243	(-1.23)	0.3102	(1.46)	-0.1409	(-1.19)
Supervisory Enforcement	0.0354	(0.62)	0.0706	(0.61)	0.0204	(0.32)
Independence of Supervisors	-0.2037	(-1.08)	0.3796 **	(2.13)	-0.4745 *	(-1.77)
Joint test for quality regulation, enforcement power and supervisory independence						
	F-test (p-value)		0.493		0.042 **	
Control variables						
GDP per capita	1.7928 **	(10.09)	0.9043	(1.49)	2.0169 **	(5.98)
constant	-0.6024	(-0.63)	-7.8756 **	(-4.35)	0.5939	(0.58)

We now conduct several robustness tests on the main issues of interest. The results for the objective variables are summarized in Table 3 below. The full results are reported in Appendix 6.

The first aims at assessing the reliability of the result found for the supervisory independence. The negative sign found in emerging countries may be related to the timing of the reform of the regulatory and supervisory institutions, which started earlier in the developed countries (generally in the 1980s) and later in emerging countries (broadly in the 1990s). Many of the latter countries are still in the transition towards a better regulation and supervision, with no clear improvement in the financial system yet, but our database already incorporates the improvement.

Although we do not have earlier data available for supervisory independence to avoid this timing problem, we do have another database, compiled by Quintyn and Taylor (2002), on supervisory independence. Using a comparable index of supervisory independence compiled from this database²³, we find that supervisory independence is no longer significant, not only in the sample of emerging countries but also in that of industrial ones (Table 1 in Appendix 6).

²³ The countries for which no information is available in Quintyn and Taylor (2002) have kept the information in Barth, Caprio and Levine (2001a). In addition, the measure of independence has been constructed on the basis of the same questions, to allow for the comparability of the results.

Notwithstanding the above result, the marked differences found in the conditional probabilities between industrial and emerging countries call for a more in-depth analysis of this issue. We check whether it may be related to the general institutional framework, and in particular the rule of law. The intuition behind is that legal supervisory independence is probably easier to implement in industrial countries than in emerging ones. In fact, supervisors in emerging countries may be less able to challenge weak banks if they are not protected. The rule of law should be a good proxy to measure the degree of implementation of a country's legal framework, including the possibility of independent institutions to take action. We, thus control, for each country's possibilities to apply the law, by interacting the rule of law²⁴ with the index of supervisory independence. Interestingly, the new variable significantly contributes to financial development, rather than hindering it (see Table 2 in Appendix 6).

Moving to more general robustness tests, we control, to the maximum extent possible, for potential endogeneity, by including the level of financial development in our starting year (1997)²⁵. The reason why we have not included it in previous exercises is its very high correlation with income per capita which would have led to collinearity problems. The results show that relatively broad central bank objectives are beneficial for industrial countries but not for emerging countries as was found in the baseline. We also find that higher quality regulation and stronger supervisory enforcement contribute to financial development in industrial countries but the significance of the supervisory independence is lost (see Table 3 in Appendix 6).

Until now, no attention has been paid to which agency is responsible for regulation and supervision, but only to the way in which these functions are performed. To test whether the location of these responsibilities makes a difference in terms of the development of the financial system, we introduce an additional variable, a dummy, which takes the value of one if the central bank is the responsible agency for supervision and zero otherwise. As shown in Table 4 in Appendix 6, the location of the supervisory responsibilities does not appear to matter in two ways: First, the location variable is not found significant in explaining the degree of financial development. Second, the results for our objective variables remains basically the same as in the baseline.

We now conduct robustness tests for the choice of the dependent variable, the definition of financial development. First, we use the two previously constructed separate indicators of financial size and development as dependent variables. This allows us to account for the fact that financial size and efficiency do not necessarily move in the same direction in all cases. This might be particularly important for emerging countries, whose financial systems may have grown more rapidly, but also more dangerously, in the time period we have chosen (1997-2000), due to the ongoing liberalization processes. And efficiency may not necessarily have increased in line with size. Two differences worth noting are found between regressing on size and on efficiency: First, large payment system functions significantly foster size but the result is lost for efficiency. Second, supervisory independence negatively affects size, not only for emerging countries but also for full sample. The opposite is true for financial efficiency for the sample of industrial countries (Tables 5 and 6 in Appendix 6).

Aware that our objective variables are bound to affect more directly the banking system than the capital markets, we also conduct the regression on the summary indicator of bank development. The results are in line with the baseline case (see Table 7 in Appendix 6).

²⁴ Kaufman's index is preferred to La Porta's because it is compiled for the same year as the degree of supervisory independence (1998, instead 1996). This is particularly relevant since both variables will be interacted.

²⁵ As previously mentioned, there is no single starting year for all of them. Macroeconomic and financial-system related variables are chosen for a homogeneous year (1997) but there is no possibility to the same for the other regressors. The year will depend on when the survey they are drawn from was conducted. The year 1997 is an approximate average of the years taken for all other regressors.

Finally, we control for the fact that missing data has been extrapolated to construct the comprehensive indicator of financial development. We regress on bank credit to the private sector, for which data was available for all 79 countries. This variable is preferred to bank liquid liabilities, which also has data for all countries in the sample, because it reflects not only the size but also the efficiency of the banking system, to some extent. The results for the central bank variables are exactly as when using bank development as dependent variable (See Table 8 in Appendix 7). The difference with the broad definition of financial development is that the large involvement of the central bank in the payments system is not beneficial for the whole sample. In turn, the quality of regulation and supervision appear highly significant, as opposed both to what was found for banking sector development and the broad definition of financial development. Even the supervisory independence is found to be beneficial for emerging countries. In sum, using bank credit to the private sector, the three supervisory related variables are highly significant in statistical terms, coinciding with its economic significance. We also regress private credit on all control variables, so as to compare the results found in the baseline. The results are similar but the significance of the financial structure is lost while bank concentration is found detrimental at a 10% confidence level.

Finally, we conduct two additional robustness tests concerning the quality of the data and the degrees of freedom. First, we exclude the 5% minimum and maximum values of the nine components of the broad definition of financial development²⁶. Second, we include the 55 small countries excluded from the baseline, so as to have 134 observations. The results are very similar in the first case (Table 10 in appendix 6). In the second, the beneficial role of a large involvement of the central bank in the payment system is lost for the full sample – but remains for emerging countries – and broad central bank objectives appear to contribute to financial development only in the sample of industrial countries (Table 11 in appendix 6)

²⁶ This is on top of the extreme outliers excluded already in the baseline. These can be found in Graphs 5 to 12.

Table 3: Summary of results for objective variables

Table	Exercise description	Dependent	Payment system			LOLR			CB objectives			Quality of regulation			Enforcement power			Supervisory independence			Joint Test for Central Bank Variables			Joint Test for Regulation and Supervision Variables		
			TS	IN	EM	TS	IN	EM	TS	IN	EM	TS	IN	EM	TS	IN	EM	TS	IN	EM	TS	IN	EM	TS	IN	EM
1 (main text)	Baseline exercise with all control variables	Financial development	++	NA	++	NA			++	NA	++	NA		NA		NA		NA		++	NA	++	NA			
2 (main text)	Baseline exercise	Financial development	+		++	++			++							++	-			++			++			
1 (appendix)	Supervisory independence with different data set	Financial development			++	++			+	++										++						
2 (appendix)	Supervisory independence controlling for rule of law	Financial development	NA	NA		NA	NA	++	NA	NA			NA	NA	NA	NA	NA	++	NA	NA			NA	NA	++	
3 (appendix)	Controlling for endogeneity of financial development	Financial development		++		+		++				+		++							++			++		
4 (appendix)	Including location of regulation and supervision	Financial development	+		++	++			++											-		++				+
5 (appendix)	Financial size as dependent variable	Financial size			++	++			++			++						--		-		++			++	
6 (appendix)	Financial efficiency as dependent variable	Financial efficiency				++			+		+			+					++		++			++		
7 (appendix)	Bank development as dependent variable	Bank development			++	++			++					+					+	-		++				+
8 (appendix)	Credit to the private sector as dependent variable	Private credit to GDP			++	++			++			++		++					++	+		++	++			++
9 (appendix)	Credit to the private sector with all control variables	Financial development		NA		NA			++	NA	++	NA		NA					NA		++	NA	++	NA		
10 (appendix)	Controlling for outliers in dependent variables	Financial development	++	+	++	++			+	+											+	++				+
11 (appendix)	Including small countries	Financial development			+	++			++										++		++					++

NA : Not available

7. CONCLUSIONS

This paper constructs a new, more comprehensive, definition of financial development, based on nine indicators of size and efficiency, using multivariate analysis. It, then, tests the relevance of the central bank and bank regulation and supervision on financial development using this newly constructed definition, as well as others for robustness. Both aspects are found to be relevant determinants of financial development but differences exist between industrial and emerging countries. Broader central bank broad objectives and LOLR functions significantly contribute to financial development in industrial countries. The first is in line with the possibility of a trade-off between financial stability and price stability, at least as concerns financial development. However, this result needs to be taken with caution since we do not test for the impact of broad central bank objectives on financial stability directly nor on price stability, both higher up in the list of central bank priorities. All in all, one could argue that as long as having broader objectives does not create a conflict of interest for the central bank, these should be preferred in order to foster financial development. The result for the LOLR is in line with the so-called “interventionist” school, which argues in favor of giving the central bank discretion to inject liquidity to a bank, independently of its solvency situation, if the circumstances warrant it. Unfortunately the survey data we have used does not allow us to determine for which circumstances a larger LOLR mandate is preferred (systemic risk or others) Finally, as expected, better quality financial regulation and supervision, including higher independence, also contribute to financial development in industrial countries.

For emerging countries, the central bank involvement in the payment system is the most relevant variable in fostering financial development. The fact that we do not find the central bank involvement in the payment system significant for industrial countries but we do for emerging ones is in line with the view that the central bank should only run the payment system as long as there is no private institution that can do it better. This implies minimizing settlement risk without incurring moral hazard. In an emerging country it may be more difficult to find a private institution capable of minimizing the systemic risk involved in running the payment system. In addition, some model specifications show a positive role for broad central bank objectives and LOLR functions for emerging countries too. The fact that these results are not as strong as for industrial countries may be related to the use that emerging countries’ have made of discretion in its central bank objectives and/or in their use of the LOLR. Finally, no evidence is found of a positive role of better quality regulation and supervision for emerging countries. For some specifications, supervisory independence even appears to hinder financial development. We find evidence that this is the case only for countries with a very poor rule of law. A policy conclusion that one may draw from this result is that, in addition to being legally independent from political interference, regulatory and supervisory authorities need to have a legal and institutional framework, which allows them to take the necessary actions to preserve a sound financial system.

To summarize, the results found for the comprehensive definition of financial development compares relatively well with narrower, but frequently used, indicators of financial development, such as bank credit to the private sector. As far as financial system development is concerned, the regression results - notwithstanding its weaknesses in terms of degrees of freedom - argue in favor of a large mandate for the central bank, in terms of its objectives, payment system involvement and LOLR. High quality regulation and supervision, particularly a high degree of independence, is also found beneficial, as long as a institutional framework is in place.

There are too many topics for future research at this stage. First, it would be interesting to see whether the functions that central bank should change over time as the financial system develops – some kind an optimal life cycle in the design of central bank. This would require information on changes in central bank functions in line with what García Herrero and del Rio (2003) find for financial stability. Second, we intend to explore the causality relation between financial development and growth, based on our more comprehensive definition. Finally, the interrelation between regulation and supervision and the quality of institutions also deserves more research.

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APPENDIX 1

DATA SOURCES²⁷

DEPENDENT VARIABLES, YEAR, DEFINITION, SOURCE
<p>Liquid Liabilities of Banks and other Deposit-Taking Institutions/GDP (2000): Currency plus demand and interest-bearing deposits divided by GDP. <i>International Financial Statistics, IMF (2002)</i></p> <p>Bank S spreads between the Lending and Deposit rates (2000): Spread between short-term domestic currency lending and deposit interest rates. <i>International Financial Statistics, IMF (2002)</i></p> <p>Overhead Cost (inverse of) (1997): Ratio of overhead cost to total assets. Overhead costs are the expenses of a business that are not attributable directly to the production or sale of goods. We compute them as yearly averages and divide them by total assets. <i>Beck et al. (1999)</i></p> <p>Net Interest Margin (inverse of) (1997): Inverse of bank interest income minus interest expense over overhead cost. Yearly averages, divided by overhead costs. <i>Beck et al. (1999)</i></p> <p>Stock Market Turnover Ratio (2000): Total value of shares traded during the period divided by the average market capitalization for the period. Average market capitalization is calculated as the average of the end of period values for the current period and the previous period. <i>The World Bank World Development Indicators (2001b)</i></p> <p>Number of Listed Companies in the Stock Exchange (2000): Total number of companies listed in domestic stock exchanges. <i>The World Bank World Development Indicators (2001b)</i></p> <p>Ratio of Bank Lending to the Private Sector/GDP (2000): Share of outstanding loans, purchases of non-equity securities, trade credits and other accounts receivable to the domestic private sector that establish a claim for repayment, divided by GDP. <i>The World Bank World Development Indicators (2001b)</i></p> <p>Stock Market Capitalization/GDP (2000): Aggregate capitalization value of all shares listed in the stock exchange divided by GDP. <i>International Financial Corporation (IFC)</i></p> <p>Bonds Outstanding/GDP (2000, 1997): Nominal value of existing domestic bonds, both government and corporate, divided by GDP. <i>Beck et al (1999), Caviglia, Krause and Thimann (2002) and Bank of International Settlements (BIS) (2002)</i></p>
OBJECTIVE VARIABLES, YEAR, DEFINITION, SOURCE
<p>Central Bank Objectives (1980-1989): If central banks have price stability as single objective, the variable takes the value of 0, if they assign high priority to a fixed exchange rate, it takes the value of 0,33, if they put price or exchange rate stability among the objectives but not the main ones, it is equal to 0,66. Finally, if they do not mention exchange rate or price stability in the list of their objectives, it takes the value of 1. <i>Cukierman et al. (1992), and Mahadeva and Sterne (2000). Generally Cukierman et al. (1992) except for countries where the 1990s have implied important changes in the central bank objectives.</i></p> <p>Central Bank Payment System Functions (Before 1999): Sum of five dummies. Each equals one if central banks: (i) conduct formal oversight of the payment system, (ii) conduct informal oversight, (iii) operate the payment system, (iv) cover credit and liquidity risks through the extension of intraday credit into overnight credit, and/or (v) guarantee settlement failure. <i>Fry et al. (1999), Fry et al. (1996) and FSSAs²⁸ from the IMF and the World Bank. Fry et al. (1996) used to crosscheck for recent changes in the functioning of the payment system. For those countries included in both surveys and which underwent changes, older information selected.</i></p> <p>Central Bank LOLR Functions (Before 1999): If LOLR only envisages liquidity injections to the system as a whole, this variable takes a value 0, if injections to single illiquid institutions are allowed, it takes a value of 1, and if also includes insolvent institutions, it takes a value of 2. <i>Sinclair (2000), BIS (2000)^{Error! Marcador no definido.} Jácome (2001) and FSSAs^{Error! Marcador no definido.} from the IMF and the World Bank</i></p> <p>Quality of Financial Regulation (1998-2000): We calculate this index based on the responses to a broad-based questionnaire by Barth, Caprio and Levine (2001a) concerning existing capital and new capital. Questions refer to issues such as minimum required capital-to-asset ratio conforming to Basle guidelines, whether it varies with market risk, or whether the market value of loan losses is deducted from reported accounting capital. Each positive answer takes a value of 1 and each negative a value of 0, and the index ranges from 1 to 9. <i>Barth, Caprio and Levine (2001a)</i></p>

²⁷ The number of available observations for each variable can be found in Appendix 2. Year for which the variable is available in brackets and source in italics.

²⁸ Some of these reports are not for public use yet.

OBJECTIVE VARIABLES, YEAR, DEFINITION, SOURCE (Cont).
<p>Enforcement Power of Supervisors (1998-2000): We calculate this index based on the answers to the same questionnaire, in the area of the enforcement capacity of bank supervisors. A few of the questions are: can supervisors meet with any external auditors to discuss their reports without bank approval? Are auditors legally required to report any misconduct by managers or directors to the supervisory authorities? Can the supervisory authorities take legal action against external auditors for negligence? Every positive answer takes a value of 1 and each negative a value of 0. The index ranges from 0 to 16. <i>Barth, Caprio and Levine (2001a)</i></p>
<p>Independence of the Supervisory Authority (1998-2000, 2002): We calculate this index based on the answers to three questions regarding the independence of the supervisory authority that are included in the same questionnaire. The questions are how is head of supervisory agency/other directors removed?, To whom are supervisors accountable?, and How is the head of the supervisory agency/other directors appointed? The index ranges from 0 to 5 according the degree of overall independence. For a robustness test we complement this survey with a different one, Quintyn and Taylor 2002 with similar questions but a smaller country sample. <i>Barth, Caprio and Levine (2001a). Quintyn and Taylor (2002)</i></p>
<p>Location of Supervisory Responsibilities (Before 1994): This a dummy that takes a value of 1 when the banking supervisory responsibilities are assigned to the Central Bank and 0 otherwise. <i>Tuya and Zamalloa (1994)</i></p>
CONTROL VARIABLES, YEAR, DEFINITION, SOURCE
<p>Inflation (1997): Logarithm of one plus the annual change in consumer prices. <i>International Financial Statistics, IMF (2002)</i></p>
<p>Fiscal Deficit/GDP (1997): Public deficit. <i>International Financial Statistics, IMF (2002)</i></p>
<p>Gross Domestic Saving/GDP (1997): Difference between GDP and public and private consumption divided by GDP. <i>The World Bank Development Indicators (2001b)</i></p>
<p>Per Capita GDP in PPP terms (1997): The World Bank Development Indicators (2001b)</p>
<p>Income per Capita (1999): Real GDP Per Capita in constant dollars (international prices, base year 1985). <i>Penn World Tables</i></p>
<p>Financial Structure/GDP (1997): Difference between 1 minus the ratio of banks' liquid liabilities to the sum of stock market capitalization and domestic bonds outstanding, all as a percentage of GDP, in absolute value. <i>International Financial Statistics, IMF (2002), IFC and The World Bank Development Indicators (2001b)</i></p>
<p>Concentration (1997): Bank concentration indicates the weight of the three largest banks' assets to total assets. <i>Beck et al. (1999)</i></p>
<p>Foreign Participation (1997): Share of foreign bank assets as a percentage of total bank assets. A bank is defined as foreign if at least 50% of equity is owned by foreign investors. <i>Beck et al. (1999)</i></p>
<p>Banking Crises Event (1999): It is a dummy which takes the value of 1 if a banking crisis has occurred between 1994 and 1997 and 0 otherwise. We follow the definition coined by Caprio and Klingebiel (1999) and compare across different surveys</p>
<p>De-facto Exchange Rate Regimes (1997): This definition is based on an index, which ranges from 3 to 1, 3 being fixed, 2 managed and 1 floating. <i>Levy-Yeyati and Sturzenegger (2002)</i></p>
<p>Index of Economic Freedom (1990): This index includes measures of the size of government, the structure of the economy, the conduct of monetary policy and price stability, the freedom to use alternative currencies, the legal structure and poverty rights, as well as the freedom to trade with foreigners, and to exchange in the capital and financial markets. The higher the number the more market-oriented a country is. <i>Fraser Institute database</i></p>
<p>Creditor rights (1985-1997): The index ranges from 0 to, 4 A high score stands for more rights It aggregates a number of dummies, which have the value of 1 when: the country imposes restrictions, such as creditors' consent or minimum dividends to file for reorganization; secured creditors are able to gain possession of their security once the reorganization petition has been approved (no automatic stay); secured creditors are ranked first in the distribution of the proceeds that result from the disposition of the assets of a bankrupt firm; and when the debtor does not retain the administration of its property pending the resolution of the reorganization. <i>La Porta et al. (1998)</i></p>
<p>Rule of Law (1996): This index summarizes the law and order tradition in a country and ranges from 1 to 4. A low score indicates less tradition for law and order. <i>Political Risk Services (1996)</i></p>
<p>Rule of Law (1998): This measure includes several indicators, such as the extent to which agents have confidence in and abide by the rules of society (including the effectiveness and predictability of the judiciary, and the enforceability of contracts). <i>Kaufmann et al. (2001)</i></p>
<p>Deposit Insurance Scheme (1999): The Deposit Insurance Scheme shows whether a country has a limited and explicit deposit insurance scheme or not, taking a value of 1 if it does, and a value of 0 otherwise. <i>Demirguc-Kunt and Sobaci (2000)</i></p>

APPENDIX 2: STYLIZED FACTS

TABLE 1
Main Statistics per Variable and per Country Group

	<i>Total sample</i>			<i>Industrial countries</i>			<i>Emerging countries</i>		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Dependent									
Financial development principal component	134	0.00	2.16	23	3.13	1.66	111	-0.65	1.62
Bank liabilities	134	50.60	34.60	23	70.77	23.94	111	46.43	35.07
Bank interest rate spreads (inverse)	134	0.21	0.21	23	0.37	0.21	111	0.17	0.19
Bank overhead costs (inverse)	99	34.86	24.37	23	42.88	20.72	76	32.01	24.47
Net interest margin (inverse)	96	31.26	17.75	23	48.05	19.34	73	26.43	14.03
Stock market turnover	82	0.45	0.46	23	0.67	0.37	59	0.37	0.46
Stock exchange listed companies	83	491.33	1153.41	21	1060.29	1780.66	62	298.61	774.31
Private credit	111	47.08	43.39	21	95.47	44.45	90	35.14	34.63
Stock market capitalization	83	58.11	73.43	21	114.73	72.99	62	38.93	63.44
Bonds outstanding	52	54.68	39.33	20	91.40	34.81	32	31.72	19.71
Objective variables									
Central bank									
Involvement in payments system	83	2.16	1.13	18	2.56	1.04	65	2.05	1.14
LOLR	61	1.10	0.51	18	1.00	0.34	43	1.14	0.56
Objectives	102	0.46	0.28	20	0.50	0.30	82	0.43	0.27
Regulation and supervision									
Quality of regulation	122	5.16	1.69	22	6.41	1.53	100	4.88	1.60
Enforcement power	122	11.13	2.86	22	11.05	2.79	100	11.15	2.89
Independence of supervisors	82	2.44	1.12	22	2.65	1.28	60	2.36	1.05
Control variables									
Institutional variables									
Rule of law	45	6.99	2.63	21	9.26	1.05	24	5.00	1.84
Creditors' rights	43	2.30	1.39	21	1.95	1.07	22	2.64	1.59
Economic freedom index	103	5.48	1.90	23	7.44	1.16	80	4.92	1.68
Deposit Insurance Scheme	124	0.25	0.43	23	0.74	0.45	101	0.14	0.35
Financial system-related									
Unbalanced financial structure	76	3.50	8.59	21	0.53	0.66	55	4.64	9.87
Foreign participation	67	20.34	21.96	18	0.10	0.20	49	0.24	0.22
Bank concentration	82	66.73	21.97	23	0.64	0.23	59	0.68	0.22
Prior banking crisis	134	0.47	0.50	23	0.26	0.45	111	0.51	0.50
Macro									
GDP per capita	129	8323.06	7950.65	23	22146.08	4371.83	106	5323.73	4703.02
Domestic savings	114	17.28	11.96	17	23.87	5.38	97	16.13	12.43
Inflation	103	13.58	42.72	23	1.46	0.92	80	17.07	47.96
Economic policies									
Fiscal deficit	91	-1.81	3.76	14	-1.53	2.79	77	-1.86	3.92
Exchange rate regime	117	1.89	0.91	21	2.10	0.94	96	1.84	0.90

Note: This table reflects original data, including outliers.

TABLE 2
Correlation Matrix

Dependent variable	Dependent variables									
	Financial development	Bank liabilities	Bank interest rate spreads (inverse)	Bank overhead costs (inverse)	Net interest margin (inverse)	Stock market turnover	Stock exchange listed companies	Private credit	Stock market capitalization	Bonds outstanding
Dependent variable										
Financial development	1.00									
Bank liabilities	0.71	1.00								
Bank interest rate spreads (inverse)	0.67	0.41	1.00							
Bank overhead costs (inverse)	0.57	0.43	0.33	1.00						
Net interest margin (inverse)	0.64	0.39	0.37	0.57	1.00					
Stock market turnover	0.56	0.41	0.45	0.32	0.28	1.00				
Stock exchange listed companies	0.46	0.14	0.29	0.31	0.12	0.25	1.00			
Private credit	0.87	0.83	0.55	0.41	0.47	0.42	0.34	1.00		
Stock market capitalization	0.74	0.53	0.59	0.35	0.34	0.31	0.33	0.62	1.00	
Bonds outstanding	0.62	0.24	0.24	0.29	0.36	0.22	0.47	0.42	0.50	1.00
Objective variables										
Central bank										
Involvement in payments system	0.19	0.10	0.03	0.12	-0.01	0.21	0.11	0.17	-0.08	-0.02
LOLR	0.02	0.08	0.08	0.01	-0.10	-0.19	-0.11	0.04	-0.14	-0.24
Objectives	0.11	0.06	0.09	0.08	0.07	0.16	0.10	0.09	0.05	0.13
Regulation and supervision										
Quality of regulation	0.22	0.05	0.16	0.03	0.12	0.04	0.27	0.29	0.19	0.27
Enforcement power	0.01	0.02	0.18	-0.06	0.00	-0.03	-0.03	-0.03	-0.24	-0.10
Independence of supervisors	0.08	-0.05	0.07	-0.11	0.05	0.04	0.02	0.00	0.10	-0.11
Control variables										
Institutional variables										
Rule of law	0.68	0.43	0.28	0.29	0.57	0.44	0.17	0.53	0.48	0.66
Creditors' rights	0.10	0.19	0.02	0.21	-0.15	-0.03	0.23	0.15	0.01	0.21
Economic freedom index	0.67	0.47	0.36	0.26	0.33	0.28	0.25	0.63	0.53	0.46
Deposit Insurance Scheme	0.37	0.13	0.24	0.03	0.30	0.06	0.29	0.31	0.21	0.43
Financial system-related										
Unbalanced financial structure	-0.30	-0.16	-0.29	-0.19	-0.14	-0.25	-0.13	-0.15	-0.29	-0.28
Foreign participation	-0.21	-0.15	-0.10	0.01	-0.01	-0.26	-0.13	-0.32	-0.28	-0.34
Bank concentration	-0.24	0.04	-0.19	0.00	-0.04	-0.17	-0.21	-0.25	0.03	-0.07
Prior banking crisis	-0.25	-0.34	-0.24	-0.13	-0.23	-0.08	0.01	-0.34	-0.19	-0.10
Macro										
GDP per capita	0.83	-0.05	-0.05	-0.04	-0.12	-0.05	0.08	-0.06	0.12	-0.09
Domestic savings	0.52	0.41	0.32	0.49	0.35	0.52	0.16	0.44	0.45	0.21
Inflation	-0.26	-0.26	-0.21	-0.22	-0.23	-0.17	-0.11	-0.27	-0.27	-0.29
Economic policies										
Fiscal deficit	0.20	0.10	0.18	0.33	0.27	0.25	-0.05	0.23	0.15	0.02
Exchange rate regime	0.07	0.01	0.22	-0.16	-0.08	0.23	0.09	0.09	0.09	0.05

Objective variables	Objective variables					
	Involvement in payments system	LOLR	Objectives	Quality of regulation	Enforcement power	Independence of supervisors
Objective variables						
Central bank						
Involvement in payments system	1.00					
LOLR	-0.03	1.00				
Objectives	0.08	0.22	1.00			
Regulation and supervision						
Quality of regulation	0.00	0.09	0.02	1.00		
Enforcement power	0.05	-0.03	-0.01	0.07	1.00	
Independence of supervisors	0.00	-0.17	-0.16	-0.02	0.12	1.00
Control variables						
Institutional variables						
Rule of law	0.13	-0.06	0.16	0.23	-0.07	-0.01
Creditors' rights	-0.24	-0.21	0.07	-0.13	-0.03	-0.30
Economic freedom index	0.13	0.11	0.00	0.28	0.04	-0.09
Deposit Insurance Scheme	-0.03	0.12	-0.01	0.30	0.05	-0.08
Financial system-related						
Unbalanced financial structure	-0.06	0.16	-0.22	0.02	0.03	-0.06
Foreign participation	-0.23	-0.12	-0.10	-0.25	0.04	0.02
Bank concentration	-0.06	-0.25	0.13	-0.23	-0.02	-0.23
Prior banking crisis	0.08	0.11	0.19	-0.03	-0.14	-0.07
Macro						
GDP per capita	-0.07	0.26	0.01	0.05	0.02	0.04
Domestic savings	-0.06	-0.12	0.04	-0.04	-0.11	0.10
Inflation	-0.17	0.09	-0.07	-0.05	-0.18	0.09
Economic policies						
Fiscal deficit	0.27	0.16	0.07	0.10	-0.09	0.04
Exchange rate regime	0.18	-0.04	0.10	0.06	0.05	-0.16

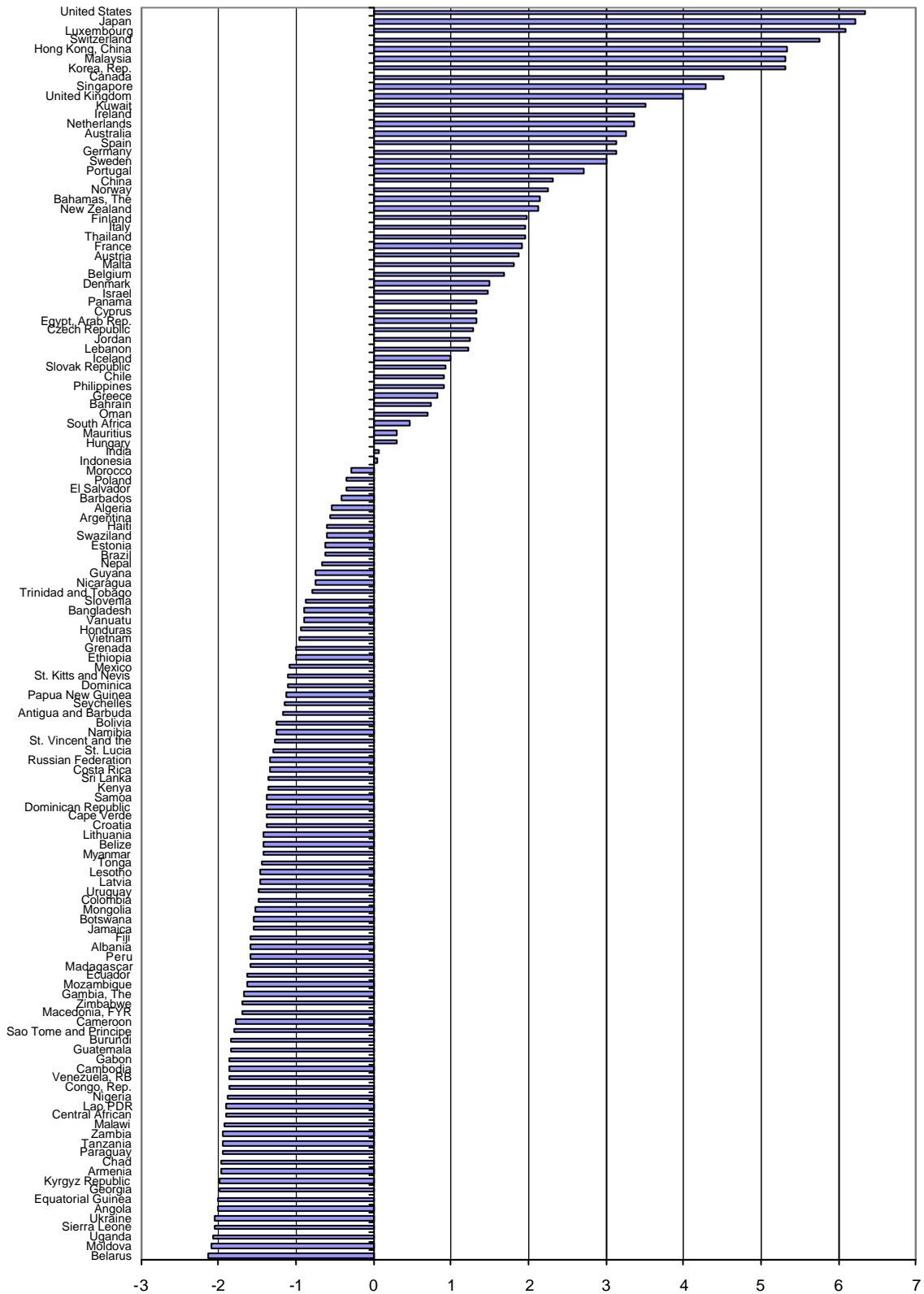
Control variables

	Rule of law	Creditors' rights	Economic freedom index	Deposit Insurance Scheme	Unbalanced financial structure	Foreign participation	Bank concentration	Prior banking crisis	GDP per capita	Domestic savings	Inflation	Fiscal deficit	Exchange rate regime
Control variables													
Institutional variables													
Rule of law	1.00												
Creditors' rights	-0.03	1.00											
Economic freedom index	0.75	0.09	1.00										
Deposit Insurance Scheme	0.14	-0.21	0.35	1.00									
Financial system-related													
Unbalanced financial structure	-0.12	0.04	-0.06	-0.08	1.00								
Foreign participation	-0.44	0.02	-0.21	-0.21	0.13	1.00							
Bank concentration	-0.02	0.04	-0.23	-0.16	0.05	0.20	1.00						
Prior banking crisis	-0.29	0.01	-0.31	-0.17	-0.06	0.04	-0.10	1.00					
Macro													
GDP per capita	-0.11	0.08	0.00	0.19	-0.10	0.00	-0.01	-0.02	1.00				
Domestic savings	0.41	0.17	0.51	0.19	-0.21	-0.21	-0.15	-0.11	-0.05	1.00			
Inflation	-0.30	0.13	-0.24	-0.15	0.15	0.06	-0.13	0.02	0.06	0.00	1.00		
Economic policies													
Fiscal deficit	0.32	0.18	0.39	0.12	-0.03	-0.15	-0.23	-0.03	-0.09	0.34	-0.05	1.00	
Exchange rate regime	0.31	0.01	0.10	0.01	-0.02	0.15	-0.03	0.06	-0.04	-0.05	-0.04	-0.09	1.00

APPENDIX 3: DESCRIPTIVE GRAPHS

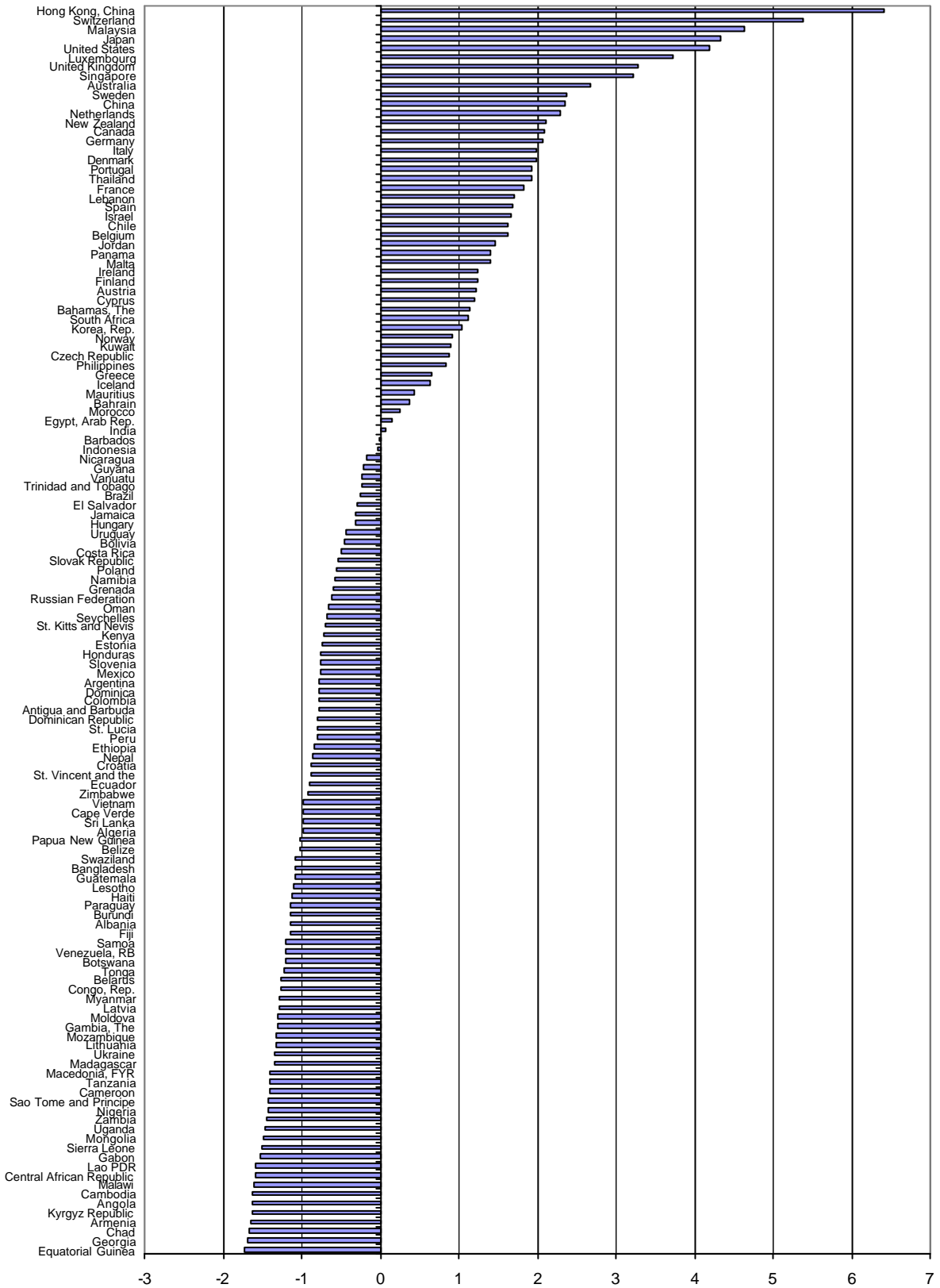
Graph 1

Financial Development Principal Component: Size and efficiency



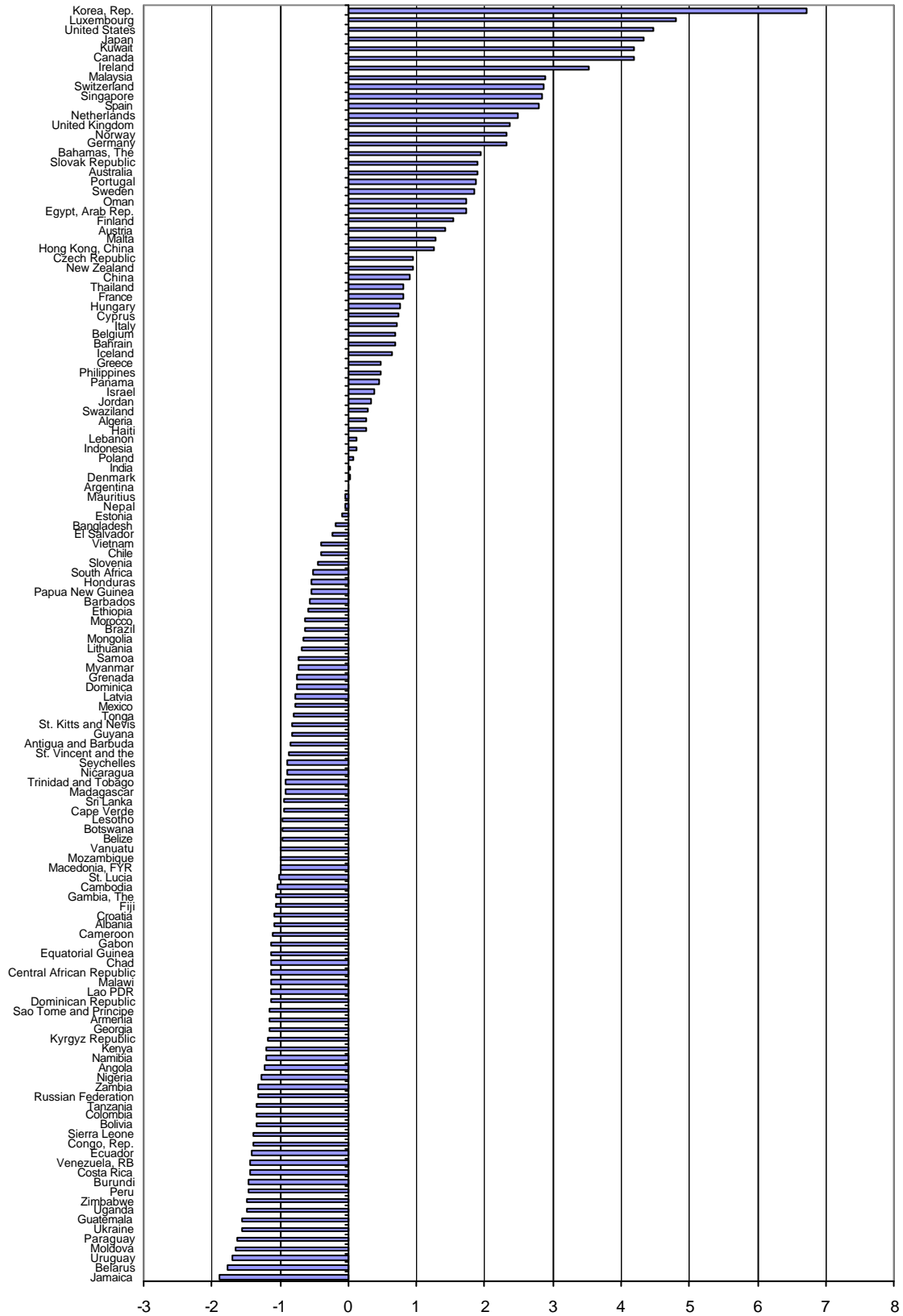
Graph 2

Financial Development Principal Component: Size



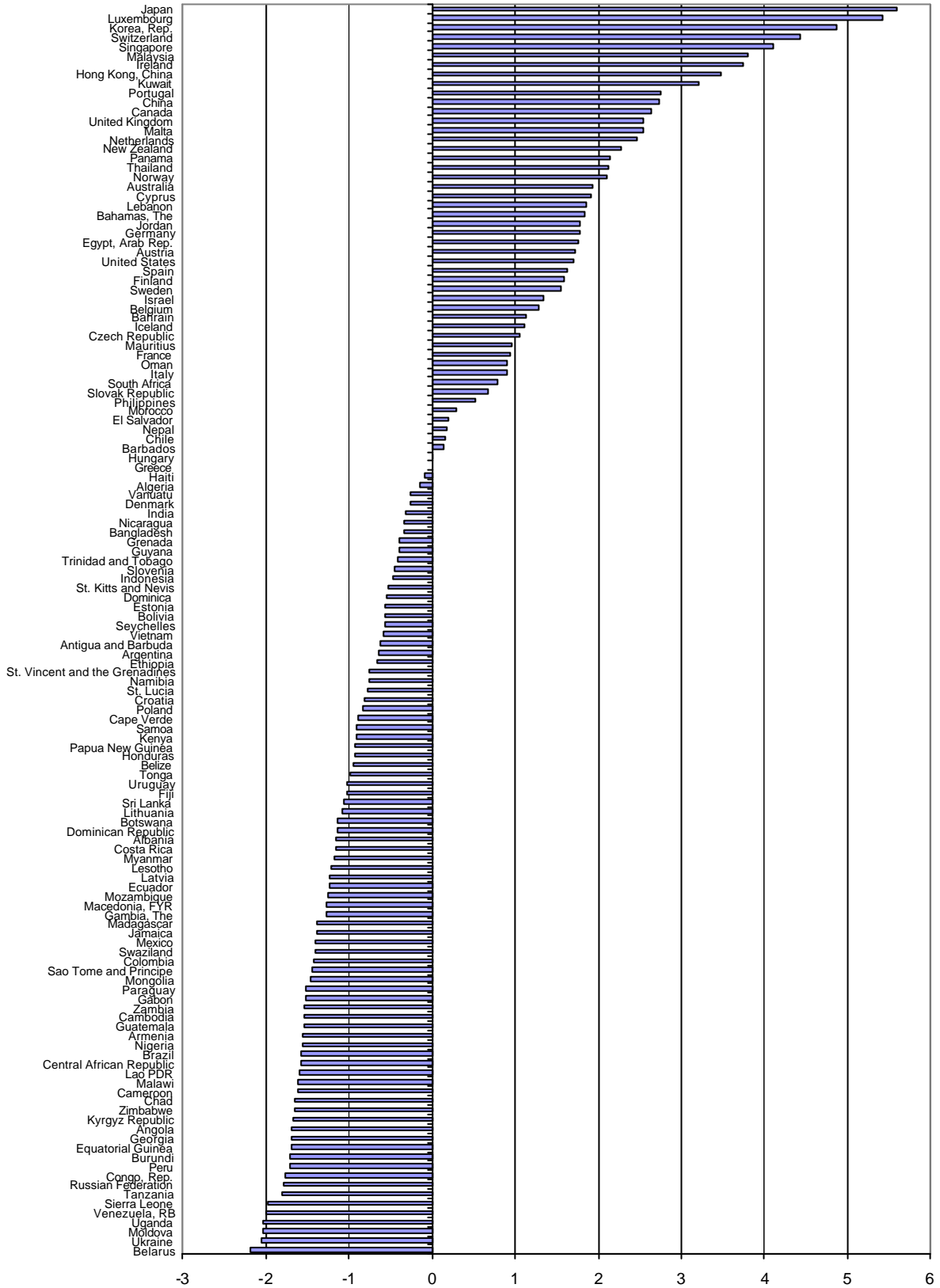
Graph 3

Financial Development: Efficiency



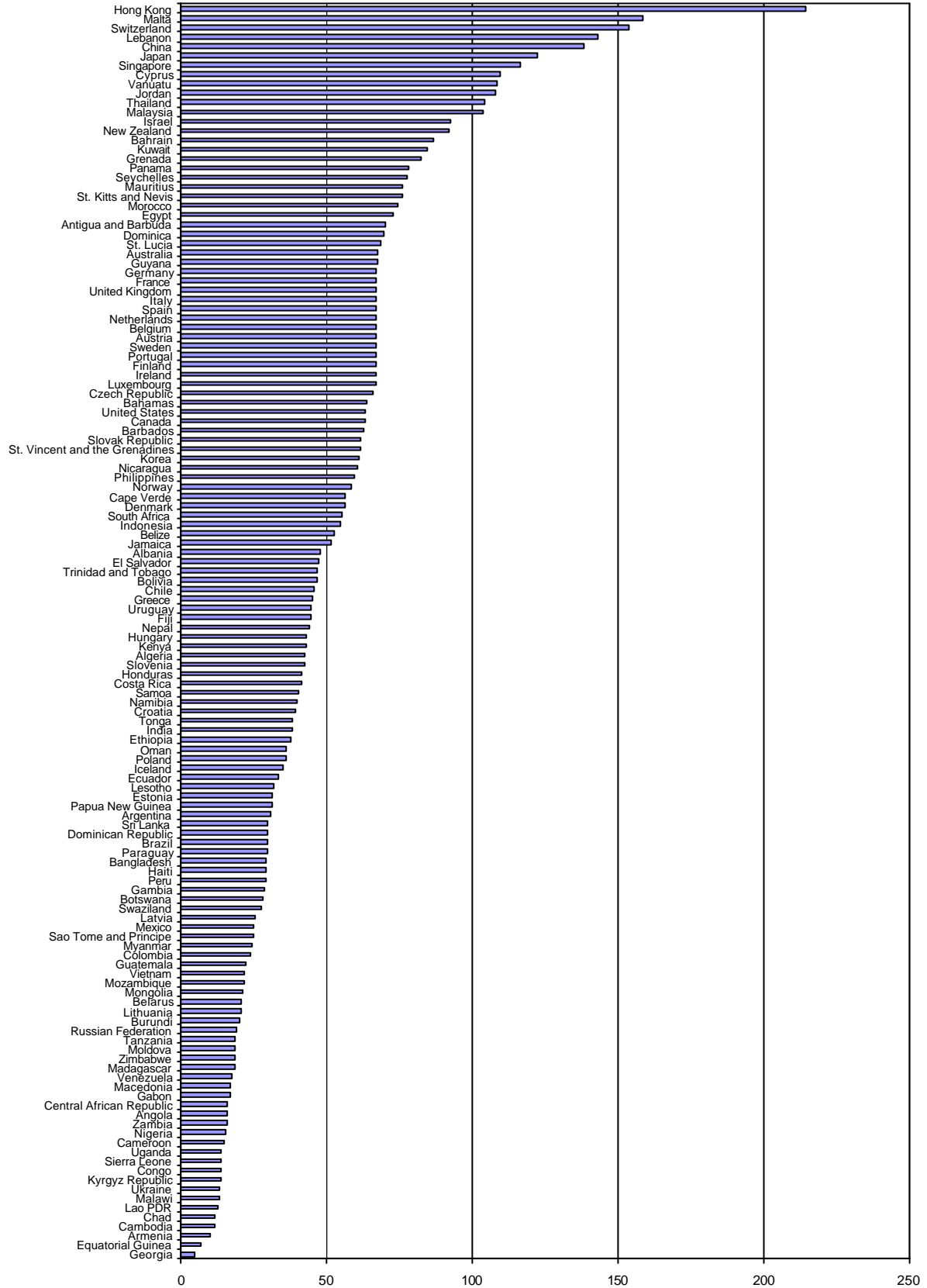
Graph 4

Financial Development Principal Component: Banking sector



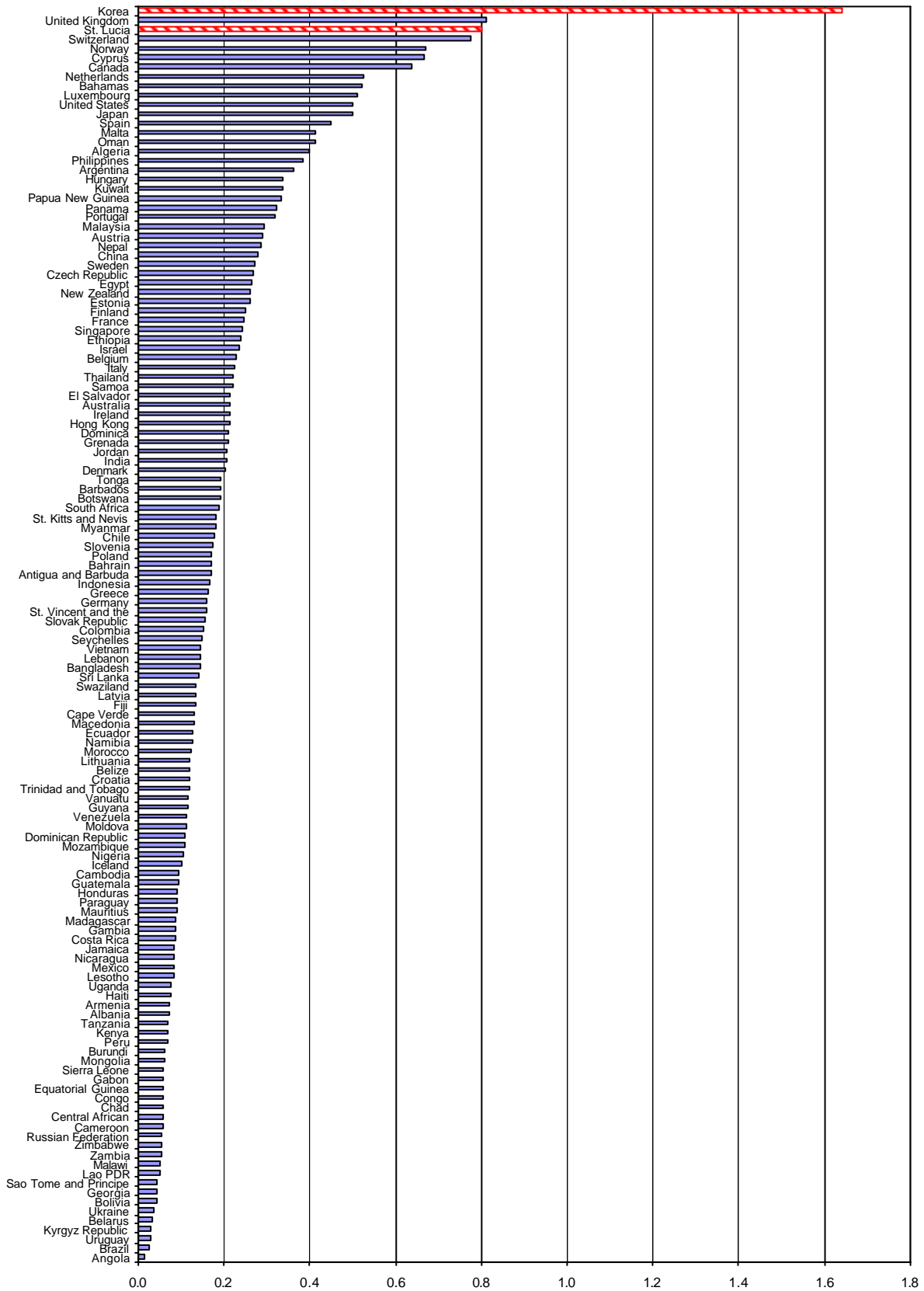
Graph 5

Bank Liabilities



Graph 6

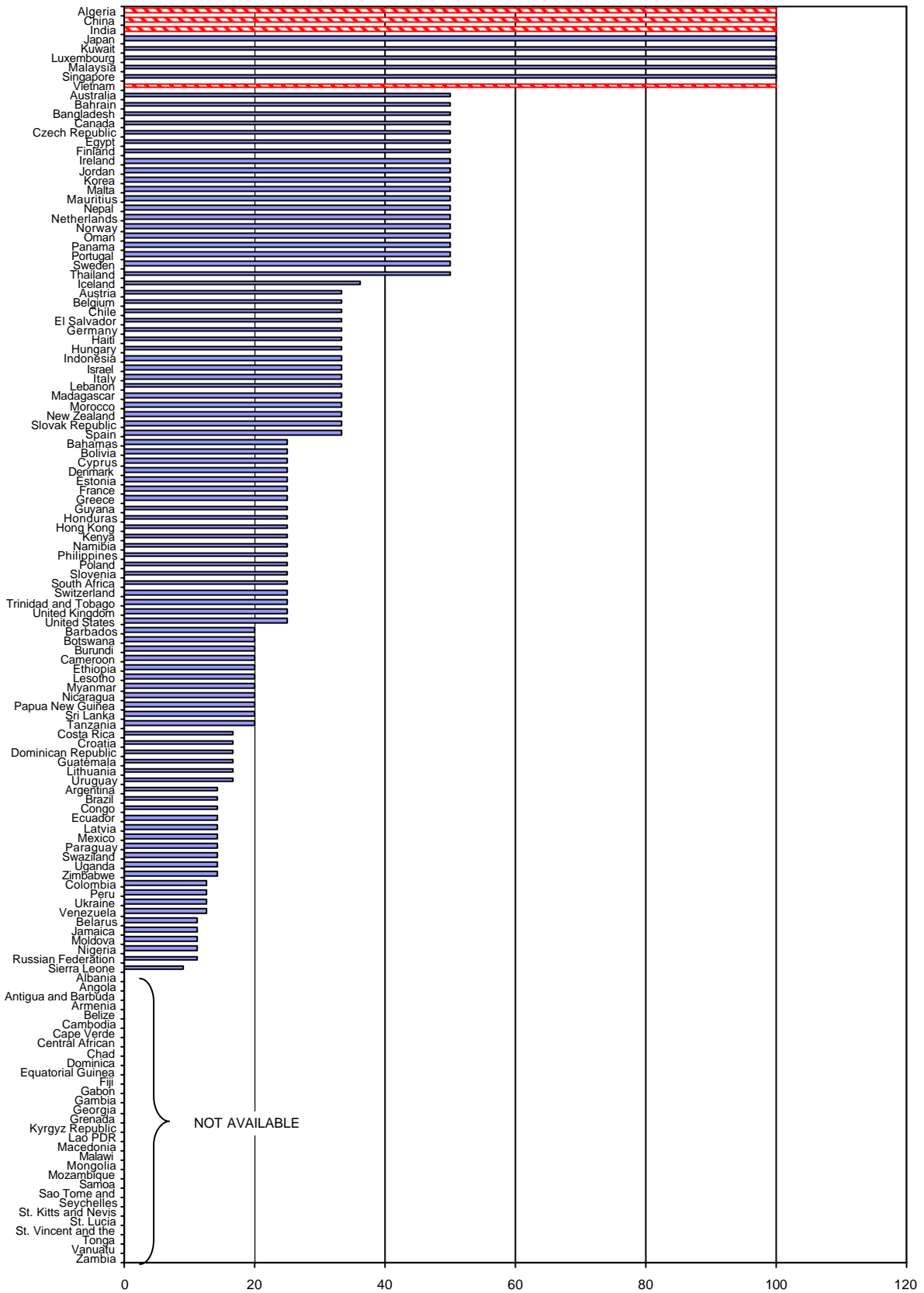
Inverse of Bank Spreads



Note: Outliers have a barred line

Graph 7

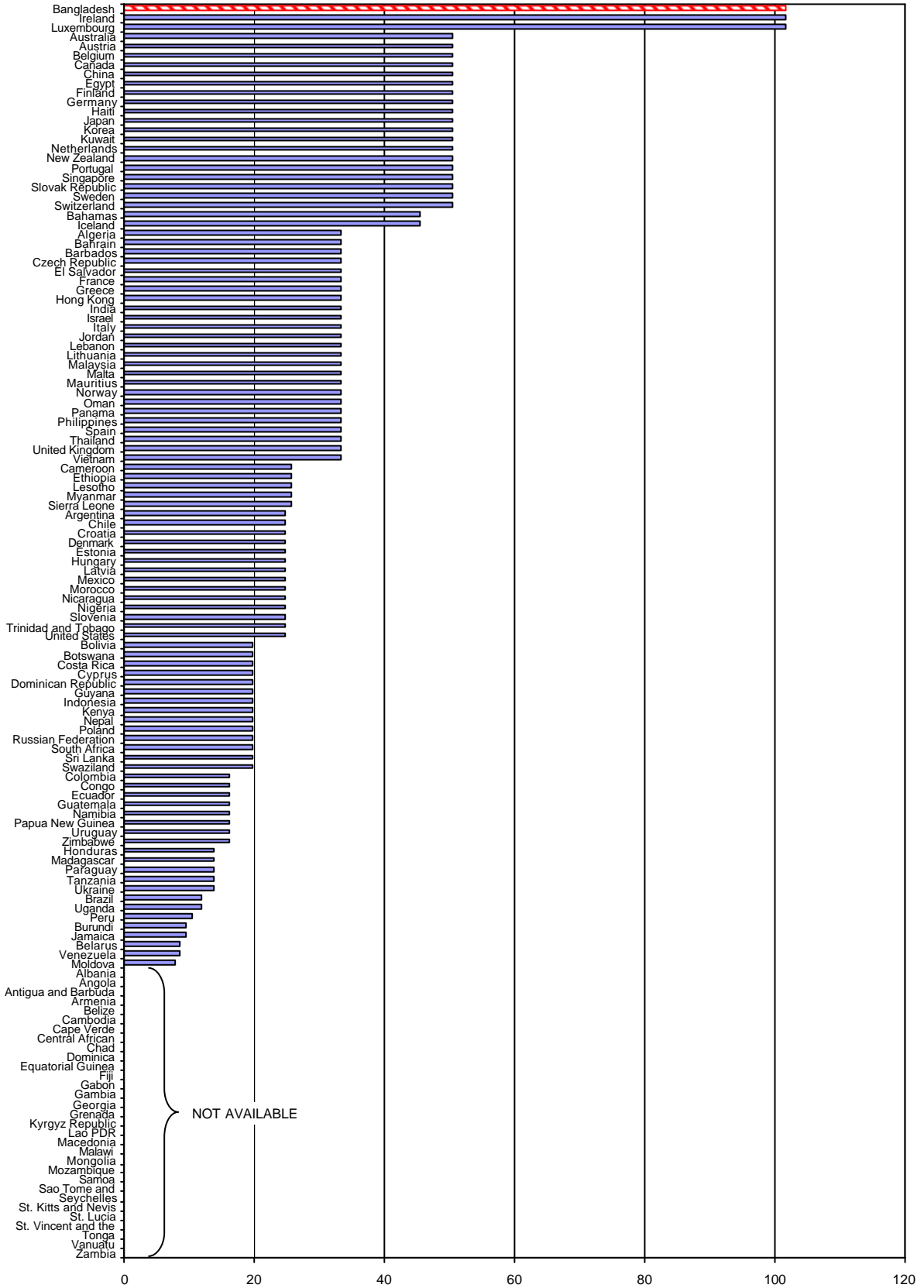
Inverse of Bank Overhead Costs



Note: Outliers have a barred line

Graph 8

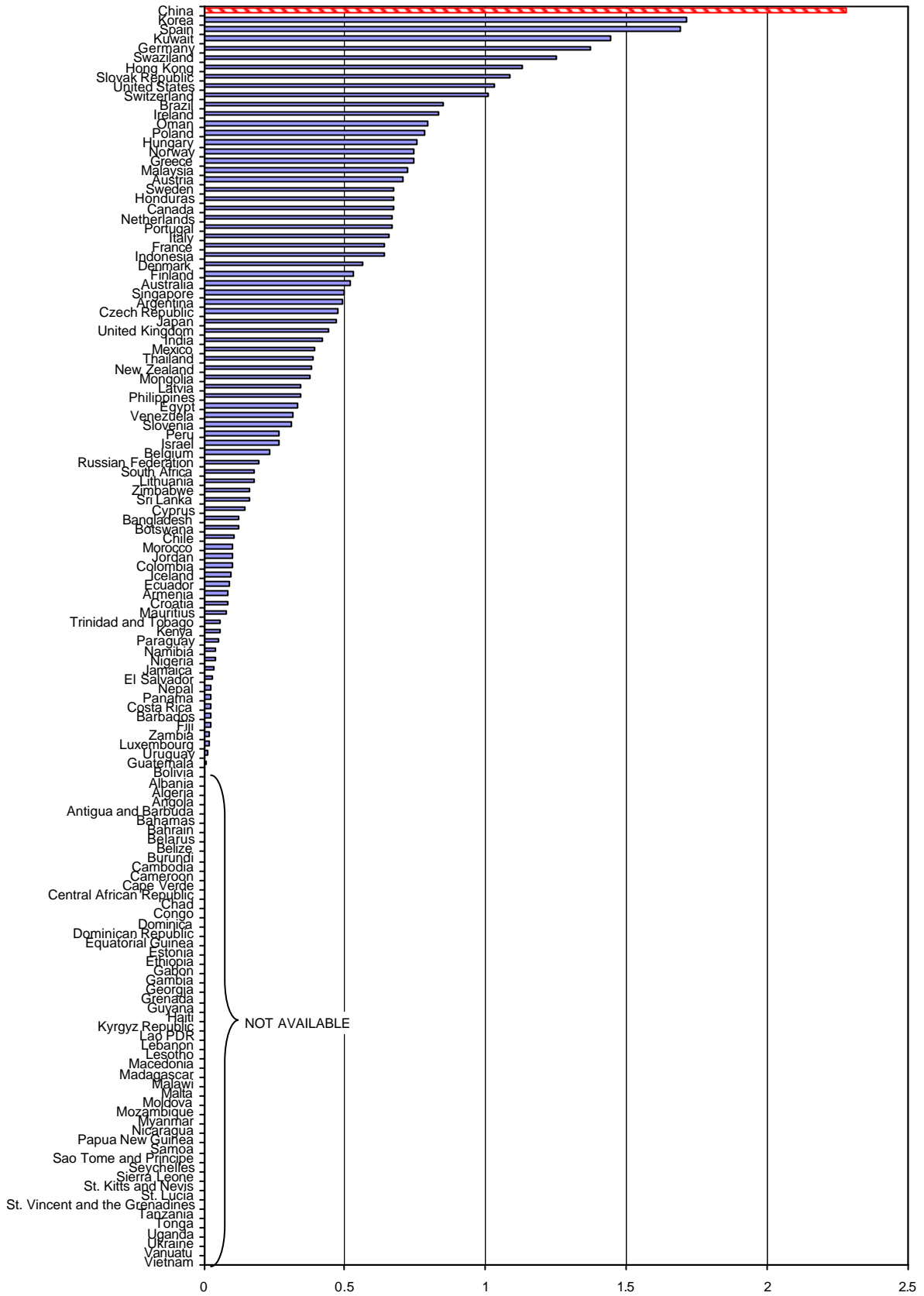
Inverse of Net Interest Margin



Note: Outliers have a barred line

Graph 9

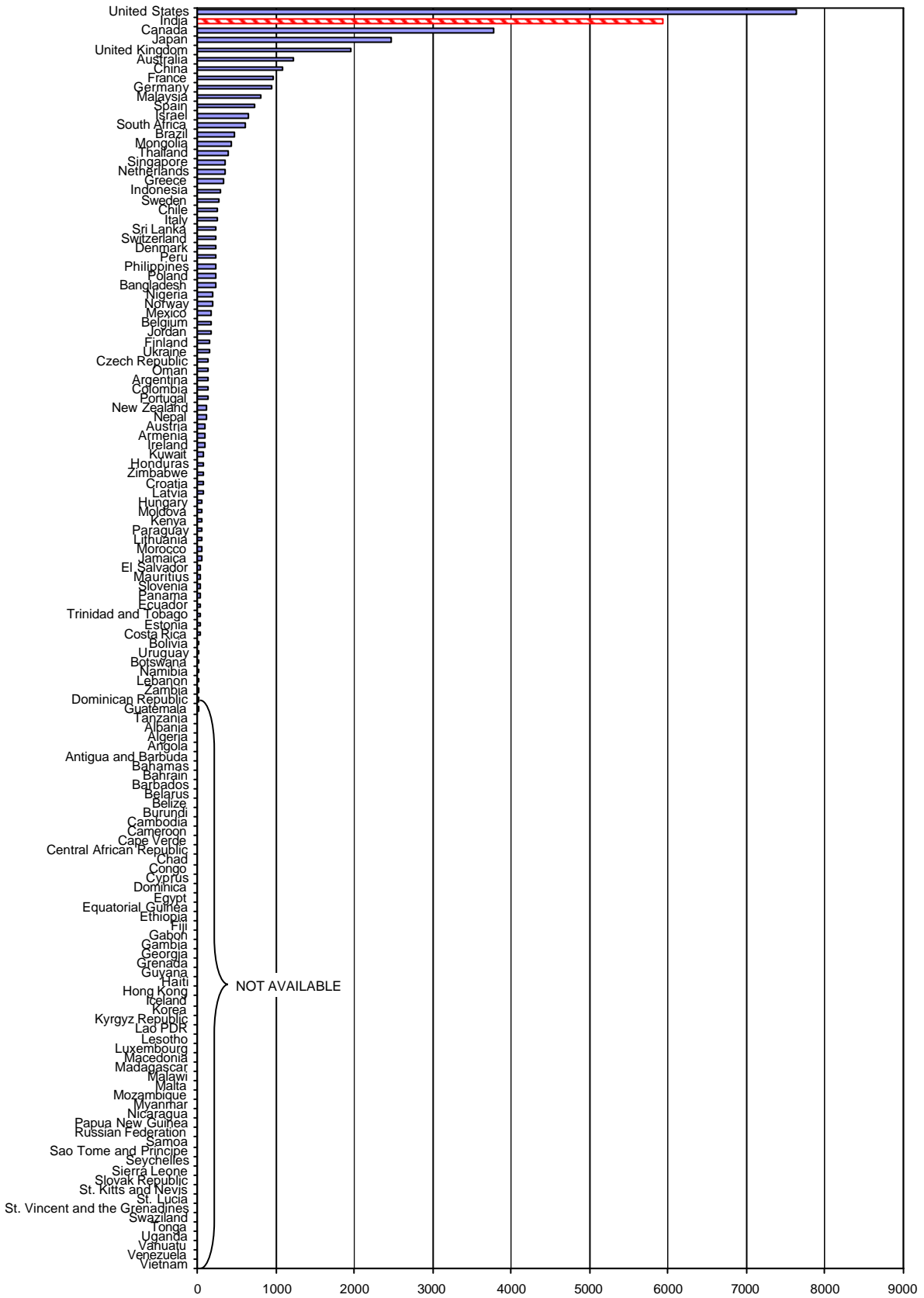
Stock Market Turnover



Note: Outliers have a barred line

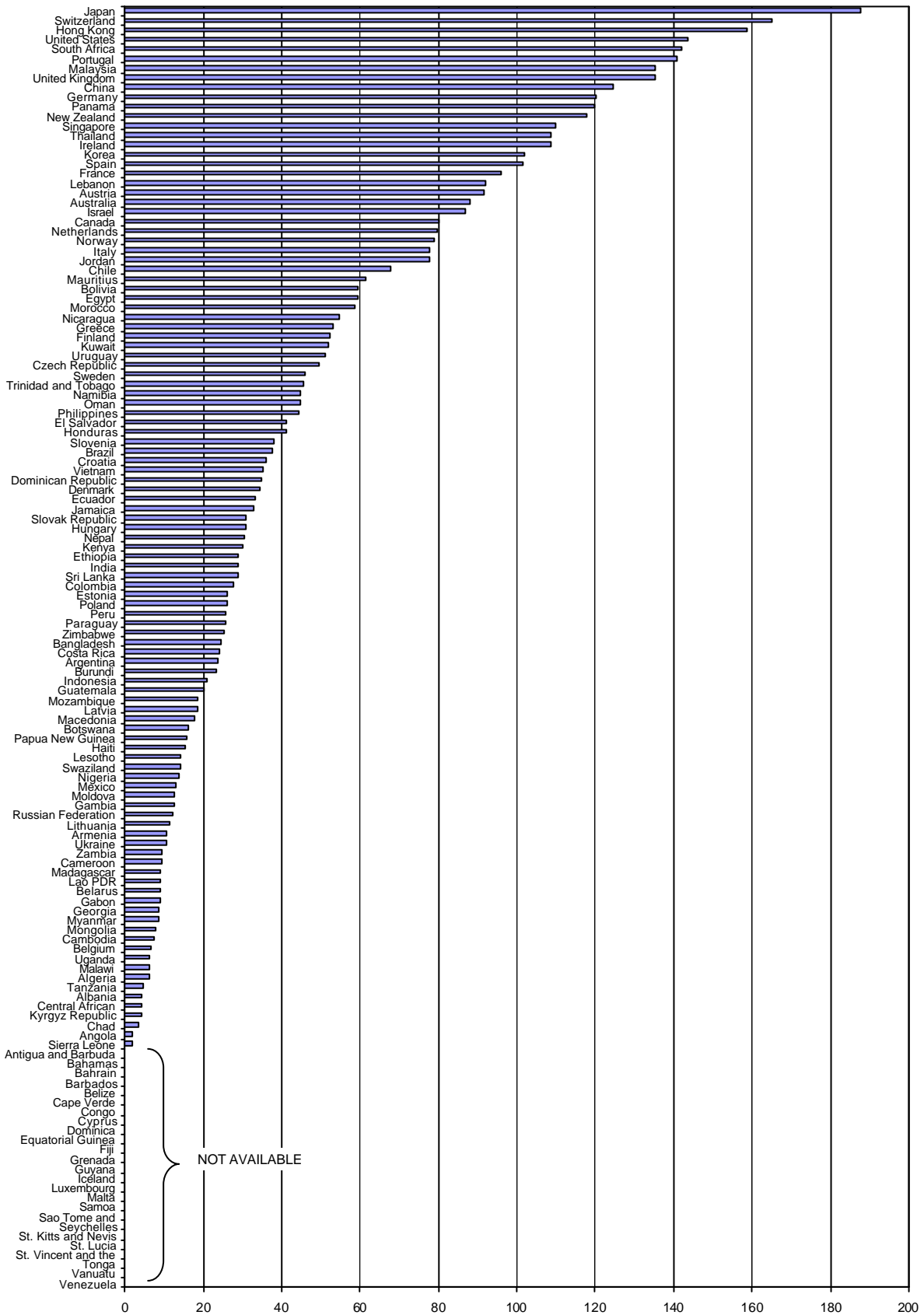
Graph 10

Stock Exchange Listed Companies



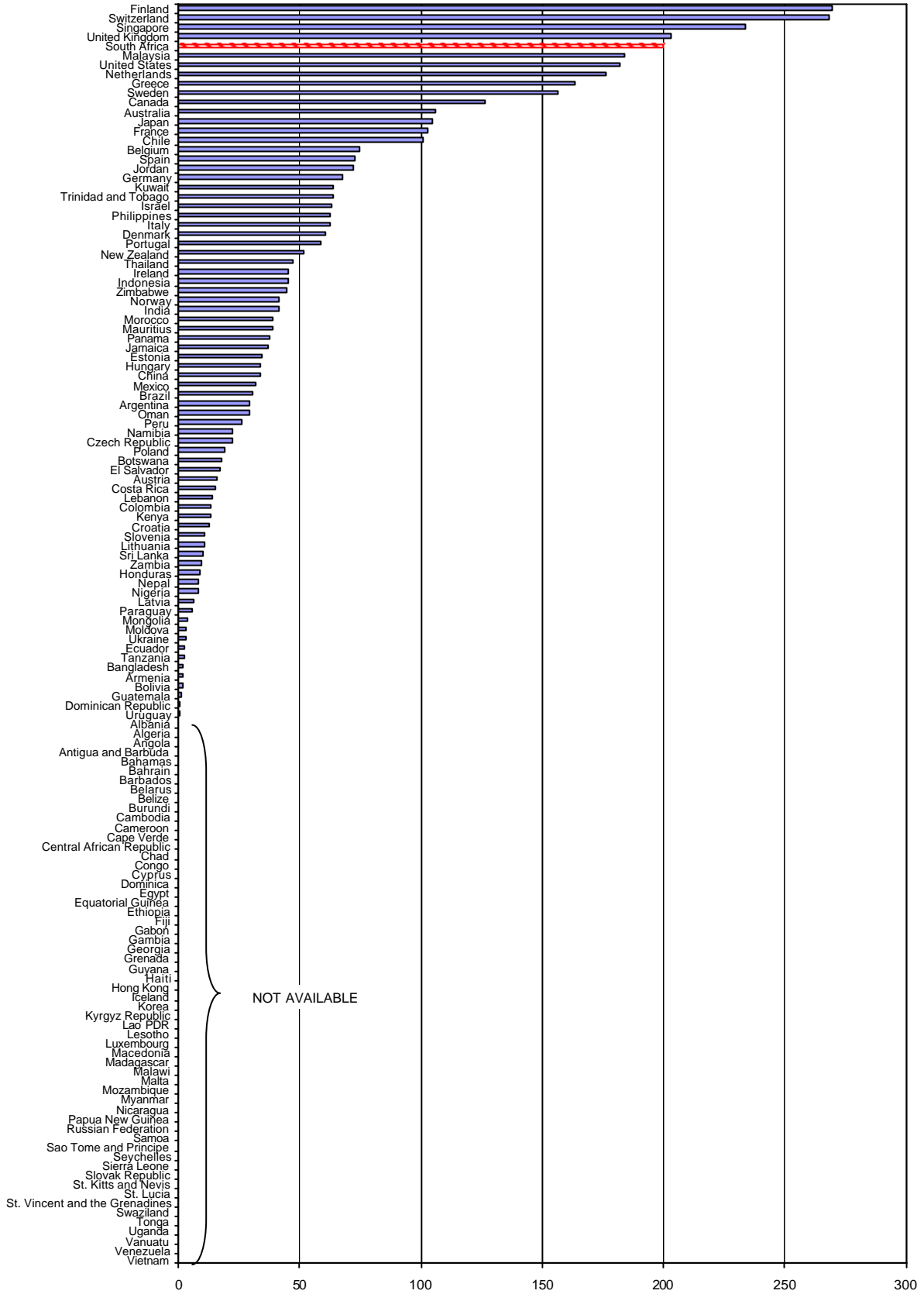
Note: Outliers have a barred line

Graph 11
Private Credit



Graph 12

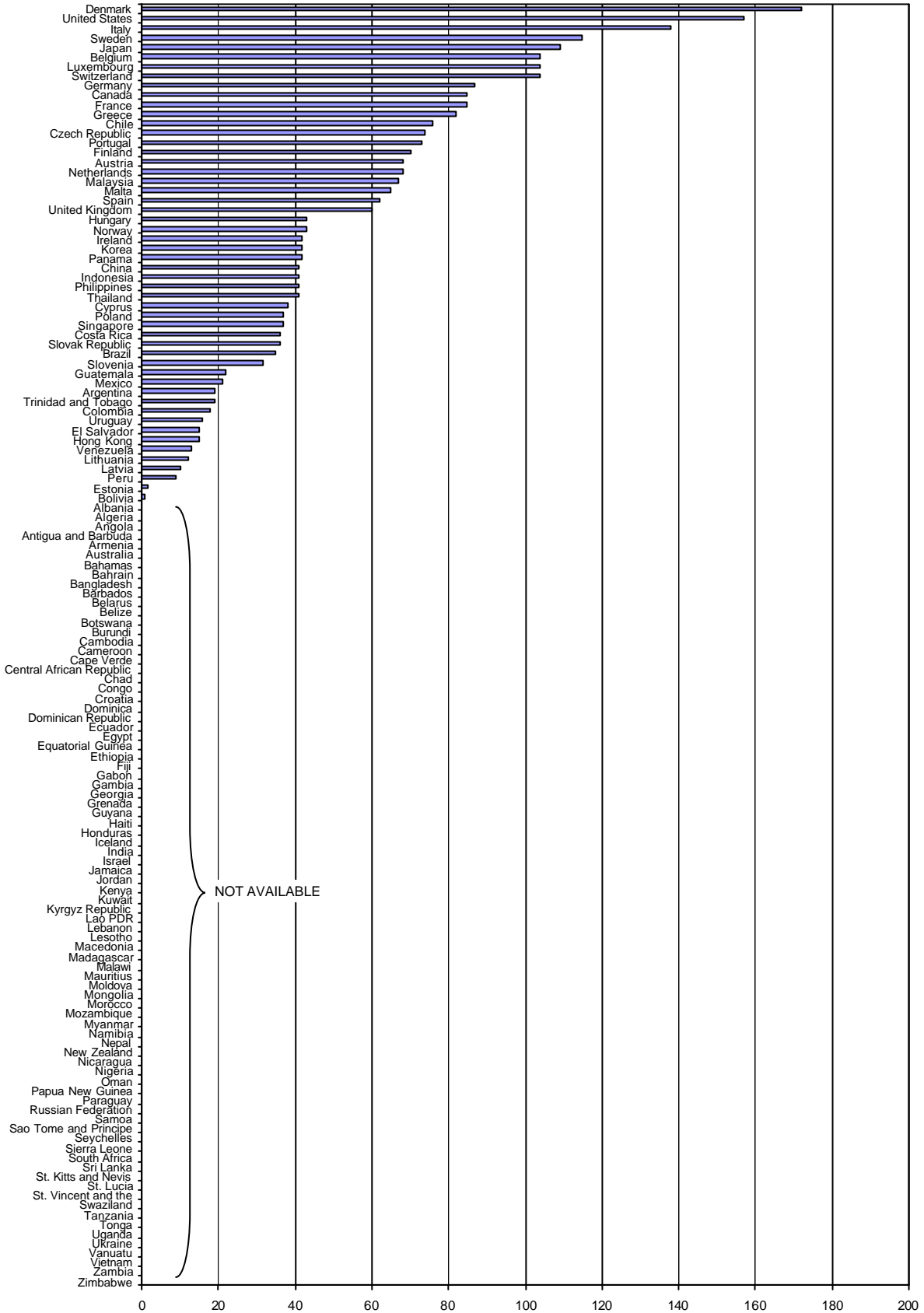
Stock Market Capitalization



Note: Outliers have a barred line

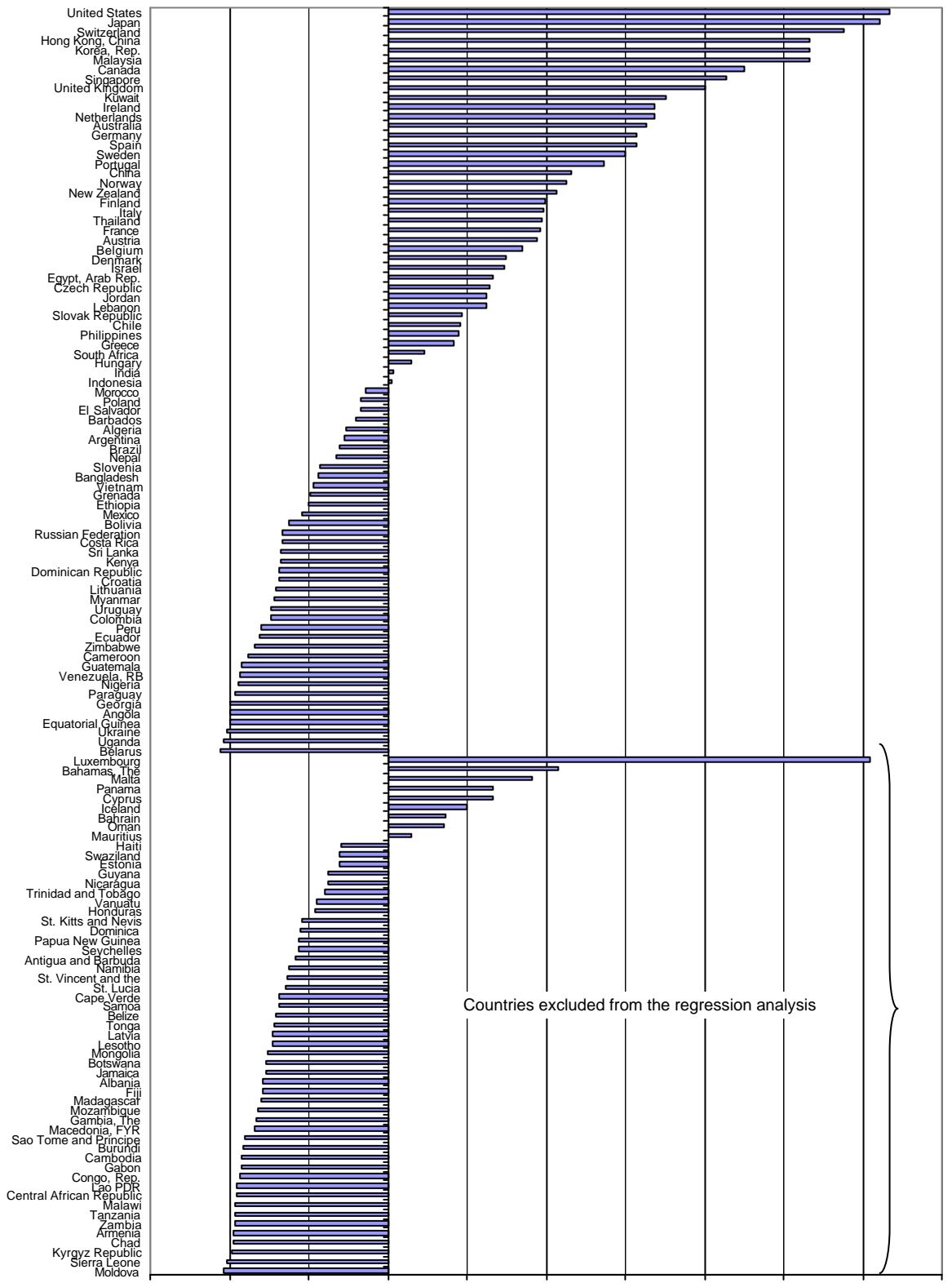
Graph 13

Bonds Outstanding



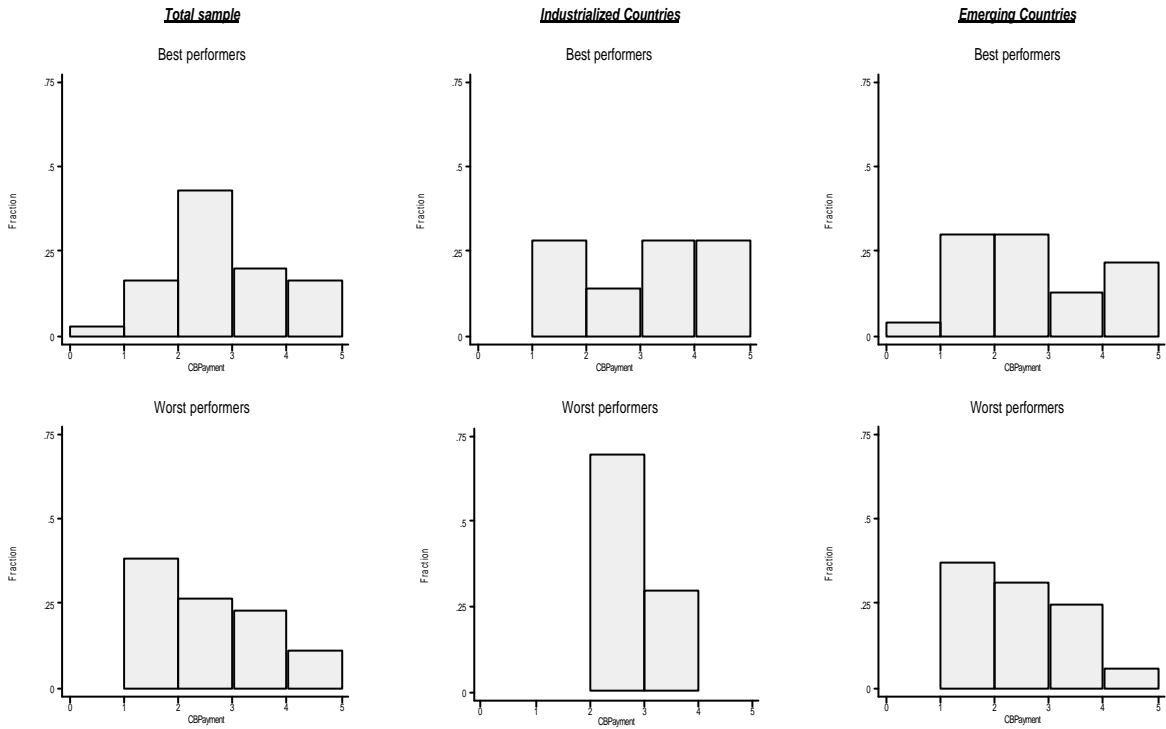
Graph 14

Financial Development Principal Component: Small countries excluded from baseline

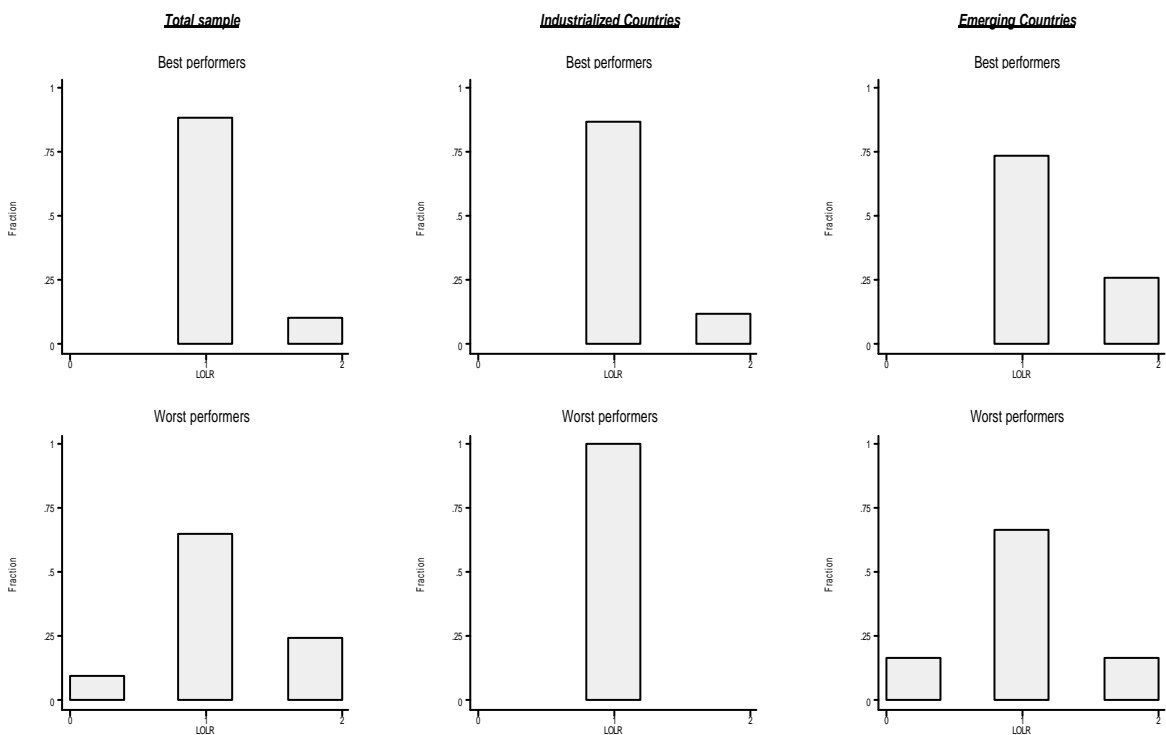


APPENDIX 4: CONDITIONAL PROBABILITIES

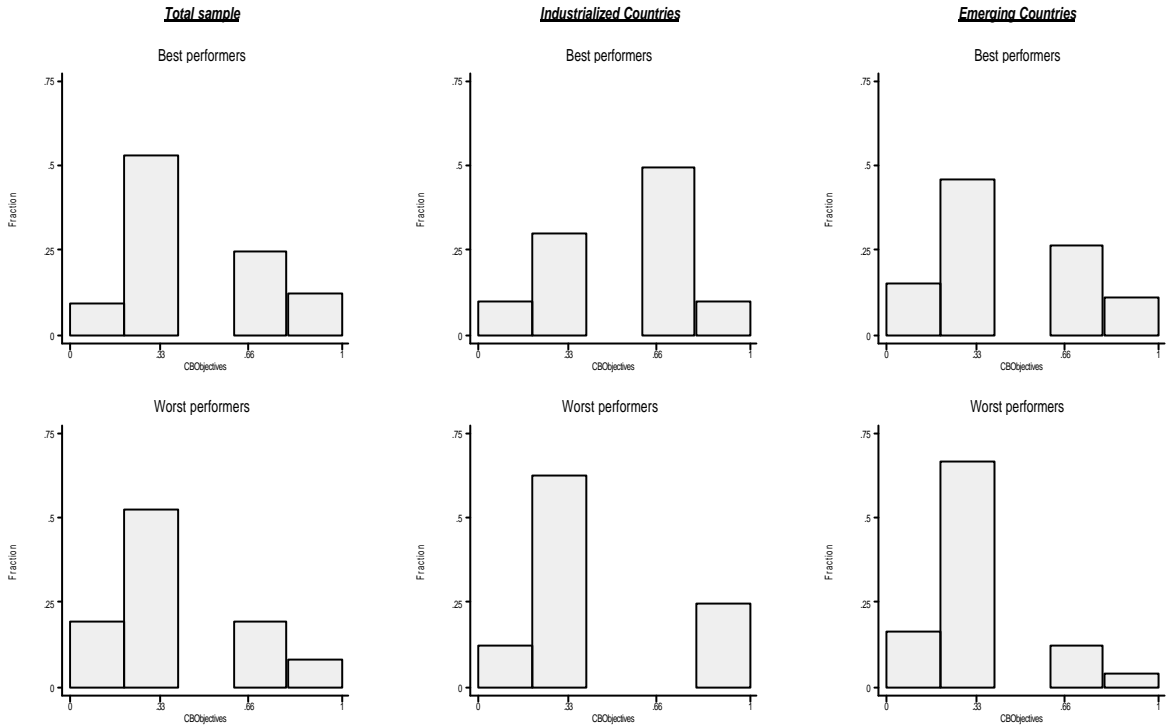
Set 1: Central Bank Involvement in Payments System



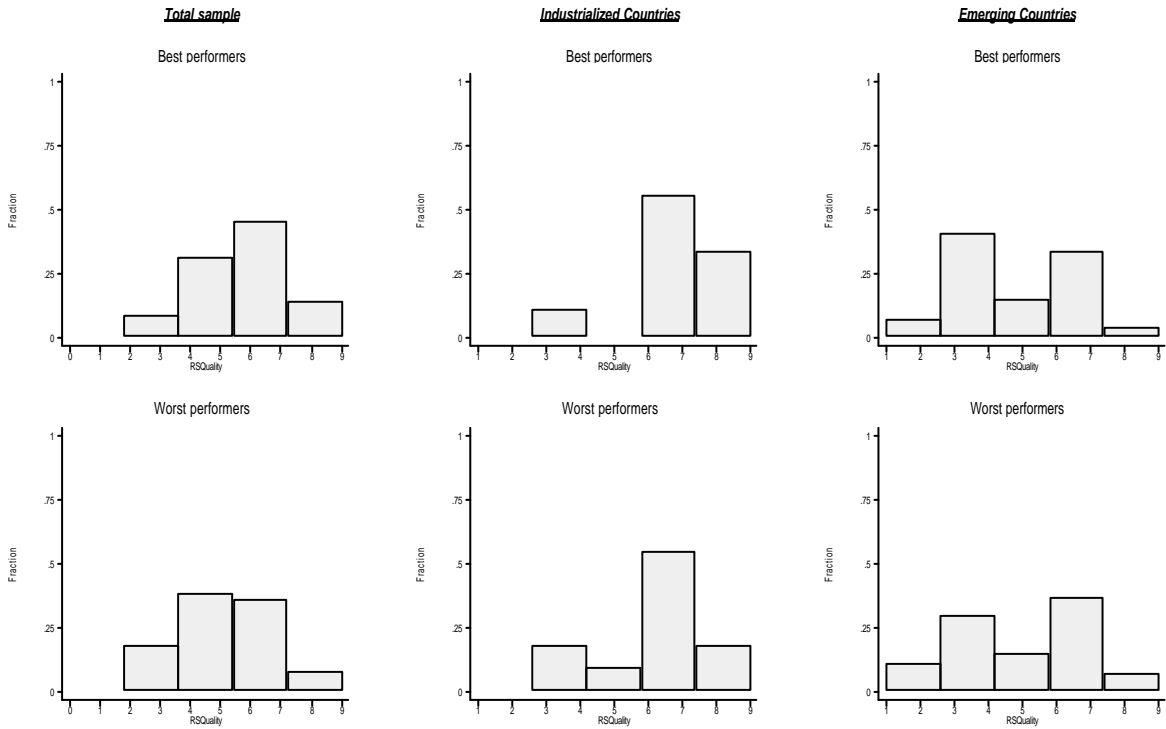
Set 2: LOLR



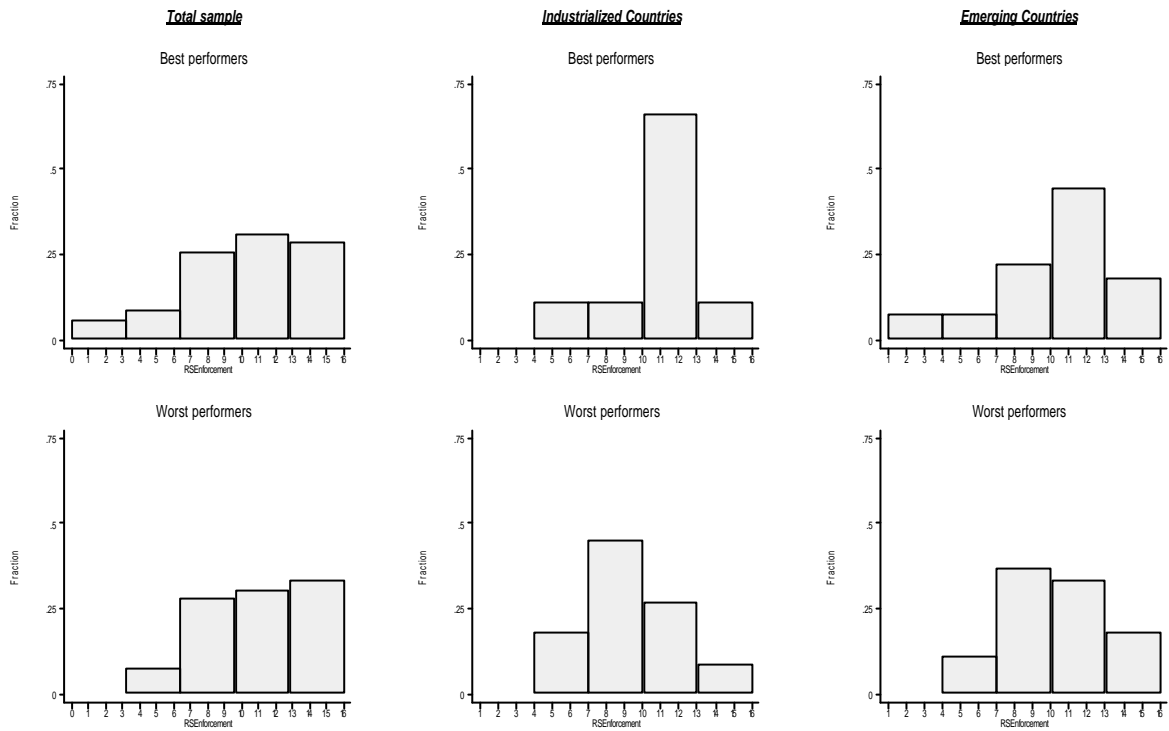
Set 3: Central Bank Objectives



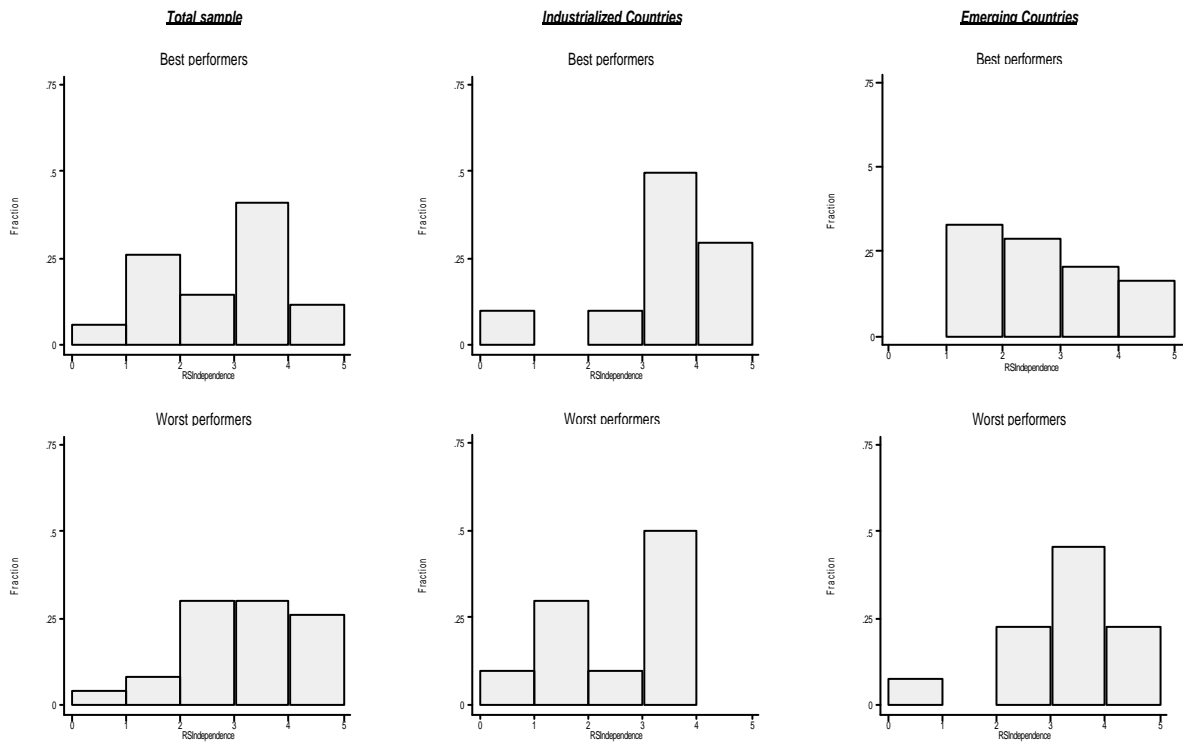
Set 4: Quality of Regulation



Set 5: Supervisory Enforcement



Set 6: Independence of Supervisors



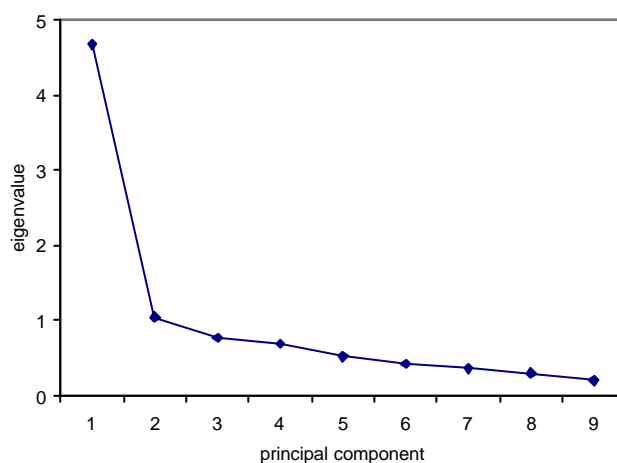
APPENDIX 5: PRINCIPAL COMPONENT ANALYSIS

Principal Component Analysis for Financial Development: Size and efficiency

Number observations	79								
Correlation matrix	Bank liabilities	Bank interest rate spreads (inverse)	Bank overhead costs (inverse)	Net interest margin (inverse)	Stock market turnover	Stock exchange listed companies	Private credit	Stock market capitalization	Bonds outstanding
Bank liabilities	1								
Bank interest rate spreads (inverse)	0.414	1							
Bank overhead costs (inverse)	0.478	0.401	1						
Net interest margin (inverse)	0.459	0.465	0.659	1					
Stock market turnover	0.340	0.540	0.324	0.413	1				
Stock exchange listed companies	0.216	0.376	0.203	0.221	0.317	1			
Private credit	0.699	0.557	0.543	0.605	0.478	0.470	1		
Stock market capitalization	0.573	0.407	0.520	0.491	0.403	0.401	0.656	1	
Bonds outstanding	0.311	0.404	0.376	0.490	0.452	0.494	0.580	0.498	1.000

Component	Eigenvalue	Difference	Proportion	Cumulative
1	4.664	3.614	0.518	0.518
2	1.050	0.276	0.117	0.635
3	0.774	0.086	0.086	0.721
4	0.688	0.167	0.077	0.797
5	0.521	0.091	0.058	0.855
6	0.430	0.068	0.048	0.903
7	0.363	0.060	0.040	0.943
8	0.303	0.096	0.034	0.977
9	0.207	-	0.023	1

Eigenvectors (Scoring coefficients)	1	2	3	4	Component 5	6	7	8	9
Bank liabilities	0.33	-0.34	-0.23	-0.56	-0.09	-0.25	0.27	0.16	0.48
Bank interest rate spreads (inverse)	0.33	0.15	0.48	-0.26	0.54	-0.18	-0.49	0.08	0.07
Bank overhead costs (inverse)	0.33	-0.43	0.02	0.39	0.28	0.40	0.13	0.55	-0.07
Net interest margin (inverse)	0.35	-0.30	0.18	0.45	0.08	-0.21	0.16	-0.67	0.20
Stock market turnover	0.30	0.25	0.61	-0.17	-0.47	0.35	0.33	0.01	-0.01
Stock exchange listed companies	0.25	0.63	-0.38	0.04	0.42	0.22	0.36	-0.11	0.17
Private credit	0.41	-0.04	-0.18	-0.18	-0.01	-0.28	0.15	-0.06	-0.81
Stock market capitalization	0.36	-0.07	-0.35	-0.11	-0.26	0.50	-0.58	-0.27	0.03
Bonds outstanding	0.33	0.34	-0.11	0.43	-0.40	-0.45	-0.22	0.37	0.17



Note: Factor scores are linear composites formed standardizing each variable to zero mean and unit variance (See Hamilton (2002) for further details).

APPENDIX 6:

ADDITIONAL EMPIRICAL RESULTS

Table 1. Robustness test for supervisory independence with different data set ⁽¹⁾

	<i>All countries</i>		<i>Industrial countries</i>		<i>Emerging countries</i>	
Number of obs	79		21		58	
F-test (p-value)	0.000 **		0.000 **		0.000 **	
R-squared	64.58%		63.80%		47.84%	
Dependent		Robust		Robust		Robust
Financial development principal component	Coefficient	t-test	Coefficient	t-test	Coefficient	t-test
Objective variables						
Central bank						
Involvement in payments system	0.3162	(1.62)	0.3720	(0.90)	0.4638 **	(2.00)
LOLR	0.3818	(0.78)	3.5770 **	(4.87)	0.0412	(0.08)
Objectives	1.0347 *	(1.74)	2.6973 **	(2.16)	1.0304	(1.30)
Joint test for CB Objectives, payment system and LOLR						
F-test (p-value)	0.156		0.003 **		0.224	
Regulation and supervision						
Quality of Regulation	-0.1235	(-1.21)	0.2133	(1.12)	-0.1702	(-1.44)
Supervisory Enforcement	0.0370	(0.64)	0.0826	(0.71)	0.0082	(0.13)
Independence of Supervisors	-0.1841	(-0.98)	0.1950	(1.12)	-0.3973	(-1.62)
Joint test for quality regulation, enforcement power and supervisory independence						
F-test (p-value)	0.483		0.245		0.119	
Control variables						
GDP per capita	1.7758 **	(10.37)	0.9066	(1.31)	2.0251 **	(6.11)
constant	-0.6164	(-0.63)	-7.1793 **	(-3.16)	0.6329	(0.59)

(1) Quintyn and Taylor (2002)

Table 2. Robustness test for supervisory independence controlling for rule of law ⁽²⁾

	<i>Emerging countries</i>	
Number of obs	57	
F-test (p-value)	0.000 **	
R-squared	53.88%	
Dependent		Robust
Financial development principal component	Coefficient	t-test
Objective variables		
Central bank		
Involvement in payments system	0.7308	(0.97)
LOLR	0.4630 **	(2.20)
Objectives	-0.2674	(-0.76)
Joint test for CB Objectives, payment system and LOLR		
F-test (p-value)	0.188	
Regulation and supervision		
Quality of Regulation	-0.1606	(-1.55)
Supervisory Enforcement	-0.0086	(-0.13)
Independence of Supervisors	0.4260 **	(3.56)
Joint test for quality regulation, enforcement power and supervisory independence		
F-test (p-value)	0.003 **	
Control variables		
GDP per capita	1.0547 **	(2.75)
constant	0.0662	(0.08)

(2) Kaufman et al (2001)

Table 3. Robustness test for endogeneity of financial development

	<i>All countries</i>		<i>Industrial countries</i>		<i>Emerging countries</i>	
Number of obs	79		21		58	
F-test (p-value)	0.000 **		0.000 **		0.000 **	
R-squared	93.63%		96.39%		91.42%	
Dependent		Robust		Robust		Robust
Financial development principal component	Coefficient	t-test	Coefficient	t-test	Coefficient	t-test
Objective variables						
Central bank						
Involvement in payments system	-0.0934	(-0.83)	0.2371 **	(2.66)	-0.1481	(-1.25)
LOLR	0.2945 *	(1.82)	0.2669	(0.76)	0.3884 **	(2.48)
Objectives	-0.1700	(-0.55)	0.4508	(1.34)	-0.3528	(-0.87)
Joint test for CB Objectives, payment system and LOLR						
F-test (p-value)	0.279		0.110		0.037 **	
Regulation and supervision						
Quality of Regulation	0.0301	(0.63)	0.0937 *	(1.82)	-0.0590	(-1.29)
Supervisory Enforcement	0.0264	(1.12)	0.0869 **	(2.78)	0.0196	(0.67)
Independence of Supervisors	0.1287	(1.57)	0.0577	(0.88)	0.0979	(1.02)
Joint test for quality regulation, enforcement power and supervisory independence						
F-test (p-value)	0.314		0.026 **		0.436	
Control variables						
Financial development in 1997	0.9983 **	(31.79)	1.1482 **	(8.80)	0.9232 **	(16.74)
constant	-0.6687	(-1.58)	-2.8288 **	(-4.14)	-0.0876	(-0.23)

Table 4. Inclusion of location of regulation and supervision as additional regressor

	<i>All countries</i>		<i>Industrial countries</i>		<i>Emerging countries</i>	
Number of obs	78		21		57	
F-test (p-value)	0.000 **		0.000 **		0.000 **	
R-squared	65.60%		70.73%		49.02%	
Dependent		Robust		Robust		Robust
Financial development principal component	Coefficient	t-test	Coefficient	t-test	Coefficient	t-test
Objective variables						
Central bank						
Involvement in payments system	0.3339 *	(1.86)	0.1729	(0.44)	0.4481 **	(2.24)
LOLR	0.4270	(0.90)	3.7090 **	(5.80)	0.0304	(0.06)
Objectives	0.8945	(1.51)	2.5483 **	(2.01)	0.8745	(1.11)
Joint test for CB Objectives, payment system and LOLR						
F-test (p-value)	0.106		0.001 **		0.161	
Regulation and supervision						
Quality of Regulation	-0.1396	(-1.41)	0.2808	(1.04)	-0.1399	(-1.18)
Supervisory Enforcement	0.0495	(0.86)	0.0653	(0.57)	0.0278	(0.44)
Independence of Supervisors	-0.2420	(-1.38)	0.3533	(1.50)	-0.4852 *	(-1.86)
Joint test for quality regulation, enforcement power and supervisory independence						
F-test (p-value)	0.320		0.334		0.098 *	
Control variables						
Location of regulation and supervision	0.5204	(1.63)	0.1714	(0.23)	0.1829	(0.43)
GDP per capita	1.8708 **	(11.24)	1.0376	(1.29)	2.0265 **	(5.97)
constant	-0.9008	(-0.94)	-7.7694 **	(-3.98)	0.4495	(0.38)

Table 5. Robustness test for financial size as dependent variable

	<i>All countries</i>		<i>Industrial countries</i>		<i>Emerging countries</i>	
Number of obs	79		21		58	
F-test (p-value)	0.000 **		0.000 **		0.004 **	
R-squared	61.11%		69.84%		49.15%	
Dependent	Robust		Robust		Robust	
Financial development as size principal component	Coefficient	t-test	Coefficient	t-test	Coefficient	t-test
Objective variables						
Central bank						
Involvement in payments system	0.2236	(1.39)	-0.1527	(-0.53)	0.3982 **	(2.29)
LOLR	0.2739	(0.66)	2.6949 **	(5.19)	0.0486	(0.10)
Objectives	0.8233	(1.59)	2.0255 **	(2.69)	0.7139	(1.17)
Joint test for CB Objectives, payment system and LOLR						
F-test (p-value)	0.210		0.001 **		0.129	
Regulation and supervision						
Quality of Regulation	-0.0269	(-0.35)	0.4357 **	(3.07)	-0.0516	(-0.57)
Supervisory Enforcement	-0.0075	(-0.19)	-0.0697	(-0.87)	-0.0207	(-0.46)
Independence of Supervisors	-0.2679 **	(-1.97)	0.1468	(1.03)	-0.3981 *	(-1.90)
Joint test for quality regulation, enforcement power and supervisory independence						
F-test (p-value)	0.250		0.037 **		0.133	
Control variables						
GDP per capita	1.2854 **	(7.80)	0.7504	(1.58)	1.5951 **	(4.16)
constant	-0.0488	(-0.07)	-4.9372 **	(-4.77)	0.5866	(0.71)

Table 6. Robustness test for financial efficiency as dependent variable

	<i>All countries</i>		<i>Industrial countries</i>		<i>Emerging countries</i>	
Number of obs	79		21		58	
F-test (p-value)	0.000 **		0.000 **		0.006 **	
R-squared	51.79%		61.73%		31.35%	
Dependent	Robust		Robust		Robust	
Financial development as efficiency principal component	Coefficient	t-test	Coefficient	t-test	Coefficient	t-test
Objective variables						
Central bank						
Involvement in payments system	0.2579	(1.63)	0.3794	(1.06)	0.2588	(1.53)
LOLR	0.2335	(0.73)	2.4323 **	(6.06)	-0.0369	(-0.11)
Objectives	0.6528	(1.52)	1.7137 *	(1.66)	0.6014	(1.07)
Joint test for CB Objectives, payment system and LOLR						
F-test (p-value)	0.135		0.000 **		0.341	
Regulation and supervision						
Quality of Regulation	-0.1548 *	(-1.68)	-0.0163	(-0.09)	-0.1466	(-1.55)
Supervisory Enforcement	0.0612	(0.97)	0.1764 *	(1.74)	0.0543	(0.70)
Independence of Supervisors	-0.0211	(-0.13)	0.3918 **	(2.07)	-0.2774	(-1.27)
Joint test for quality regulation, enforcement power and supervisory independence						
F-test (p-value)	0.424		0.042 **		0.138	
Control variables						
GDP per capita	1.2410 **	(8.46)	0.4911	(0.88)	1.2866 **	(3.45)
constant	-0.7892	(-1.00)	-5.8943 **	(-3.32)	0.2143	(0.26)

Table 7. Robustness test for bank development as dependent variable

	<i>All countries</i>		<i>Industrial countries</i>		<i>Emerging countries</i>	
Number of obs	79		21		58	
F-test (p-value)	0.000 **		0.000 **		0.000 **	
R-squared	48.46%		65.76%		41.08%	
Dependent		Robust		Robust		Robust
Bank development principal component	Coefficient	t-test	Coefficient	t-test	Coefficient	t-test
Objective variables						
Central bank						
Involvement in payments system	0.2450	(1.34)	0.0711	(0.24)	0.4270 **	(2.31)
LOLR	0.4517	(0.87)	3.8061 **	(8.34)	-0.0194	(-0.04)
Objectives	0.5980	(0.94)	2.0797 **	(2.38)	0.5440	(0.68)
Joint test for CB Objectives, payment system and LOLR						
F-test (p-value)	0.369		0.000 **		0.149	
Regulation and supervision						
Quality of Regulation	-0.1519	(-1.62)	0.0765	(0.40)	-0.1123	(-1.02)
Supervisory Enforcement	0.0399	(0.68)	0.1695 *	(1.76)	0.0140	(0.22)
Independence of Supervisors	-0.2015	(-1.03)	0.3304 *	(1.77)	-0.4577 *	(-1.68)
Joint test for quality regulation, enforcement power and supervisory independence						
F-test (p-value)	0.318		0.171		0.090 *	
Control variables						
GDP per capita	1.2756 **	(7.26)	0.0422	(0.05)	1.5906 **	(5.19)
constant	-0.2877	(-0.27)	-6.4390 **	(-2.71)	0.7012	(0.70)

Table 8. Robustness test for credit to the private sector as dependent variable

	<i>All countries</i>		<i>Industrial countries</i>		<i>Emerging countries</i>	
Number of obs	79		21		58	
F-test (p-value)	0.000 **		0.000 **		0.000 **	
R-squared	46.34%		76.20%		44.54%	
Dependent		Robust		Robust		Robust
Private credit to GDP	Coefficient	t-test	Coefficient	t-test	Coefficient	t-test
Objective variables						
Central bank						
Involvement in payments system	0.1602	(1.50)	0.0720	(0.44)	0.3034 **	(3.02)
LOLR	0.1747	(0.55)	2.6571 **	(8.88)	-0.1249	(-0.43)
Objectives	0.3531	(0.91)	1.6166 **	(4.02)	0.3664	(1.06)
Joint test for CB Objectives, payment system and LOLR						
F-test (p-value)	0.343		0.000 **		0.036 **	
Regulation and supervision						
Quality of Regulation	0.0222	(0.45)	0.3177 **	(3.81)	0.0028	(0.05)
Supervisory Enforcement	0.0108	(0.31)	0.1198 **	(2.13)	-0.0241	(-0.69)
Independence of Supervisors	-0.1207	(-1.05)	0.2345 **	(2.31)	-0.2380 *	(-1.71)
Joint test for quality regulation, enforcement power and supervisory independence						
F-test (p-value)	0.675		0.000 **		0.146	
Control variables						
GDP per capita	0.6389 **	(5.88)	-0.3674	(-1.07)	0.8130 **	(5.47)
constant	-0.6025	(-1.00)	-6.0120 **	(-7.24)	0.2399	(0.47)

Table 9. Robustness test: credit to the private sector as dependent variable, including all control variables

	<i>All countries</i>		<i>Emerging countries</i>	
Number of obs	79		58	
F-test (p-value)	0.000 **		0.000 **	
R-squared	61.76%		66.59%	
Dependent		Robust		Robust
Private credit to GDP	Coefficient	t-test	Coefficient	t-test
Objective variables				
Central bank				
Involvement in payments system	0.1467	(1.39)	0.3518 **	(3.15)
LOLR	0.1988	(0.61)	-0.0820	(-0.29)
Objectives	0.6031	(1.53)	0.7883 **	(2.14)
Joint test for CB Objectives, payment system and LOLR				
	F-test (p-value)	0.192		0.017 **
Regulation and supervision				
Quality of Regulation	0.0592	(1.17)	0.0387	(0.96)
Supervisory Enforcement	-0.0017	(-0.05)	-0.0302	(-0.89)
Independence of Supervisors	-0.0357	(-0.29)	-0.1384	(-1.03)
Joint test for quality regulation, enforcement power and supervisory independence				
	F-test (p-value)	0.679		0.378
Control variables				
Institutional				
Rule of law	-0.0717	(-1.21)	-0.0631	(-0.83)
Creditors' rights	0.1728 **	(2.05)	0.3130 **	(3.50)
Economic freedom index	0.1148 *	(1.90)	0.0954	(1.57)
Deposit Insurance Scheme	-0.1872	(-0.96)	0.0045	(0.01)
Joint test for institutional variables				
	F-test (p-value)	0.018 **		0.003 **
Financial system-related				
Unbalanced financial structure	0.0019	(0.32)	0.0033	(0.49)
Foreign participation	-0.3281	(-0.51)	-0.2109	(-0.27)
Bank concentration	-0.0102 *	(-1.81)	-0.0095	(-1.27)
Financial crisis after liberalization	-0.4476 **	(-2.13)	-0.6066 **	(-2.69)
Joint test for financial system related variables				
	F-test (p-value)	0.080 *		0.066 *
Macroeconomic				
GDP per capita	0.4687 **	(2.94)	0.6126 **	(3.62)
Domestic savings	0.0077	(0.67)	-0.0006	(-0.05)
Inflation	-3.1978 **	(-3.43)	-2.2534 **	(-2.64)
Joint test for macroeconomic variables				
	F-test (p-value)	0.000 **		0.000 **
Economic policies				
Fiscal deficit	-0.0095	(-0.41)	-0.0142	(-0.62)
Exchange rate regime	-0.0996	(-0.66)	-0.0790	(-0.53)
Joint test for economic policy variables				
	F-test (p-value)	0.658		0.672
constant	-0.4189	(-0.37)	-0.2663	(-0.21)

Table 10. Robustness test controlling for outliers in the definition of financial development

	<i>All countries</i>		<i>Industrial countries</i>		<i>Emerging countries</i>	
Number of obs	79		21		58	
F-test (p-value)	0.000 **		0.000 **		0.000 **	
R-squared	62.99%		61.73%		44.98%	
Dependent	Robust		Robust		Robust	
Financial development principal component	Coefficient	t-test	Coefficient	t-test	Coefficient	t-test
Objective variables						
Central bank						
Involvement in payments system	0.4041 **	(2.13)	0.5718 *	(1.73)	0.4663 **	(2.30)
LOLR	0.5024	(0.86)	4.9418 **	(8.96)	-0.0177	(-0.03)
Objectives	0.9686	(1.63)	1.9723 *	(1.69)	1.3339 *	(1.73)
Joint test for CB Objectives, payment system and LOLR						
F-test (p-value)	0.063 *		0.000 **		0.084 *	
Regulation and supervision						
Quality of Regulation	-0.1206	(-1.22)	0.1928	(0.94)	-0.1395	(-1.14)
Supervisory Enforcement	0.0000	(0.00)	0.1021	(0.75)	-0.0291	(-0.47)
Independence of Supervisors	-0.2675	(-1.19)	0.1331	(0.51)	-0.4661	(-1.53)
Joint test for quality regulation, enforcement power and supervisory independence						
F-test (p-value)	0.339		0.588		0.074 *	
Control variables						
GDP per capita	1.7785 **	(9.49)	0.0251	(0.03)	1.8061 **	(6.06)
constant	-0.2893	(-0.27)	-7.0551 **	(-2.75)	0.8817	(0.82)

Table 11. Robustness test including small countries

	<i>All countries</i>		<i>Industrial countries</i>		<i>Emerging countries</i>	
Number of obs	134		23		111	
F-test (p-value)	0.000 **		0.000 **		0.000 **	
R-squared	68.01%		73.81%		47.36%	
Dependent	Robust		Robust		Robust	
Financial development principal component	Coefficient	t-test	Coefficient	t-test	Coefficient	t-test
Objective variables						
Central bank						
Involvement in payments system	0.1872	(1.20)	0.0785	(0.27)	0.3171 *	(1.86)
LOLR	0.3712	(1.01)	3.1048 **	(7.28)	-0.0646	(-0.19)
Objectives	0.6006	(1.50)	2.2776 **	(2.61)	0.4676	(1.03)
Joint test for CB Objectives, payment system and LOLR						
F-test (p-value)	0.120		0.000 **		0.246	
Regulation and supervision						
Quality of Regulation	-0.0680	(-1.05)	0.2306	(1.45)	-0.0903	(-1.39)
Supervisory Enforcement	-0.0049	(-0.13)	0.0986	(1.27)	-0.0057	(-0.15)
Independence of Supervisors	-0.0268	(-0.17)	0.3925 **	(2.21)	-0.1872	(-0.93)
Joint test for quality regulation, enforcement power and supervisory independence						
F-test (p-value)	0.739		0.041 **		0.359	
Control variables						
GDP per capita	1.8126 **	(14.57)	1.3751 **	(2.74)	1.8940 **	(7.90)
constant	-0.5943	(-0.90)	-7.3273 **	(-4.65)	0.2115	(0.30)