Doctoral Dissertation

Government Borrowing, Government Banks, and Financial Intermediation

September 2021

Doctoral Program in Economics

Graduate School of Economics

Ritsumeikan University

Rania Kabir

Doctoral Dissertation Reviewed

by Ritsumeikan University

Government Borrowing, Government Banks, and Financial Intermediation

（政府借入、政府銀行および金融仲介）

September 2021

2021 年 9 月

Doctoral Program in Economics

Graduate School of Economics

Ritsumeikan University

立命館大学大学院経済学研究科

経済学専攻博士課程後期課程

Rania Kabir

ラニア　カビール

Supervisor：Professor David Flath

研究指導教員：ディビッド　フラス　教授

Acknowledgment

I want to express my deepest gratitude to my supervisor, Professor David Flath, for his continuous support, selfless help, and patient guidance through the entire dissertation process. His way of doing research work and confident attitude has a profound impact on me. I am truly grateful for his help towards finishing my dissertation writing. I also like to pay my appreciation to Professor Kazuo Inaba for his generous support that contributes to the accomplishment of the dissertation. His helpful information and way of arranging research seminars always helped us to keep on track. I would also like to thank Professor Nobuki Sugita for his valuable suggestions to conduct my future research work.

I also thank the graduate school staff and the International Center for their support. In addition, I appreciate the Asian Development Bank (ADB) for providing me necessary financial support and mental support. I would not forget the favor of having a maternity leave approved by my supervisor Professor David Flath and the ADB during my study period.

My sincere thanks to my family for their continuous support and encouragement. I give my best regards to all who supported me during the accomplishment of the dissertation. Last but not least, I am indebted to my Creator for giving me strengths in accomplishing the dissertation.

Abstract

This study examines whether government actions such as government borrowing from the banking sector and government ownership of banks generally stimulate financial intermediation or depress it. At first, a cross-country regression equation is estimated with bank credit to the private sector relative to GDP as a dependent variable and government borrowing from the banking system relative to GDP as an independent variable, using a cross-country dataset for 73 countries. The results show that government debt held by banks crowds out bank credit to the private sector dollar-for-dollar, and this is true of developing countries and high-income countries alike. It is consistent with domestic sovereign debt placed with banks at market prices and banks managing their private credit to maintain constant capital ratios.

Next, the study uses a cross-country dataset for 112 countries to identify the effect of government-owned banks on the overall extent of financial intermediation. To conduct the analysis, a new measure of financial development is proposed and estimated. Its basic premise is that societal saving on a large scale requires financial intermediation. We calculate this measure—which we dubbed 'saving efficiency,' which is the gap between actual domestic saving rates of lower-income countries and the savings rates they would have if their financial systems were developed. The results show that saving efficiency tends to be smaller in lower-income countries whose banking industries are more dominated by government banks. That supports a view in which government banks in developing countries manifest crony capitalism, not vehicles for overcoming market failure.

Lastly, the study uses time-series data of Bangladesh to see whether government ownership of banks has facilitated financial development in Bangladesh. Results suggest that higher government ownership of banks is associated with a lower level of financial development in Bangladesh. The study also analyzes placement of government debt with banks, another way besides outright government ownership of banks that government borrowing from the banking sector might constrain financial intermediation in

Bangladesh. The preponderance of the evidence is that placing government debt with banks has had a little measurable effect on bank credit to the private sector using time-series data of Bangladesh.

Keywords: Government borrowing, Government banks, saving efficiency, financial intermediation
JEL Classification Code: O23, H62, G21. G28

Table of Contents

List of Tables

Page

List of Appendixes

Page

Chapter 1
Introduction

1.1 Background of the Study

In many developing countries, securities markets are thin, and access to international funding is limited, so bank lending is the main conduit of financial intermediation. In this instance, government debt placed with banks will displace bank lending to the private sector, constrict the already limited flow of funds to businesses, and crowd out private investment (Caballero and Krishnamurthy, 2004). Such a crowding-out effect of government borrowing has been shown to slow the economic growth of developing countries (Adam and Bevan, 2005), as this logic implies. In rich countries, too, government bonds held by banks crowd out bank lending, but the alternative sources of funds in these countries, including domestic securities markets and external sources such as Euromarkets, prevent any constriction of private bank credit *per se* from much affecting their macroeconomic investment. Besides government borrowing from the banking sector, government ownership of banks itself suppresses financial intermediation. In a wide-ranging paper, La Porta et al. (2002) document the ubiquity of government banks and attempt to measure their many effects on macroeconomic growth and development. They estimate numerous regression equations with cross-country panel data. Their general conclusion is that government banks are more prevalent in countries with corrupt governments and weak political institutions and that the banks misallocate resources and inhibit economic growth. If government banks overcome failures in the markets for credit and investment, they should be expanding the overall extent of financial intermediation. If government banks are vehicles of crony capitalism, they may or may not expand the flow of financial intermediation. Concern about the harm of government borrowing from the banking sector and government ownership of banks on financial intermediation of the developing countries has prompted this study.

1.2 Purpose of the Study

This study examines whether government actions such as government borrowing from the banking sector and government ownership of banks generally stimulate financial intermediation or depress it. First, the study examines how government borrowing from the banking sector crowds out bank credit to the private sector in developing and high-income countries. Several recent papers, including Kumhof and Tanner (2005), Emran and Farazi (2009), Hauner (2009), and Gray et al. (2014), find in developing countries, domestic government bonds placed with banks crowd out bank loans by more than dollar-for-dollar which is a super-crowding out of bank credit that indicates that the banks are "lazy." This study aims to clarify what "lazy bank" might mean.

Second, the study examines whether government banks generally promote financial intermediation or impede it in lower-income and higher-income countries.

Third, the study examines whether financial intermediation is increasing over time in Bangladesh and whether government ownership of banks has facilitated financial development in Bangladesh. To put it another way, are the lending activities of government banks in Bangladesh socially desirable, or politically motivated, and socially harmful?

Fourth, the study examines whether government borrowing from the banking sector constrains financial intermediation in Bangladesh. The aim is to see whether cross-country results of the study are reflected in the Bangladesh case based on time series data, and the study also compares the Bangladesh data with other countries.

1.3 Structure of the Study

To address the above study purposes, the research is organized as follows. The research introduces the background, purposes, and structure in Chapter 1.

In Chapter 2, a cross-country regression equation is estimated using five-year-averaged panel data for 73 countries, 1995-2014, to see how government borrowing from the banking sector affects banks credit to the private sector- the most crucial variable of financial intermediation. The results show that government debt held by banks crowds

out bank credit to the private sector dollar-for-dollar, and this is true of developing countries and high-income countries alike.

Using a cross-country dataset for 112 countries, 1970-2017, Chapter 3 estimates econometric models that identify the effect of government-owned banks on the overall extent of financial intermediation. To conduct the analysis, a new measure of financial development is proposed and estimated which is the gap between actual domestic saving rates of lower-income countries and the saving rates that they would have if their financial systems were developed (based on prediction out of sample from a regression estimated for higher-income countries). This measure of financial development could also be called 'saving efficiency. Findings suggest that saving efficiency tends to be smaller in lower-income countries whose banking industries are more dominated by government banks.

Chapter 4 examines whether government ownership of banks has facilitated financial development in Bangladesh. It uses 1970-2017 time-series data of selected variables for Bangladesh and compares it with other income group countries. Based on the time-series data, findings suggest that higher government ownership of banks is associated with a lower level of financial development in Bangladesh. A brief comparison of government or state-owned banks (SCB's) with other banks in Bangladesh reveals that the SCB's are performing poorly.

Chapter 5 discusses placement of government debt with banks, another way besides outright government ownership of banks that government borrowing from the banking sector might constrain financial intermediation in Bangladesh. It uses 1995-2017 time-series data of selected variables for Bangladesh and compares the data with other income group countries. On average, credit by domestic money banks to the government and state-owned enterprises as a percent of GDP is higher in Bangladesh. However, the preponderance of evidence is that the placing of government debt with banks has had little measurable effect on bank credit to the private sector or financial intermediation.

Based on the above analysis, Chapter 6 outlines conclusions.

Chapter 2
Government Borrowing from the Domestic Banking Sector and Private Credit

2.1 Introduction

This chapter examines the crowding out of private credit caused by government borrowing from the domestic banking sector. It estimates a cross-country regression equation with bank credit to the private sector relative to GDP as dependent variable and government borrowing from the banking system relative to GDP as an independent variable, using five-year-averaged panel data for 73 countries, 43 developing countries and 30 high income countries for 1995-2014. The results show that government debt held by banks crowds out bank credit to the private sector dollar-for-dollar, and this is true of developing countries and high-income countries alike. This is consistent with domestic sovereign debt being placed with banks at market prices, and with banks managing their private credit with the aim of maintaining constant capital ratios.

It is already discussed that in many developing countries, securities markets are thin and access to international funding is limited, so bank lending is the main conduit of financial intermediation. In this instance, domestic sovereign debt placed with banks will displace bank lending to the private sector, constrict the already limited flow of funds to businesses, and crowd out private investment (Caballero and Krishnamurthy, 2004). Such a crowding-out effect of government borrowing has been shown to slow the economic growth of developing countries (Adam and Bevan, 2005), as this logic implies. In rich countries too, government bonds held by banks crowd out bank lending, but the alternative sources of funds in these countries, including domestic securities markets and external sources such as Euromarkets, prevent any constriction of private bank credit *per se* from much affecting their macroeconomic investment.

Concern about the harm from domestic sovereign debt crowding out bank credit to the private sectors of the developing countries has prompted empirical study. Several recent papers have estimated the extent of crowding out of bank lending by the domestic government bonds that banks in developing countries hold, including Kumhof and Tanner (2005), Emran and Farazi (2009), Hauner (2009), and Gray et al. (2014). A general

finding of these authors is that in developing countries, domestic government bonds placed with banks crowd out bank loans by more than dollar-for-dollar—government bonds "super-crowd out" private credit by banks in developing countries. The common interpretation of this super-crowding out finding is that banks in developing countries that hold domestic government debt are "lazy." In other words, the safe return from holding government bonds enables the banks to shirk in their attentiveness to private lending. One may question this interpretation. A more straight-forward interpretation of super-crowding out is that the government bonds are placed with the banks at above-market price—an example of financial repression, a special tax levied on the banks—and the implied erosion of bank equity caused by such a tax prompts the banks to retrench their assets. In any case, our estimates do not indicate super-crowding out of bank loans, but dollar-for-dollar crowding out. That is about what one would expect if the government bonds are placed with banks at market prices, that is, without financial repression, whether or not the banks are "lazy."

The study also do not dismiss the claim that banks are indeed lazy. But one of the aim in this paper is to clarify exactly what that might mean, by directly tying it to the distorted incentives of the managers of regulated firms, including banks, to dissipate any excessive pecuniary profit by indulging in nonpecuniary emoluments, as explained long ago by Alchian and Kessel (1962). Lack of diligence in extending private loans could be an example of managerial shirking in response to this sort of incentive. But for incentives to shirk to be exacerbated by a bank's holding of government bonds would seem to require that the bonds entail a subsidy rather than a tax.

In the rich countries, it is often suggested that banks wish to hold government bonds to lower their own costs of attaining the minimum capital ratios set by regulators. In the Basel formula, government bonds have a risk weight of zero, which means that banks that hold government bonds do not as a result of doing so face any regulatory mandate to retrench their holdings of other assets or augment their capital (i.e., bank equity). If a bank faces a binding constraint to attain such a minimum capital ratio, then its holding of government bonds entails an implicit subsidy, rather than a tax. By holding government bonds, the bank may avoid the need to rein in its otherwise profitable private lending. Under these circumstances, government bonds held by a bank would not crowd out its private lending dollar-for-dollar, but by something less than that. We find no

evidence of this either. For both high-income countries and low-income countries, we find that government bonds crowd-out bank lending dollar-for-dollar. An increase in government bonds held by banks constricts bank loans to the private sector by an equal amount—each added dollar of bondholding by banks induces a decreased dollar of bank lending to the private sector.

2. 2 Bank Lending, Bank Laziness, and Crowding Out

2.2.1 Bank Lending

Our aim is to measure how banks' holding of government bonds affects their private-sector lending. The first step is to think about the main determinants of bank lending. The basic model we will use is one in which each bank adjusts its asset portfolio—including loans and government bonds—to maintain a capital ratio (equity to assets) that minimizes its overall cost of capital. Modigliani and Miller (1958 and 1963) famously set out conditions under which a firm's cost of capital is unaffected by its capital ratio. A unique privately optimal capital ratio must be premised on deviation from those highly restrictive conditions, and that is the approach we will take here.

The Modigliani-Miller proposition applies to all firms, including banks—intermediaries that accept deposits and issue credit (Miller, 1994). That is, if the composition of a bank's liabilities and equity entails no transaction costs, taxes, or subsidies, then such composition has no bearing on the bank's cost of capital. But, as with other firms, so it is with banks: The premise of the Modigliani-Miller proposition is false. It is false because there are agency costs of debt and equity, and because there are taxes and subsidies related to debt and equity. It is costly for depositors to ascertain the risk to which they are subject, and costly for bank stockholders to assure the safety of deposits. Greater bank equity means that bank stockholders themselves have more wealth at stake in the prudential management of bank assets, meaning that they are inclined to behave in ways that make the deposits safer. To just that extent, banks with greater equity will have a lower overall cost of capital—they are avoiding the higher costs associated with alternative ways of assuring the safety of deposits (Holmström and Tirole, 1997). On the other hand, government insurance of bank deposits typically entails a subsidy of the banks that accept or create such deposits. And so, a bank with lower equity value and more

deposits in relation to its assets may enjoy a lower private overall cost of capital. These considerations and others point to bank choice of a unique privately optimal capital structure (Exley and Smith, 2006). Let us set to one side the interesting question (addressed by Gropp and Heider, 2008) of how such a privately optimal bank capital structure might vary across countries and over time, depending on details of regulations and institutions, and depending on macroeconomic conditions, and assert that each commercial bank adjusts its asset portfolio—including loans and government bonds—so as to maintain a target capital structure.

The considerations just now related amount to a simple model of bank lending in which each bank aims to maintain a constant capital ratio, here defined as bank equity as a share of bank assets at risk, that is assets other than bank reserves (vault cash and deposits at the central bank). If bank assets at risk comprise both government bonds and loans, then the capital ratio is as follows (with all items understood to be stated at current market value).

$$Bank's\ Capital\ Ratio = \frac{\text{Equity}}{\text{Government Bonds} + \text{Loans}} \qquad [1]$$

Rearranging, and presuming that loans do not affect bank equity directly (that is, the overall cost of capital depends on the capital ratio but not on the composition of the bank's assets), and that the bank seeks to maintain a target capital ratio so defined (and marked by an asterisk '*'), leads to a simple model of bank loan behavior.

$$\text{Loans} = \frac{\text{Equity}}{Capital\ Ratio^{*}} - \text{Government Bonds} \qquad [2]$$

Here, government bonds on the balance sheets of banks crowd out their private credit (i.e., loans), dollar-for-dollar. This is our basic model, and the cross-country regression estimates we will present here—and which are the main content of this paper—generally support this model. But to understand contrary results reported in some previous literature, we need to place this loan equation in a slightly more general setting.

Consider the possibility that a bank's holding of government bonds affects its equity directly. The effect could be positive or negative. That is, government bonds could be placed with the bank at a below-market price and so entail a subsidy, or could be forced on the bank at an above-market price, a kind of tax. The market value of the bank's equity can be expressed as follows.

$$Equity = \text{Equity}_0 + \gamma\ \text{Government Bonds}\,, \qquad [3]$$

where "Equity_0" is the bank's equity that is unrelated to and unaffected by its holding of government bonds rather than other assets. The parameter γ stands for the implicit tax or subsidy embodied in the placement of government bonds with banks at other than the market price, a tax if $\gamma < 0$, and a subsidy if $\gamma > 0$. Now there is an added effect on loans by a bank that holds government bonds and aims to maintain a constant target capital ratio.

$$\text{Loans} = \frac{\text{Equity}_0}{Capital\ Ratio^*} + \gamma\frac{\text{Government Bonds}}{Capital\ Ratio^*} - \text{Government Bonds} \qquad [4]$$

The new term, $\gamma\frac{\text{Government Bonds}}{Capital\ Ratio^*}$, is positive or negative depending on whether government bonds increase bank equity or reduce it. If positive, then there will be less than dollar-for-dollar crowding out of bank loans by government bonds held by banks. If negative, then there will be more than dollar-for-dollar crowding out of bank loans—'super crowding out.' Super crowding out is what Emran and Farazi (2009) claimed to find in a regression estimated for a panel of 60 developing countries, and asserted as evidence that banks in those countries are "lazy." Already we have a more straightforward explanation of the super-crowding-out of bank credit by the government bonds that these banks hold. It could just mean that the banks are holding the government bonds reluctantly, at the behest of governments; it is a kind of tax that reduces bank equity and thus induces the banks to constrict their total assets to maintain their target capital ratios. The banks that hold government bonds may not be behaving more lazily than other banks, but actually managing their asset portfolios as efficiently. In any case, what would lazy bank behavior mean, and how might it manifest itself?

2.2.2 Lazy Banks

The root idea behind the lazy bank notion seems to be the old claim by Sir John Hicks (1935, p. 8) that "the best of all monopoly profits is a quiet life." In other words, a competitive firm cannot survive unless efficient, but a monopoly may do so, and to just that extent, the monopoly will be less diligent in pursuit of profit. But as further elaborated by Alchian and Kessel (1962), this presumes that there is an absence of competition to be the monopoly. If there is such competition—a perfectly competitive capital market in which firms themselves could be easily traded—then a monopoly and a competitive firm will face the same consequences of failure to maximize profit. Alchian and Kessel go on to argue that where a firm is a monopoly by dint of government protection of entry, then it will indeed face a different constraint than a perfect competitor. The price to the protected firm's managers of indulging in nonpecuniary emoluments is apt to be lower than its true marginal cost, simply because a higher pecuniary profit will invite withdrawal of the government protection. High pecuniary profit is a "no-no" for the government-protected firm, so the price to the managers of dissipating the profit within the firm itself in ways that are wasteful yet pleasing to themselves is lower than it otherwise would be, and the managers will indulge in just that. Banks in whatever country are a clear example of regulated firms protected from entry, precisely the sort of monopolies that Alchian and Kessel have in mind. A regulated bank (every bank) is 'lazy'—lax in its pursuit of pecuniary profit.

So, where does the holding of government bonds on the balance sheets of banks fit into this? If the government bonds entail a subsidy, that is, the bonds placed with the bank at a below-market price, then they add to the pecuniary profit of the bank, and the bank managers will tend to dissipate that profit by indulging in nonpecuniary emoluments that they value below the social cost. Inattention to the onerous efforts needed to manage private credit could well be one such indulgence. If that is true, then a bank that holds subsidized government bonds would lazily allow its private loans to fall below the level consonant with the value-maximizing capital ratio. We might represent the loans of a bank subject to this 'Alchian-Kessel' phenomenon as follows.

$$\text{Loans} = \frac{\text{Equity}_0}{Capital\ Ratio^*} + (1-\lambda)\gamma\frac{\text{Government Bonds}}{Capital\ Ratio^*} - \text{Government Bonds} \quad [5]$$

The parameter $\lambda \geq 0$ shows the Alchian-Kessel effect on a bank's private credit of any extraordinary changes in its equity resulting from its holding of government bonds placed at other than the market price, so that $\gamma \neq 0$. The Alchian-Kessel effect influences private credit by the bank in the opposite direction of that needed to maintain the target capital ratio. If the Alchian-Kessel effect is large enough, $\lambda > 1$, it dominates the effect on bank loan behavior of whatever implicit tax or subsidy is embodied in the placement of government bonds with banks.

Government bonds placed at a below-market price, entailing a subsidy at the rate $\gamma > 0$, would super-crowd out private credit only if the Alchian-Kessel effect was very strong so that $\lambda > 1$.

$$\frac{\Delta\text{Loans}}{\Delta\text{Govt Bonds}} = \frac{(1-\lambda)\gamma}{Capital\ Ratio^*} - 1 \quad [6]$$

$$< -1, \quad \text{if } \gamma > 0 \text{ and } \lambda > 1. \quad super\ crowding\ out$$

$$> -1, \quad \text{if } \gamma > 0 \text{ and } \lambda = 0. \quad less\ than\ complete\ crowding\ out$$

Maintaining a target capital ratio, one that presumptively minimizes the bank's cost of capital (consonant with $\lambda = 0$, no Alchian-Kessel effect), would imply less than complete crowding out by government bonds that entail a subsidy, not super-crowding out as would be implied by a strong Alchian-Kessel effect. This seems to be the Emran and Farazi (2009) line of argument. They find super-crowding out and take that as evidence of bank laziness—in the language we have adopted, a 'strong Alchian-Kessel effect.' But what if the government bonds are placed with the banks at an above-market price—financial repression—rather than below-market price as Emran and Farazi apparently assumed?

If the government bonds entail a tax rather than a subsidy (so that $\gamma < 0$), then their forced placement on the bank balance sheet (at above-market price) would raise the price of laziness for the bank's managers. A lazy bank that reluctantly holds government bonds would expand its total asset portfolio. The government bonds would crowd out private

credit incompletely, that is less than dollar-for-dollar—and in the presence of a very strong Alchian-Kessel effect, $\lambda > 1$, would even expand private credit. In the absence of any Alchian-Kessel effect, $\lambda = 0$, the bank would maintain a target capital ratio, which would mean shrinking its asset portfolio if it includes government bonds placed at an above-market price, implying that the bonds super-crowd out the bank's private credit.

$$\frac{\Delta \text{Loans}}{\Delta \text{Govt Bonds}} = \frac{(1-\lambda)\gamma}{Capital\ Ratio^*} - 1 \qquad [7]$$

$$< -1, \qquad \text{if } \gamma < 0 \text{ and } \lambda = 0. \quad super\ crowding\ out$$

$$> -1, \qquad \text{if } \gamma < 0 \text{ and } \lambda > 1. \quad less\ than\ complete\ crowding\ out$$

It seems that to identify evidence of lazy bank behavior it is necessary to know whether government bonds are placed with banks at market price, below-market price, or above-market price. The only result that is completely neutral with respect to the lazy bank thesis is dollar-for-dollar crowding out of private credit by government bonds, and that is the result we find. It is consistent with government bonds placed with banks at market price and so not affecting the price of "laziness" by the bank managers. Banks might be lazy—and based on the Alchian and Kessel (1962) argument presumably, they are lazy—but their proclivity for laziness seems to be unaffected by the presence of government bonds on the bank balance sheets.

In the remaining chapters, we estimate a cross-country regression relating private credit by banks to the banks' holdings of domestic sovereign debt. The principle aim is to determine whether government bonds placed with banks in developing countries super-crowd out the banks' private credit. We find that they do not. This result also relates to the question of whether government bonds placed with banks represent either a government subsidy of banks or a special tax placed on banks—financial repression. It seems from the results that, averaged over a broad set of developing countries, government bonds held by banks entail neither a subsidy nor a tax.

2.3 Empirical Model

2.3.1 Estimating Equation

The estimating equation is derived from Eq. [5] above, repeated here.

$$\text{Loans} = \frac{\text{Equity}_0}{Capital\ Ratio^*} + (1-\lambda)\gamma\frac{\text{Govt Bonds}}{Capital\ Ratio^*} - \text{Govt Bonds} \qquad [5]$$

This describes the loan behavior of a single bank, while the data for the estimating equation are aggregated by country. In aggregating the private sector loans of all banks, *i*, in a country, let us suppose that their target capital ratios are similar to those of one another (the target capital ratios presumably do vary across countries).

$$\sum_i \text{Loans}_i = \frac{\sum_i \text{Equity}_{0_i}}{Capital\ Ratio^*} + (1-\lambda)\gamma\frac{\sum_i \text{Govt Bonds}_{\ i}}{Capital\ Ratio^*} - \sum_i \text{Govt Bonds}_{\ i} \qquad [8]$$

For comparison of bank loan behavior across countries, *j*, let us scale variables in relation to GDP.

$$\frac{\sum_i \text{Loans}_{ij}}{GDP_j} = \frac{\sum_i \text{Equity}_{0\,ij}/Capital\ Ratio_j^*}{GDP_j} + (1-\lambda)\gamma\frac{\sum_i \text{Govt Bonds}_{\ ij}/Capital\ Ratio_j^*}{GDP_j} - \frac{\sum_i \text{Govt Bonds}_{\ ij}}{GDP_j} \qquad [9]$$

This equation is the basis for the econometric analysis.

We will estimate a cross-country regression equation with ***Private bank loans as a percent of GDP*** as a dependent variable and ***Government bonds held by banks as a percent of GDP*** as an independent variable. Based on Eq. [9], we also include ***Government bonds held by banks relative to their target capital ratios, as a percent of GDP***.

Control variables in the regression include correlates of the first term in Eq. [9], $\frac{\sum_i \text{Equity}_{0\,ij}/Capital\ Ratio_j^*}{GDP_j}$, the amount of assets at risk as a percentage of GDP that banks as a group in each country *j* would seek to maintain, absent any extraordinary taxes or subsidies. These control variables are: ***the natural logarithm of Per-capita Real GDP***,

Bank deposits relative to GDP, and an index of ***Institutional quality***. In the next section, we describe all the variables and comment on why we chose them.

2.3.2. Data

The dataset is an unbalanced panel for 73 countries, averaged over four successive five-year periods, 1995-2014. It includes both high-income countries and developing countries. The names, descriptions, and sources of all the variables are reported in Appendix Table A1. The sources include the World Bank World Development Indicators, International Country Risk Guide, and the World Bank Global Financial Development Database.

The list of countries, and the time periods in which variables are observed for each, are reported in Appendix Table A2. Our focus is on equilibrium relationships between government bonds held by banks and the private loans by banks, not on the short-run dynamics that led to such an equilibrium. Therefore, we have followed a standard procedure and averaged the variables over successive five-year intervals. The variables are described below.

i. Private Credit

The dependent variable of the estimating equation is ***Bank loans/ GDP***, defined as credits to the private sector by domestic money banks as a percent of GDP.

ii. Government credit

The first main explanatory variable of interest is ***Government Bonds /GDP***, defined as credit by domestic money banks to government and state-owned enterprises as a percent of GDP. This study is focused on general government borrowing from commercial banks. To compute that, we follow Hauner (2009) and add together two items to capture the amount of commercial banks' holdings of debt issued by the entire public sector. They are credit extended by the domestic money banking system (1) to the general government,[1] and (2) to state-owned enterprises.

A second main variable of interest, related to the one just mentioned, is ***Government Bonds/ GDP ÷ Capital/Assets***, government bonds held by banks as a percent of

[1] General government includes all levels of government and extra budgetary funds, but not central banks.

GDP relative to their target capital ratios. In constructing this variable, we used as a proxy for the target capital ratios of banks in each country, in each five-year period, the ratio of commercial bank capital to bank total assets. Here 'capital' means bank equity as reported on the balance sheet.

iii. Correlates of baseline bank assets as a percent of GDP

Here we describe our control variables related to the amount of assets at risk as a percentage of GDP that banks as a group in each country *j* would seek to maintain, absent any extraordinary taxes or subsidies.

As shown by Eq. [9], countries in which the target capital ratios of banks incline them as a group to hold more assets at risk as a percent of GDP, *ceteris paribus*, will have more private bank loans relative to GDP. This suggests the importance of control variables related to the baseline scale of the banking industry in each country. Countries differ from one another both in the extent to which financial intermediation is occurring at all, and also differ from one another in the share of total intermediation that is performed by banks rather than by other intermediaries. Bank assets as a percent of GDP thus reflect both the overall economic development of a country and the relative efficiency there of banks compared to other financial intermediaries.

Variables related to the overall economic development of each country, and to the development of the financial system, in particular, include the **natural logarithm of per-capita real GDP** and a widely used measure of the quality of institutions—an index of the extent of **'law and order'** as judged by the International Country Risk Guide. The variable related to the relative efficiency of banks compared to other financial intermediaries is **Deposits/GDP**, defined as the ratio of bank deposits (demand + time + saving) to GDP, expressed as a percent.

We believe that all of these variables taken together are a reasonable proxy for the basic underlying extent of banking activity in relation to each country's GDP. Including the natural log of per-capita real GDP reflects the high correlation between the development of the banking system and the development of the economy. The other variables pick up factors that could affect the relative viability of banks, taking as given the scale of the economy itself. A country with better institutions is likely to have more

financial intermediation, *ceteris paribus*. And a country with more bank deposits as a percent of GDP is likely to have more efficient banks.

2.3.3 Summary Statistics and Correlation Matrix

The descriptive statistics for each variable are displayed in Table 1 and the correlation matrices in Tables 2a and 2b.

Table 1. Means of variables and numbers of observations, by income class and period of observation.

	Obs	Loans / GDP	Govt Bonds/ GDP	Per - Capita Real GDP	Law and Order	Deposits/ GDP	Capital/ Assets	Govt Bonds/ GDP ÷ Capital/ Assets
		%	%	2010 USD	index	%	%	%
High income, 30 countries								
1995-99	25	54.8	11.7	24,158	5.2	55.3	8.6	174.3
2000-04	28	63.8	11.5	27,137	4.8	62.8	8.4	165.3
2005-09	28	74.0	10.4	30,382	4.7	70.6	8.4	151.9
2010-14	20	80.1	13.0	31,580	4.5	89.2	10.0	168.4
1995-2014	101	67.4	11.5	28,106	4.8	68.0	8.8	164.5
Developing, 43 countries								
1995-99	27	37.1	8.1	2,961	3.7	34.2	9.7	102.5
2000-04	38	33.0	9.7	3,362	3.1	35.4	10.5	129.7
2005-09	41	36.1	9.3	4,040	3.1	38.0	10.7	108.0
2010-14	38	41.2	11.2	4,160	3.0	41.1	10.9	119.0
1995-2014	144	36.8	9.7	3,691	3.2	37.4	10.5	115.6

Table 1 shows the means of each variable, separately for high-income countries and for developing countries, for each five-year interval and for the whole period of observation. It is evident from the Table that financial intermediation by banks is substantially less in developing countries than in high-income ones, as shown by the

smaller values of ***Loans/ GDP*** and ***Deposits/ GDP***. At the same time, the placement of government bonds with banks relative to GDP—***Govt Bonds /GDP***—is only slightly less in the developing countries than in the high-income ones. Unsurprisingly, developing countries have substantially lower ***Per-Capita Real GDP*** than the high-income countries and worse legal systems, as shown by the ***Law and Order*** index. All of the variables show monotonic trends consonant with increasing income per person, with some exceptions: In the high-income countries, bank ***Capital /Assets*** ratios were lower in the intervals 2000-09 than in 1995-99, possibly reflecting the Lehman shock. And in the developing countries, ***Loans /GDP*** were lower in the interval 2000-04 than in 1995-99, possibly reflecting the Asian financial crisis of 1998.

Tables 2a and 2b correlation matrices show that many of the variables are statistically correlated with one another, some more strongly than others. ***Loans/ GDP*** is negatively correlated with bank ***Capital /Assets*** ratios, positively correlated with the ***Law and Order*** index, with the natural log of ***per-capita real GDP***, and with ***Deposits/ GDP***. This comports with our rationale for including these variables, as explained above. To put it another way, variables presumptively related to the scale of the banking sector are correlated with loans to the private sector by banks as a percent of GDP.

Government Bonds/ GDP is positively correlated with ***Loans/ GDP***, which is perhaps because governments borrow more from banks in countries where the scale of the banking sector is itself large. Where the banking sector of a country is large, its banks make more private loans and also hold more government bonds.

Table 2a. Correlation coefficients. High-income countries.*

	Loans/ GDP	Govt Bonds/ GDP	Govt Bonds/ GDP ÷ Capital/ Assets	ln Per-Capita Real GDP	Per-Capita Real GDP	Law and Order	Deposits /GDP
Govt Bonds/ GDP	0.307						
	0.002						
Govt Bonds/ GDP ÷ Capital/ Assets	0.384	0.899					
	0.000	0.000					
ln Per-Capita Real GDP	0.673	0.199	0.254				
	0.000	0.046	0.011				
Per-Capita Real GDP	0.601	0.140	0.207	0.952			
	0.000	0.162	0.038	0.000			
Law and Order	0.547	0.101	0.158	0.651	0.607		
	0.000	0.316	0.114	0.000	0.000		
Deposits/GDP	0.782	0.637	0.631	0.519	0.422	0.331	
	0.000	0.000	0.000	0.000	0.000	0.001	
Capital/Assets	−0.393	−0.140	−0.365	−0.344	−0.352	−0.357	−0.258
	0.000	0.162	0.000	0.000	0.000	0.000	0.009

*p-values below coefficients. Number of observations = 101 for all.

Table 2b. Correlation coefficients. Developing countries.*

	Loans/ GDP	Govt Bonds/ GDP	Govt Bonds/ GDP ÷ Capital / Assets	ln Per-Capita Real GDP	Per-Capita Real GDP	Law and Order	Deposits/ GDP
Govt Bonds/ GDP	**0.152**						
	0.069						
Govt Bonds/ GDP ÷ Capital/ Assets	**0.160**	**0.896**					
	0.055	0.000					
ln Per-Capita Real GDP	**0.313**	**0.109**	**−0.006**				
	0.000	0.195	0.940				
Per-Capita Real GDP	**0.252**	**0.149**	**0.007**	**0.909**			
	0.002	0.074	0.932	0.000			
Law and Order	**0.254**	**−0.039**	**0.000**	**−0.095**	**−0.123**		
	0.002	0.643	0.997	0.256	0.142		
Deposits/GDP	**0.765**	**0.469**	**0.447**	**0.267**	**0.217**	**0.149**	
	0.000	0.000	0.000	0.001	0.009	0.076	
Capital/Assets	**−0.294**	**−0.299**	**−0.509**	**0.046**	**0.028**	**0.039**	**−0.354**
	0.000	0.000	0.000	0.588	0.742	0.643	0.000

*p-values below coefficients. Number of observations = 101 for all.

To measure the crowding out of private credit caused by government borrowing from domestic banks will require not just correlation but multiple regression.

The extremely high correlation between ***Government Bonds/ GDP*** and ***Government Bonds/ GDP ÷ Capital/Assets***—around 0.9 both for high-income countries and developing countries—is unsurprising but has an important implication for our analysis. Because the two variables are collinear, it will be difficult to precisely measure the separate effects of each of them on the ***Loans/ GDP*** ratios. We will follow two

strategies to overcome this. The first is to test their joint effect on ***Loans/ GDP***, not just their individual effects. The second is to assert prior knowledge based on our reasoning that the linear coefficient on ***Government Bonds/ GDP*** in an equation explaining ***Loans/ GDP*** is minus one, in order to more precisely estimate the coefficient on ***Government Bonds/ GDP ÷ Capital/Assets***.

2.4. Econometric Model

This section presents regression estimates of the crowding out of private credit caused by government borrowing from the domestic banking sector. Sequential five-year averages of the underlying annual panel data, for 1995-2014, are used, which gives a maximum of four observations per country, $t = 1,..,4$. As shown in Appendix Table A2, the dataset is an unbalanced panel. The whole sample has data for 73 countries, $j = 1,..,73$. Of these, 30 are high-income counties, and 43 are developing countries.

Our estimating equation is based directly on Eq. [9] but with a stochastic error term, u_{jt}, and observable variables replacing the theoretical ones.

$$\frac{\sum_i \text{Loans}_{ij}}{GDP_j} = -\frac{\sum_i \text{Govt Bonds}_{ij}}{GDP_j} + (1-\lambda)\gamma \frac{\sum_i \text{Govt Bonds}_{ij}/Capital\ Ratio_j^*}{GDP_j} + \frac{\sum_i \text{Equity}_{0ij}/Capital\ Ratio_j^*}{GDP_j}$$

[9′]

$$\frac{Loans}{GDP} = \beta_1 \frac{Govt\ Bonds}{GDP} + \beta_2 \frac{Govt\ Bonds/GDP}{Capital/Assets} + \beta_0 + \beta_3 \ln \frac{per\ capita}{Real\ GDP} + \beta_4 \frac{Law\ and}{Order} + \beta_5 \frac{Deposits}{GDP} + u_{jt}$$

[10]

The parameters to be estimated are $\beta_0, \ldots \beta_5$. Based on Eq. [9], we might expect that in Eq. [10], $\beta_1 = -1$ and $\beta_{2=}(1-\lambda)\gamma$. The other parameters in Eq. [10] map the variables ***ln Per Capita Real GDP***, ***Law and Order,*** and ***Deposits/GDP*** onto the latent variable $\frac{\sum_i \text{Equity}_{0ij}/Capital\ Ratio_j^*}{GDP_j}$.

We next need to consider the properties of the error term in Eq. [10]. We will adopt a one-way random-effects specification. We will suppose that the error term has two parts, one that varies across countries in our dataset and the other that varies both across countries and over time in each country.

$$u_{jt} = v_j + e_{jt}. \quad [11]$$

We further suppose that both components of the error term are each identically independently distributed, have a zero mean, and have a zero covariance both with each other and with the observed variables included in the regression. Under this specification, based on the Gauss-Markov theorem, the efficient estimator is the GLS estimator with weights constructed from the sample variance in each component of the regression error term. We have two reasons for adopting this specification.

First, the coefficient $\beta_{2=}(1-\lambda)\gamma$ can be reasonably considered to itself vary across observations. The parameter γ stands for the implicit tax or subsidy embodied in the placement of government bonds with banks other than the market price. If, as we suppose, such parameter is statistically independent of the observed explanatory variables, then its random effects are well-represented by the specification of the error term shown in Eq. [11].

Second, the Hausman specification test—shown in the last rows of Table 3—establishes the preferability of the one-way random-effects specification over a one-way fixed-effects specification. The upshot of the test is that the estimated coefficients differ little between the fixed-effects and random-effects estimates, meaning that the greater efficiency of the random-effects estimator outweighs the possible bias that results from not controlling for 'fixed effects'—unobserved variables that do not vary over the period of observation.

2.4.1 Results

The result of random-effects estimation is displayed in the leftward columns of Table 3. The standard errors are displayed below each coefficient estimate. The *p*-value for the χ^2-test of difference from −1 of the coefficient on ***Govt Bonds /GDP*** is displayed beneath the point estimate. Also displayed is the *p*-value for the χ^2-test of difference from −1 of the summed coefficients on ***Govt Bonds /GDP*** and ***Government Bonds/ GDP ÷ Capital/Assets***. The *p*-values for both tests show the absence of statistical significance, both for high-income countries and for developing countries. Because of the collinearity between ***Govt Bonds /GDP*** and ***Government Bonds/ GDP ÷ Capital/Assets***, the test of their joint effect on ***Loans/ GDP*** is of particular interest, and the *p*-values for the difference

Table 3. Random-effects regression estimates. Dependent variable= Loans/GDP.*

	High−income countries	Developing countries		High−income countries	Developing countries
Govt Bonds/ GDP	**−1.606** (0.452)	**−0.570** (0.315)	# Constrained:	**−1.00** –––	**−1.00** –––
# H_0 : (Govt Bonds/ GDP = −1)			# *p*-value:	0.193	0.178
χ^2 (1)	1.80	2.07			
Prob > χ^2	0.180	0.150			
Govt Bonds/ GDP ÷ Capital/ Assets	**0.054** (0.028)	**0.002** (0.020)		**0.024** (0.017)	**0.022** (0.014)
			# *p*-value:	0.176	0.116
# H_0: (Govt Bonds/ GDP + Govt Bonds/ GDP ÷ Cap/Assets = −1)					
χ^2 (1)	1.65	2.07			
Prob > χ^2	0.199	0.150			
ln Per-Capita Real GDP	**15.928** (5.892)	**5.978** (2.684)		**16.413** (5.730)	**6.373** (2.653)
Law and Order	**5.707** (3.131)	**5.118** (1.470)		**6.216** (3.115)	**4.963** (1.471)
Deposits/GDP	**0.603** (0.088)	**0.923** (0.094)		**0.583** (0.084)	**0.951** (0.092)
Constant	**−150.78** (52.816)	**−56.560** (21.815)		**−158.613** (50.677)	**−58.404** (21.676)
Adjusted R^2	0.607	0.540		0.613	0.534
$\rho = \sigma_v^2/(\sigma_v^2 + \sigma_e^2)$	0.507	0.811		0.470	0.805
Observations	101	144		101	144
Countries	30	43		30	43
Hausman test: χ^2 (5)	9.99	3.56		4.51	3.27
Prob > χ^2	0.076	0.615		0.341	0.514

*Coefficient estimates in bold type. Standard errors in parentheses below coefficient estimates.

from −1 of their joint effect are 0.20 for high-income countries and 0.15 for developing countries, both indicating absence of statistical significance by the conventional standard. The hypothesis that government bonds held by banks crowd out private credit by banks, dollar-for-dollar, is not rejected by the data. This is our main finding. The data do not support the notion that government bonds are in general placed with banks at prices uniformly either below the market level, or above it. Neither for high-income countries, nor developing countries. There is no support here for the view that government bonds held by banks either worsen or relax the incentives of a preponderance of bank managers to wastefully divert pecuniary profit to nonpecuniary emoluments.

Collinearity impedes our precisely estimating the separate coefficients on ***Govt Bonds /GDP*** and ***Government Bonds/ GDP ÷ Capital/Assets***. Nevertheless, as we have already noted, the data fail to reject the null hypothesis, implied by our model, that the coefficient on ***Govt Bonds /GDP*** equals −1. The *p*-values shown in Table 3 are 0.18 for the high-income countries and 0.15 for the developing countries. By asserting prior knowledge based on our reasoning that the true coefficient is indeed −1, and imposing that as a constraint, we may more precisely estimate the coefficient on ***Government Bonds/ GDP ÷ Capital/Assets***. These estimates are displayed in the rightward columns of Table 3. As can be seen there, the estimated coefficient on ***Government Bonds/ GDP ÷ Capital/Assets*** exhibits no statistically significant deviance from zero, neither for the high-income countries nor the developing countries. The standard errors of the estimated coefficients and *p*-values are displayed below the coefficients on this variable. Notice that the *p*-value of the coefficient estimate for the high-income countries is 0.18 and for developing countries is 0.12. There is no support here for $\beta_{2=}(1-\lambda)\gamma \neq 0$ for the high-income countries nor for the developing countries—no systematic pattern of placement of government debt with banks at prices uniformly either below the market level or above it.

All of the regressions we have just described and that are reported in Table 3 are estimated using one-way random effects. In the last row of the Table, we report the results of the Hausman test for which the null hypothesis is that of no difference in the coefficients estimated using the random effects specification and those estimated using a fixed-effects specification. For the estimates with ***Govt Bonds /GDP*** set equal to −1, the

p-value for the Hausman test is 0.34 for the high-income countries and 0.51 for the developing countries, which fail to reject the null hypothesis and lead us to favor the greater efficiency of the random-effects estimate over the unbiasedness of the fixed-effect estimate. We also report the Hausman test results for the unconstrained regressions (which afford less support for random-effects estimates for the high-income countries). We think the constrained regressions have the least biased coefficients.

The coefficients on the control variables have the expected signs and are statistically significant in all the regressions. To interpret these coefficients, note that the ***Loans/ GDP*** ratios of the developing countries in our sample are on average about half as great as for the high-income countries—in the most recent period 2010-14, around 40 pct compared to 80 pct. The average per-capita Real GDP of developing countries in our sample is around $1/8^{th}$ that of the high-income countries. Based on the estimated coefficients on ***ln Per Capita Real GDP,*** which are around 6 for the developing country sub-sample, per-capita real GDP explains pretty much all of the average difference in ***Loans/ GDP*** between the developing countries and high-income countries.

The ***Law and Order*** index averages near 3 for the developing countries, and between 4 and 5 for the high-income countries. Based on the estimated coefficients on ***Law and Order,*** which are around 5 for the developing countries, an increase in the index by one unit in the developing countries would increase their ***Loans/ GDP*** by around 5 percentage points which is only a small portion of the 40 percentage point average difference in ***Loans/ GDP*** between developing countries and high-income ones.

Deposits/ GDP are about half as great in developing countries as in high-income ones—45 pct compared to 90 pct. Based on our estimated coefficient on ***Deposits/ GDP,*** which is about 0.9 for the developing country sub-sample, a doubling of the bank deposits of developing countries would increase their ***Loans/ GDP*** ratio by about 40 percentage points, closing the 40 percentage point difference in ***Loans/ GDP*** between developing and high-income countries. Finally, the overall goodness-of-fit of the regressions is quite good as judged by the adjusted R^2.

2.4.2. Robustness Check

As a check on our findings, we report in Table 4 the result of estimating our model using only the mean values of each variable for each country—a 'between-effects' OLS regression. This is the regression equation extracted from the sample variances of error terms used to weight observations in the random-effects regressions shown in the last two columns of Table 3. In the between-effects regression of Table 4, the numbers of observations equal the numbers of countries. The regression is estimated with the restriction that the coefficient on ***Govt Bonds /GDP*** is set equal to −1. The *p*-values for the test of this restriction are 0.711 for the high-income countries and 0.998 for the developing countries—failure to reject the null hypothesis that the restriction is true, indicating that the restriction is consonant with the data for which the equation is estimated. Furthermore, the coefficient on ***Government Bonds/ GDP ÷ Capital/Assets*** exhibits no statistically significant deviance from zero. Its *p*-value is 0.510 for the high-income countries and 0.700 for the developing countries. The control variables have the same signs as in the random-effects regression but with larger standard errors. The coefficient on ***ln Per Capita Real GDP*** is not statistically significant. ***Law and Order*** is statistically significant for the high-income countries but not for the developing countries. Nevertheless, the adjusted R^2 of 0.88 for the high-income countries and 0.637 for the developing countries show the goodness of fit of the equation.

Table 4. Between-effects regression estimates. Dependent variable= Loans/GDP.*

		High−income countries	Developing countries
Govt Bonds/ GDP	# Constrained :	**−1.000** –––	**−1.000** –––
# H_0 : (Govt Bonds/ GDP = −1)	# p-value	0.711	0.998
Govt Bonds/ GDP ÷ Capital/ Assets		**0.013** (0.020)	**0.010** (0.026)
	# p-value:	0.510	0.700
ln Per-Capita Real GDP		**8.526** (7.650)	**3.465** (3.283)
Law and Order		**11.187** (5.675)	**3.835** (2.919)
Deposits/GDP		**0.624** (0.097)	**0.945** (0.136)
Constant		**−105.039** (97.735)	**−30.203** (28.104)
Adjusted R^2		0.833	0.637
Observations		30	43
Countries		30	43

*Coefficient estimates in bold type. Standard errors below coefficient estimates.

These results strengthen our confidence in thinking that government bonds placed with banks, on average across the broad spectrum of countries, crowd out bank loans to the private sector approximately dollar-for-dollar.

Based on a straightforward model in which each bank adjusts its asset portfolio to maintain a constant capital ratio, this chapter finds that government bonds crowd out dollar-for-dollar the private loans of banks that maintain constant target capital ratios. Banks behave as though the government bonds they hold entail neither a subsidy nor a tax. The next chapter will examine the effect of government bank ownership on the overall extent of financial intermediation or financial development, a much broader area than this chapter.

Chapter 3
Government Banks and Financial Development

3.1. Introduction

This chapter examines whether government banks generally promote financial intermediation or impede it. The main finding, based on cross-country regressions, is that government banks do not promote financial intermediation. That supports a view in which government banks are manifestations of crony capitalism, not vehicles for overcoming market failure. This is a small contribution to an already vast literature.

In a wide-ranging paper, La Porta et al. (2002) document the ubiquity of government banks and attempt to measure their many effects on macroeconomic growth and development. They estimate numerous regression equations with cross-country panel data. Their general conclusion is that government banks are more prevalent in countries with corrupt governments and weak political institutions, and that the banks misallocate resources and inhibit economic growth. They contrast the Gerschenkron (1962)' development view' that government banks can overcome market failure and promote investment and industrialization in economically backward countries that would otherwise be doomed to perpetual stagnation, and the 'political view' that government banks serve corrupt political interests. Their findings generally favor the political view.

The framework of analysis is similar to that of La Porta et al. (2002), but our aim is a bit narrower. Our aim is to precisely measure the effect of government banks on the extent of financial intermediation. If government banks do overcome failures in the markets for credit and investment, they should be expanding the overall extent of financial intermediation. If government banks are vehicles of crony capitalism, they may or may not expand the flow of financial intermediation (There are many ways to be corrupt and inefficient, and some of them divert resources away from consumption and towards wealth, albeit ill-gotten wealth, while others do the opposite). To measure the effect of government banks on the extent of financial intermediation requires a carefully constructed benchmark, a notion of what the flow of financial intermediation would be in the absence of government banks, given the observed features of each country—its

demographic profile, state of economic development, and so on. This is a challenging but not insurmountable problem.

Our estimating scheme leads to a novel measure of financial development, which is a further contribution of this paper—our estimation proceeds in two steps. First, we estimate a regression equation explaining the domestic saving rates of higher-income countries using panel data, 1970-2017, based on variables rooted in the logic of the life-cycle model—age dependency both young and old, and growth rate of real GDP. We then use this regression equation to predict out of sample the saving rates of low-income countries. We would expect the low-income countries to have these saving rates if their financial development were as complete as that of the higher-income countries. The discrepancies between the predicted and actual saving rates measure the gaps in the financial development of the low-income countries. We show that these gaps are indeed related to measures of the depth and breadth of financial intermediation and to the presence of government-owned banks. Low-income countries in which government banks are more prominent have less financial development and lower saving rates.

Previous measures of financial development are based on directly observed features of each country's financial system. The World Bank financial development indicators dataset is a prominent example. The developers of this dataset describe it concisely in a Vox.edu post and in a more expansive NBER working paper, Cihák, Demirgüç-Kunt, Feyen, & Levine (2013a, 2013b). We draw on the World Bank dataset for control variables in our estimation of the effect of government banks on saving rates. In the VOX.edu post, Cihák et al. document the extreme difference between low-income countries and higher-income countries both in the depth of financial institutions and access to them. It is our belief that lack of recourse to financial intermediation in the low-income countries breaks the connection between individual saving and societal saving that supports the main implications of the Modigliani life-cycle model of saving when applied to the higher-income countries. As our estimates will show, age dependency and high GDP growth rates are associated with high national saving rates in the higher income countries, but not in the low-income countries.

Our modeling approach is original, but its underlying idea is not. Deaton (1989) has suggested that a different saving model is needed for the developing countries and has

carried out an empirical study based on this understanding. Rosenzweig (2001) surveys this literature. These authors highlight the lack of recourse to formal financial channels for farm households in low-income countries. The little wealth that these households accumulate is dedicated to self-insurance against natural disasters and the like. The household members are not saving for their own retirements but are instead relying upon within-family transfers between young and old to provide for consumption in old age. In short, the saving by the young members of the households in low-income countries is largely offset by the dissaving of their older relatives, and so results in little net accumulation of societal wealth. In the higher-income countries, the young save for their own future retirement by accumulating savings in the form of financial assets, financial claims that are intermediated and support real investment that, if the economy is growing, may be expected to surpass the dissaving of the current retirees who are drawing down their own savings. In this way, the financial development and financial intermediation in higher-income countries support higher national saving rates. This is the framework of our empirical analysis.

3.2. Household Saving and Financial Intermediation

To estimate the effect of government banks on financial intermediation, we need to develop an understanding of how financial intermediation is related to societal saving. The core idea is the life-cycle model. One of the best short explanations of the life-cycle model is the 1985 lecture in Stockholm, Sweden by Franco Modigliani upon receiving the Nobel Prize in economic science (Modigliani, 1986). The life-cycle model is the starting point of our empirical framework.

3.2.1. Life-Cycle Saving

Posit that each individual is a life-cycle saver with perfect foresight, balancing consumption over his or her own lifetime, first working, then retiring. In any given year, workers are saving, and retirees are dissaving. Here we define 'household saving rate' as net accumulation of private wealth in relation to private after-tax income. We include in household saving both personal saving and business saving, on the principle that private businesses are owned by households.

Only some fraction of the savings of households is intermediated. If saving is not intermediated, then it is either in the form of real assets (a cow, a tractor), currency (money in a jar), or an intra-family transfer (funding the consumption of elderly relatives in the household, now retired, on a presumption that the next generation will do the same). To take an extreme case, with saving only in the form of intra-household transfers, the saving of workers is exactly equal to the dissaving of the retirees, and there is no net societal saving. It may still be the case—as in the famous example of Samuelson (1958)—that each generation (until the last one, if there ever is a last one) consumes more over its own lifetime than it itself produced, thanks in each case to the largesse of the succeeding generation. But in this example, the saving of each generation (in the form of transfers to retired relatives) is exactly offset by the dissaving of the retirees—there is no accumulation of real assets. Similarly, if saving for retirement is only done by stashing money in jars, there is no accumulation of real physical assets, and therefore no net societal saving.

Financial intermediation of household saving allows saving by workers to result in the accumulation of real assets that the workers themselves do not own. The financial assets of households—in the form of bank deposits, insurance contracts, shares of stock, and so on—enable businesses to obtain loans from banks or insurance companies, or sell bonds or shares of stock, and use these intermediated savings to fund real investments (buildings, machines, and tools). Without financial intermediation, the consumption of retirees is tethered to the saving of those who are still working. With financial intermediation, the consumption of retirees becomes tied to the return on investment in the real assets that the saving has made possible, which has no necessary relation to the saving of those who are currently working.

With financial intermediation, the saving of workers can be greater than the dissaving of retirees, so that net societal household saving occurs. Within the logic of the life-cycle model, net saving is likely to be greater the more numerous or, the more productive are the workers who are now saving compared to those who went before them and are now retired. A persistently high economic growth rate or persistently high population growth rate thus implies a higher household saving rate than would otherwise attain, but only if household saving is intermediated or is in the form of direct accumulation of household real assets. A vast empirical literature based on the life-cycle

model has confirmed these and other broad determinates of saving rates, both across countries and over time. Hussein and Thirwall (1999), Li, Zhang, and Zhang (2007), Horioka and Terada-Hagiwara (2012), and Wang, Xu, and Xu (2015) are excellent examples of this literature. We will draw on these studies and the underlying logic of the life-cycle model to specify determinates of household saving rates in our econometric model.

All of this is prolog to our main focus, which is on how financial intermediation affects societal saving rates and whether government banks promote or inhibit financial intermediation. To address these matters, let us suppose that some fraction γ of the saving by households is financially intermediated, where $0 \leq \gamma \leq 1$. If $\gamma = 0$, then, unless households accumulate real assets that they themselves own, there is no societal household saving. At the other extreme, with $\gamma = 1$ all household savings are intermediated, and the standard implications of the life-cycle model are fully operative. One can think of the parameter γ as measuring the extent of household' financial inclusion,' the degree to which households have recourse to financial markets in accumulating their private savings. To keep matters simple, let us presume that households do not accumulate real assets that they themselves own, so that all household assets are either in the form of currency (and not intermediated) or financial instruments (that result in intermediation).

3.3. An Algebraic Framework

The economic framework that motivates our econometric specification can be expressed using a simple algebraic model that we next explain.

3.3.1. Effect of Saving on Investment and Growth

We describe an open economy with a financial sector. The real GDP of the economy is the value of a Cobb-Douglas aggregate production function,

[1] $$Y = AK^{\beta}L^{1-\beta}.$$

We follow the standard definitions of saving aggregates. National saving ('domestic saving') is

[2] $$Y - C - G = I + X - M,$$

which is equal to private saving, $Y - T - C$, plus government saving, $T - G$.

[3] $$Y - T - C = Y(1 - \tau) - C$$

[4] $$T - G = \tau Y - G$$

Here, τ is the average effective tax rate. In our empirical estimates, we will adopt the view that government saving is folded into private wealth. That is, private consumption and saving decisions are based on a belief that government debt is an incipient tax burden that cannot be passed on to the succeeding generation. That means that $G = T$, where T now includes any future tax burdens implied by current government purchases, G, not just the current taxes, τY, recorded in the national accounts. In effect, this means that private saving is the same as domestic saving $S \equiv Y - C - G$.

The saving rate $\frac{S}{Y}$ affects the investment rate, $\frac{\Delta K}{Y}$, which affects the economic growth rate, $\frac{\Delta Y}{Y}$. But estimating how the saving rate affects the investment rate poses special challenges. The effect of saving on investment varies from country to country depending on each countries extent of integration with international capital markets. Estimates of the relation between saving rates and investment rates would therefore have to measure and control for cross-country variation in integration with global capital markets. This difficult task lies beyond the scope of the current paper. Here, we will confine our empirical investigation to the effect of financial development on domestic saving.

3.3.2. Effect of Financial Development on Saving.

We return the focus to financial development. The domestic saving rate, $\frac{S}{Y}$, which we will denote by S^*, depends on the extent of financial intermediation, parameterized as γ, and depends also on a vector $\mathbf{x}$ of variables that the life-cycle model identifies as important: age dependency—young and old—and economic growth.

[5] $$S^* \equiv \frac{S}{Y} = \gamma \boldsymbol{\beta}' \mathbf{x} \ ,$$

Where,

[6] $$\boldsymbol{\beta}' \mathbf{x} = \beta_0 + \beta_1 x_1 + \cdots + \beta_{\mathrm{n}} x_{\mathrm{n}} \ .$$

Further posit that the fraction γ of household savings that are intermediated depends on a linear combination of variables, $\mathbf{z}$, related to the extent of financial development:

'government banks (share of banking industry),' financial credits to the private sector relative to GDP, bank deposits relative to GDP, and so on.

[7] $$\gamma = \boldsymbol{\theta}'\mathbf{z} \ ,$$

Where,

[8] $$\boldsymbol{\theta}'\mathbf{z} = \theta_0 + \theta_1 z_1 + \cdots + \theta_{\mathrm{k}} z_{\mathrm{k}} \ .$$

The parameters in Eq. [5] belong to two separate linear equations.

[9] $$S_i^* = \gamma \times \left(\beta_0 + \beta_1 x_{1,i} + \cdots + \beta_{\mathrm{n}} x_{\mathrm{n},i}\right) ,$$

[10] $$\gamma_i = \theta_0 + \theta_1 z_{1,i} + \cdots + \theta_{\mathrm{k}} z_{\mathrm{k,i}} \ .$$

How to estimate the parameters of Eqs. [9] and [10]? We introduce a special assumption and proceed in two steps. The assumption is that higher-income countries have fully developed financial systems, $\gamma = 1$.

[11] $$\gamma_i = \begin{cases} 1 \quad , & if\ i \subset H \\ \theta_0 + \theta_1 z_{1,i} + \cdots + \theta_{\mathrm{k}} z_{\mathrm{k,i}}, & if\ i \subset L \end{cases} ,$$

where $i \subset H$ connotes the high-income sub-sample. The first step then is to estimate an equation explaining how the saving rates in ***higher-income*** countries, those belonging to set H, are related to life-cycle model variables—the growth rate of real GDP and age dependency both young and old.

[12] $$S_{it}^* = \begin{cases} \beta_0 + \beta_1 x_{1,it} + \cdots + \beta_{\mathrm{n}} x_{\mathrm{n},it} \ + \ u_{it}, & if\ i \subset H \\ \gamma_{it} \times \left(\beta_0 + \beta_1 x_{1,it} + \cdots + \beta_{\mathrm{n}} x_{\mathrm{n},it}\right) + \ \gamma_{it} \times u_{it} \ , & if\ i \subset L \end{cases}$$

where u_{it} is a stochastic error term comprising any unobserved variables. The coefficient estimates of Eq. [12] for the sub-sample consisting only of the higher-income countries, $i \subset H$, are used to impute the saving rates of all countries, i, conditional on $\gamma_i = 1$.

[13] $$\widehat{S_{it}^*} = \widehat{\beta_0} + \widehat{\beta_1} x_{1,it} + \cdots + \widehat{\beta_{\mathrm{n}}} x_{\mathrm{n,it}} \ .$$

The ratio of the actual saving rate of each country,i, relative to its predicted saving rate conditional on $\gamma_{it} = 1$ is an estimate of the parameters γ_{it}, the extent of financial development of each country i, the fraction of its household savings that are intermediated in period t.

[14] $$\hat{\gamma}_{it} = \frac{S_{it}^*}{\widehat{S_{it}^*}} .$$

In the second and final step in the analysis, the estimated parameter $\hat{\gamma}_{it}$ is used as a dependent variable in a regression equation in which variables $\mathbf{z}$ related to financial

development—including the prevalence of government-owned banks—are the independent variables.

[15] $$\hat{\gamma}_{\boldsymbol{it}} = \theta_0 + \theta_1 z_{1,it} + \cdots + \theta_{\mathrm{k}} z_{\mathrm{k,it}} + \varepsilon_{it},$$

where ε_{jt} is a stochastic error term.

Next, consider the specification of error terms in the two estimating equations, based on Eqs. [12] and [15]. Because we will be using panel data, various specifications are possible. Our preferred specification of the saving equation is one-way random effects and fixed effects of the financial development equation. Now, let us describe the specifications we will be using.

The saving equation we estimate is the following.

[16] $$S^*_{it} = \beta_0 + \beta_1 x_{1,it} + \cdots + \beta_{\mathrm{n}} x_{\mathrm{n},it} + u_{it}\,, \quad where\ i \subset H\,.$$

We will adopt a one-way random-effects specification. That is, we will suppose that the error term has two parts, one v_i that varies across countries in our dataset and the other e_{it} that varies both across countries and over time.

[16] $$u_{it} = v_i + e_{it}.$$

We further suppose that both components of the error term are each identically independently distributed, have a zero mean, and have a zero covariance both with each other and with the observed variables included in the regression. Under this specification, based on the Gauss-Markov theorem, the efficient estimator is the GLS estimator with weights constructed from the sample variance in each component of the regression error term.

The financial development equation is the following.

[15] $$\hat{\gamma}_{\boldsymbol{it}} = \theta_0 + \theta_1 z_{1,it} + \cdots + \theta_{\mathrm{k}} z_{\mathrm{k,it}} + \varepsilon_{it}.$$

For this equation, we will adopt a fixed-effects specification. The two-way fixed-effects model is

[15] $$\varepsilon_{it} = \omega_i + \alpha_t + e_{it},$$

where the ω_js and α_ts are non-random parameters to be estimated and e_{jt} is an identically independently distributed random variable with zero mean, and zero covariance with the observed variables included in the regression. In the one-way fixed effects model, the time-based fixed effects, α_t, are all set at zero.

We next describe the data that we use to carry out these estimates and our reasons for choosing the variables that we do.

3.4 Data

The dataset is an unbalanced panel for 112 countries, 1970-2017. Sequential ten-year averages of the underlying annual panel data are used, which gives a maximum of five observations per country, $t = 1,..,5$. The time periods correspond to each of the five decades since 1970 (the last of which is still in progress), resulting in 560 maximum possible time-series, cross-section observations for each variable—there are many missing observations. Observations for most of the variables related to the financial system are only available since the 1990s. The variables for estimating the saving equation are available since the 1970s for many countries. Of the 112 countries in the dataset, 73 are high-income or upper-middle-income counties and 39 are low-income or lower-middle-income countries.

We included in the dataset observations for all countries other than small (defined by the World Bank as ones having populations less than 1.5 million),[2] fragile and conflict-affected (as classified by the World Bank), or dependent territories.

Names of variables, descriptions, and sources are reported in Appendix Table A1. The sources include the World Bank, World Development Indicators database, and World Bank, Financial Development Indicators database.

3.4.1. Variables for Estimating the Saving Equation

The dependent variable in the saving equation is Gross Domestic ***Saving*** as a percentage of GDP. Explanatory variables are two age-dependency ratios—**young** (aged 15 or less) and ***old*** (aged 65 and older), each stated as a percentage of the working-age population (aged 16 to 64)—and the annual ***growth*** rate of real GDP. The rationale for including these variables is rooted in the logic of the life-cycle saving model.

[2] We made an exception for Singapore which we did include although small by this definition.

3.4.2. Variables for Estimating the Financial Development Equation

The dependent variable in the financial development equation is the ratio of the actual saving rate of each country, *i*, relative to its predicted saving rate based on the estimates of the saving equation for the high- and upper-middle-income sub-sample. Our name for this variable is '***Saving efficiency.***' It reflects and measures the extent of financial development of each country.

The independent variable of most interest is the ***Government banks*** share of the banking system. The 1970 and 1995 observations are from La Porta et al. (2002) and are the percentage of banking system equity that is government-owned in each country. The observations for later years (1999, 2001, 2005, 2008, 2009, 2010) are taken from the World Bank, Banking Supervision Survey and equal the percentage of each country's banking system assets comprising assets of banks that are 50% or more government-owned. Observations based on the two different definitions are likely to be highly correlated, and we shall proceed on the assumption that they measure the same thing.

Other independent variables related to the extent of financial development are ones related to the depth and breadth of financial services in each country: ***Bank credits*** relative to bank deposits, ***Foreign loans and deposits*** of banks relative to total bank deposits, and ***Financial system deposits*** relative to GDP.

3.4.3. Summary Statistics and Correlation Matrices

The means and standard deviations for each variable are displayed in Table 5 and the correlation matrices in Tables 3a and 3b.

Table 5 shows the means of each variable, separately for countries by income group for the whole period of observation. The income groups follow the 2019 classification of countries by the World Bank based on per-capita GDP expressed in international monetary units. The four categories—High income, Upper-middle income, Lower-middle income, and Low income—correspond to approximate quartiles in the ranking of countries by per-capita GDP. The first column of Table 5 shows the numbers of countries in each category in our sample, and the second column shows the per-capita real GDP of the countries in each category, averaged over the entire period of observation, 1970-2017. The last rows in the table show the means and standard deviations of variables for the whole sample.

Table 5. Means and standard deviations of variables.

	N	Real GDP per capita	Saving efficiency	Domestic Saving Rate	Young (% of working age pop.)	Old (% of working age pop.)	Growth (annual %)	Government banks (share of banking system)	Bank credits (% deposits)	Financial system deposits (% GDP)	Foreign loans and deposits (% deposits)
High income	41	31,213	1.101	26.6	34.5	18.3	3.3	0.239	111.4	62.1	74.0
		19,750	0.343	9.3	13.3	7.3	2.3	0.276	41.3	48.0	100.0
Upper middle	33	5,222	0.895	22.1	51.8	10.8	4.0	0.404	119.4	32.0	55.9
		3,036	0.520	13.7	19.7	5.0	4.2	0.342	198.0	22.8	63.1
Lower middle	27	1,555	0.736	16.3	69.4	7.7	4.0	0.365	105.8	25.2	55.4
		846	0.563	11.2	19.3	3.1	2.6	0.303	88.7	16.4	49.1
Low income	12	513	0.454	8.0	86.4	5.8	3.8	0.199	93.6	13.0	93.3
		193	0.626	8.2	10.2	1.2	2.8	0.262	75.7	10.0	76.2
All	113	13,391	0.887	20.9	53.4	12.3	3.7	0.310	110.1	39.6	66.5
		18,293	0.528	12.5	24.2	7.3	3.1	0.310	116.5	37.8	78.2

It is evident from Table 5 that financial intermediation by banks is substantially less in developing countries than in high-income ones, as shown by the smaller values of ***bank credits*** as a percent of deposits and ***financial deposits*** as a percent of GDP in lower-income countries. The domestic ***saving*** rates are also lower on average in the lower-income countries. It is natural to presume that this is because the financial systems of the lower-income countries are less fully developed, as just remarked. Note also the monotonically decreasing levels of ***saving efficiency***—the variable constructed from our estimates—at lower incomes. The ***government banks*** share of the banking system is not monotonically related to income. Some high-income countries have a substantial presence of government banks, and some low-income countries have no government banks. To analyze the effect of government banks on financial development will require a more sophisticated approach than simple correlation.

The age-dependency variables do seem to exhibit monotonic relations with income, as shown in Table 5. Lower-income countries tend to have more ***young*** persons and fewer ***old*** persons as percentages of the working population compared to higher-income countries. The middle-income countries have higher growth rates than the high-income countries, consistent with convergence toward long-term steady-state growth paths. The low-income countries have the lowest growth rates and are apparently not converging.

The correlation matrices shown in Table 6a and 6b show some of the same patterns as evident in Table 5 comparisons of means across countries grouped by income. Table 6a shows that variables that the life-cycle model identifies as important determinates of saving rates—age dependency, ***young*** and ***old,*** and ***growth***—have stronger correlations with saving rates in the higher-income countries than in the lower-income countries. This is a crucial premise of our estimating strategy. Table 6b shows the correlations among variables related to financial development.

Table 6a. Correlation coefficients—Variables in saving regressions.
(P-values below coefficients.)

High and upper-middle-income countries. (N=322)

	Real GDP per capita	Domestic Saving Rate	Young (% of working age pop.)	Old (% of working age pop.)
Domestic Saving Rate	**0.305** <.0001			
Young (% of working age pop.)	**−0.482** <.0001	**−0.077** 0.1669		
Old (% of working age pop.)	**0.533** <.0001	**−0.161** 0.004	**−0.743** <.0001	
Growth (annual %)	**−0.186** 0.0008	**0.260** <.0001	**0.275** <.0001	**−0.354** <.0001

Low and lower-middle-income countries (N=171)

	Real GDP per capita	Domestic Saving Rate	Young (% of working age pop.)	Old (% of working age pop.)
Domestic Saving Rate	**0.404** <.0001			
Young (% of working age pop.)	**−0.589** <.0001	**−0.151** 0.049		
Old (% of working age pop.)	**0.499** <.0001	**0.068** 0.378	**−0.707** <.0001	
Growth (annual %)	**−0.015** 0.845	**0.054** 0.482	**−0.053** 0.490	**−0.219** 0.004

Table 6b. Correlation coefficients—Variables in Financial Development regressions.
(P-values and numbers of observations below coefficients)

	Real GDP per capita	Domestic Saving Rate	Saving efficiency	Government banks (share of banking system)	Bank credits (% deposits)	Foreign loans and deposits (% deposits)
Domestic Saving Rate	**0.469** <.0001 316					
Saving efficiency	**0.453** <.0001 316	**0.904** <.0001 316				
Gov banks	**−0.246** <.0001 270	**0.025** 0.686 268	**−0.008** 0.893 268			
Bank credits	**0.020** 0.726 320	**0.097** 0.085 316	**0.172** 0.002 316	**−0.027** 0.660 270		
Financial syst. deposits	**0.698** <.0001 320	**0.389** <.0001 316	**0.337** <.0001 316	**−0.229** 0.000 270	**−0.098** 0.080 320	
Foreign loans and deposits	**0.141** 0.012 320	**0.090** 0.109 316	**0.121** 0.031 316	**−0.070** 0.249 270	**0.210** 0.000 320	**0.149** 0.008 320

3.5. Econometric Estimates

This section presents estimates of the regression of economic growth and age dependency, both young and old, on domestic saving rates. It also describes estimates relating the prediction errors from that regression to financial development indicators, including the prevalence of government banks.

3.5.1 Saving Equation

The result of the one-way random-effects estimation of the saving equation is shown in Table 7 for the higher-income and lower-income subsamples. We have two reasons for choosing a random-effects model rather than a fixed-effects one. First, our aim is to model the variation in saving rates in a way that enables us to predict out of sample. A fixed-effects specification controls time-invariant, unobservable variables, but out-of-sample predictions cannot be premised on unobserved variables. Second, the Hausman test statistics—reported in the last row of Table 7—fail to detect statistically significant bias when using the one-way random-effects specification rather than the less efficient one-way fixed effects specification.

As shown in Table 7, all coefficients are statistically significant and have the expected signs for the higher-income sub-sample, while none are statistically significant for the lower-income sub-sample. Indeed, the Wald statistic shows that the equation explains virtually none of the variation in saving rates among the lower-income countries. The Wald statistic is highly significant for the higher-income sub-sample. Here, the higher-income sub-sample includes countries classified by the World Bank as either 'high income' or 'upper-middle-income,' and the lower-income sub-sample includes both 'low income' and 'lower-middle-income." Chow tests (which we do not report) support this division of the sample. These results comport our interpretation that financial intermediation is effective in the higher-income countries but not the lower-income countries.

We have used the saving regression equation estimated for the higher-income countries—left-hand column of Table 7—to predict the ***saving*** rates of all countries, given their observed ***young*** and ***old***-age dependency and real GDP ***growth*** rates. For the lower-income countries, these predicted saving rates are estimates of what the saving rates would be if their financial systems were as developed as those of the higher-income

Table 7. Saving regressions: One-way random effects regression.

Dependent Variable: **Domestic Saving Rate**.

	High and Upper-middle Income Countries			Low and Lower-middle Income Countries		
	Coef.	z	P>z	Coef.	z	P>z
Young (% of working age population)	**−0.20** ***			**−0.06**		
	0.04	−5.24	0.000	0.06	−0.99	0.324
Old (% of working age population)	**−0.41** ***			**−0.26**		
	0.12	−3.37	0.001	0.52	−0.49	0.621
Growth (annual %)	**0.88** ***			**−0.23**		
	0.17	5.23	0.000	0.25	−0.92	0.359
Constant	**35.79**			**21.07**		
	3.27	10.96	0.000	7.61	2.77	0.006
No. of obs.	322			171		
No. of countries	73			39		
R^2: within =	0.145			0.013		
between =	0.172			0.001		
overall =	0.160			0.010		
Wald $\chi^2(3)$ =	53.47			1.42		
Prob > χ^2 =	0			0.70		
σ_v	8.91			8.87		
σ_e	6.81			7.52		
$\rho = \sigma_v^2/(\sigma_v^2 + \sigma_e^2)$	0.63			0.58		
Hausman test: χ^2 (3)	4.84			0.13		
Prob > χ^2	0.18			0.94		

countries, given their actual demographic profiles and growth rates. The saving rates of all the countries in the sample for each decade and the ratios of predicted saving rates to actual ones—***saving efficiency***—are reported in Appendix Table A3.

Several of the countries in the sample exhibited negative saving rates in some of the decades, in effect decumulation of wealth. These include Albania, Armenia, Bosnia & Herzegovina, Georgia, and Jordan among the upper-middle-income countries, and Kyrgyz, Cambodia, El Salvador, Benin, Sierra Leone, and Tajikistan among the lower-income countries. None of the predicted saving rates were negative for any countries. That means that, as computed here, the saving efficiency of the countries whose actual saving rates were negative is itself negative. How should we interpret these negative values of 'saving efficiency'? Our interpretation is that if the actual saving rate is negative, the higher the predicted saving rate, the less effective financial intermediation is, the same as when the actual saving rate is positive. Simply stated, our index of financial development, $\hat{\gamma}_{it} = \frac{S_{it}^*}{\widehat{S_{it}^*}}$, is not bounded by zero; more negative values mean less financial development.

Our saving efficiency variable is a new measure of financial development. Other measures of financial development have been proposed. Ito and Kawai (2018) construct indices of financial development that are weighted averages of variables drawn from multiple sources. We do not say our measure is better, just that it is different.

3.5.2 Financial Development Equation

The fixed-effects estimation of the financial development equation is shown in Tables 8, 9, and 10. Table 8 shows estimates in which the independent variables do not include the government banks share of the banking system. Tables 6 and 7 have the ***government banks*** variable. In these estimates, fixed-effects estimates reduce the bias associated with omitting unobserved variables that the fixed effects capture. The Hausman test statistics generally indicate that such bias is present in the random-effect counterparts to the fixed-effect estimates we report.

In Table 8 it is evident that ***Bank credits*** as a percent of deposits and ***Foreign loans and deposits*** as a percent of deposits have a positive association with ***saving efficiency*** in the lower-income countries and in the full sample. ***Financial system deposits*** as a

percent of GDP have a positive association with ***saving efficiency*** in the higher-income sample and in the full sample. Broadly speaking, saving rates seem to be positively affected by the depth of financial intermediation by banks. Saving rates are higher in countries in which banks collect more deposits, and given the deposits, extend more loans. Such financial intermediation is more characteristic of the higher-income countries than the lower-income countries. ***Foreign loans and deposits*** seem to be positively associated with saving rates only in the lower-income countries. This may be because some of the lower-income countries have valuable natural resources that contribute much to wealth when the export prices of the resources rise. Angola is an example of a country that has shown very large saving rates—four times higher than predicted by the saving regression equation. That probably reflects a huge influx of foreign exchange as a result of rising prices of natural resources (oil). The wealth accumulation in Angola is not the result of financially intermediated savings. The ***Foreign loans and deposits*** variable picks up this effect. The variable is not positively associated with saving in the higher-income sub-sample.

The estimates reported in Table 9 address the main concern of this paper, the effect of government banks on the effectiveness of financial intermediation. We add the variable ***government banks*** share of the banking system to the equation and re-estimate. The values of the government banks variable for all countries and decades are reported in Appendix Table A4. In the regression estimates of Table 9, the variable has a negative sign and is statistically significant for the lower-income sub-sample. The point estimate of the coefficient, equal to −0.608, means that if government banks share of the banking system is 20 percent (=0.20), the saving efficiency of the country is reduced by about 12 percent—if the saving rate was 10 percent of GDP with no government banks and saving efficiency 0.5, a 20 percent government bank share of the banking system would reduce saving efficiency to 0.44 and reduce the saving rate to 8.8 percent of GDP. This seems big enough to matter. Notice that these effects are after controlling for ***bank credits*** as a percent of deposits and ***financial deposits*** as a percent of GDP. The straightforward interpretation is that the effect of government banks on saving arises from misallocation of investment. It is not that government banks constrain the flow of loans to the private sector, but that they divert the loans to less productive uses. Government banks in lower-income countries constrain output and impede the accumulation of wealth.

Table 8. Financial development regression: One-way fixed effects regression.

Dependent variable: **Saving efficiency**.

	Full sample				High and Upper-middle Income Countries				Low and Lower-middle Income Countries		
	Coef. (Std. Err.)	*t*	P>*t*		Coef. (Std. Err.)	*t*	P>*t*		Coef. (Std. Err.)	*t*	P>*t*
Bank credits (% deposits)	**0.004** ***				**0.001** **				**0.006** ***		
	0.001	5.93	0.000		0.001	2.18	0.031		0.001	5.17	0.000
Financial system deposits (% GDP)	**0.004** **				**0.004** ***				**−0.004**		
	0.002	2.00	0.047		0.001	3.21	0.002		0.006	−0.79	0.434
Foreign loans and deposits (% deposits)	**0.001** **				**−0.001** *				**0.003** ***		
	0.001	2.53	0.012		0.000	−1.80	0.075		0.001	2.56	0.012
Constant	**−1.371**				**0.475**				**−2.701**		
	0.390	−3.51	0.001		0.143	3.32	0.000		0.673	−4.01	0.000
F test that all fixed effects=0:	*F*(107, 205)=	4.7			*F*(69, 132) =	10.92			*F*(37, 70) =	3.72	
	Prob > *F* =	0			Prob > F =	0			Prob > *F* =	0	
R^2	0.757				0.874				0.692		
Number of obs =	316				205				111		
Number of countries =	108				70				38		
Hausman test: χ^2 (3)	11.27				2.36				11.09		
Prob > χ^2	0.01				0.50				0.01		

Table 9. Government bank and financial development : One-way fixed effects regression.

Dependent variable: **Saving efficiency**.

	Full sample				High and Upper-middle Income Countries				Low and Lower-middle Income Countries			
	Coef. (Std. Err.)	*t*	P>*t*		Coef. (Std. Err.)	*t*	P>*t*		Coef. (Std. Err.)	*t*	P>*t*	
Govt banks (share of banking system)	**−0.049**				**0.065**				**−0.608**	**		
	0.166	−0.30	0.768		0.126	0.52	0.606		0.289	−2.10	0.041	
Bank credits (% deposits)	**0.005**	***			**0.001**				**0.010**	***		
	0.001	6.79	0.000		0.001	1.44	0.152		0.001	7.73	0.000	
Financial system deposits (% GDP)	**0.004**	*			**0.003**	***			**−0.005**			
	0.002	1.88	0.061		0.001	2.74	0.007		0.006	−0.82	0.419	
Foreign loans and deposits (% deposits)	**0.002**	***			**0.000**				**0.003**	**		
	0.001	2.73	0.007		0.001	−0.91	0.365		0.002	2.17	0.036	
Constant	**−1.846**				**0.529**				**−4.016**			
	0.492	−3.75	0.687		0.143	3.70	0.000		0.722	−5.57	0.000	
F test that all fixed effects=0:	*F*(101,161)=	4.43			*F*(67,112) =	9.44			*F*(33,45) =	6.47		
	Prob > *F* =	0			Prob > *F* =	0			Prob > *F* =	0		
R^2	0.790				0.881				0.860			
Number of obs =	267				184				83			
Number of contries =	102				68				34			
Hausman test: $\chi^2(4)$	9.96				5.86				10.48			
Prob > χ^2	0.04				0.21				0.11			

Table 10. Government bank and financial development: Two-way fixed effects regression.
Dependent variable: **Saving efficiency**.

	Full sample				High and Upper-middle Income Countries				Low and Lower-middle Income Countries			
	Coef. (Std. Err.)	*t*	P>*t*		Coef. (Std. Err.)	*t*	P>*t*		Coef. (Std. Err.)	*t*	P>*t*	
Govt banks (share of banking system)	**−0.214**				**0.259**	*			**−0.861**	**		
	0.199	−1.08	0.284		0.146	1.77	0.080		0.362	−2.38	0.022	
Bank credits (% deposits)	**0.005**	***			**0.000**				**0.010**	***		
	0.001	6.67	0.000		0.001	0.91	0.366		0.001	6.83	0.000	
Financial system deposits (% GDP)	**0.005**	**			**0.001**				**−0.004**			
	0.002	2.06	0.041		0.002	0.44	0.663		0.009	−0.37	0.718	
Foreign loans and deposits (% deposits)	**0.002**	**			**0.001**				**0.004**	**		
	0.001	2.40	0.017		0.001	−0.44	0.659		0.002	2.35	0.023	
Constant	**−1.76**				**0.753**				**−3.566**			
	0.498	−3.54	0.000		0.171	4.40	0.000		0.760	−4.69	0.000	
F test that all fixed effects=0:	*F*(103,159)=	4.37			*F*(69,110) =	9.63			*F*(35,43) =	6.36		
	Prob > *F* =	0			Prob > *F* =	0			Prob > *F* =	0		
R^2	0.794				0.887				0.869			
Number of obs =	267				184				83			
Number of contries =	102				68				34			
Hausman test: $\chi^2(4)$	11.56				13.31				5.21			
Prob > χ^2	0.02				0.01				0.27			

3.5.3. Robustness Check.

As a robustness check, we re-estimate the regression equations of Table 9 under a two-way fixed-effects specification rather than one-way fixed-effects. These estimates are shown in Table 10 and show pretty much the same result as in Table 9. In the high and upper-middle-income sub-sample, the coefficient on the government banks variable was positive with a *p*-value of 0.08. Controlling for time-fixed-effects made this one small difference. Perhaps it opens the possibility that government banks have a different effect in high-income countries than in low-income ones.

This chapter, based on a new measure of financial development—which we dubbed 'saving efficiency' finds that it tends to be smaller in lower-income countries whose banking industries are more dominated by government banks. The following chapters will examine a single country- Bangladesh case to see whether this paper's cross-country results are reflected in the Bangladesh case.

Chapter 4

Government Banks and Financial Development in Bangladesh

4.1 Introduction

This chapter examines whether financial intermediation in Bangladesh increases over time and whether government ownership of banks has stimulated financial intermediation or depressed it. According to La Porta et al. (2002), government banks are more prevalent in countries with corrupt governments and weak political institutions, and that the banks misallocate resources and inhibit economic growth. They contrast the Gerschenkron (1962) 'development view' that government banks can overcome market failure and promote investment and industrialization in economically backward countries that would otherwise be doomed to perpetual stagnation, and the 'political view' that government banks serve corrupt political interests. Their findings generally favor the political view. Yeyati et al. (2004) document the lack of evidence that state-owned banks promote financial development and economic growth. Based on a new measure of financial development—saving efficiency—Kabir and Flath (2020) also find that financial development is lower in lower-income countries whose banking industries are more dominated by government banks. That supports a view in which government banks in developing countries manifest crony capitalism, not vehicles for overcoming market failure. This chapter will examine whether government ownership of banks has facilitated financial intermediation in Bangladesh. To put it another way, are the lending activities of government banks in Bangladesh socially desirable, or politically motivated, and socially harmful? If government banks do overcome failures in the markets for credit and investment, they should be expanding the overall extent of financial intermediation. If government banks are vehicles of crony capitalism, they may or may not expand the flow of financial intermediation. According to World Bank, government solutions to overcome market failures rely on two crucial assumptions. First, governments know better than markets; second, governments act in the best interest of society. Both assumptions relate to the public-interest view or development view. Both assumptions have been proven wrong in Bangladesh as across the developed and developing world. Bureaucrats have turned out to have limited knowledge and expertise to run financial institutions and

systems and they do not maximize society's welfare, but are rather subject to political and regulatory capture, influenced by the political sphere and the regulated entities, as hypothesized by the private interest view or political view (Beck and Rahman, 2006). This chapter aims to see which government view fits in Bangladesh's case.

As already discussed, this paper uses a new measure of financial development rooted in the logic of economics. Its basic premise is that societal saving on a large scale requires financial intermediation. The new measure of financial development- 'saving efficiency,' which is the gap between actual domestic saving rates of lower-income countries and the saving rates that they would have if their financial systems were developed (based on prediction out of sample from a regression estimated for higher-income countries) will be the main focus of this chapter.

This chapter uses 1970-2017 time-series data of selected variables on Bangladesh to see whether cross-country results of other papers are reflected in the Bangladesh case and compare the Bangladesh data with other countries. Based on the time series evidence, my findings suggest that higher government ownership of banks is associated with a lower level of financial development in Bangladesh. The Gerschenkron 'development view' that government banks promote efficient investment in developing countries with ineffective financial systems does not fit the Bangladesh case. A brief comparison of government banks or state-owned banks (SCB's) with other banks in Bangladesh reveals that the SCB's are performing poorly. When focusing on financial intermediation variables such as loan disbursement trends and deposit mobilization of the SCB's, findings suggest that they do not contribute much to financial intermediation. State-owned bank's lending patterns are volatile, indicating that they are not having a sound lending policy or development mandate. They have been enmeshed in big loan scandals. The disparate facts about the SCB's in Bangladesh are consistent with the 'political view' of government ownership of banks. They are manifestations of crony capitalism, not engines of economic development.

Financial intermediation has been increasing over time in Bangladesh, while government ownership of banks has been decreasing. The savings rate has also increased over time, which is a further indication of progressive financial development and widening financial intermediation. If financial intermediation in Bangladesh had been

effective over the recent decades, then the increasing age dependency would have resulted in a falling national saving rate based on the life cycle savings model. Yet, the saving rate has been going up. It must mean that financial intermediation is widening, even though government banks have been receding.

4.2 Data

The dataset is an unbalanced panel for 112 countries, 1970-2017. Sequential ten-year averages of the underlying annual panel data are used. Observations for most of the variables related to the financial system are only available since the 1990s. The variables for estimating the saving equation are available since the 1970s for many countries. Of the 112 countries in the dataset, 73 are high-income or upper-middle-income counties, and 39 are low-income or lower lower-middle-income countries. Names of variables, descriptions, and sources are reported in Appendix Table A1.

This chapter uses the same variables used in chapter three, which was a cross-country analysis. Two regressions have been used in that chapter. This chapter will see whether the cross-country regression results are in line with the case of Bangladesh. A brief summary of the regression equation and the main result of that chapter is given below.

4.2.1 Variables for Estimating the Saving Equation

The dependent variable in the saving equation is Gross Domestic ***Saving*** as a percentage of GDP. Explanatory variables are two age-dependency ratios—**young** (aged 15 or less) and ***old*** (aged 65 and older), each stated as a percentage of the working-age population (aged 16 to 64)—and the annual ***growth*** rate of real GDP. The rationale for including these variables is rooted in the logic of the life-cycle saving model, already familiar to most economists. The results show all coefficients are statistically significant and have the expected signs for the higher-income sub-sample, while none are statistically significant for the lower-income sub-sample. These results comport our interpretation that financial intermediation is effective in the higher-income countries but not the lower-income countries.

4.2.2 Variables for Estimating the Financial Development Equation

We have used the saving regression equation estimated for the higher-income countries to predict the ***saving*** rates of all countries, given their observed ***young*** and ***old***-age dependency and real GDP ***growth*** rates. Then we construct the '***Saving efficiency***' variable that is the dependent variable in the financial development equation. It is the ratio of the actual saving rate of each country, i, relative to its predicted saving rate. It reflects and measures the extent of financial development of each country. The independent variable of most interest is the ***Government banks*** share of the banking system. Other independent variables related to the extent of financial development are related to the depth and breadth of financial services in each country: ***Bank credits*** relative to bank deposits, ***Foreign loans and deposits*** of banks relative to total bank deposits, and ***Financial system deposits*** relative to GDP.

Results show that ***saving efficiency*** seems to be positively affected by the depth of financial intermediation by banks. Saving rates are higher in countries in which banks collect more deposits, and given the deposits, extend more loans. Such financial intermediation is more characteristic of the higher-income countries than the lower-income countries. The estimates of ***government banks*** share of the banking system, which was the main variable of the paper, have a negative sign and are statistically significant in explaining saving efficiency for the lower-income sub-sample. The effect of government banks on saving arises from the misallocation of investment. It is not that government banks constrain the flow of loans to the private sector, but they divert the loans to less productive uses. Government banks in lower-income countries constrain output and impede the accumulation of wealth. Next, I will describe what I find in the case of Bangladesh.

4.3 Government Banks and Financial Intermediation in Bangladesh

In Table 11, columns one to five show the means of variables related to financial development for Bangladesh and averages across countries by income group, 1970-2017. Columns six to nine present the means of variables related to the life cycle savings model. The income groups follow the 2019 classification of countries by the World Bank based on per-capita GDP expressed in international monetary units. The last five rows represent four categories of countries—High income, Upper-middle income, Lower-

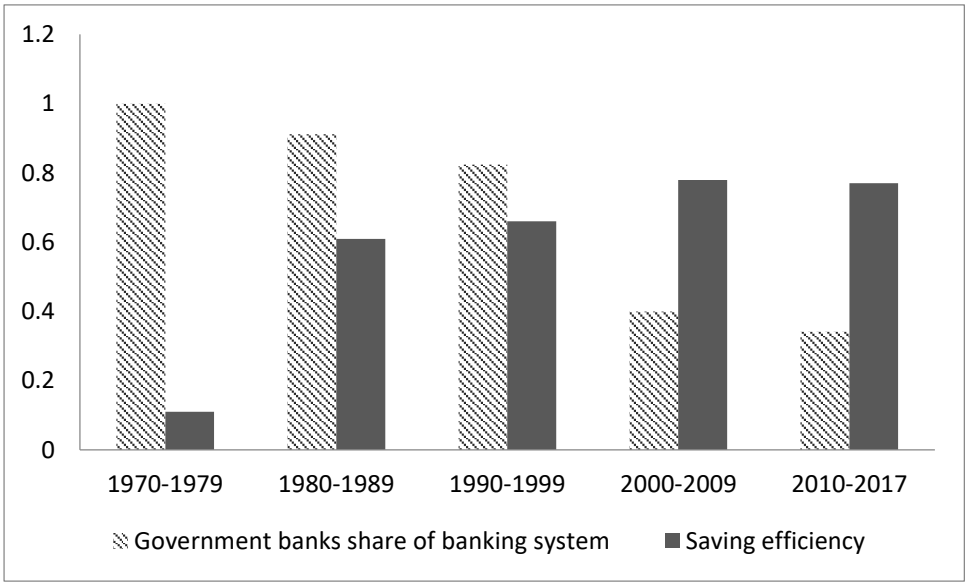
Table 11: Government bank and financial intermediation in Bangladesh

		(1) Bank Credits to deposits (%)	(2) Financial system deposits to GDP (%)	(3) Foreign loan and deposits to total deposits (%)	(4) Government banks share of banking system	(5) Saving efficiency	(6) Annual GDP growth (%)	(7) Old (% of working-age pop.	(8) Young (% of working-age pop.	(9) Domestic saving to GDP (%)
Bangla desh	1970-1979	35.8	8.8	-	1.0	0.11	1.5	5.7	86.8	1.9
	1980-1989	67.4	10.2	-	-	0.61	3.5	5.8	82.9	12.3
	1990-1999	78.2	19.6	13.7	0.82	0.66	4.7	6.0	71.2	15.4
	2000-2009	70.8	35.4	10.9	0.40	0.78	5.5	6.9	57.1	20.6
	2010-2017	87.1	42.5	9.6	0.34	0.77	6.6	7.6	46.1	22.5
High income		111.4	62.1	74.0	0.24	1.10	3.3	18.3	34.5	26.6
Upper middle income		119.4	32.0	55.9	0.40	0.89	4.0	10.8	51.8	22.1
Lower middle income		105.8	25.2	55.4	0.36	0.74	4.0	7.7	69.4	16.3
Low income		93.6	13.0	93.3	0.19	0.45	3.8	5.8	86.4	8.0
All countries		110.1	39.6	66.5	0.31	0.89	3.7	12.3	53.4	20.9

middle income, and Low income and the Whole sample. Data are averaged over the entire period of observation, 1970-2017. It is evident from the table that financial intermediation by banks is substantially less in developing countries than in high-income ones, as shown by the smaller values of ***bank credits*** as a percent of deposits and ***financial deposits*** as a percent of GDP in lower-income countries. The ***government banks*** share of the banking system is not monotonically related to income. Some high-income countries have a substantial presence of government banks, and some low-income countries have no government banks. Saving efficiency is a variable that reflects and measures the extent of financial development of each country. Note the monotonically decreasing levels of ***saving efficiency*** of lower-income countries. The domestic ***saving*** rates are also lower on average in the lower-income countries, and it is natural to presume that this is because the financial systems of the lower-income countries are less fully developed, as just remarked. The age-dependency variables do seem to exhibit monotonic relations with income, as shown in the table. Lower-income countries tend to have more ***young*** persons and fewer ***old*** persons as percentages of the working population compared to higher-income countries. The middle-income countries have higher ***growth*** rates than the high-income countries, consistent with convergence toward long-term steady-state growth paths.

Here is a brief analysis of the selected variables for Bangladesh in comparison to other country groups. The five upper rows of the table represent time series data of 1970-2017 divided into five periods. What stands out are the following. First, financial intermediation is increasing over time, but it is substantially lower than other income groups. On average, the ***loan-to-deposit ratio*** is 87 percent in the most recent period (2010-2017). The ratio is lower compared to averages ranging between 93.6 and 119.4 percent in low-income and upper-middle-income countries. On average, ***financial system deposits*** are 42.51 percent of GDP in recent time (2010-2017) and higher than the averages of other income groups except for high-income countries. Averages range between 13 and 62.1 percent for different income groups. Foreign loans and deposits to total deposits are decreasing over time. On average ***foreign loans and deposits to total deposits*** are only 9.57 percent for 2010-2017. The ratio is very low compared to the averages ranging between 55.4 and 93.3 percent in other income groups. These findings

suggest financial intermediation is not effective in Bangladesh yet. Second, ***savings efficiency*** seems to be positively affected by banks' depth of financial intermediation and negatively affected by the government banks share of the banking system.



Graph 1: Government banks and financial development in Bangladesh

Graph 1 shows that ***the Government banks share of the banking system*** in Bangladesh decreases over time, and financial development or savings efficiency is increasing over time. Savings efficiency is lower when the government-owned banks comprise a larger share of the banking system. That is what we found in our cross-country analysis from the previous chapter. Savings efficiency and the domestic ***saving*** rates are on average lower in Bangladesh than in high-income and upper-middle-income group countries. This indicates that the financial system of Bangladesh is not fully developed but is improving over time. Progressive financial development and widening financial intermediation have been occurring in Bangladesh. On average, the savings efficiency of Bangladesh is 0.77 for the period 2010-2017, and averages of other income groups range between 0.45 and 1.10. The average domestic savings rate is 22.5 percent in the period 2010-2017, and averages of other income group countries range between 8 and 26.6 percent. Finally, on average, ***old-***age dependency has been increasing, and ***young***-age dependency has been decreasing in Bangladesh. The country has fewer old persons and more young persons than higher-income countries as percentages of the working population. GDP is growing at a reasonable rate and, on average higher than the averages

of other income groups. If financial intermediation in Bangladesh had been effective over the recent decades, then the changes in age dependency would have resulted in a falling national saving rate based on the life cycle savings model. These results comport with our cross-country results that the life cycle savings model is not working in lower-income countries; financial intermediation is effective in the higher-income countries but not in the lower-income countries.

4.3.1 The Major Drive of Financial Intermediation in Bangladesh

The Bangladesh financial system consists of three broad sectors- (1) Formal sector, (2) Semi-formal sector, and (3) Informal sector. The formal sector includes all regulated institutions, including banks, non-bank financial institutions, insurance companies, capital market Intermediaries like brokerage houses, merchant banks, micro finance institutions, etc. The semi-formal sector includes those institutions which are regulated but do not fall under the jurisdiction of the Central Bank, Insurance Authority, Securities and Exchange Commission, or any other enacted financial regulator. This sector is mainly represented by Specialized Financial Institutions like House Building Finance Corporation, Palli Karma Sahayak Foundation, Samabay Bank, Grameen Bank, Non-governmental organizations, and discrete government programs. The informal sector includes private intermediaries which are completely unregulated (Wikipedia). Except for banks, all other financial system institutions play a very insignificant role in financial intermediation as most of the institutions are very small. Domestic capital markets are mostly nonexistent as they are inactive and unstable. They do not play a significant role in financial intermediation and resource mobilization in the economy. While savings intermediated by banks amounted to 8.3% of GDP (30% of national savings), capital raised through equity and bond issues together was equivalent to only 0.07% of GDP in 2012 (Shah, 2016). The economy of Bangladesh is over-reliant on bank financing. So it is crucial to see which type of banks are playing a role in financial intermediation as ownership of banks can significantly influence the efficiency of the banks.

Generally, the ownership of Bangladesh banks can be categorized into four groups, namely State-Owned Commercial Banks (SCB's), Private Commercial Banks (PCB's), Development Financial Institutions (DFI's), or Specialized Development Banks

(SB's), and Foreign Commercial Banks (FCB's). The SCB's consist of six banks. SCB's were considered as the proper means of generating savings that can facilitate industrial finance to the sectors of the economy with the utmost development prospects (Islam et al. 2014), but in Bangladesh, the PCB's lead the Bangladesh banking sector since they cover more than 60% of total assets and deposits. The PCB's performance is higher than SCB's and SB's because of their quality and services. Islam et al. (2014) reported that the PCB's have rapidly occupied the market share at the expense of the SCB's.

Table 12: Banking system structure

	2001				2018			
	No of banks	No of branches	Share of assets	Share of deposits	No of banks	No of branches	Share of assets	Share of deposits
SCBs	4	3608	46.5	50.93	6	3746	25.6	26.6
SBs	5	1298	9.5	5.64	3	1412	2.2	2.6
PCBs	30	1331	37.2	36.58	41	5060	67.0	66.0
FCBs	12	34	7.8	6.85	09	68	5.2	4.8
Total	51	6271	100	100	59	10286	100	100

(Source: Bangladesh Bank website)

Since 1982 the banking system of Bangladesh has evolved through a continuous process of reforms. The shares of SCBs in total deposits and credits were higher than the respective shares of PCBs until 2003, and then the shares of PCBs surpassed those of SCBs, which have maintained and expanded in favor of PCBs. Table 12 shows changes in the system structure of each category of banks from the year 2001-2018. At present, the PCBs have more than 65% of total deposits, but SCBs have only 26.6%, and PCBs assets coverage is 67%, while it is only 25.6% in SCBs. Table 12 indicates that PCBs are playing a major role in the financial intermediation of Bangladesh. Detailed financial intermediation of each category of banks will be shown in the following section.

4.4 The Efficiency of Government Banks in Bangladesh

In Bangladesh, government or state-owned banks consist of six banks. According to the bank health index (BHI) report prepared by the Central Bank of Bangladesh, among six state-owned banks, three of the banks, Sonali Bank, Rupali Bank, and Basic Bank, are in the 'red zone.' The other two banks Agrani Bank and Janata Bank, are in the 'yellow zone,' and one of the banks, Bangladesh Krishi Bank, is not even included in the BHI

report as their financial health is too bad. Banks that perform well in line with the indicators are placed in the green zone, while lenders with the worst performance belong to the red zone. The yellow zone consists of banks that stay between the red and the green zones. The BHI report is prepared based on six financial indicators: asset quality, capital adequacy ratio, efficiency, profitability, liquidity, and lending ratio against capital (Uddin, 2018). State-owned banks had entered into the red zone for their deteriorating financial health stemming largely from rising default loans, financial scandals, and declining capital and profits. In this section, a brief comparison of state-owned banks with other banks will be shown.

4.4.1 Capital Adequacy

Under Basel-III, banks in Bangladesh are required to maintain a Minimum Capital Requirement of 10.0 percent of the Risk-Weighted Assets or BDT 4.0 billion as capital, whichever is higher. Table 13 shows the Capital-to-Risk-Weighted-Assets Ratio (CRAR) by types of bank. It is observed that in 2017, state-owned banks (SCB's) maintained a CRAR of 5.04 percent. In June 2018, the CRAR of SCB's further dropped to 2 percent. The capital adequacy ratio is decreasing over time for SCB's signaling significant capital shortfalls.

Table 13: Capital-to-risk-weighted-asset ratio by type of banks

(In percent)

Bank types	2010	2011	2012	2013	2014	2015	2016	2017	2018 June
SCBs	8.9	11.7	8.1	10.8	8.3	6.4	5.9	5.04	2.0
DFIs	-7.3	-4.5	-7.8	-9.7	-17.3	-32.0	-33.7	-35.5	-31.9
PCBs	10.1	11.5	11.4	12.6	12.5	12.4	12.4	12.5	12.2
FCBs	15.6	21.0	20.6	20.2	22.6	25.6	25.4	24.9	23.0
Total	9.3	11.4	10.5	11.5	11.3	10.8	10.8	10.8	10.0

(Source: Bangladesh Bank website)

4.4.2 Asset Quality

The ratio of gross Non-Performing Loans (NPLs) to total loans and net NPLs to total net loans is the most critical indicator of the asset quality in the loan portfolio. Table 14 shows that private commercial banks (PCB's) had the lowest and state-owned banks (SCB's) had the highest gross NPLs. SCB's gross NPLs were 28.24 percent at the end of June 2018. In recent years the ratio shows an upward trend mainly due to loan scams in the SCB's, excessive finance to some large business groups, increased total classified loans, defaulted outstanding, and non-recovery of loans.

Table 14: Gross-NPL-to-total-loan ratio by types of bank

(In percent)

Bank types	2010	2011	2012	2013	2014	2015	2016	2017	2018 June
SCBs	15.7	11.3	23.9	19.8	22.2	21.5	25.1	26.5	28.2
DFIs	24.2	24.6	26.8	26.8	32.8	23.2	26.0	23.4	21.7
PCBs	3.2	2.9	4.6	4.5	4.9	4.9	4.6	4.9	6.0
FCBs	3.0	3.0	3.5	5.5	7.3	7.8	9.6	7.0	6.7
Total	7.3	6.1	10.0	8.9	9.7	8.8	9.2	9.3	10.4

(Source: Bangladesh Bank website)

Table 15: Net-NPL-to-total-loans ratio by types of bank

(In percent)

Bank types	2010	2011	2012	2013	2014	2015	2016	2017	2018 June
SCBs	1.9	-0.3	12.8	1.7	6.1	9.2	11.1	11.2	11.7
DFIs	16.0	17.0	20.4	19.7	25.5	6.9	10.5	9.7	7.4
PCBs	0.00	0.2	0.9	0.6	0.8	0.6	0.1	0.2	0.8
FCBs	-1.7	-1.8	-0.9	-0.4	-0.9	-0.2	1.9	0.7	0.8
Total	1.3	0.7	4.4	2.0	2.7	2.3	2.3	2.2	2.7

(Source: Bangladesh Bank website)

Table 15 shows the ratio of net NPLs to total net loans (net of provisions and interest suspense). It was 2.7 percent in June 2018 for the banking sector and 11.7 percent for

SCB's. Table A5 shows the required loan loss provision and the actual provision maintained by the banks in the appendix. The table shows that from 2010 to 2017, the banks in aggregate continuously failed to maintain the required level of provision against their NPLs. In recent years, the provision maintenance ratio showed a declining trend. The main reason for the deficit in provision was the inability of some SCB's and PCB's, due to an increase in classified loans, poor quality and inadequacy of collaterals, low profit, and provision transfer for write-offs. A comparative position of loan loss provisions of four types of banks as of the end of 2016, 2017, and 2018 is shown in Table A6. The provision maintenance ratios of SCB's show a declining trend in recent years.

4.4.3 Management Soundness

As evident from Table 16, the expenditure-income (EI) ratio of the state-owned banks (SCB's) was 81.3 percent in 2017, high compared to other banks, which could mainly be attributable to high administrative and operating expenses. At the end of June 2018, the EI ratio of SCB's stood at 83.9 percent.

Table 16: Expenditure-to-income ratio by types of bank

(In percent)

Bank types	2010	2011	2012	2013	2014	2015	2016	2017	2018 June
SCBs	80.7	62.7	73.2	84.1	84.1	84.5	90.2	81.3	83.9
DFIs	87.8	88.6	91.2	94.8	99.5	113.9	137.8	124.0	149.9
PCBs	67.6	71.7	76.0	77.9	75.8	75.5	73.5	73.8	78.4
FCBs	64.7	47.3	49.6	50.4	46.8	47.0	45.7	46.6	44.3
Total	70.8	68.6	74.0	77.8	76.1	76.3	76.6	74.7	80.3

(Source: Bangladesh Bank website)

4.4.4 Earnings and Profitability

Table 17 shows the net profit of state-owned banks (SCB's) only. It reveals mixed results. There is inconsistency in the profit trend, and some of the banks are even running banking operations at a loss. Tables A7 and A8 in the appendix show the ROA and ROE of four types of banks. Both the ROA and ROE of the SCB's were less than the industry average.

Table 17: Net profits of state-owned banks

(In million BDT)

Profit and loss (after tax)	2014	2015	2016	2017	2018
Sonali Bank	6055	587	1516	7092	2264
Janata Bank	381	480	260	268	180
Agrani Bank	1990	650	-6970	6760	1040
Rupali Bank	420	235	-1258	499	379
Basic Bank	-1100	-3140	-14930	-6843	-3539

(Source: Annual reports of SCB's)

4.4.5 Liquidity

Table 18 exhibits the quarterly trend of excess liquid assets (in excess of CRR and SLR) of scheduled banks. State-owned banks (SCB's) had the most surplus liquid assets among all groups of banks.

Table 18: Excess liquid assets of banks

(In billion BDT)

Bank types	2018 (June)	2018 (Sep)	2018 (Dec)	2019 (March)	2019 (June)
SCBs	512.7	430.6	336.5	309.2	397.0
DFIs	0.07	0.58	0.10	0.04	0.00
PCBs	289.2	233.6	255.0	192.5	333.0
FCBs	144.8	146.0	172.1	140.6	126.1
Total	946.8	810.8	763.9	642.4	856.1

(Source: Bangladesh Bank website)

4.4.6 Financial Intermediation

Table 19 and Table 20 depict loan disbursement trends of banks. There is an unusual pattern for state-owned banks (SCB's) compared to private commercial banks (PCB's). The disbursement growth of the SCB's seems quite volatile. It might mean that SCB's have a poor bank lending policy. During 2018, private sector credit growth went down 31 percent for SCB's. Loan disbursement was only Tk. 26.3 billion for SCB's and TK. 528.9 billion for PCB's. It is surprising that the loan growth of SCB's has been reducing, although the average lending rate has been falling over time. Table 21 shows the lending rate of SCB's. The lending rate was 6.75 percent in 2018, the lowest among all of the bank's categories. SCB's spread also has been falling over time. It was only 2.38 percent in 2018.

Table 22 shows deposit growth of SCB's is 8.07 percent in 2018, but that growth has been falling over time also. It is evident from the tables that SCB's contribution to financial intermediation is very limited in Bangladesh.

Table 19: Loan disbursement growth (Industrial term lending)

(In percent)

Bank types	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
SCBs	11.9	-40.0	31.1	-19.4	107.3	12.0	21.5	262.8	26.9	-7.4	-75.7	121.3	-4.9	28.9	-31.6
DFIs	21.4	76.4	0.00	34.6	-16.7	17.0	48.8	66.5	53.7	-4.1	-9.1	-20.6	-27.9	51.8	-2.6
PCBs	102.5	57.1	19.2	24.1	81.1	-3.2	54.5	6.0	4.0	27.7	13.2	42.3	7.3	-6.3	13.7
FCBs	73.7	7.5	-17.5	99.4	48.6	6.1	-76.7	66.6	12.6	35.1	-26.6	27.2	35.2	-38.5	56.3

(Source: Bangladesh Bank website)

Table 20: Loan disbursement in billion

(In billion BDT)

Bank types	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
SCBs	7.5	4.5	5.9	4.7	9.8	11.0	13.4	48.7	61.8	57.2	13.9	30.8	29.3	38.5	26.3
DFIs	1.7	3.0	3.0	4.0	3.3	3.9	5.9	9.9	15.2	14.6	13.2	10.5	7.6	10.8	10.5
PCBs	32.4	50.9	60.7	75.3	136.4	132.0	203.9	216.1	224.8	287.2	325.2	462.9	496.8	465.3	528.9
FCBS	10.6	11.4	9.4	18.7	27.8	29.6	6.9	11.5	12.9	17.5	12.8	16.3	22.0	13.5	21.2

(Source: Bangladesh Bank website)

Table 21: Movements in lending and deposit rates

(In percent)

Bank types	Lending Rate					Deposit Rate				
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
SCBs	10.7	10.0	8.5	8.3	6.7	6.8	6.3	4.8	4.3	4.3
DFIs	9.6	9.6	8.8	8.7	7.5	8.2	7.8	6.4	5.9	5.7
PCBs	10.7	11.6	10.3	9.6	10.2	7.0	6.2	5.2	5.2	5.9
FCBs	11.4	9.7	8.3	8.1	8.9	3.6	2.5	1.7	1.6	2.2

(Source: Bangladesh Bank website)

Table 22: Deposit mobilization*

Bank types	Deposit In billion BDT						Deposit growth In percent					
	2013	2014	2015	2016	2017	2018	2013	2014	2015	2016	2017	2018
SCBs	1522.8	1714.5	2105.4	2447.4	2654.1	2868.4	16.6	12.5	22.8	16.2	8.4	8.0
DFIs	301.8	340.0	226.1	247.4	263.5	286.0	24.0	12.6	-33.5	9.4	6.5	8.5
PCBs	3551.1	4176.2	4743.5	5382.3	6080.0	7127.2	14.8	17.6	13.5	13.4	12.9	17.2
FCBs	316.9	328.0	331.5	358.9	377.6	517.2	7.1	3.4	1.0	8.2	5.2	36.9

(Source: Bangladesh Bank website)

Note: State-owned commercial banks- SCBs; Development financial institutions or specialized banks- DFIs; Private commercial banks-PCBs and Foreign commercial banks-FCBs. All data's are from Bangladesh Bank annual reports-various issues

* Data's are reported in June each year except 2018

4.5 Government Banks Lending Culture and Corruption

In Bangladesh, the banking sector crisis is attributed to a lack of good governance, political interference in approving loans, corruption, and a culture of exemption towards loan defaulters, especially in government or state-owned banks.

4.5.1 Preferential Lending

There have been various credit schemes for state-owned banks (SCB's) to promote priority sectors such as agriculture, exports, and small-scale industries in Bangladesh. Among these, the agricultural sector was given top priority. Being SCB's, they were expected to extend rural and preferential credits to a variety of priority sectors and schemes under subsidized terms and conditions while there are no loan directives for private commercial banks (PCB's). Prior to 1985, at the beginning of each year, the central bank announced its preferential lending and refinancing targets for subsectors. Since 1985, however, these directives for preferential lending have been replaced by lists of favored and discouraged subsectors or activities. They were also pressured to lend to public corporations or privatized public corporations. Lending in accordance with the authorities' directives reduced SCB's autonomy and undermined their efforts to maintain good credit approval practices. Banks feel no necessity of screening for good customers—an effective practice for banks under normal circumstances. Although the authorities provided no guarantees for priority lending, banks seemed to expect that if serious default problems developed, the authorities would have to step in eventually, especially if the borrowers were public corporations (IMF, 1990)

4.5.2 Appointment of Politically-linked People

Governance failings and appointment of politically linked people to the boards of state-owned banks (SCB's) have contributed to large loans default, frequent scams, and poor recovery of embezzled money. These open the door for corruption, money laundering, and financial crime risks (Byron and Ahmed, 2017). The reason for the culture of loan indiscipline at the SCB's is that many incompetent people were appointed in influential positions upon political consideration by the Awami League-led government upon assuming power in 2009 (Uddin, 2018). The APG report 2017 referred

to the loan scam of Sonali Bank, fraud of BASIC Bank, and the fund embezzlement from Janata Bank. The report said significant involvement of politically exposed persons in the board and management of SCB's and failings of internal controls and governance were common influences. It also said politically exposed persons were present as beneficial owners or directors/managers of banks, securities firms, and other businesses (Byron and Ahmed, 2017).

4.5.3 Flexible Legislation Change

Another problem is that legislation can be changed easily. For example, in 2018, two dubious amendments were made to the Banking Company Act, which undermined good governance in the banking sector. The tenure of the bank's boards of directors increased from six years to nine years, and up to four family members can now be allowed to be on a board instead of two. These types of legislation pave the way for corrupted members in the board of banks (Hassan, 2019)

4.5.4 Lack of Corrective Measure

According to the APG report, the money laundering risks did not appear well assessed in the country's national risk assessment exercises. The APG report said there was evidence of the authorities' poor use of formal and informal channels when large amounts of proceeds of crime were being taken out of Bangladesh about the state-owned BASIC Bank's loan scam case. The authorities were aware of a significant amount of monies being sent to another country, but no official requests for assistance had been made at that time. The former BASIC Bank chairman Bachchu was blamed for damaging Basic bank through large-scale irregularities. Despite the central bank's reservations, the government had appointed him for a second term. Loans laundered abroad through corrupt practices is tough to trace as it is mostly laundered through illegal channels, said a former deputy governor of Bangladesh Bank. Zaid Bakht, chairman of state-owned Agrani Bank, said there were incidents of loan money being taken out of the country. This is generally done through over-invoicing, where a borrower opens a letter of credit involving money that is far higher than the amount needed for the import. He also said that loans approved through corruption and bowing to political pressure were difficult to recover (Byron and Ahmed, 2017).

4.5.5 Major Loan Scandals

From 2010-2014, the Hallmark scandal resulted in the embezzlement of Tk. 26 billion from Sonali Bank, the largest state-owned commercial bank of Bangladesh. Later, Tk. 45 billion was embezzled from another state-owned bank Basic Bank during the Bismillah Group Scandal. Adding to the crisis, Janata Bank, another state-owned bank, has lost Tk. 120 billion to loan scams by Crescent Group and Anon Tex Group. Between the years 2010-2015, Janata Bank had lent more than TK. 100 billion without complying with the central bank's single borrower exposure limit criteria. Janata Bank lent about Tk. 55 billion to AnonTex—in clear violation of the Bank Company Act 1991—as it provided 25% of the state-owned bank's capital base (Hassan, 2018). At present, Janata Bank has the most default loans. Five state-owned banks account for almost two-thirds of total default loans in the banking sector mostly because of politically motivated lending and financial crimes, the financial stability report of the Bangladesh Bank said. Again private commercial banks (PCB's) are also given back up from SCB's in times of difficulty. For example, during The then Farmers Bank loan scandals, near the end of 2017, more than Tk 35 billion was siphoned off from the bank. For corruption allegations, depositors started withdrawing money from the bank, prompting the central bank and the government to step in and rescue the bank. Later, four state-owned commercial banks—Sonali Bank, Janata Bank, Agrani Bank, and Rupali Bank—and the Investment Corporation of Bangladesh bailed out the bank, buying its equity shares worth Tk. 7.15 billion (Uddin, 2018). State-owned banks were forced to buy shares of Farmers Bank when they were themselves suffering from a deficit of capital (Mawla, 2018).

The central bank supervises State-owned banks, but the finance ministry controls their boards. The board members are politically appointed and plagued with corruption (Ahmed, 2013). People have seen how reluctant the government is to find why Basic Bank, one of the best performing banks, has fallen and what role its board played in its downfall and seen how unwilling the government was in going after the perceived perpetrators behind the Sonali Bank-Hall-Mark scandals. And yet reforms are not being done in these banks. The government took a lenient view of the crimes being committed in those banks. They now need regular recapitalization. In other words, this means as the

politically strong thieves rob these banks and the taxpayers have to fill up their vaults only to be emptied again (Ahmed, 2013).

This chapter of the study finds that government banks are impeding financial development and suppressing societal savings in Bangladesh. Although financial intermediation is increasing over time in Bangladesh, it is still substantially lower than in other middle-income countries. My findings suggest that the Gerschenkon 'development view' that government banks promote efficient investment in developing countries with ineffective financial systems does not fit the Bangladesh case. Instead, findings are broadly supportive of the political view based on banks' lending culture. The next chapter will deal with the placement of government debt with banks, besides outright government ownership of banks that government borrowing from the banking sector might constrain financial intermediation in Bangladesh.

Chapter 5
Government Borrowing from the Domestic Banking Sector and Private Credit in Bangladesh

5.1 Introduction

This chapter of the study examines whether financial intermediation increases over time in Bangladesh and whether government borrowing from the banking sector generally stimulates financial intermediation or depresses it. Other papers like Emran and Farazi (2009), Hauner (2009), and others document that government borrowing crowds out private credit in developing countries. Kabir and Flath (2020) also find a crowding out of private credit dollar for dollar in developing and developed countries. Majumder (2007) finds there is no crowding-out effect. Rather, the crowding-in effect is evident in Bangladesh.

Government external debt is low with greater reliance on domestic debt in Bangladesh. As the interest rate of the national savings certificate (NSD) is significantly higher than any other interest rate prevailing in the Government securities market, government borrowing is higher through the NSD certificate while the borrowing from the banking sector is decreasing over the periods. The role of government in credit markets is largely visible in Bangladesh. On average, the ratio of credit by domestic money banks to the government and state-owned enterprises as a percent of GDP is close to 18 percent, which is higher than other regions developing and high-income countries.

Banks hold government securities mainly to fulfill regulatory requirements. As per the regulatory norms of the Central Bank, conventional banks must attain a Statutory Liquidity Ratio (SLR) of 13%, and Islamic banks must maintain it at 6%. SLR can be maintained in the form of cash, gold, or debt securities. Thus banks prefer to invest in government securities as they can withdraw funds at any time, and it helps them maintain their SLR requirements. The maximum portion of government securities is in the portfolio of the state-owned banks. State-owned banks have had higher surplus liquid assets. Therefore, to utilize their extra liquidity, banks opted for a secured alternative, i.e., investment in government securities. According to the financial stability department of

Bangladesh Bank, stringent Memorandum of Understanding (MOUs) with central ank accompanied by state-owned banks high non-performing loan (NPLs) might have induced them to focus more on money market instruments rather than expanding loans and advances. Banks' lending behavior might manifest banks laziness or financial repression, or neither. It depends on the government debt placed with banks at market price or below or above market price. If government bonds are placed with the banks at an above-market price—an example of financial repression, a special tax levied on the banks and the implied erosion of bank equity caused by such a tax prompts the banks to reduce their assets, occurring super crowding out of private credit and if government bonds are placed with the bank at a below-market price, then they add to the pecuniary profit of the bank, and the bank managers will tend to dissipate that profit by indulging in nonpecuniary benefits. A bank that holds subsidized government bonds would lazily shrink its total asset portfolio.

A growing economy like Bangladesh needs credit available to the private sector to support businesses and ensure sustainable growth, but unfortunately, state-owned banks have failed to do that. Banks should strive to increase their deposit base and ensure higher credit to the private sector. Although the Government had been relying less on the bank, this trend recently reversed, and the government bank-based budget financing is shown. The yield of government securities is also increasing significantly. Safety and security offered by these securities, along with rising yield, might have induced banks to invest heavily in these instruments. Emran and Farazi (2009) state that the safe return from holding government bonds enables the banks to shirk in their attentiveness to private lending. Kumhof and Evan (2005) also state that domestic banks choose to be highly exposed to government debt and keep more liquid assets in banks portfolio because the alternative, private lending, is riskier under existing legal and institutional imperfections. Again, banks, mainly state-owned banks, have significant capital shortfalls over the years. Category-wise bank data reveal that government-owned banks struggle to maintain the capital adequacy ratios, affecting loans to the private sector. This chapter uses 1995-2017 time-series data of selected variables on Bangladesh to see whether cross-country results of other papers are reflected in the Bangladesh case and compare the Bangladesh data with those of other countries. Here, the preponderance of the evidence is that placing

government debt with banks has had a little measurable effect on bank credit to the private sector. Instead, regulations, credit risk, capital requirements making banks challenged to expand loans to private sectors.

5.2 Data

We use an unbalanced panel data-set for 73 countries. Data are averaged over the entire period of observation, 1995-2017. It includes both high-income countries and developing countries. Of the 73 countries in the dataset, 30 are high-income counties, and 43 are developing countries. Names of variables, descriptions, and sources are reported in Appendix Table 1.

This chapter uses almost the same variables used in the previous chapter 2, which was a cross-country analysis, and will see whether the cross-country regression results are in line with the case of Bangladesh. A brief summary of the main result of that chapter is given below.

5.2.1 Variables for Estimating the Banks Private Credit Equation

The main explanatory variable of interest is ***Government Bonds /GDP***, defined as credit by domestic money banks to government and state-owned enterprises as a percent of GDP. A second main variable of interest is ***Government Bonds/ GDP ÷ Capital/Assets***, government bonds held by banks as a percent of GDP relative to their target capital ratios. Variables related to each country's overall economic development and the development of the financial system, in particular, include the **natural logarithm of per-capita real GDP** and a widely used measure of the quality of institutions—an index of the extent of **'law and order.'** The variable related to the relative efficiency of banks compared to other financial intermediaries is **Deposits/GDP**, defined as the ratio of bank deposits (demand + time + saving) to GDP, expressed as a percent.

The main results show that the hypothesis that government bonds held by banks crowd out private credit by banks, dollar-for-dollar, is not rejected. On average, across the broad spectrum of countries, government bonds placed with banks crowd out bank loans to the private sector approximately dollar-for-dollar. The coefficients on the control variables have the expected signs and are statistically significant in all the regressions. The next part will show what I find in the case of Bangladesh.

5.3 Government Borrowing and Financial Intermediation in Bangladesh

Table 23 shows each variable for Bangladesh and separately for high-income countries and developing countries for 1995-2017. The last three rows represent High-income countries, developing countries, and the whole sample. Data are averaged over the entire period of observation, 1995-2017. It is evident from the table that financial intermediation by banks is substantially less in developing countries than in high-income ones, as shown by the smaller values of ***Loans/ GDP*** and ***Deposits/ GDP***. At the same time, the placement of government bonds with banks relative to GDP—***Govt Bonds /GDP***—is only slightly less in the developing countries than in the high-income ones. Unsurprisingly, developing countries have substantially lower ***Per-Capita Real GDP*** than the high-income countries and worse legal systems, as shown by the ***Law and Order*** **index**. All of the variables show monotonic trends consonant with increasing income per person, with some exceptions: In the high-income countries, bank ***Capital /Assets*** ratios are lower than the developing countries.

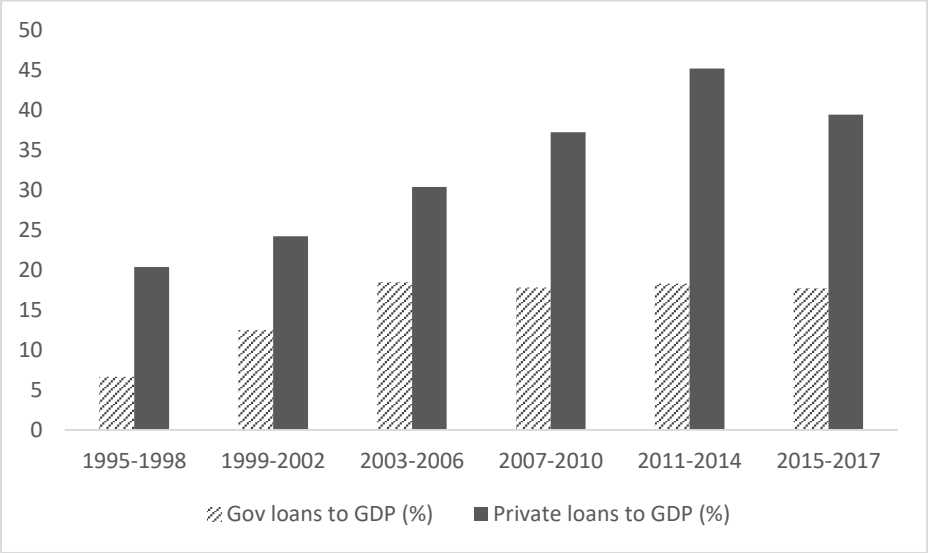
Now comes a brief analysis of the selected variables for Bangladesh in comparison to high-income and developing country groups. The upper rows of the table represent the entire period of observation, 1995-2017 dividing into six periods. The following table presents government borrowing and private credit conditions of the banking sectors in Bangladesh relative to other regions of the world. Definitions of the variables are reported in the appendix. What clearly stands out are the following observations.

First, the role of government in credit markets is largely visible in Bangladesh. On average, the ratio of credit by domestic money banks to the government and to state-owned enterprises as a percent of GDP is close to 18 percent since 2003. This is higher compared to averages ranging between 9.70 and 11.50 percent in other regions developing and high-income countries, respectively. Second, loans provided to the private sector by domestic money banks as a percent of GDP is increasing, and the average ratio is also higher than the total sample and other developing countries sample. Comparing ratios of deposits to GDP and loans to GDP, it exhibits credit growth is much slower than deposit growth, and the average loan to deposits ratio is around 70 percent, lower than the rest of the world. Third, per capita, real GDP is increasing at a reasonable rate though not reflected in the private credit growth, and the average is still far below the

rest of the world. Fourth, on average law and order index is around 2 in our sampling years and far below the rest of the world, indicating bad institutional quality, which has an effect on private credit. Finally, on average, the ratio of bank capital to bank total assets is 5.43 for the time period 2015-2017. This is lower compared to averages ranging between 8.80 and 10.50 in developed and developing countries, respectively. This shows banks have significant capital shortfalls over the years. Category-wise bank data reveal that government-owned banks struggle to maintain the capital adequacy ratios although their other counterpart's foreign and private commercial banks are in line with the capital adequacy.

Table 23: Government borrowing and financial intermediation in Bangladesh

		(1) Gov loans to GDP (%)	(2) Private loans to GDP (%)	(3) Deposits to GDP (%)	(4) Loans to deposits (%)	(5) Per capita real GDP(2010 USD)	(6) Law and order index	(7) Capital to assets (%)
Bangla desh	1995-1998	6.65	20.37	24.13	87.34	463.51	3.00	5.00
	1999-2002	12.49	24.24	32.01	74.94	516.97	2.00	3.85
	2003-2006	18.51	30.41	45.93	66.40	589.45	1.67	3.75
	2007-2010	17.84	37.25	48.26	80.15	714.70	2.50	-
	2011-2014	18.32	45.19	51.53	86.51	862.01	2.00	6.12
	2015-2017	17.74	39.43	56.23	70.12	1054.06	-	5.43
High income countries		11.50	67.40	68.00	99.11	28106.00	4.80	8.80
Developing countries		9.70	36.80	37.40	98.39	3691.00	3.20	10.50
Total		9.22	39.32	40.36	93.41	11032.72	3.71	9.77



Graph 2: Government borrowing and financial intermediation in Bangladesh

Here I tried to find whether the cross country results of our study is in line with the Bangladesh case, but it seems from the table, and figure 2 that the placing of government debt with banks has had a little measurable effect on bank credit to the private sector and that is one limitation of using time series evidence as they cannot precisely measure an effect. To comport with our cross-country results that government bonds crowd out bank lending dollar-for-dollar, we need to see the pricing mechanism of government debt placement with the bank. Is the government debt placed with the banks at market price or below market price or above market price? Due to data unavailability, this is beyond the area of my current study.

5.3.1 Government Borrowing and its Consequences

The following table shows government financing conditions in Bangladesh. Government total financing need has been reduced, and significant shifts from external financing to domestic financing have occurred. External financing is low with greater reliance on domestic financing. As the interest rate of the national savings certificate (NSD) is significantly higher than any other interest rate prevailing in the government securities market, government borrowing is higher through the NSD certificate while the borrowing from the banking sector is decreasing over the periods. The share of

government credit from the banking sector has risen significantly over 2011– 2014, then dropped significantly and again rising in recent time.

Table 24: Government borrowing (as% of GDP)

	1991	2000	2011	2012	2013	2014	2015	2016	2017	2018	2019
Financing of overall budget deficit	5.5	5.3	3.6	3.2	3.3	3.1	3.7	3.7	3.4	4.6	4.8
a)Net foreign financing	5.0	2.5	0.3	0.3	0.5	0.2	0.3	0.7	0.6	1.1	1.7
b)Net domestic financing(i+ii)	0.6	2.8	3.3	2.9	2.8	2.8	3.4	2.9	2.8	3.5	3.1
i)Bank borrowings	0.2	1.5	2.7	2.6	2.3	1.4	0.03	0.6	-0.4	0.5	1.2
ii)Non-bank borrowings	0.4	1.4	0.6	0.3	0.5	1.5	3.3	2.3	3.3	3.0	1.9

(Source: Bangladesh Bank website)

According to Bangladesh Banks report, in 2015-2019, the banking industry increased its exposure to government and other securities, mostly government securities. However, loans and advances remained the dominant asset type. In 2019 investment in government securities increased by around 44.3 percent compared to the previous year. Government borrowing from savings certificates and bonds decreased recently due to a 10 percent tax slapped on the profits. This is forcing the government to borrow more from banks as an alternative. The government exceeded its annual limit for bank borrowing in the fiscal year 2019 (Uddin, 2019).

On the implication of excessive government reliance on domestic financing and its likely impact on private sector credit, such reliance in a low-growth environment could crowd out credit to the private sector, put pressure on domestic interest rates, worsen fiscal positions, and further slow the recovery (IMF REOMCD, 2012). So, it is important to understand how 'crowding out' is demonstrated. Crowding out may impact the economy firstly via an interest rate channel where additional government borrowing is likely to push up term interest rates, making it more expensive for other borrowers to obtain private credit and thereby crowding them out of the market. Secondly, if

government assets are funded by sight deposits (or short-term wholesale market borrowing), there may be a maturity mismatch which limits the banks' appetite for additional long-term assets like private credit. Banking supervisors usually set maturity mismatch limits, restricting commercial banks' ability to engage in liquidity transformation. Even if they did not do so, prudent treasury management at commercial banks would still limit this activity (Gray, 2014). For the Bangladesh case, the interest rate channel is not working as there is no evidence that government borrowing from the bank pushes the interest rate. But for the possibility of maturity mismatch, around 70% of banks' deposits are within the 1-year bucket. Therefore, funding long-term assets with short-term liabilities creates a maturity mismatch in the banking sector.

5.3.2 Banks Preferences to Hold Government Securities

Banks hold government securities mostly to fulfill regulatory requirements. As per the regulatory norms of the Central Bank, conventional banks must attain a statutory liquidity ratio (SLR) of 13%, and Islamic banks must maintain it at 6%. Thus banks prefer to invest in government securities as they can withdraw funds at any time, and it helps them maintain their SLR requirements. Banks tend to hold securities under the held-to-maturity (HTM) portfolio. As per Central Bank primary dealer (PD), banks are allowed to maintain government securities in HTM up to 125% (Non-PD-110 %) against the SLR requirement of their holding. As a result, to avoid revaluation loss, they maintain the maximum of their holdings in HTM, which they cannot trade in the secondary market. Moreover, the maximum portion of government securities is in the portfolio of the state-owned banks. But, their contribution to the secondary trading of government securities is insignificant (BB CFDBM, 2019). As already stated before that state-owned commercial banks have the highest surplus liquid assets among all banks. This is because government securities are all counted as liquid assets, and SCB's holding of government debts increases their ratio of liquid assets to total assets.

We also see in Table 23 that the loan to deposit ratio is very low in Bangladesh compared to other income group countries. According to Bangladesh Bank data, recent loan and deposit growth show that even with higher deposit growth from 9.8% in 2018 to 12.4% in 2019, the loan growth is only 11.9% in 2019 from 14.1% in 2018. It indicates

banks are taking a cautious stance. It seemed that the legacy of high non-performing loans made them cautious in lending. Therefore, to utilize the bank's extra liquidity, banks opted for a secured alternative, i.e., investment in government securities. Among different categories of banks, specialized banks and private commercial banks had higher shares of loans and advances (80.3 and 72.4 percent respectively), while the state-owned commercial banks possessed the lowest proportion (51.1 percent) in their asset mix.

The next chapter gives concluding remarks of the dissertation and proposes policy implications accordingly.

Chapter 6
Concluding Remarks

6.1 Conclusion

This study examines whether government actions such as government borrowing from the banking sector and government ownership of banks generally stimulate financial intermediation or depress it.

At first, we deal with the possible crowding out of private credit by government borrowing from the domestic banking sector and its adverse effects on private investment, which are widely discussed in the economic development literature. We propose new cross-country estimates of the crowding out of bank loans to the private sector caused by government borrowing from banks. The estimates cannot reject the hypothesis that government borrowing from domestic banks, on average, crowds out the banks' credit to the private sector, dollar-for-dollar. This holds for developing countries and high-income countries.

Concern about the possible adverse effects of excessive government borrowing from domestic banks in developing countries has congealed around the 'lazy bank' thesis. This is the notion that government borrowing from banks may weaken the incentives of the banks to properly attend to their private-sector lending. One contribution of this paper has been to clarify the precise logic underlying the lazy bank thesis. We have argued that it reprises the Alchian and Kessel (1962) claim that regulated firms face an implicit or *de facto* maximum profit constraint. Suppose the pecuniary profit of such a regulated firm threatens to become too large. In that case, the managers of the firm will have an enhanced incentive to wastefully divert the pecuniary profit to nonpecuniary emoluments that they value less than the cost. If government bonds are placed with private, regulated banks at below-market prices and so entail a subsidy, they boost the pecuniary profit of the banks and so will trigger such an effect. This is the essence of the lazy bank thesis.

Here, we have adopted the view that each bank has a target capital ratio—a ratio of equity to assets at risk that attains a minimum cost of capital to the bank, unrelated to the composition of its assets. In this view, government bonds that are placed with banks

at market prices have no effect on bank equity and so would displace bank loans to the private sector, dollar-for-dollar. Our estimates are consistent with this situation. The lazy bank behavior would manifest itself only if government bonds were placed with banks at below- (or above-) market prices, and so affect the bank equity and alter the incentive to divert pecuniary profit to nonpecuniary emoluments.

The study highlights an issue that has not been fully studied, how bank loan behavior responds to government subsidy. This paper finds that banks behave as though the government bonds they hold have no positive or negative effect on their equity. This is based on a straightforward model in which each bank adjusts its asset portfolio to maintain a constant capital ratio. If government bonds crowd out dollar-for-dollar the private loans of banks that maintain constant target capital ratios, then the banks are behaving as though the government bonds they hold entail neither a subsidy nor a tax. And that is precisely what we found.

Chapter 3 deals with the effect of government bank ownership on the overall extent of financial intermediation. La Porta et al. (2002) and other scholars have added evidence supporting their finding that government bank loans in lower-income countries are not funding socially beneficial investments. They contrast the Gerschenkron (1962) 'development view' that government banks can overcome market failure and promote investment and industrialization in economically backward countries that would otherwise be doomed to perpetual stagnation, and the 'political view' that government banks serve corrupt political interests. Their findings generally favor the political view. Dinç (2005) shows that government-owned banks increase their lending during election years compared to lending by private banks. Micco et al.(2007) find that government-owned banks in low-income countries have higher costs and lower profits than privately-owned banks and that these effects are more pronounced during election years. Barry et al.(2016) find that countries in which more banks are government-owned are more prone to corruption in lending, as identified by survey responses from private business owners. Our study, too, finds that government banks in lower-income countries are impeding financial development and suppressing societal savings.

One contribution of this paper has been to propose and estimate a new measure of financial development rooted in the logic of economics. Its basic premise is that societal saving on a large scale requires financial intermediation. The gap between actual domestic

saving rates of lower-income countries and the saving rates that they would have if their financial systems were developed (based on prediction out of sample from a regression estimated for higher-income countries), is the nub of our measure of financial development. We calculate this measure—which we dubbed 'saving efficiency'—and show that it tends to be a bit smaller in lower-income countries whose banking industries are more dominated by government banks.

In chapter 4, the study tries to find whether the cross-country results are reflected in the Bangladesh case. La Porta et al. (2002) contrast the Gerschenkron (1962) 'development view' that government banks can overcome market failure and promote investment and industrialization in economically backward countries that would otherwise be doomed to perpetual stagnation, and the 'political view' that government banks serve corrupt political interests. Their findings generally favor the political view. In Bangladesh, politicians often use government-owned banks to finance commercially unviable government projects or state-owned enterprises (Hussain, 2020). The dominance of government-owned banks and politically connected private banks and the reluctance to resolve the weak banks among them result in inefficiencies in the financial system in Bangladesh (Beck and Rahman, 2006). Economies with a higher share of government-owned banks experience lower levels of financial development, more concentrated lending, and lower economic growth and are more likely to suffer systemic fragility (Barth et al., 2004). This study, too, finds that government banks are impeding financial development and suppressing societal savings in a lower-middle-income country—Bangladesh. Although financial intermediation is increasing over time in Bangladesh, it is still substantially lower than in other middle-income countries. My findings suggest that the Gerschenkon 'development view' that government banks promote efficient investment in developing countries with ineffective financial systems does not fit the Bangladesh case. Rather, my findings are broadly supportive of the political view based on banks' lending culture.

In Bangladesh, among six state-owned banks, three of the banks belong to the "red zone" (lenders with worst performance) because of their irregularities. Two other state-owned banks have also entered into the yellow zone (between the red and the green zones) as their financial health worsened significantly in recent times (Uddin, 2018). The

recent rising trends of non-performing loans (NPLs) for SCB's are a major concern for policymakers and the stakeholders. There are concerns that the reported NPLs are underestimated considering significant under-provisioning, regulatory forbearance, and legal loopholes, according to World Bank, Bangladesh Development Update. Loan scandals of five state-owned banks account for almost two-thirds of total default loans in the banking sector, mainly because of politically motivated lending and financial crimes. State-owned banks (SCB's) are unable to maintain required loan loss provisions, and due to that, the bank's net profit is also declining. SCB's loan disbursement trend indicates that they do not have a sound lending policy and their loan growth went down significantly in the recent year. Deposits mobilizations are limited too. All of the government banks are suffering from a deficit of capital. "Every year, the government has been providing capital to these banks from the national budget. Every time the government takes such initiatives, the organizations are encouraged to be more corrupt and incompetent, said the former Bangladesh Bank Governor Saleh Uddin Ahmed (Mawla, 2018). Over the years, directives for preferential lending have been replaced by lists of favored and discouraged subsectors, and that lending legacy is continuing till now, indicating most of the lending activities of SCB's are not socially desirable rather politically motivated and socially harmful. There is an explicit guarantee for SCB's that governments would eventually step in during the time of the problem. It is often linked with an implicit guarantee for privately-owned banks. All of the evidence presented in the paper indicates SCB's inefficiency, although they fund some government projects which are socially desirable public goods. It is high time to think are they increasing benefits or costs in the society and to take lessons from other countries like India where government banks are performing efficiently. "In India, state-owned banks provide money to the government. But in our country, we are providing capital to them," said independent MP Rustam Ali Farazi. He also remarked that people are afraid to deposit money in banks. Even though people come to banks for security, they now have to take risks when banks launder money (bdnews24.com, 2018). Thousands of millions of taka have been laundered from the banking sector, but instead of taking action against bank plunderers, the finance minister has protected the bank owners (Uddin, 2018).

Besides outright government ownership of banks, this study also tries to find whether government borrowing from banks constrains financial intermediation in Bangladesh. The study tries to see whether the cross-country results of crowding out of private credit are in line with the Bangladesh case. As for the Bangladesh case, the government is largely dependent on domestic financing. On average, credit by domestic money banks to the government and to state-owned enterprises as a percent of GDP is higher compared to other income group countries. Banks tend to hold government securities under the Held-to-Maturity portfolio to fulfill the bank's SLR requirements. The maximum portion of government Securities is in the portfolio of the SCBs, and they hold these securities in excess of SLR requirements resulting in SCB's higher surplus liquid assets. Besides government dependency on banks, SCB's high non-performing loans (NPLs) might have induced them to focus more on government securities. Again banks have significant capital shortfalls over the years. SCBs especially struggle to maintain the capital adequacy ratios, which has an effect on loans to the private sector also. Here, the preponderance of the evidence is that the placing of government debt with banks has had a little measurable effect on bank credit to the private sector. Bank regulations, credit risk, capital requirements making banks challenged to expand loans to private sectors.

6.2 Policy Implication

The model of bank asset-holding presented in chapter 2 may have application beyond the analysis of the effects of government bonds on bank balance sheets. The Federal Reserve System, the Bank of Japan, and the European Central Bank have all now set interest rates to pay on commercial bank excess reserves. By adjusting that rate, a central bank affects either a subsidy or a tax on the portion of commercial bank assets held as excess reserves. If the interest rate is negative, as it has been in the US and Japan, it is a tax on bank reserves. One effect on bank loan behavior of changes in the interest rate on excess reserves occurs because of the changes in bank equity such interest rate adjustments induce. That is the same channel by which government bonds held by banks can affect their loan behavior as modeled here.

Our model, in which banks have optimal capital ratios that influence their asset-holding, can be applied to analyze the effects on bank behavior of changes in the interest rate on reserves. Ours is perhaps the simplest model for representing such a channel of

central bank monetary control, and variants of it have already appeared in the literature. For example, Gertler and Kiyotaki (2010) advance an argument in which banks have optimal capital ratios because increased bank equity weakens the price to bank managers of diverting funds, which raises the cost of external funds and constrains bank lending. Bank profits replace external funds and relax this constraint. Eggertsson et al. (2017) develop this model still further, in a New-Keynesian model of a macroeconomy, and show that lower bank profits increase banks' financing costs, thereby reducing credit supply. Gambacorta and Shin (2018) show that for a sample of major international banks in high-income countries, bank assets do indeed move in proportion to the market value of bank equity. We found that for a broad cross-section of countries, including both high-income and developing countries, aggregate bank assets at risk are little affected by the banks' holdings of government bonds. The most straightforward interpretation is that the bonds neither add much to the banks' equity nor subtract from it.

Financial development measured by the 'savings efficiency' variable has been increasing over time in Bangladesh, while government ownership of banks has been decreasing. Private commercial banks (PCB's) are playing a significant role in financial intermediation, and they are leading the banking sector in Bangladesh. One of the important reasons for the better performance of PCBs is the imposition of effective supervision of the central bank on them. Since 2009, both the on-site and off-site supervision of Bangladesh Bank has been strengthened and upgraded along with an intensive capacity development program. All these measures have ultimately reflected in the better performances of PCB's. On the other hand, SCB's condition is deteriorating over the years, and it should be a matter of concern for the policymakers. At present, Central Bank's monitoring power over the government banks is almost nonexistent (Hossain, 2019). Without the turnaround of government banks, overall efficiency in the banking system cannot be achieved. For this resolution, along with the strict application of internal corporate governance of government banks, ensuring effective supervision of government banks by the central bank of Bangladesh is a necessity otherwise, the government should stop recapitalizing the government banks as it has not brought any improvement in their financial health and should aim for continuing retrenchment of government banks.

6.3 Possible Limitations and Suggestions for Future Work

Finally, we hasten to note some limitations of our analysis that may suggest avenues for further exploration. First, in chapter 3, our classification of countries according to the World Bank designation of 'low income' or not in 2019 is a criterion used in the study to divide our sample. To conserve degrees of freedom, we adopted the premise that countries belong to either of two categories: having attained complete financial development and the other not. We include high-income and upper-middle-income countries in one category and lower-middle-income countries and low-income countries in the other category. But financial development, however may not be necessarily monotonically related to per-capita income.

Second, our inferences assume the validity of using out-of-sample predictions from the regression estimates for the higher income sample to simulate the effect of financial development on the saving rates of the low-income countries. The model we estimated is a simplified representation of a complete model with too many parameters to estimate. By assuming all 'high income' countries have fully developed financial systems, we could construct the saving efficiency parameter without knowing how saving itself interacts with the financial development variables. But in a completely articulated model, saving interacts with financial development for all the countries, including the high-income ones. Then the saving equation and saving efficiency equation has to be estimated jointly to take account of these interactions. With more degrees of freedom, it might become possible to estimate a complete model in which some of the parameters to estimate are interactive terms in the saving equation in which financial development variables are multiplied by life-cycle variables.

Third, the implication of excessive reliance on domestic financing and its likely impact on private sector credit could crowd out credit to the private sector. However, the study fails to measure the effect of government debt on private credit based on the time series evidence for the Bangladesh case. Further time series analysis is required when considerable data will be available.

Finally, this study only compares the data of Bangladesh with the cross-country results. There is more scope for future work to see the other South Asian countries' findings.

References

Adam, Christopher. S. & David, L. Bevan. (2005). Fiscal deficits and growth in developing countries. *Journal of Public Economics*, 89, 571-597.

Agrani Bank Annual Report. Various issues.

Ahmed, I. (2013, October 04). Fix what needs to be fixed. *The Daily Star.* Retrieved from https://www.thedailystar.net/

Alchian, Armen. A. & Kessel, Reuben. A. (1962). Competition, monopoly, and the pursuit of pecuniary gain. *National Bureau of Economic Research, Aspects of Labor Economics*, Princeton, NJ: Princeton University Press, 157-183.

Bangladesh Bank Annual Report. Various issues. Retrieved from https://www.bb.org.bd/

Bangladesh Bank Quarterly, Various issues. Retrieved from https://www.bb.org.bd/

Bangladesh Bank. (2019).Comprehensive framework of the development of the bond market in Bangladesh.

Barth, J., Caprio, G., & Levine, R. (2004). Bank regulation and supervision: what works best? *Journal of Financial Intermediation*, 13, 205-48.

Barry, Thierno Amadou., Lepetita, Laetitia., & Strobel, Frank. (2016). Bank ownership structure, lending corruption and the regulatory environment. *Journal of Comparative Economics*, 44(3), 732-751.

Basic Bank Annual Report. Various issues.

Beck, T. & Rahman, H. (2006).Creating a more efficient financial system: challenges for Bangladesh. World Bank Policy Research Working Paper, No. 3938.

Byron, R. & Ahmed, R. (2017, July 16). Public bank scams: Problems left to persist. *The Daily Star.* Retrieved from https://www.thedailystar.net/

Caballero, R. & Krishnamurthy, A. (2004). Fiscal policy and financial depth. NBER Working Paper 10532.

Cihák, Martin., Demirgüç-Kunt, Asli., Feyen, Erik & Levine, Ross. (2013a). Measuring financial development. VoxEU.org.

Cihák, Martin., Demirgüç-Kunt, Asli., Feyen, Erik & Levine, Ross. (2013b). Financial development in 205 economies, 1960 to 2010. NBER Working Paper no. 18946.

Deaton, Angus. (1989). Saving in developing countries: Theory and review. *World Bank Economic Review* (Proceedings of the World Bank Annual Conference on Development Economics), 3(1), 61-96

Dinç, Serdar. (2005). Politicians and banks: Political influences on government-owned banks in emerging markets. *Journal of Financial Economics*, 77, 453–479.

Eggertsson, Gauti. B., & Juelsrud, Ragnar. E., & Wold, Ella. Getz. (2017).Are negative nominal interest rates expansionary? NBER Working Paper 24039.

Emran, M.S. & Farazi, S. (2009). Lazy banks? Government borrowing and private credit in developing countries. Institute for International Economic Policy Working Paper 2009-9.

Exley, C.J. & Smith, A.D. (2006). The cost of capital for financial firms. Presented to the Institute of Actuaries.

Financial Stability report. (2019). Bangladesh Bank. Issue 10, 277-280.

Gambacorta, L. & Shin, H.S. (2018). Why bank capital matters for monetary policy. *Journal of Financial Intermediation,* 35, 17-29.

Gerschenkron, Alexander. (1962). *Economic backwardness in historical perspective*. Harvard University Press, Cambridge, MA.

Gertler, M. & Kiyotaki, N. (2010). Financial intermediation and credit policy in business cycle analysis. *Handbook of monetary economics*, 3(3), 547-599.

Gray, S., & Karam, P., & Turk, R. (2014). Are banks really lazy? Evidence from Middle East and North Africa. IMF Working Paper 86.

Gropp, R. & Heider, F. (2008). The determinants of bank capital structure. *Center for European Research*, 8(15).

Hassan, M. (2018, October 14). Janata Bank plagued by bad loans, capital shortfall, huge losses. *Dhaka Tribune*. Retrieved from https://www.dhakatribune.com

Hassan, M. (2019, January 02). Loan scams, soaring NPLs, bank owners increasing clout hurt banking sector. *Dhaka Tribune*. Retrieved from https://www.dhakatribune.com

Hauner, D. (2009). Public debt and financial development. *Journal of Development Economics*, 88, 171-183.

Hicks, J. R. (1935). Annual survey of economic theory: the theory of monopoly. *Econometrica*, 3(1), 1-20.

Holmström, B. & Tirole, J. (1997). Financial intermediation, loanable funds, and the real sector. *Quarterly Journal of Economics,* 112, 663-691.

Horioka, Charles Yuji & Terada-Hagiwara, Akiko. (2012). The determinants and long-term projections of saving rates in Developing Asia. *Japan and the World Economy*, 24, 128–137.

Hossain, S. (2019, February 3). Janata bad loans up by Tk 2,868cr in 3 months. NEWAGE. Retrieved from https://www.newagebd.net/

Hussain, Zahid. (2020, February 18).Financial inclusivity and the banking sector. *The Daily Star.* Retrieved from https://www.thedailystar.net/

Hussein, K. and Thirwall, A. P. (1999). Explaining differences in the domestic saving ratio across countries: A panel data study. *Journal of Development Studies*, 36(1), 31–52.

International Monetary Fund. (1990) Banks in distress: The case of Bangladesh. Retrieved from https://www.elibrary.imf.org

International Monetary Fund. (2012). Regional economic outlook update, "Middle East and North Africa: Historic transitions under strain", Middle East and Central Asia, economic and financial Surveys.

Islam, M., Siddiqui, M. H., Hossain, K. F., & Karim, L. (2014). Performance evaluation of the banking sector in Bangladesh: A comparative analysis. *Business and Economic Research*, 4(1), 70–107.

Ito, Hiroyuki & Kawai, Masahiro. (2018). Quantity and quality measures of financial development: Implications for macroeconomic performance. *Public Policy Review* (Policy Research Institute, Ministry of Finance, Japan), 14(5), 803-834.

Janata Bank Annual Report. Various issues.

Kabir, Rania. & Flath, David. (2020). Crowding out of private credit caused by government borrowing from the domestic banking sector: New cross-country estimates and a novel interpretation. *Social System Studies*, 41, 183-208.

Kabir, Rania. & Flath, David. (2020). Government banks and financial development. *International Journal of Economic Policy Studies*

La Porta, Rafael., Lopez-de-Silanes, Florencio & Shleifer, Andrei. (2002). Government ownership of banks. *The Journal of Finance*, 57 (1), 265-301.

Li, Hongbin., Zhang, Jie & Zhang, Junsen. (2007). Effects of longevity and dependency rates on saving and growth: Evidence from a panel of cross countries. *Journal of Development Economics*, 84, 138–154.

Kumhof, M. & Evan, T. E. (2005). Government debt: a key role in financial intermediation. IMF Working Paper 57.

Mawla, Golam. (2018, December 3). How much trouble is the country's banking sector in? *Dhaka Tribune.* Retrieved from https://www.dhakatribune.com/

Majumder, A. M. (2007). Does public borrowing crowd-out private investment? The Bangladesh evidence. Policy Analysis Unit, Working Paper, No.0708

Micco, Alejandro., Panizza, Ugo & Yañez , Monica. (2007). Bank ownership and performance. Does politics matter? *Journal of Banking & Finance*, 31(1), 219-241.

Modigliani, Franco. (1986). Life cycle, individual thrift, and the wealth of nations. *American Economic Review*, 76(3), 297-313.

Miller, M. (1994). Do the M&M propositions apply to banks? *Journal of Banking and Finance*, 19, 483-489.

Modigliani, F. & Miller, M. (1958). The cost of capital, corporation finance and the theory of investment. *American Economic Review*, 48 (3), 261-297.

Modigliani, F. & Miller, M. (1963). Corporate income taxes and the cost of capital: a correction. *American Economic Review*, 53 (3), 433-443.

Parliament Correspondent. (2018, June 10). Muhith under fire over loan scandals in banking sector. *bdnews24.com.* Retrieved from https://bdnews24.com/

Rosenzweig, M. R. (2001). Savings behavior in low-income countries. *Oxford Review of Economic Policy*, 17 (1), 40-54.

Rupali Bank Annual Report. Various issues.

Samuelson, Paul A. (1958). An exact consumption-loan model of interest with or without the social contrivance of money. *Journal of Political Economy*, 66(6), 467-482.

Shah, H. Syed. (2016). Capital market development in Bangladesh a sector reform perspective. ADB South Asia Working Paper, No. 48.

Sonali Bank Annual Report. Various issues.

Staff Correspondent. (2011, June 11). Why silent on troubled banks? MPs slam Muhith for keeping mum on scams, irregularities in banking sector; some allege proposed budget favours 'bank looters'. *The Daily Star.* Retrieved from https://www.thedailystar.net/

Uddin, Zamir. A. (2018, June 15). State Banks sit with most default loans. *The Daily Star.* Retrieved from https://www.thedailystar.net/

Uddin, Zamir. A. (2018, September 23). Seven banks in 'red zone'. *The Daily Star.* Retrieved from https://www.thedailystar.net/

Uddin, Zamir. A. (2018, December 24). Farmers Bank to take new name amid image crisis

Troubled bank seeks a fresh start. *The Daily Star.* Retrieved from https://www.thedailystar.net/

Uddin, Zamir. A. (2019, December 03). Govt's aggressive bank borrowing: Private sector may face credit crunch. *The Daily Star.* Retrieved from https://www.thedailystar.net/

Wang, Pengfei., Xu, Lifang & Xu, Zhiwei. (2015). Financial development and the aggregate savings rates: A hump-shaped relationship. Unpublished manuscript.

Wikipedia. *Financial system in Bangladesh.* Retrieved from https://en.wikipedia.org/wiki/

Yeyati, L. Eduardo., & Micco, Alejandro., & Panizza. Ugo. (2004). Should the government be in the banking business? The role of state-owned and development banks. Inter-American Development Bank, Working Paper, No. 517.

Appendix.

Table A1. Variable names, descriptions, and sources

Variables	Description	Source
Loans/ GDP	The financial resources provided to the private sector by domestic money banks as a percent of GDP. Domestic money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits.	WDI
Govt Bonds/ GDP	Credit by domestic money banks to the government and to state-owned enterprises as a percent of GDP.	GFDD
Capital/ Assets	Ratio of bank capital to bank total assets, expressed as a percent. Capital includes funds contributed by owners, retained earnings, and general and special reserves and provisions.	GFDD
Per-capita Real GDP	Natural logarithm of per capita Gross Domestic Product (constant 2010 US$).	WDI
Deposits/ GDP	Demand, time and saving deposits as a percent of GDP.	GFDD
Law and Order	Law and order are assessed separately, with each sub-component comprising zero to three points. The law sub-component is an assessment of the strength and impartiality of the legal system, while the order subcomponent is an assessment of popular observance of the law. The index varies from 0 to 6 and higher values represent better judicial systems.	International Country Risk Guide
Government banks, share of banking system	Fraction of banking system equity that is government-owned	LaPorta et alia (2002): 1970: (GB70) 1995: (GB95)
	Fraction of banking system's assets in banks that are 50% or more government owned	BSS (1999, 2001, 2005, 2008, 2009, 2010).
Savings efficiency	Ratio of the actual savings rate relative to predicted saving rate	Authors calculation
Foreign loans and deposits of banks relative to total bank deposits	External loans and deposits of reporting banks vis-à-vis all sectors (% of domestic bank deposits)	FDI
Financial system deposits relative to GDP	Demand, time and saving deposits in deposit money banks and other financial institutions*** as a share of GDP	FDI
Bank credits relative to bank deposits	The financial resources provided to the private sector* by domestic money banks** (% of domestic bank deposits)	FDI
Age dependency ratio, old % of working age population	Ratio of people older than 64 to those ages 15-64.	WDI

Age dependency ratio, young % of working age population	Ratio of people younger than 15 to those ages 15-64.	WDI
Real GDP annual growth rate	Annual percentage growth rate of GDP based on constant local currency	WDI
Gross domestic saving relative to GDP	GDP less final consumption expenditure (total consumption) to GDP	WDI

Note: acronyms referring to World Bank datasets: World development indicators, WDI; The Global Financial Development Database, GFDD; Financial development indicators, FDI; and Banking supervision survey, BSS.

* Financial resources provided to the private sector by domestic money banks (bank credits to the private sector) refer to loans, purchases of non-equity securities, and trade credits and other accounts receivable that establish a claim for repayment.
** Domestic money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits.
*** The financial sector (banks and other financial institutions) includes the monetary authorities (the central bank) and deposit money banks, as well as other financial corporations where data are available (including corporations that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange companies.

Table A2. Unbalanced panel dataset.

High-income countries (30)

Country	Income group	1995-99	2000-04	2005-09	2010-14
Argentina	1	ARG	ARG	ARG	ARG
Australia	1	AUS	AUS	AUS	AUS
Brunei Darussalam	1			BRN	BRN
Canada	1	CAN	CAN	CAN	
Switzerland	1	CHE	CHE	CHE	CHE
Chile	1	CHL	CHL	CHL	CHL
Czech Republic	1	CZE	CZE	CZE	
Denmark	1	DNK	DNK		
Estonia	1	EST	EST		
Hong Kong SAR, China	1	HKG	HKG	HKG	HKG
Croatia	1	HRV	HRV	HRV	HRV
Hungary	1	HUN	HUN	HUN	
Iceland	1	ISL	ISL	ISL	ISL
Israel	1	ISR	ISR	ISR	ISR
Japan	1	JPN	JPN	JPN	JPN
Korea, Rep.	1	KOR	KOR	KOR	KOR
Kuwait	1	KWT	KWT	KWT	KWT
Lithuania	1	LTU	LTU	LTU	
Latvia	1	LVA	LVA	LVA	
Norway	1	NOR	NOR	NOR	
New Zealand	1			NZL	NZL
Oman	1		OMN	OMN	OMN
Poland	1	POL	POL	POL	
Russian Federation	1	RUS	RUS	RUS	RUS
Singapore	1	SGP	SGP	SGP	SGP
Slovak Republic	1	SVK	SVK	SVK	
Sweden	1		SWE	SWE	
Uruguay	1	URY	URY	URY	URY
United States	1	USA	USA	USA	USA
Venezuela, RB	1	VEN	VEN	VEN	VEN

Table A2. (cont'd)

Developing countries (43)
(Income group 2= 'low income,' and Income group 3= 'middle income' as defined by the World Bank. Here, both are categorized as developing countries)

Country	Income group	1995-99	2000-04	2005-09	2010-14
Albania	2		ALB	ALB	ALB
Armenia	2	ARM	ARM	ARM	ARM
Azerbaijan	2			AZE	AZE
Bangladesh	2	BGD	BGD		BGD
Bulgaria	2	BGR	BGR	BGR	
Belarus	2		BLR	BLR	BLR
Bolivia	2	BOL	BOL	BOL	BOL
Brazil	2	BRA	BRA	BRA	BRA
China	2	CHN	CHN	CHN	CHN
Colombia	2	COL	COL	COL	COL
Costa Rica	2	CRI	CRI	CRI	CRI
Dominican Republic	2	DOM	DOM	DOM	DOM
Algeria	2			DZA	DZA
Ecuador	2	ECU	ECU	ECU	
Egypt, Arab Rep.	2	EGY	EGY	EGY	EGY
Gabon	2		GAB	GAB	
Guatemala	2		GTM	GTM	GTM
Honduras	2	HND	HND	HND	HND
Indonesia	2		IDN	IDN	IDN
India	2	IND	IND	IND	IND
Jordan	2	JOR	JOR	JOR	JOR
Kenya	2	KEN	KEN	KEN	KEN
Morocco	2	MAR	MAR	MAR	
Moldova	2		MDA	MDA	MDA
Mexico	2	MEX	MEX	MEX	MEX
Mozambique	3		MOZ	MOZ	MOZ
Malaysia	2	MYS	MYS	MYS	MYS
Namibia	2		NAM	NAM	NAM
Nigeria	2	NGA	NGA	NGA	NGA
Panama	2		PAN	PAN	
Peru	2	PER	PER	PER	PER
Philippines	2	PHL	PHL	PHL	PHL
Paraguay	2	PRY	PRY	PRY	PRY
Romania	2		ROM	ROM	ROM
Sierra Leone	3		SLE	SLE	SLE
Serbia	2		SRB	SRB	SRB
Thailand	2	THA	THA	THA	THA
Tanzania	3	TZA			TZA
Uganda	3	UGA	UGA	UGA	UGA
Ukraine	2	UKR	UKR	UKR	UKR
Vietnam	2			VNM	VNM
Yemen, Rep.	2			YEM	YEM
South Africa	2	ZAF	ZAF	ZAF	ZAF

Table A3. Saving and saving efficiency.

		Saving: S_{it}^{*}					Saving efficiency: $\hat{\gamma}_{it}$		
Country	I.D.	1970s	1980s	1990s	2000s	2010s	1990s	2000s	2010s
HIGH INCOME									
United Arab Emirate	ARE				33.3	51.3		0.95	1.45
Australia	AUS	28.8	25.5	24.3	25.1	25.7	0.97	1.00	1.10
Austria	AUT	28.5	24.5	25.6	27.4	27.3	1.07	1.20	1.26
Belgium	BEL	27.3	20.8	25.1	26.5	24.7	1.11	1.24	1.21
Canada	CAN	23.3	23.7	21.1	24.9	21.9	0.85	1.01	
Switzerland	CHE	33.3	30.5	30.2	32.2	34.7	1.33	1.39	1.56
Chile	CHL	13.7	19.5	25.7	28.6	25.0	0.92	1.06	0.94
Czech Republic	CZE			29.3	30.9	32.0	1.31	1.17	1.40
Germany	DEU	23.6	20.8	24.2	24.6	26.5	1.02	1.18	1.30
Denmark	DNK	22.8	22.0	25.8	27.7	26.9	1.10	1.28	1.33
Spain	ESP	25.0	21.4	21.8	24.7	22.6	0.90	1.03	1.09
Finland	FIN	30.5	29.1	26.5	29.3	21.7	1.15	1.30	1.13
France	FRA	27.0	22.0	22.6	22.9	21.7	1.01	1.08	1.12
United Kingdom	GBR	13.8	14.1	15.6	15.2	15.1			
Greece	GRC	27.8	20.5	15.4	14.2	9.9	0.65	0.62	0.58
Croatia	HRV			13.0	20.8	21.5	0.51	0.89	1.05
Hungary	HUN			21.5	24.0	28.8	0.94	1.00	1.24
Ireland	IRL	14.4	17.8	29.1	37.8	45.3	1.06	1.41	1.66
Iceland	ISL	29.2	24.2	21.2	20.5	24.6	0.92	0.82	1.02
Israel	ISR	12.7	13.8	18.9	20.1	21.8	0.76	0.87	0.96
Italy	ITA	24.8	22.4	22.4	21.3	19.7	0.98	1.06	1.11
Japan	JPN	37.0	33.3	32.2	26.0	22.6	1.34	1.29	1.41
Korea, Rep.	KOR	22.6	33.3	38.0	33.8	35.1	1.18	1.13	1.26
Kuwait	KWT	59.4	33.1	9.9	44.1	47.7	0.31	1.36	1.56
Lithuania	LTU			12.5	15.2	19.8	0.48	0.60	0.85
Luxembourg	LUX	37.5	32.0	41.3	47.6	51.8	1.57	1.95	2.06
Latvia	LVA			12.0	19.2	21.2	0.49	0.75	0.97
Netherlands	NLD	27.7	26.3	28.5	29.0	29.7	1.11	1.24	1.41
Norway	NOR	31.5	32.8	30.2	37.6	35.4	1.32	1.70	1.63
New Zealand	NZL	22.9	23.9	23.5	24.5	23.3	0.98	1.01	1.00
Oman	OMN	50.6	40.4	25.0	45.6	42.6	1.06	1.67	1.36
Panama	PAN	30.4	20.5	22.1	25.1	35.7	0.84	0.92	1.27
Poland	POL			20.5	18.3	22.0	0.81	0.68	0.86
Portugal	PRT	19.1	19.9	17.9	15.9	15.9	0.75	0.74	0.83
Saudi Arabia	SAU	60.3	26.5	28.0	45.1	41.8	1.25	1.73	1.41
Singapore	SGP	28.8	43.0	49.0	48.0	53.6	1.51	1.57	1.80

Country	I.D.	Saving: S_{it}^{*} 1970s	1980s	1990s	2000s	2010s	Saving efficiency: $\hat{\gamma}_{it}$ 1990s	2000s	2010s
Slovak Republic	SVK			25.7	24.3	25.1	0.99	0.86	0.95
Slovenia	SVN			25.3	27.5	26.6	1.02	1.08	1.20
Sweden	SWE	27.4	25.9	26.0	29.2	28.5		1.38	1.40
Uruguay	URY	17.9	16.8	15.3	17.1	19.4	0.67	0.80	0.85
United States	USA	22.6	21.6	20.3	17.6	17.0	0.84	0.75	0.74
UPPER-MIDDLE INCOME									
Albania	ALB		28.8	−16.1	9.4	9.3	−0.74	0.34	0.37
Argentina	ARG	27.2	22.4	17.6	22.8	17.9	0.75	0.99	0.80
Armenia	ARM			−3.5	7.5	5.2	−0.19	0.25	0.19
Azerbaijan	AZE			11.1	39.2	41.2	0.67	1.04	1.51
Bulgaria	BGR		33.2	17.9	14.3	21.3	0.93	0.56	0.99
Bosnia and Herzegovina	BIH				−10.8	−4.5		−0.40	−0.19
Belarus	BLR			24.8	25.6	33.1	1.21	0.88	1.35
Brazil	BRA	20.8	23.4	18.6	19.4	18.1	0.78	0.72	0.70
China	CHN	36.6	35.0	39.7	44.5	48.8			
Colombia	COL	19.7	20.6	18.4	16.5	18.7	0.76	0.61	0.67
Costa Rica	CRI	15.3	23.3	16.1	18.0	17.5	0.63	0.67	0.64
Algeria	DZA	35.2	31.5	30.1	49.1	43.2	1.47	1.82	1.64
Ecuador	ECU	20.7	21.7	20.5	21.6	25.5	0.92	0.87	1.01
Georgia	GEO		31.0	−3.9	7.4	13.1	−0.29	0.28	0.51
Guatemala	GTM	14.7	9.9	9.0	5.2	3.8	0.47	0.26	0.16
Iran, Islamic Rep.	IRN	32.4	16.9	32.2	44.1	42.2	1.52	1.55	1.47
Jordan	JOR	−14.1	−7.1	4.8	−2.4	−1.2	0.21	−0.09	−0.05
Kazakhstan	KAZ			15.9	37.1	40.1	0.89	1.18	1.45
Sri Lanka	LKA	15.2	17.8	18.0	16.9	22.9	0.66	0.59	0.82
Mexico	MEX	21.3	28.5	22.7	21.4	22.7	0.97	0.92	0.87
Macedonia, FYR	MKD			14.0	3.8	13.0	0.64	0.15	0.50
Malaysia	MYS	25.1	32.1	40.6	43.0	34.7	1.45	1.55	1.16
Peru	PER	19.7	26.4	17.6	22.4	24.6	0.76	0.85	0.91
Paraguay	PRY	18.9	23.5	27.1	29.0	25.1	1.29	1.28	0.94
Romania	ROU			18.4	16.3	22.6	0.88	0.61	0.95
Russian Federation	RUS			31.8	32.7	30.2	1.76	1.15	1.21
Serbia	SRB			4.9	4.4	9.4		0.17	0.42
Thailand	THA	21.4	26.0	35.7	31.5	32.3	1.23	1.08	1.15
Turkmenistan	TKM			7.1	45.5	84.1			
Turkey	TUR	31.8	29.6	19.7	22.8	24.8	0.79	0.87	0.86
Venezuela	VEN	28.9	23.0	28.2	35.1	25.5	1.22	1.35	1.05

		Saving: S_{it}^{*}					Saving efficiency: $\hat{\gamma}_{it}$		
Country	I.D.	1970s	1980s	1990s	2000s	2010s	1990s	2000s	2010s
South Africa	ZAF	30.7	27.3	18.5	19.8	19.5	0.83	0.76	0.77
LOWER-MIDDLE INCOME									
Angola	AGO				46.0	38.9		2.01	2.20
Bangladesh	BGD	1.9	12.3	15.4	20.6	22.5	0.66	0.78	0.77
Bolivia	BOL	17.5	13.9	9.8	16.4	20.4	0.46	0.73	0.81
Cameroon	CMR	18.3	24.1	20.6	19.9	18.2	1.36	1.00	0.85
Egypt, Arab Rep.	EGY	10.6	18.2	14.5	14.8	7.5	0.65	0.57	0.30
Ghana	GHA	10.2	4.8	7.5	4.5	13.3	0.35	0.19	0.51
Honduras	HND	15.7	8.7	19.5	9.0	6.1	1.05	0.40	0.24
Indonesia	IDN	19.9	26.7	28.4	28.3	33.9	1.09	1.00	1.16
India	IND	12.6	15.8	23.9	29.9	31.5	0.93	1.08	1.06
Kenya	KEN	20.2	19.3	14.4	7.1	6.8	0.85	0.35	0.28
Kyrgyz Republic	KGZ		13.3	4.8	3.0	−6.3	0.30	0.12	−0.23
Cambodia	KHM			−0.4	11.7	17.0	−0.03	0.41	0.58
Lao PDR	LAO		0.8		15.7	15.4		0.63	0.53
Morocco	MAR	14.0	21.7	21.8	24.3	21.8	0.96	0.91	0.82
Moldova	MDA			6.9	−8.6	−4.8	0.37	−0.30	−0.16
Mongolia	MNG		19.4	30.6	22.9	33.2	1.57	0.77	1.04
Mauritania	MRT	5.7	3.1	10.8	11.3	25.6		0.51	1.12
Nigeria	NGA		65.9	49.2	35.6	20.3	2.60	1.47	0.99
Nicaragua	NIC			8.2	4.0	11.8	0.42	0.17	0.44
Pakistan	PAK	8.2	8.3	15.1	14.1	8.1	0.74	0.61	0.33
Philippines	PHL	26.3	23.0	15.1	16.0	15.9	0.69	0.64	0.56
Senegal	SEN	15.2	4.3	5.4	7.8	10.6	0.30	0.38	0.48
El Salvador	SLV	16.6	6.9	3.7	−1.0	−1.8	0.17	−0.05	−0.08
Tunisia	TUN	23.6	22.7	21.8	21.4	12.8	0.86	0.78	0.49
Ukraine	UKR		28.8	26.3	24.1	12.8	1.87	0.91	0.58
Uzbekistan	UZB			20.9	29.9	26.1			
Vietnam	VNM		4.4	16.2	27.5	27.0	0.62	0.94	0.88
LOW INCOME									
Benin	BEN	0.5	−2.4	9.4	10.5	13.0	0.48	0.52	0.61
Burkina Faso	BFA	8.9	2.4	9.0	6.6	17.5	0.47	0.32	0.82
Guinea	GIN		16.6	18.3	10.8	2.9	0.92	0.56	0.12
Madagascar	MDG	4.2	2.9	4.2	8.6	7.9	0.24	0.44	0.37
Malawi	MWI	14.4	12.7	3.4	4.2	4.3	0.18	0.22	0.21
Niger	NER	6.7	7.3	5.7	10.1	16.6	0.36	0.60	0.93
Nepal	NPL	12.1	11.0	12.0	10.6	11.0	0.54	0.48	0.43

Country	I.D.	Saving: S_{it}^{*} 1970s	1980s	1990s	2000s	2010s	Saving efficiency: $\hat{\gamma}_{it}$ 1990s	2000s	2010s
Rwanda	RWA	6.0	5.0	−5.5	4.1	6.8	−0.30	0.16	0.26
Sierra Leone	SLE	17.2	8.9	3.2	−4.3	−6.1	0.22	−0.19	−0.27
Tajikistan	TJK			33.6	−1.4	−17.2	4.23	−0.05	−0.61
Tanzania	TZA			3.8	22.3	26.7	0.20	1.02	1.23
Uganda	UGA		2.6	5.7	9.5	15.3	0.29	0.49	0.80

Table A4. Government banks as fraction of banking system in each country

Country	ID	1970s	1980s	1990s	2000s	2010s
HIGH INCOME						
United Arab Emirate	ARE	0.459		0.419	0.423	
Australia	AUS	0.209		0.062	0.000	0.000
Austria	AUT	0.708		0.272	0.040	0.118
Belgium	BEL	0.399		0.276	0.000	0.000
Canada	CAN	0.109		0.000	0.000	0.000
Switzerland	CHE	0.249		0.142	0.137	0.161
Chile	CHL	0.915		0.157	0.159	0.195
Czech Republic	CZE	1.000		0.355	0.031	
Germany	DEU	0.519		0.392	0.384	0.315
Denmark	DNK	0.098		0.044	0.048	0.006
Spain	ESP	0.326		0.010	0.000	0.000
Finland	FIN	0.321		0.263	0.000	0.000
France	FRA	0.744		0.086	0.017	0.016
United Kingdom	GBR	0.000		0.000	0.117	0.260
Greece	GRC	0.927		0.454	0.147	0.108
Croatia	HRV	1.000		0.190	0.042	0.042
Hungary	HUN	1.000		0.195	0.040	0.039
Ireland	IRL	0.038		0.045	0.036	0.207
Iceland	ISL	1.000		0.677	0.164	0.405
Israel	ISR	0.676		0.646	0.115	0.000
Italy	ITA	0.757		0.265	0.049	0.001
Japan	JPN	0.069		0.006	0.000	
Korea, Rep.	KOR	0.566		0.276	0.258	0.223
Kuwait	KWT	0.360		0.164	0.000	
Lithuania	LTU			0.440	0.030	0.000
Luxembourg	LUX			0.050	0.048	0.052
Latvia	LVA				0.088	0.155
Netherlands	NLD	0.078		0.075	0.054	0.140
Norway	NOR	0.545		0.437	0.000	0.000
New Zealand	NZL	0.335		0.000	0.018	0.034
Oman	OMN	0.045		0.129	0.000	
Panama	PAN	0.179		0.143	0.118	0.110
Poland	POL	1.000		0.640	0.204	0.220
Portugal	PRT	1.000		0.232	0.226	0.226
Saudi Arabia	SAU	0.376		0.145	0.206	
Singapore	SGP	0.129		0.068	0.000	

Country	ID	1970s	1980s	1990s	2000s	2010s
Slovak Republic	SVK	1.000		0.499	0.018	0.009
Slovenia	SVN	1.000		0.484	0.331	0.511
Sweden	SWE	0.208		0.116	0.000	
Uruguay	URY	0.423		0.688	0.498	0.456
United States	USA	0.000		0.000	0.000	0.000
UPPER-MIDDLE INCOME						
Albania	ALB			0.614	0.540	
Argentina	ARG	0.719		0.453	0.377	0.436
Armenia	ARM			0.025	0.000	0.000
Azerbaijan	AZE			0.044	0.583	
Bulgaria	BGR	1.000		0.516	0.056	0.032
Bosnia and Herzegovina	BIH			0.300	0.043	0.011
Belarus	BLR			0.673	0.748	0.717
Brazil	BRA	0.708		0.416	0.403	0.435
China	CHN	1.000		0.995	0.688	
Colombia	COL	0.577		0.539	0.114	0.060
Costa Rica	CRI	1.000		0.909	0.547	0.537
Algeria	DZA	1.000		1.000	0.929	
Ecuador	ECU	1.000		0.406	0.140	0.165
Georgia	GEO			0.000		
Guatemala	GTM	0.321		0.149	0.025	0.018
Iran, Islamic Rep.	IRN	0.894		1.000		
Jordan	JOR	0.281		0.130	0.000	
Kazakhstan	KAZ	1.000		0.286	0.062	0.231
Sri Lanka	LKA	1.000		0.632	0.541	0.591
Mexico	MEX	0.827		0.303	0.093	0.130
Macedonia, FYR	MKD			0.005	0.015	
Malaysia	MYS	0.200		0.050	0.000	0.000
Peru	PER	0.874		0.145	0.031	0.000
Paraguay	PRY	0.550		0.480	0.079	0.061
Romania	ROU			0.663	0.184	0.079
Russian Federation	RUS	1.000		0.505	0.382	0.408
Serbia	SRB					
Thailand	THA	0.241		0.239	0.223	0.175
Turkmenistan	TKM			0.971	0.960	
Turkey	TUR	0.818		0.457	0.315	0.316
Venezuela	VEN	0.829		0.314	0.127	0.331
South Africa	ZAF	0.000		0.000	0.000	0.001
LOWER-MIDDLE INCOME						
Angola	AGO				0.235	0.187
Bangladesh	BGD	1.000		0.824	0.400	0.341
Bolivia	BOL	0.531		0.092	0.034	
Cameroon	CMR					
Egypt, Arab Rep.	EGY	1.000		0.776	0.573	
Ghana	GHA			0.379	0.129	0.097
Honduras	HND	0.492		0.155	0.008	0.010
Indonesia	IDN	0.749		0.434	0.388	0.384
India	IND	1.000		0.825	0.727	0.737
Kenya	KEN	0.451		0.299	0.027	0.048
Kyrgyz Republic	KGZ			0.144	0.298	0.203
Cambodia	KHM			0.160		
Lao PDR	LAO					
Morocco	MAR	0.591		0.309	0.286	

Country	ID	1970s	1980s	1990s	2000s	2010s
Moldova	MDA			0.071	0.137	0.125
Mongolia	MNG					
Mauritania	MRT					
Nigeria	NGA	0.575		0.115	0.022	0.000
Nicaragua	NIC	0.904		0.634	0.000	0.010
Pakistan	PAK	0.735		0.860	0.288	0.210
Philippines	PHL	0.522		0.197	0.123	0.125
Senegal	SEN	0.494		0.280	0.051	0.083
El Salvador	SLV	0.531		0.167	0.044	0.060
Tunisia	TUN	0.529		0.374	0.405	
Ukraine	UKR				0.135	0.169
Uzbekistan	UZB					
Vietnam	VNM	1.000		0.991		
LOW INCOME						
						0.083
Benin	BEN				0.051	
Burkina Faso	BFA				0.051	0.083
Guinea	GIN				0.000	
Madagascar	MDG				0.000	0.000
Malawi	MWI			0.489	0.062	0.093
Niger	NER				0.051	0.083
Nepal	NPL			0.200	0.272	0.243
Rwanda	RWA			0.500	0.066	
Sierra Leone	SLE				0.401	0.377
Tajikistan	TJK			0.074	0.098	0.140
Tanzania	TZA	1.000		0.949	0.100	0.047
Uganda	UGA				0.020	0.032

Table A5: Required provision and provision maintained by the banking industry

(In billion BDT)

All Banks	2010	2011	2012	2013	2014	2015	2016	2017	June 2018
Amount of NPLs	227.1	226.4	427.3	405.8	501.6	594.1	621.7	743.0	893.4
Required provision	149.2	148.2	242.4	252.4	289.6	308.9	362.1	443.0	528.8
Provision maintained	142.3	152.7	189.8	249.8	281.6	266.1	307.4	375.3	448.9
Excess/shortfall	-6.9	4.6	-52.6	-2.6	-7.9	-42.8	-54.7	-67.7	-79.9
Provision maintenance ratio (%)	95.4	103.0	78.3	99.0	97.2	86.1	84.9	84.7	84.9

(Source: Bangladesh Bank website)

Table A6: Comparative position of provision adequacy

(In billion BDT)

Year	Items	SCBs	DFIs	PCBs	FCBs
2016	Required provision	174.0	27.8	144.2	16.0
	Provision maintained	113.2	28.4	149.4	16.4
	Provision maintenance ratio (%)	65.1	102.2	103.6	102.5
2017	Required provision	216.9	26.1	184.3	15.6
	Provision maintained	134.3	26.2	198.2	16.5
	Provision maintenance ratio (%)	61.9	100.4	107.5	105.8
2018 June	Required provision	252.9	25.0	234.6	16.2
	Provision maintained	162.0	27.9	242.0	16.9
	Provision maintenance ratio (%)	64.1	111.6	103.2	104.3

(Source: Bangladesh Bank website)

Table A7: Profitability ratios: ROA

(In percent)

Bank types	2010	2011	2012	2013	2014	2015	2016	2017	2018 June
SCBs	1.1	1.3	-0.56	0.59	-0.55	-0.04	-0.16	0.21	-0.68
DFIs	0.2	0.1	0.06	-0.40	-0.68	-1.1	-2.8	-0.62	-1.6
PCBs	2.1	1.6	0.92	0.95	0.99	1.0	1.0	0.89	0.57
FCBs	2.9	3.2	3.2	2.9	3.3	2.9	2.5	2.2	2.7
Total	1.8	1.5	0.64	0.90	0.64	0.77	0.68	0.74	0.29

(Source: Bangladesh Bank website)

Table A8: Profitability ratios: ROE

(In percent)

Bank types	2010	2011	2012	2013	2014	2015	2016	2017	2018 June
SCBs	18.4	19.7	-11.9	10.9	-13.5	-1.5	-6.0	3.5	-12.3
DFIs	-3.2	-0.9	-1.1	-5.8	-5.9	-5.8	-13.9	-3.1	-8.4
PCBs	20.9	15.7	10.2	9.8	10.3	10.8	11.1	12.0	8.2
FCBs	17.0	16.6	17.3	16.9	17.7	14.6	13.1	11.3	13.7
Total	21.0	17.0	8.2	11.1	8.1	10.5	9.4	10.6	4.4

(Source: Bangladesh Bank website)