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Bank Profitability and Economic Growth

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Abstract

Is bank profitability beneficial for economic growth? While policymakers have shown major concerns for low levels of bank profitability, the influence of bank profitability on economic growth remains an open question. While it can favor economic growth by strengthening financial stability, it can also result from lower competition and as such depress economic growth. We provide the first empirical investigation to appraise the impact of bank profitability on economic growth. We examine a panel of 132 countries during the period 1999-2013 using generalized method of moments (GMM) dynamic panel techniques. We document a positive impact of bank profitability on economic growth in both the short-run and the long-run. These findings are robust to controlling for the dynamics of banks' profits. They are also robust to alternative measures, specifications, and time periods. They support the view that bank profitability should be promoted by authorities for growth concerns.

JEL Codes: G21, O16, O40.

Keywords: bank profitability, economic growth, finance-growth nexus.

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1. Introduction

The 2008 global financial crisis and steep decrease of interest rates took a toll on bank profitability. This situation raised a new set of concerns for policymakers. When questioned on July 1, 2016 on how the ECB might use monetary policy to stimulate the Eurozone economy, ECB chief economist Peter Praet said: “*The profitability of the [banking] sector will be a key consideration.*” This declaration illustrates how the notion of bank profitability is at the heart of central bank concerns.³ A straight question that arises is whether or not bank profitability does contribute to economic growth. There are two main channels through which bank profitability can affect economic growth.

First, bank profitability can influence economic growth by exerting an impact on financial stability. Several works have shown that financial stability is beneficial for economic growth (e.g., Furceri and Mourougane, 2012, and Kupiec and Ramirez, 2013, on the costs for economic growth associated with financial crises). Therefore, bank profitability can favor economic growth by enhancing financial stability for the following reasons. On the liabilities and equity side, profitable banks can retain earnings, increase their core capital, offer higher returns to shareholders, and more easily raise capital on the markets (Flannery and Rangan, 2008). On the asset side, profitable banks might be more adverse to risk as they have more to lose if downside risks materialize (Keeley, 1990). As a consequence, they have stronger incentives to screen loans (Coval and Thakor, 2005) and monitor borrowers (Holmström and Tirole, 1997). Empirical evidence confirms that greater profitability increases financial stability (e.g., Claeys and Schoors, 2007, for Russia; Arena, 2008, for Latin America; the common use of profitability in predicting bank distress in CAMELS ratings).

However the argument according to which bank profitability would favor economic growth by fostering financial stability only works if financial stability is beneficial for economic growth. Even if there is a commonly accepted view that financial stability enhances growth, Rancière, Tornell and Westermann (2008) find that countries with occasional financial crises may enjoy higher growth than countries with stable financial systems. Thus, we cannot say for certain that bank profitability is positive for economic growth by fostering financial stability.

³ The President of the Dutch central bank, Klaas Knot, observed: “The low interest rates (...) put pressure on banks’ profitability” (October 4, 2016), while ECB Executive Board member Yves Mersch noted that banks that cannot withstand temporary strains on their earnings may have bigger questions to answer about their future viability as businesses (October 3, 2016).

Second, bank profitability can be associated with economic growth through bank competition. A key driver of bank profitability is competition since low competition in the banking industry increases bank profits (e.g., Goddard, Molyneux, and Wilson, 2004). However low competition also increases financing obstacles for firms (Beck, Demirgüç-Kunt, and Maksimovic, 2004) while high competition alleviates credit constraints (Ryan, O'Toole, and McCann, 2014; Love and Pería, 2015). If high bank profitability results from a lack of competition, it may result in lower access to credit and thus depress growth (e.g., Cetorelli and Gambera, 2001; Claessens and Laeven, 2005).⁴ Furthermore low competition leads to high loan rates which can undermine entrepreneurship and reduce private consumption.

However, some researchers argue that low bank competition fosters access to credit. The information hypothesis of Petersen and Rajan (1994) asserts that banks are more likely to extend credits if they are able to gather information on borrowers. In a concentrated credit market, Petersen and Rajan (1995) further show that creditors are more likely to fund credit-constrained firms as they can internalize the benefits of lending to firms. Boot and Thakor (2000) confirm that an increase in competition increases small-business lending. In line with this view, Fungacova, Shamshur and Weill (2017) provide empirical evidence that lower bank competition reduces the cost of credit for borrowing firms, thereby favouring access to credit.

Therefore, the influence of bank profitability on economic growth remains an open question⁵, which has not been empirically settled since no research to the best of our knowledge has ever investigated this question. To fill this gap, the objective of this research is to examine the causal effect of bank profitability on economic growth. To this end, we perform a cross-country analysis on a sample of 132 countries over the period 1999 to 2013. We provide preliminary estimates with OLS, panel fixed-effects and instrumental-variables regressions. We then perform dynamic panel GMM estimations and consider the documented predictors of economic growth in line with Beck and Levine (2004) and Arcand, Berkes and Panizza (2015).

⁴ In a related vein, several works show how bank deregulation, associated with enhanced competition, leads to higher economic growth (Jayaratne and Strahan 1996; Ketteni and Kottaridi, 2019), while few studies show the beneficial influence of bank efficiency on economic growth (Belke, Haskamp and Setzer, 2016; Diallo, 2018).

⁵ It has to be stressed that bank profits are mechanically associated with GDP since GDP is the sum of all sources of income including wages and company profits. However the share of bank profits in GDP is very low in our sample with a mean of 0.65%. We can thus consider the mechanical impact of changes in bank profits on economic growth as negligible. We thank an anonymous reviewer for pointing this out.

We enter this analysis aware that the dynamics of bank profitability might affect the results. In their analysis of 100 past banking crises, Reinhart and Rogoff (2014) uncover a regular pattern of high-leverage in banks and rapid lending growth that creates an asset bubble and eventually precipitates a financial crisis. The situation, therefore, could arise where the influence of bank profitability on economic growth is positive in the short term, but turns negative as time goes by. Consequently, we assess the influence of the dynamics of bank profitability by performing estimations that jointly include past and current levels of profitability.

Two main results emerge. First, the current level of bank profitability positively affects economic growth. This effect is robust across estimations. Our baseline model provides an effect of 3.199, i.e. a 1% increase in banks' return-on-assets generates an additional 3.2% of growth over three years. Second, computing the long-term impact of bank profits on economic growth also yields a positive estimate. Beyond the business cycle, additional banks' profits positively contribute to economic growth. Taking into account the dynamics of bank profitability with the past level of profitability does not impact this result. Overall, integrating both the current and past level of bank profits leads to a global long-term effect of 2.75% on economic growth.

This study therefore contributes substantially to the extensive literature on bank profitability. This literature has mainly assessed the potential variables influencing bank profitability (Goddard, Molyneux, and Wilson, 2004; García-Herrero, Gavilá, and Santabárbara, 2009; Lee and Hsieh, 2013; Djalilov and Piesse, 2016) and the dynamics of bank profitability over the business cycle (Albertazzi and Gambacorta, 2009; Bolt et al., 2012; Lopez, Rose and Spiegel, 2020). We provide a new angle by investigating the consequences of bank profitability, through its impact on economic growth. We thus add a new perspective to the literature on the finance-growth nexus. This vast literature summarized by Levine (2005) has identified the beneficial role of bank credit on growth, even if this relation turns to be non-monotonic (Arcand, Berkes and Panizza, 2015; Slesman, Baharumshah and Azman-Saini, 2019).

The remainder of the paper is as follows. Section 2 details the methodology and the data. Section 3 reports the estimations. Section 4 provides concluding remarks.

2. Empirical strategy

In this section, we present our empirical strategy to estimate the impact of bank profitability on economic growth. We first present the data and variables used and then the methodology employed.

2.1. Data and variables

Our data on economic growth are taken from the World Bank's World Development Indicators Database. The data on bank profitability are from the World Bank Group's Global Financial Development Database (GFDD) and aggregate information on commercial banks. We concentrate on the period from 1999 to 2013, the period during which bank profitability data are available. In accordance with earlier studies, we ignore yearly data and use three-year averages to smooth business cycle fluctuations (e.g. Beck and Levine, 2004).

The explained variable is the real GDP per capita growth. It is defined as the annual variation of GDP per capita based on the measurement of GDP per capita in current US dollars. The multivariate approach controls for inflation. To capture bank profits, we use banks' return-on-assets (*ROA*). Banks' return-on-assets is a standard indicator of bank profitability in the literature (Garcia-Herrero, Gavila and Santabarbara, 2009; Bolt et al., 2012). We employ the return-on-assets before tax to avoid the impact of cross-country differences in taxation. The indicator is computed with underlying bank-by-bank unconsolidated data from Bankscope. Specifically, it is calculated as the nominal return before tax aggregated at the country level, divided by the total assets of banks, aggregated at the country level. In the regressions, we winsorize the variable at the 1% level to avoid the influence of outliers. Aggregated banking data are only available from 1999, the starting year of our analysis.

Table 1 provides a univariate analysis of the relation between ROA and GDP growth. Panel A in Table 1 provides raw statistics on ROA from 1999 to 2013. Over the period, there is a total of 132 countries and 635 observations. The mean ROA is 1.55% worldwide for the whole period. While relatively low in the late 1990s at around 1.16%, it rose in the early 2000s and reached 1.90% for the period 2005–2007. We draw a first picture of the relationship between GDP growth and banks' profit in the panel B of Table 1. To do so, we sort countries according to their banks' ROA and apportioning countries to quintiles. We provide the corresponding GDP growth per capita for each quintile and employ a Kruskal-Wallis equality-of-population rank statistic to test differences across groups. The key finding

is the positive relation between bank profitability and growth. The median GDP growth goes from 2.08% in countries with the lowest level of bank profitability to 9.15% in countries where banks reap the highest profits.

Figure 1 displays the relation between banks' ROA and GDP per capita growth in our sample with the highest and lowest percentiles removed. We find a positive relation between banks' ROA and growth. On average, a 1% increase in banks' ROA is associated with a .92% increase in GDP per capita growth. Thus, the univariate analysis suggests the existence of a positive relation between bank profitability and economic growth.

We now turn to the variables used in the multivariate analysis, described in Table 2.

The choice of the country-level determinants of economic growth is based on the empirical literature on economic growth. Since this literature is huge, we briefly review the empirical literature related to our work linking characteristics of the banking system to economic growth. A first strand of studies has shown the impact of banking development on economic growth. Among them, Beck and Levine (2004) have investigated the influence of banks and stock markets on economic growth. In addition to the investigated key variables, they include in the analysis six determinants of economic growth: the initial GDP per capita, the average years of education, trade openness, the ratio of government expenditures to GDP, inflation, and the black market premium. They find evidence that bank development but also stock market development have a beneficial impact on economic growth.

A second strand of studies has questioned whether this influence would always be positive. In an influencing paper, Arcand, Berkes and Panizza (2015) analyze whether the impact of financial development can be non-monotonic on economic growth. In addition to the measure of financial development and its squared value which are the focus of the paper, they consider the following determinants when explaining economic growth: the initial level of GDP per capita, the average years of education, government expenditures to GDP, trade openness, inflation. They find evidence of the existence of a threshold above which financial development does not exert a beneficial influence on economic growth.

A third strand of studies has scrutinized which characteristics of the banking development can affect economic growth. Among them, Benczur, Karagiannis and Kvedaras (2019) have studied whether the impact of financial development on economic growth is affected by the composition in terms of the sources of financing and of the recipients of financing. They consider several determinants of economic growth next to their variables for the financing: GDP per capita, enrolment in secondary education, government expenditures

to GDP, trade openness, and inflation. They show that credit to companies is more beneficial for economic growth than credit to households, and confirm a non-linear relationship between banking development and economic growth.

Taking into account the former literature, we thus model economic growth as a function of seven additional components. To control for initial conditions, we employ the initial level of GDP defined as the first value of GDP per capita at market prices in current US dollars (*Initial GDP*). We account for human capital with the variable *Education* that measures the number of years of schooling for population aged 25 and over, obtaining the data from Barro and Lee database.⁶ We control for inflation computed from the annual variation in the consumer price index (ΔCPI). We drop observations below -10% to skip outliers. In the regressions, we set negative observations to zero and then apply the inverse hyperbolic sine transformation, $Inflation = \ln(\Delta CPI + \sqrt{\Delta CPI^2 + 1})$. We consider country openness with trade in percentage of GDP (*Openness*). Next, we control for government size with *Government Expenditures* defined as the percentage in GDP of the general government final consumption expenditures. Last, we control for labour and capital formation. We define *Labour* as the proportion of a country's population that is employed, in percent. We define *Capital Formation* as the gross capital formation in current US\$, in percent of GDP in current US\$. As in the studies of Beck and Levine (2004) and Arcand, Berkes and Panizza (2015), we use logs of all control variables with the exception of *Labour* and *Capital Formation*, that are percentage ratios.

We next assess the role of banking crisis and bank riskiness. Our dummy variable *Banking Crisis* from the GFDD takes a value of one for each year in which a banking crisis occurs. To control for bank risks, we use two aggregated indicators of risks provided by the GFDD. We first use the Z-scores of banks, which compare the capital buffer available to banks (equity and return-on-assets) to the volatility of those returns. Specifically, following the GFDD definition, “it is estimated as $(ROA + (equity/assets))/sd(ROA)$; $sd(ROA)$ is the standard deviation of ROA.” Variables are obtained at the bank level and first aggregated at the country level before doing the calculation. This indicator is widely used in the literature to capture the probability of default of banks (e.g. Laeven and Levine, 2009). We also use the ratio of banks' non-performing loans to gross loans (*NPL*) to capture credit risk. We follow the definition of the GFDD, where the NPL ratio is measured as the “ratio of defaulting loans (payments of interest and principal past due by 90 days or more) to total gross loans (total

⁶ <http://www.barrolee.com/>

value of loan portfolio). The loan amount recorded as nonperforming includes the gross value of the loan as recorded on the balance sheet, not just the amount that is overdue.” Again, variables are obtained at the bank level and first aggregated at the country level before doing the calculation.

Last, we examine the roles of monetary policy, banking development, economic development and institutional development. We detail the corresponding variables in each subsection. Appendix A provides a list of the variables along with their definition and source. Table 2 presents descriptive statistics for all the variables. All economic variables are expressed in current US dollars, or calculated from variables in current US dollars.

Taking the restrictions set by the different data sources and the use of lagged variables in the regression, we end up with a panel of 132 countries over the period of 1999 to 2013. While the univariate analysis allowed us to use 635 observations and 132 countries, the use of lagged variables in the multivariate analysis restricts the sample to 361 observations and 107 countries – robustness test in Table 12 does not use lagged variables, which expands the sample back to 132 countries and yields similar results. Appendix C gives a list of the countries included in the analysis.

2.2. Methodology

To assess the impact of bank profits on economic growth, we estimate the following growth model:

$$y_{i,t} = \alpha_0 + \alpha_1 \cdot y_{i,t-1} + \beta_1 \cdot ROA_{i,t} + \beta_2 \cdot ROA_{i,t-1} + \sum_{k=1}^K \gamma_k \cdot Controls_{k,i,t} + \varepsilon_{i,t}, \quad (1)$$

where y stands for GDP growth per capita and ROA for banks’ return-on-assets. Countries are indexed with i and years with t . Using yearly data is likely to accentuate seasonality components in our sample. In accordance with former literature (e.g. Beck and Levine, 2004), we do not consider yearly data, but split the full period into three-year periods to smooth business-cycle fluctuations. Our dataset spans 1999 to 2013, which allows us to consider five successive three-year periods.

The baseline model includes the five control variables detailed in the previous subsection: *Initial GDP*, *Education*, *Inflation*, *Openness* and *Government Expenditures*. In the first set of estimations, we only consider $ROA_{i,t}$. We compute the long-term effect of ROA on GDP growth as $\frac{\beta_1}{1-\alpha_1}$ (e.g. Abbassi and Linzert, 2012). We next add $ROA_{i,t-1}$ to account for

the potential dynamics in bank profitability. In that case, the computation of the long-term effect becomes $\frac{\beta_1 + \beta_2}{1 - \alpha_1}$.

We estimate the equation (1) with four alternative approaches, which progressively account for potential econometric flaws.

Following Beck and Levine (2004) and Arcand, Berkes and Panizza (2015), we start our analysis with a cross-country OLS regression. OLS regressions are not only useful in describing the data but also in providing a first (biased) estimate of the coefficients. Error terms of the OLS are most likely to be correlated with the regressors for three reasons: an omitted variable bias, a potential reverse causality and a dynamic regressor, y_{t-1} . In this paper, we will follow the approach of Beck and Levine (2004) and Arcand, Berkes and Panizza (2015) among others, in order to tackle the issue of reverse causality in our sample and provide robust estimates.

Our first step to tackle the omitted variable bias is to perform a panel fixed-effects (FE) regression. Panel fixed-effects regression resolves the omitted variable bias, but not the problems of reverse causality or a dynamic regressor.

We move a step further with an instrumental variables (IV) estimation, using the Lerner index in the banking industry to instrument *ROA*. The Lerner index is a potentially valuable instrument as bank competition has a direct impact on bank profitability (e.g. Goddard, Molyneux and Wilson, 2004), but it is unlikely to be correlated with the other regressors or to affect GDP growth per capita directly. Appendix B provides first-stage regressions and the usual tests on the validity of this instrument. While an IV panel FE model resolves the problem of omitted variable bias and reverse causality, it does not tackle the issue created by a dynamic regressor.

Our final step, therefore, is to obtain valid estimates is to use a system GMM model with first-differencing, following Arellano and Bond (1991) and Blundell and Bond (1998). We briefly introduce GMM estimators below and refer to Roodman (2006) for a more extensive discussion. GMM estimators are designed for panel data analysis following a dynamic process, with fixed individual effects, endogenous, predicted and exogenous regressors, serial correlation and heteroscedasticity within individuals and uncorrelated disturbances across individuals. They are also robust to a panel with a small number of time periods and many individuals (“small T, large N”). GMM estimators use the lags of the variables as instruments. This allows us to tackle the issue of endogeneity and identify the causal relationship in our sample (e.g., Beck and Levine, 2004). We use all the lags available

starting with the second lags for endogenous variables and the first lags for predetermined variables. All contemporaneous variables, except *Education*, are defined as endogenous. *Education* and the lagged variables are defined as predetermined. Yearly fixed-effects and Lerner Index are defined as exogenous.⁷ The model is estimated with panel fixed-effects at the country level. We compute robust standard errors using Windmeijer (2005) finite sample correction, that clusters standard-errors at the panel (country) level.

3. Results

This section presents the results. We first concentrate on the main estimations, including both the current and the lagged level of bank profits. In the next subsection, we assess the roles of bank risk and banking crises. The third subsection breaks down into assessment of the roles of monetary policy and financial development, the roles of economic development and institutions, and finally some robustness tests.

3.1 Baseline results

Table 3 displays the estimations considering the current level of ROA as our key explaining variable. The different columns provide OLS, Panel FE, IV Panel FE and System GMM estimations. The key finding is the significantly positive coefficient of *ROA* in all estimations, supporting the view that bank profitability enhances economic growth.

The OLS model provides a lower bound of 1.195%, while Panel FE yields a coefficient of 1.535% and the IV regression gives an estimate of 2.239 %. System GMM provides an estimate at 3.078%. In other words, an increase of the nominal ROA of 1 percent leads to an increase of 3.1% of nominal economic growth over a period of three years.⁸ Models are correctly specified with significant F-statistics and Chi². For IV Panel FE and System GMM, there is no evidence of over-identification with non-significant Hansen statistic. As it should be for System GMM estimations, the first difference of errors is only significantly auto-correlated at the first order. Regarding the other explanatory variables, we observe that past

⁷ Because we employ the years as instruments, we refrained from using the Lerner Index as well: while this does not affect our results, it entails a loss of 19 countries in the sample.

⁸ Our model controls for inflation and, hence, employs the nominal growth of GDP per capita as dependent variable. Running the model with real GDP growth per capita as dependent variable instead yields an estimate of 0.44% for ROA, significant at the 5% level. This difference between ROA coefficients impacting either nominal GDP (as reported) or real GDP (unreported) as dependent variable is similar throughout the paper.

level of GDP per capita growth positively contributes to the current level of growth and government expenditures exert a negative impact on growth.

We next consider the dynamics of bank profitability and redo the System GMM estimations by including the past level of banks' return-on-assets (ROA_{t-1}). Panel FE models do not correct for autocorrelation in the error-term, especially in panels with few periods and many individuals, and thus are ill-suited for dynamic models. Thus, we rely on the estimates provided by the System GMM, which do account for these issues. The results are displayed in the last column of Table 3. We still observe a significantly positive coefficient for ROA , of similar magnitude, confirming the positive impact of the current level of bank profitability on economic growth. We do not find a significant coefficient for ROA_{t-1} .

A crucial concern is the long-term impact of bank profitability on economic growth. We compute and test the long-term effect of bank profits. Results are reported at the bottom of Table 3. One main result emerges. The long-term effect of ROA is positive and significant, both when we only consider the contemporaneous impact on GDP growth and when we consider the impact of the previous level of ROA as well. This is the case in OLS, fixed-effects, IV and system GMM regressions. This finding suggests bank profitability contribute to the upward part of the business cycle but also exerts a positive effect beyond the business cycle.⁹

Thus, our estimations lead to two main conclusions. First, bank profitability helps foster economic growth in the short-run. We find evidence that the current level of bank profitability is positively associated with greater economic growth. Second, when considering the dynamics of bank profitability by considering jointly the impact of the past and current levels of bank profitability, we also observe a positive and significant impact of bank profitability on economic growth in the long-run.

3.2 Interactions with country-level variables

Our main estimations indicate that bank profitability exerts a positive short-term and long term impact. We can investigate whether this relation is influenced by the economic and institutional framework of the country. To this end, we consider four factors of this framework: monetary policy, financial development, economic development and institutional quality.

⁹ We test for a longer-term dynamic adding the second lag of ROA but find no support for a significant effect of ROA_{t-2} , while the main results hold for ROA and ROA_{t-1} .

Monetary policy can influence the impact of bank profitability on growth by favouring higher or lower profits, since monetary policy has been shown to be a key driver of bank profitability (Demirgüç-Kunt and Huizinga, 1999; Borio, Gambacorta and Hofmann, 2017). In that case, the monetary policy stance might be a valuable tool to affect the relationship between bank profitability and economic growth. We address these two questions by incorporating the role of monetary policy in the growth equation. We use the M2 and M3 growth as our indicators of the monetary environment. Both variables are calculated using nominal terms and scaled by nominal GDP. We interact both these variables with the banks' return-on-assets to estimate if the monetary environment impacts the effects of bank profits on GDP growth. Table 4 reports the results.

In the first step, we control for M2 growth. The coefficients of ROA and ROA_{t-1} remain positive and non-significant, respectively. However, when monetary policy is accounted for, the role of the current level of bank profits is reduced by almost half, i.e. monetary policy is a big driver of bank profits. Conversely, the coefficient of *M2 Growth* is positive and significant, in line with the view that accommodative monetary policy fosters growth. Hence, the monetary policy stance seems to reduce the role of bank profits in driving economic growth. In the second step, we add the interaction of bank profitability with M2 growth ($ROA \times M2\ Growth$). The coefficient of the interaction is non-significant, however, the coefficient of ROA remains positive and the long-term effect of ROA and ROA_{t-1} is positive and significant. This supports the view that while the monetary stance affects banks' profitability and economic growth, there is also a specific channel linked to banks' profits.

We redo similar estimations using the growth of M3 as our indicator of monetary policy. Compared to M2, controlling for M3 growth further reduces the size of the impact of banks' profitability on economic growth. In this specification, a 1% increase in banks' profits leads to .925% increase in nominal GDP growth per capita. This confirms the role played by the monetary policy in affecting the link between banks' profits and growth. Next, controlling for M3 growth and its interaction with ROA yields a negative and significant coefficient for ROA_{t-1} . This underlines the dynamic effect a loose monetary stance can have on the link between banks' profitability and economic growth. This result is in line with the evidence that an environment with accommodative monetary policy and low interest rate levels is detrimental to bank profits (Borio, Gambacorta and Hofmann, 2017). We now show that is also detrimental to the positive role of bank profits on economic growth from a dynamic perspective. Monetary policy can foster the relationship between bank profits and economic

growth in the short run, but it creates a negative impact in the next period and generates no significant long-term impact.

So far, we have presented the isolated impact of the interaction between monetary policy and banks' profitability. At the bottom of the table, we provide an estimate of the full effect of profitability, by summing the coefficients of ROA, ROA_{t-1} , and the interaction between ROA and monetary policy. We also report the corresponding χ^2 statistic to test for its significance. This allows us providing an estimate of the overall impact of the conjunction of monetary policy and bank profitability on economic growth. When using M2 as an indicator of monetary policy, the effect is positive and significant: the combined impact of an increase in the aggregate amount of money and an increase of bank profitability, including their combined effect, result in a positive impact on economic growth. The effect is however non-significant with M3, even if the sign of the effect remains the same. This confirms the role played by a loose monetary policy in reducing the positive link between banks' profits and economic growth.

We now consider the roles of *financial and economic development*, asking whether they influence the relation between bank profitability and economic growth. Recent studies in the finance-growth nexus have shown that the impact of financial development indicators on economic growth can be conditional to the level of development of the country (Rioja and Valev, 2004; Arcand, Berkes and Panizza, 2015; Benczur, Karagiannis and Kvedaras, 2019). In line with this conclusion, the relationship between bank profitability and economic growth may be conditional to the level of financial development.

Financial and economic development are also often associated with lower information asymmetries (Godlewski and Weill, 2011; Fungacova, Shamshur and Weill, 2017). The quality of risk analysis increases with the knowledge and skill of bank employees, which are positively associated with economic and financial development. In line with that argument, we expect bank profitability to be less beneficial to economic growth in countries with greater financial and economic development as these countries are less affected by information asymmetries. As a consequence, the argument that high profitability associated with low competition would be beneficial for access to credit because profitable banks would be more able to gather information on the borrower would be less relevant.

We use two indicators to measure financial development: the ratio of domestic credit to the private sector scaled by GDP (*Private Credit*), banks' private credits scaled by the sum of banks' private credit and central bank assets (*Bank Share*). Table 5 reports the results. Controlling for the financial environment does not alter the relationship between bank

profitability and economic growth. *Private Credit* exerts a negative impact on economic growth. This is rather at odds with the literature on the finance-growth nexus, but can be explained by the introduction of bank profits into the equation, the use of a larger sample and more recent data.¹⁰ When we add the interaction between *ROA* and any of both financial development indicators, we find no significant coefficient for the interaction term, suggesting that the impact of bank profitability on economic growth is not influenced by the level of financial development.

Again, we now turn to the full impact of financial development and bank profitability, by adding up their individual effect as well as their combined impact. Results are reported at the end of the table, with the corresponding χ^2 statistic. Results support a positive and significant effect of the combined and overall impact of bank share and private credit and bank profitability.

We consider economic development using the World Bank classification of income. We create the dummy variable *Income Group*. The World Bank classifies countries into four income groups: low-income (*Income Group* = 1), middle income, upper middle income and high income (*Income Group* = 4). In Table 6, we first add *Income Group* to the model that does not modify the impact of bank profitability on economic growth. Next, we consider whether the relationship between bank profitability and economic growth is different between income groups. To do so, we use a dummy variable for each income group (respectively *Low Income*, *Middle Income*, *Upper-Middle Income*, *High Income*, by increasing order of income) and interact it with *ROA*. We do not observe a significant coefficient for the interaction term between *ROA* and the different *Income Groups*. Hence, our results suggest an evenly spread positive impact of banks' profitability on economic growth for countries at different stages of economic development.

At the end of the table, we report the full effect of bank profitability. The full effect turns to be positive and significant in all models but model 5. This overall confirms that the level of economic development does not play a significant role.

Finally, we consider the impact of *institutional quality*. Institutions can influence the relation between bank profitability and economic growth in multiple ways. As noted, bank profitability influences economic growth by fostering financial stability. However, financial stability may be beneficial or detrimental to economic growth. The detrimental impact of financial stability results from the fact that financial liberalization associated with financial

¹⁰ See the "vanishing effect" found by Rousseau and Wachtel (2011) and the recent evidence provided by Arcand, Berkes and Panizza (2015) of a negative effect in the case of excessive financial development.

instability can be growth-enhancing. This positive effect of financial instability for growth may be conditioned on high institutional quality that guarantees financial crises are not persistently driven by poor institutions.

In a related vein, the positive impact of bank profitability through the competition channel on growth results from high profitability associated with low competition to collect information on borrowers. This may be conditioned on high institutional quality such that high profitability is not the outcome of obstacles implemented by the authorities to preserve monopoly rents for incumbent banks. Thus, it is worthwhile to ask whether the impact of bank profitability on economic growth is influenced by institutional quality

We measure institutional quality using two indicators: *Rule of Law* captures perceptions of the extent to which agents have confidence in and abide by the rules of society, while *Regulatory Quality* captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. In the regressions, we use the first difference of these variables and multiply them by 100 to rescale them. Table 7 reports the results.

Controlling for the institutions alone does not change the results. The coefficient of *Rule of Law* turns out to be positive and non-significant, while the coefficient of *Regulatory Quality* is positive and significant. This confirms that an increase in the quality of the institutions is followed by higher growth.

We now turn to the role institutions play in the relationship between bank profits and economic growth. We capture this element using the interaction of *Rule of Law* and *ROA* and *Regulatory Quality* with *ROA*. Both estimates are non-significant. This supports a non-significant impact of institutional development on our results. In each case, the overall impact of bank profitability is also positive and significant. Turning to the overall impact, we observe consistent results. When estimating the full effect of bank profitability, we observe a positive and significant impact on economic growth in the two specifications with interactions.

3.3 Robustness checks

Additional regressions are run to test the robustness of the relation between bank profitability and economic growth. Unless otherwise indicated, we perform only System GMM panel regressions in these tests as they are the most relevant estimations in addressing endogeneity issues.

First, we investigate whether banking crises influence our results. Our period of study contains several banking crises, including the global financial crisis. It is therefore of interest to study whether the relationship between bank profitability and economic growth is different in normal times and in crisis times.

To this end, we include the dummy variable *Banking Crisis* in the estimations. Using data extracted from the GFDD, this variable is equal to one for years with a banking crisis, and to zero otherwise. Table 8 presents the results.

We first investigate whether accounting for banking crises alters the results. The addition of *Banking Crisis* is shown in column (1). We then investigate whether the impact of bank profitability on economic growth differs with the period by including interaction terms between bank profitability variables and crisis dummy variables. We test several specifications: $ROA \times Banking\ Crisis$ in column (2), ROA , $ROA_{t-1} \times Banking\ Crisis$ in column (3), $ROA \times Banking\ Crisis_{t-1}$ in column (4), $ROA \times Banking\ Crisis_{2008-2010}$ in column (5). *Banking Crisis₂₀₀₈₋₂₀₁₀* is a dummy variable equal to one if the period includes the global financial crisis period of 2008–2010, and zero otherwise. With all these specifications, we are then able to provide a broad view of the influence of banking crises on our results.

We conclude that our main findings remain unaffected. In all estimations, ROA is significantly positive and ROA_{t-1} is non-significant, and the overall effect of bank profitability is positive and significant. Hence, controlling for banking crises does not affect our main findings. Thus, the relation between bank profitability and economic growth is not influenced by the fact that our observation period includes a major crisis.

Second, we check the robustness of our profitability measure. We redo the main specification using the banks' return-on-equity. ROA , as noted, is a broad measure of bank profitability. It accounts for risks supported by both shareholders and creditors. Return-on-equity, in contrast, provides information only on the return for the capital invested by shareholders. This measure has been used in works on bank profitability (e.g. Goddard, Molyneux and Wilson, 2004). Here, we use return-on-equity before taxes, unconsolidated across countries and winsorized at the 1% level. The estimations are reported in Table 9. Our main results again hold. We observe a positive impact of the current level of bank profitability on growth with a significantly positive coefficient of ROE in the three specifications. We also find no significant effect of the lagged value of the return-on-equity and the common effect of ROE and ROE_{t-1} is positive and significant. Controlling for banking crisis also does not impact our results.

Third, we use an alternative indicator for economic growth. In the main estimations, we employ real GDP per capita growth in accordance with the vast majority of studies on the finance-growth nexus (e.g. Beck and Levine, 2004; Arcand, Berkes and Panizza, 2015). To test the robustness of this measure, we consider real GDP growth and redo the estimations in Table 10. This modification does not change the results. We still observe that the coefficient of ROA is positive and significant in all estimations. Conversely, ROA_{t-1} is non-significant. Using real GDP growth, the long-term effect of ROA and ROA_{t-1} is also positive and significant. Controlling for banking crisis also does not impact our results.

Fourth, we consider possible nonlinearity in the relation between bank profitability and economic growth. This is notably due to the non-linear pattern between the bank profit quintiles and GDP growth appearing in the raw data. We perform three estimations in Table 11. In column (1), we include the squared ROA to capture a quadratic effect. We then follow the quintile subdivision of ROA performed in Table 1 by creating five dummy variables for each ROA quintile (Q_{ROA1} to Q_{ROA5}) to generate an interaction with ROA . In column two, we only consider the first quintile since the non-linearity in raw data starts at the second quintile. In the third column, we add the other quintiles and remove the first. In all three specifications, we observe no significant coefficient for the variables added to test nonlinearity. The quadratic term of ROA is non-significant. The Lind and Mehlum (2010) U-shaped test confirms that there is no quadratic relation (with extrema outside data range). Moreover, the nonlinear pattern across quintiles we observe in the data does not hold in the model. This comports with our main specification and provides evidence of a linear relation between bank profits and economic growth.

Fifth, we challenge the way we have averaged our data. This could be important as the main objective of averaging is to smooth the business cycle. In the meantime, one of our main findings is the role of profit dynamics on GDP. Our main estimations consider three-year periods. Here, we first try a shorter horizon with two-year periods. We perform estimations with system GMM regressions. We next try a five-year horizon. For these regressions, we perform panel fixed effects with robust standard errors as the number of periods by country is insufficient to allow estimating system GMM regressions. We also cannot include any lag of the variables. Table 12 reports the results. Using a 2-year average reinforces the role of the business cycle: ROA has a positive effect on economic growth and the effect of ROA_{t-1} is negative and significant. However, our main findings are again supported with a positive and significant long-term effect. Using a 5-year average confirms a

positive effect of ROA on economic growth. Controlling for banking crisis also does not impact our results.

Finally, we control for risk in the estimations. As noted, bank profitability can affect economic growth by influencing financial stability and it can play a role in bank competition. As a consequence, this channel of transmission implies bank profitability can influence bank risk. We therefore consider the validity of our results once risk is accounted for in our estimations. We measure bank risk with two indicators. We use the *z-score* (*Z-score*), which is inversely related to the probability of default of a bank. A higher *z-score* is associated with lower bank risk. We also utilize the ratio of non-performing loans to total loans (*NPL*) as an indicator of the quality of the loan portfolio. We use data provided by the GFDD for these measures. We perform two estimations in Table 13, adding alternatively the *Z-score* and *NPL* in the estimations. We observe that the main results remain unaffected with a significantly positive coefficient for ROA and a non-significant impact of ROA_{t-1} . The long-term effect of ROA on economic growth remains positive and significant. In other words, our main conclusions are not affected when bank risk is taken into consideration.

4. Conclusions

This paper addresses the evidence of bank profitability effects on economic growth. With policymakers concerned about low bank profitability, it is of some importance to ask whether higher bank profitability actually enhances growth.

We obtain two major conclusions. First, we find that bank profitability favors economic growth in the short-run. Second, even when controlling for dynamics in banks' profitability over the business cycle, we also find a positive effect in the long-run. These findings are robust to a battery of robustness checks, including the use of alternative measures of profitability and growth.

In addition, we observe that the impact of bank profitability on economic growth is influenced by monetary policy. Considering monetary policy reduces the impact of banks' profits on economic growth – but does not remove it. Importantly, controlling for the larger money aggregate M3 reinforces the cyclical component of banks' profits. On the opposite, we do not find any significant moderating effect of economic development and institutional quality.

A possible interpretation of these conclusions deals with the positive influence of bank profitability on financial stability. Greater profitability allows banks to increase their core capital and gives greater incentives to screen loans and monitor borrowers. Through this channel, bank profitability reinforces economic growth in the short and long term based on the relation between financial stability and economic growth.

From a policy perspective, these findings support the view that bank profitability should be promoted by authorities for growth concerns. The effects are positive in both the short- and long- run. Thus, when authorities view low bank profitability as a major concern, this is indeed relevant in the broader perspective of long-run economic growth. Furthermore, it does play a positive role for short-run objectives.

Our research is an initial step towards understanding the impact of bank profitability on financial stability. Our work can be improved in different ways. It would be of interest to check the relevance of our findings for alternative periods than the period 1999-2013. It would also be particularly interesting to perform our analysis for a much longer period in line with the long-term perspective of economic growth. Furthermore the use of regional data can allow a more precise identification strategy linking bank profitability and economic growth at the regional level. We let these questions for further research.

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Table 1.
Trends in ROA

This table presents statistics for the ROA at the country level for 132 countries. ROA is presented for the full period and for three-year periods. Panel A presents statistics for ROA in all the countries (%). In Panel B, we sort countries on their ROA in each period and create quintiles. For each quintile, we provide the real GDP growth per capita (%). We test the differences across groups (levels of ROA and time-period) using the Kruskal-Wallis equality-of-population rank test (*KW test*). Chi² of the test is reported in the last column for differences across time and in the last row for differences across levels of ROA. The overall difference between levels and time-periods is given at the bottom right of the table. ***, ** and * report the 1%, 5% and 10% thresholds of significance.

	1999-2013	1999-2001	2002-2004	2005-2007	2008-2010	2011-2013	KW test, by year
Panel A: ROA							
N	635	124	127	131	129	124	
Mean	1.55	1.16	1.64	1.90	1.50	1.53	
Median	1.66	1.52	1.96	2.05	1.13	1.65	20.5***
Standard Dev.	2.87	3.23	2.35	1.54	4.34	1.92	
Minimum	-43.12	-18.07	-6.39	-5.50	-43.12	-11.47	
Maximum	14.31	14.31	11.83	7.69	7.38	8.55	
Panel B: ROA levels and Growth							
<i>20% Lowest ROA</i>							
N	127	25	26	27	26	25	
Median GDP growth	2.08	0.96	11.96	11.98	0.32	2.63	23.16***
<i>Second quintile</i>							
N	127	25	25	26	26	25	
Median GDP growth	6.57	-1.12	13.37	11.25	5.54	5.46	59.55***
<i>Third quintile</i>							
N	127	25	26	26	26	25	
Median GDP growth	8.84	2.36	10.99	10.42	7.11	8.51	21.41***
<i>Fourth quintile</i>							
N	127	25	25	26	26	25	
Median GDP growth	7.45	-0.34	12.58	10.63	6.41	6.07	43.99***
<i>20% Highest ROA</i>							
N	127	24	25	26	25	24	
Median GDP growth	9.15	1.47	14.27	15.77	10.26	6.10	37.78***
KW test - by ROA	52.41***	2.23	5.06	5.14	27.74***	15.34***	234.12***

Table 2.
Descriptive statistics

This table provides descriptive statistics for the variables used in the study. Appendix A gives the definitions of the variables.

	N	Mean	Median	Std. dev.	Minimum	Maximum
ROA (%)	635	1.66	1.55	2.87	-43.12	14.31
GDP per capita growth (%)	635	8.00	7.10	8.56	-13.65	69.27
GDP per capita (<i>current US\$</i>)	635	968969	44241	3625764	137	31100000
Education (years)	635	7.80	7.98	3.13	0.91	14.62
Inflation (%)	635	7.11	3.86	30.29	0.00	699.40
Openness	635	89.87%	77.04%	56.56%	19.77%	450.78%
Government Exp.	635	15.65%	15.42%	5.13%	4.42%	38.10%
Labour (% of population)	517	57.06	57.16	11.01	20.20	92.76
Capital Formation (<i>Millions current US\$</i>)	620	99400	9110	347000	37	3970000
Banking Crisis	635	0.11	0.00	0.32	0.00	1.00
Z-Score	635	15.85	14.62	10.73	-18.81	57.34
NPL (%)	450	6.95	4.06	7.52	0.23	74.10
M2 growth (%)	612	3.65	3.17	7.35	-35.18	50.08
M3 growth (%)	608	3.55	2.66	7.56	-18.39	94.23
Bank Share	571	0.84	0.92	0.19	0.04	1.00
Private Credit (%)	620	58.10	40.06	51.97	1.93	300.72
Rule of Law	634	0.08	-0.13	1.01	-1.92	1.98
Regulatory Quality	635	0.21	0.10	0.92	-2.08	2.10
ROE (%)	634	18.13	15.57	16.60	-82.27	131.15
GDP growth (%)	635	9.55	8.73	8.80	-13.10	69.32
Lerner	531	0.26	0.25	0.14	-0.73	0.86

Table 3.
Main estimations

The table below presents OLS, Panel fixed-effects (FE), Instrumental Variables (IV) Panel FE and System GMM regressions. The dependent variable is real GDP per capita growth. Variables are averaged over a 3-year time period. Dummy variables for the years are included but not reported. Panel models are estimated with fixed-effects at the country level. T-statistic based on robust variances is reported in parentheses. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% and 1% level, respectively. Appendix A gives the definitions of the variables. Appendix B details the first-stage of the IV Panel FE.

	OLS	Panel FE	IV Panel FE	System GMM	System GMM
ROA	1.195*** (3.62)	1.535*** (4.13)	2.239** (2.43)	3.078*** (3.88)	3.199*** (4.15)
ROA _{t-1}					-0.235 (-0.54)
GDP Per Capita Growth _{t-1}	-0.019 (-0.32)	-0.303*** (-4.46)	-0.319*** (-4.52)	-0.096 (-1.35)	-0.080 (-0.98)
Initial GDP (log)	-0.050 (-0.29)	6.041 (1.15)	5.237 (1.08)	-0.229 (-0.40)	-0.251 (-0.42)
Education (log)	2.072* (1.96)	-1.756 (-0.24)	-4.045 (-0.59)	3.595 (1.53)	3.255 (1.26)
Inflation (log)	1.760*** (2.66)	-1.138 (-0.97)	-0.996 (-0.97)	2.640* (1.89)	2.649* (1.86)
Openness (log)	-0.185 (-0.25)	-11.834*** (-2.69)	-11.989*** (-2.94)	3.360 (1.35)	3.618 (1.55)
Government Exp. (log)	-0.168 (-0.12)	-11.608** (-2.23)	-10.268* (-1.92)	-0.907 (-0.30)	-0.597 (-0.19)
Labour	0.070* (1.89)	0.103 (1.23)	0.123 (1.44)	0.036 (0.34)	0.044 (0.43)
Capital Formation	0.309*** (4.59)	0.685*** (4.55)	0.625*** (3.88)	0.320*** (2.80)	0.321*** (2.83)
Lerner	-1.348 (-0.55)	3.141 (0.66)		-3.356 (-0.68)	-3.757 (-0.74)
Constant	-14.732*** (-3.18)	-103.559* (-1.71)	2.373** (2.14)	-18.859* (-1.69)	-17.541 (-1.45)
N	361	361	351	361	361
No. of groups	107	107	99	107	107
Adjusted R ²	0.36	0.51			
F	19.46***	19.32***	19.85***		
Chi ²				150.01***	149.33***
Hansen p-value			0.88	0.17	0.15
AR 1				-2.08***	-1.99***
AR 2				-1.68	-1.63
<i>Long-Term Effect of ROA</i>	1.173*** (3.57)	1.177*** (3.79)	1.698** (2.42)	2.809*** (3.81)	2.745*** (3.42)

Table 4.
Monetary policy

System GMM panel regressions. The dependent variable is real GDP per capita growth. Variables are averaged over a 3-year time period. Dummy variables for the years are included but not reported. The model is estimated with panel fixed-effects at the country level. The t-statistic based on Windmeijer (2005) correction of variance is reported in parentheses. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% and 1% level, respectively. Appendix A gives the definitions of the variables.

	(1)	(2)	(3)	(4)
ROA	1.800** (2.40)	2.233** (2.38)	0.925** (1.97)	0.768* (1.74)
ROA _{t-1}	-0.257 (-0.63)	-0.190 (-0.50)	-0.302 (-1.14)	-0.551** (-2.01)
M2 growth	0.487** (2.46)	0.522*** (2.98)		
ROA × M2 growth		-0.029 (-0.58)		
M3 growth			0.614*** (10.41)	0.586*** (6.71)
ROA × M3 growth				0.008 (0.29)
GDP Per Capita Growth _{t-1}	-0.062 (-0.85)	-0.063 (-0.81)	-0.049 (-0.67)	-0.047 (-0.67)
Initial GDP (log)	-0.260 (-0.41)	0.062 (0.09)	0.073 (0.18)	0.139 (0.32)
Education (log)	3.560* (1.71)	3.786* (1.90)	1.696 (1.42)	1.850 (1.50)
Inflation (log)	-0.504 (-0.53)	-0.115 (-0.11)	2.585** (2.24)	3.102*** (2.99)
Openness (log)	2.643 (1.13)	2.886 (1.25)	2.906* (1.76)	3.160** (2.19)
Government Exp. (log)	-0.538 (-0.19)	-0.009 (-0.00)	1.033 (0.39)	1.476 (0.53)
Labour	0.079 (0.76)	0.060 (0.56)	-0.019 (-0.24)	0.028 (0.37)
Capital Formation	0.237* (1.69)	0.179 (1.34)	0.005 (0.06)	0.005 (0.04)
Lerner	-3.516 (-0.75)	-4.904 (-0.95)	-1.027 (-0.27)	-0.246 (-0.06)
Constant	-15.061 (-1.44)	-16.361 (-1.32)	-6.261 (-0.92)	-9.611 (-1.42)
N	353	353	352	352
No. of groups	107	107	106	106
Chi ²	314.81	339.44	542.66	475.42
Hansen p-value	0.37	0.45	0.27	0.48
AR 1	-1.96*	-2.01**	-3.07***	-3.03***
AR 2	-2.00*	-2.00*	-1.66	-1.67
<i>Long-Term Effect of ROA</i>	1.453** (1.99)	1.922** (1.99)	0.593 (1.30)	0.207 (0.47)
Full Effect		2.01** (4.17)		0.22 (0.24)

Table 5.
Financial development

System GMM panel regressions. The dependent variable is real GDP per capita growth. Variables are averaged over a 3-year time period. Dummy variables for the years are included, but not reported. The model is estimated with panel fixed-effects at the country level. The t-statistic based on Windmeijer (2005) correction of variance is reported in parentheses. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% and 1% level, respectively. Appendix A gives the definitions of the variables.

	(1)	(2)	(3)	(4)
ROA	2.748*** (4.72)	3.173*** (3.57)	2.934*** (5.00)	0.339 (0.12)
ROA _{t-1}	-0.173 (-0.44)	-0.398 (-1.08)	-0.003 (-0.01)	-0.333 (-0.98)
Private Credit	-0.067*** (-3.44)	-0.044** (-1.96)		
ROA × Private Credit		-0.008 (-0.78)		
Bank Share			-3.927 (-0.51)	-12.966 (-1.41)
ROA × Bank Share				2.673 (0.81)
GDP Per Capita Growth _{t-1}	-0.092 (-1.19)	-0.069 (-0.96)	-0.118 (-1.43)	-0.070 (-0.88)
Initial GDP (log)	0.194 (0.25)	-0.089 (-0.13)	-0.866 (-1.53)	-0.301 (-0.58)
Education (log)	6.018*** (2.71)	5.745*** (3.01)	3.592 (1.34)	2.495 (1.44)
Inflation (log)	1.680 (1.40)	1.426 (1.24)	1.396 (0.99)	2.230 (1.56)
Openness (log)	4.278** (2.03)	3.317** (1.98)	0.058 (0.02)	2.008 (0.75)
Government Exp. (log)	2.033 (0.77)	0.852 (0.37)	-1.893 (-0.47)	0.045 (0.01)
Labour	0.121 (1.07)	0.112 (1.14)	0.115 (1.22)	0.102 (1.46)
Capital Formation	0.292** (2.20)	0.302*** (2.74)	0.497*** (4.29)	0.392*** (3.69)
Lerner	-3.736 (-0.60)	-1.833 (-0.38)	-7.082 (-1.16)	-6.086 (-0.97)
Constant	-19.022 (-1.63)	-19.018** (-2.05)	-16.005 (-1.08)	-5.816 (-0.43)
N	355	355	323	323
No. of groups	107	107	102	102
Chi ²	195.03***	249.68***	220.20***	241.47***
Hansen p-value	0.28	0.42	0.26	0.50
AR 1	-2.05**	-2.03**	-1.69*	-1.86*
AR 2	-1.40	-1.40	-1.61	-1.61
<i>Long-Term Effect of ROA</i>	2.359*** (3.86)	2.596*** (2.95)	2.622*** (4.71)	0.005 (0.00)
<i>Full Effect</i>		2.77*** (9.23)		2.68*** (8.42)

Table 6.
Economic development

System GMM panel regressions. The dependent variable is real GDP per capita growth. Variables are averaged over a 3-year time period. Dummy variables for the years are included, but not reported. The model is estimated with panel fixed-effects at the country level. The t-statistic based on Windmeijer (2005) correction of variance is reported in parentheses. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% and 1% level, respectively. Appendix A gives the definitions of the variables.

	(1)	(2)	(3)	(4)	(5)
ROA	3.009*** (3.48)	3.320*** (4.23)	2.700*** (3.53)	2.703*** (3.29)	3.009*** (3.48)
ROA _{t-1}	-0.179 (-0.41)	-0.374 (-0.98)	-0.354 (-0.92)	-0.160 (-0.38)	-0.179 (-0.41)
Income Group	-1.512 (-0.70)	-0.972 (-0.47)	-1.444 (-0.69)	-0.370 (-0.22)	-1.512 (-0.70)
ROA × High Income		-1.144 (-0.93)			
ROA × Up-Middle Income			0.112 (0.11)		
ROA × Middle Income				1.031 (1.52)	
ROA × Low Income					
GDP Per Capita Growth _{t-1}	-0.118 (-1.41)	-0.099 (-1.22)	-0.100 (-1.29)	-0.118 (-1.52)	-0.118 (-1.41)
Initial GDP (log)	-0.112 (-0.16)	-0.408 (-0.80)	-0.175 (-0.34)	-0.212 (-0.37)	-0.112 (-0.16)
Education (log)	5.335 (1.09)	5.312 (1.24)	5.177 (1.31)	3.163 (0.96)	5.335 (1.09)
Inflation (log)	3.022** (2.05)	2.294 (1.62)	2.834** (2.05)	2.807* (1.92)	3.022** (2.05)
Openness (log)	3.733 (1.45)	3.239 (1.45)	1.970 (0.81)	2.419 (0.94)	3.733 (1.45)
Government Exp. (log)	1.607 (0.43)	0.426 (0.13)	1.792 (0.49)	0.999 (0.28)	1.607 (0.43)
Labour	0.032 (0.30)	0.071 (0.61)	0.043 (0.47)	0.035 (0.35)	0.032 (0.30)
Capital Formation	0.307** (2.27)	0.329*** (2.61)	0.335*** (3.00)	0.362*** (2.58)	0.307** (2.27)
Lerner	-2.443 (-0.45)	-1.963 (-0.37)	-1.311 (-0.25)	-1.303 (-0.27)	-2.443 (-0.45)
Constant	-14.521 (-1.05)	-16.400 (-1.25)	-14.362 (-1.11)	-14.872 (-1.16)	-14.521 (-1.05)
N	361	361	361	361	361
No. of groups	107	107	107	107	107
Chi ²	166.49***	259.99***	238.76***	299.81***	166.49***
Hansen p-value	0.15	0.22	0.35	0.22	0.15
AR 1	-1.88*	-1.89*	-2.03**	-1.99*	-1.88*
AR 2	-1.61	-1.60	-1.66	-1.73*	-1.61
<i>Long-Term Effect of ROA</i>	2.531*** (2.99)	2.679*** (3.43)	2.134*** (2.88)	2.275*** (2.99)	2.531*** (2.99)
<i>Full Effect</i>		1.80 (2.16)	2.46** (5.36)	3.57*** (19.56)	0.49 (0.51)

Table 7.
Institutional development

System GMM panel regressions. The dependent variable is real GDP per capita growth. Variables are averaged over a 3-year time period. Dummy variables for the years are included, but not reported. The model is estimated with panel fixed-effects at the country level. The t-statistic based on Windmeijer (2005) correction of variance is reported in parentheses. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% and 1% level, respectively. Appendix A gives the definitions of the variables.

	(1)	(2)	(3)	(4)
ROA	3.194*** (3.95)	3.268*** (3.41)	2.716*** (3.47)	2.722*** (3.45)
ROA _{t-1}	-0.263 (-0.61)	-0.577 (-1.27)	-0.423 (-0.77)	-0.619 (-1.36)
Δ.Rule of Law	0.014 (0.46)	0.046 (0.53)		
ROA × Δ.Rule of Law		0.019 (0.52)		
Δ.Regulatory Quality			0.109* (1.73)	0.093* (1.71)
ROA × Δ.Regulatory Quality				0.017 (0.76)
GDP Per Capita Growth _{t-1}	-0.081 (-1.01)	-0.062 (-0.73)	-0.082 (-1.01)	-0.072 (-0.81)
Initial GDP (log)	-0.201 (-0.33)	-0.286 (-0.46)	-0.519 (-1.03)	-0.237 (-0.54)
Education (log)	3.401 (1.28)	3.015 (1.19)	2.901 (1.08)	2.182 (0.82)
Inflation (log)	2.748* (1.90)	2.053 (1.22)	2.945** (2.09)	3.621*** (3.26)
Openness (log)	3.388 (1.46)	3.361 (1.35)	3.391 (1.49)	3.359* (1.75)
Government Exp. (log)	-0.393 (-0.13)	-1.472 (-0.42)	-0.553 (-0.17)	1.217 (0.42)
Labour	0.047 (0.45)	0.089 (0.91)	0.085 (0.76)	0.087 (0.85)
Capital Formation	0.311*** (2.68)	0.283** (2.32)	0.343*** (3.06)	0.317*** (2.67)
Lerner	-4.146 (-0.79)	-4.613 (-0.82)	-4.157 (-0.76)	-3.264 (-0.73)
Constant	-18.046 (-1.47)	-18.029 (-1.56)	-15.838 (-1.40)	-15.195 (-1.30)
N	361	361	361	361
No. of groups	107	107	107	107
Chi ²	164.95***	214.15***	233.74***	246.55***
Hansen p-value	0.17	0.27	0.25	0.33
AR 1	-2.02**	-1.99*	-2.61***	-2.71***
AR 2	-1.60	-1.56	-1.19	-1.25
<i>Long-Term Effect of ROA</i>	2.712*** (3.24)	2.534*** (2.82)	2.119*** (2.48)	1.962*** (2.78)
<i>Full Effect</i>		2.71*** (8.94)		2.12*** (7.48)

Table 8.
Robustness check: Banking Crisis

System GMM panel regressions. The dependent variable is real GDP per capita growth. Variables are averaged over a 3-year time period. Dummy variables for the years are included, but not reported. The model is estimated with panel fixed-effects at the country level. The t-statistic based on Windmeijer (2005) correction of variance is reported in parentheses. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% and 1% level, respectively. Appendix A gives the definitions of the variables.

	(1)	(2)	(3)	(4)	(5)
ROA	2.952*** (4.36)	2.174*** (3.41)	1.891*** (2.88)	3.384*** (3.22)	2.864*** (3.77)
ROA _{t-1}	-0.270 (-0.63)	-0.386 (-1.24)	0.097 (0.22)	-0.118 (-0.29)	-0.268 (-0.69)
Banking Crisis	-1.274 (-0.78)	-0.580 (-0.44)	0.671 (0.42)	-5.290* (-1.88)	0.853 (0.53)
ROA × Banking Crisis		-0.029 (-0.07)			
ROA _{t-1} × Banking Crisis			-1.664** (-2.24)		
ROA × Banking Crisis _{t-1}				-2.709 (-1.47)	
Banking Crisis _{t-1}				7.139*** (4.03)	
ROA × Banking Crisis ₂₀₀₈₋₂₀₁₀					-0.843 (-0.47)
Banking Crisis ₂₀₀₈₋₂₀₁₀					-5.703*** (-2.58)
GDP Per Capita Growth _{t-1}	-0.095 (-1.04)	-0.075 (-0.91)	-0.047 (-0.59)	-0.125 (-1.43)	-0.083 (-0.91)
Initial GDP (log)	-0.140 (-0.21)	-0.735 (-1.46)	-0.175 (-0.32)	-0.404 (-0.66)	-0.387 (-0.58)
Education (log)	3.348 (1.40)	4.018 (1.49)	3.511 (1.38)	3.432 (1.44)	4.167 (1.44)
Inflation (log)	2.833** (2.05)	2.657** (2.23)	2.526** (2.21)	2.464* (1.89)	1.970 (1.53)
Openness (log)	3.646 (1.56)	1.306 (0.69)	2.512 (1.46)	3.625* (1.66)	2.310 (1.17)
Government Exp. (log)	-0.147 (-0.04)	-1.925 (-0.65)	-0.797 (-0.24)	0.803 (0.26)	-1.418 (-0.51)
Labour	0.061 (0.66)	0.155* (1.74)	0.129 (1.49)	0.101 (0.89)	0.092 (1.05)
Capital Formation	0.338** (2.50)	0.385*** (3.70)	0.348*** (3.00)	0.389*** (3.14)	0.351*** (2.68)
Lerner	-5.948 (-1.09)	-2.416 (-0.50)	-3.559 (-0.77)	-8.166 (-1.19)	-6.571 (-1.14)
Constant	-18.234* (-1.73)	-22.947* (-1.91)	-23.564** (-1.97)	-17.074 (-1.46)	-20.528 (-1.64)
N	361	361	361	361	361
No. of groups	107	107	107	107	107
Chi ²	220.72***	275.36***	352.00***	241.81***	261.56***
Hansen p-value	0.22	0.33	0.36	0.34	0.18
AR 1	-1.94*	-2.12**	-2.28**	-2.22**	-2.23**
AR 2	-1.66	-1.82*	-1.77*	-1.68*	-1.39
<i>Long-Term Effect of ROA</i>	2.448*** (3.12)	1.663*** (3.04)	1.899*** (2.94)	2.902*** (3.13)	2.396*** (3.00)

Table 9.
Robustness check: Alternative Measure of Profitability

System GMM panel regressions. The dependent variable is real GDP per capita growth. Variables are averaged over a 3-year time period. Dummy variables for the years are included, but not reported. The model is estimated with panel fixed-effects at the country level. The t-statistic based on Windmeijer (2005) correction of variance is reported in parentheses. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% and 1% level, respectively. Appendix A gives the definitions of the variables.

	(1)	(2)	(3)
ROE	0.274** (2.55)	0.243** (2.21)	0.289** (1.99)
ROE _{t-1}	0.054 (0.84)	0.070 (1.09)	0.051 (0.68)
Banking Crisis		-3.536* (-1.69)	-2.227 (-0.74)
ROE × Banking Crisis			-0.154 (-0.69)
GDP Per Capita Growth _{t-1}	-0.111 (-1.51)	-0.139* (-1.66)	-0.151* (-1.83)
Initial GDP (log)	-0.770 (-1.10)	-0.760 (-1.03)	-0.664 (-0.85)
Education (log)	3.630 (1.32)	4.199 (1.45)	4.282 (1.39)
Inflation (log)	2.344 (1.43)	2.614* (1.66)	2.715* (1.75)
Openness (log)	2.374 (1.09)	2.089 (0.98)	2.089 (0.91)
Government Exp. (log)	-4.652 (-1.27)	-3.251 (-0.86)	-2.685 (-0.76)
Labour	0.036 (0.30)	0.040 (0.33)	0.035 (0.30)
Capital Formation	0.411*** (3.13)	0.388*** (2.97)	0.395*** (3.11)
Lerner	0.317 (0.06)	-1.071 (-0.22)	-0.357 (-0.08)
Constant	-22.535** (-2.14)	-19.832* (-1.79)	-20.779* (-1.73)
N	361	361	361
No. of groups	107	107	107
Chi ²	176.10***	201.73***	209.54***
Hansen p-value	0.12	0.13	0.17
AR 1	-1.97*	-1.99*	-1.93*
AR 2	-2.14**	-2.09**	-2.08**
<i>Long-Term Effect of ROE</i>	0.294*** (3.29)	0.275*** (3.05)	0.296*** (3.02)

Table 10.
Robustness check: Alternative Measure of Growth

System GMM panel regressions. The dependent variable is real GDP growth. Variables are averaged over a 3-year time period. Dummy variables for the years are included, but not reported. The model is estimated with panel fixed-effects at the country level. The t-statistic based on Windmeijer (2005) correction of variance is reported in parentheses. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% and 1% level, respectively. Appendix A gives the definitions of the variables.

	(1)	(2)	(3)
ROA	2.813*** (4.07)	2.747*** (4.44)	2.305*** (3.52)
ROA _{t-1}	-0.230 (-0.53)	-0.248 (-0.60)	-0.119 (-0.32)
Banking Crisis		-1.981 (-1.15)	-0.804 (-0.45)
ROA × Banking Crisis			-1.519 (-1.39)
GDP Growth _{t-1}	-0.111 (-1.37)	-0.140* (-1.65)	-0.134* (-1.75)
Initial GDP (log)	-0.169 (-0.27)	-0.032 (-0.05)	-0.136 (-0.25)
Education (log)	1.567 (0.69)	1.642 (0.82)	2.107 (0.85)
Inflation (log)	2.693** (2.13)	2.808** (2.22)	2.593** (2.20)
Openness (log)	3.501 (1.29)	3.765 (1.57)	3.154 (1.61)
Government Exp. (log)	-0.021 (-0.01)	0.373 (0.12)	-0.065 (-0.02)
Labour	0.212** (2.02)	0.213** (2.32)	0.252*** (3.07)
Capital Formation	0.364*** (3.27)	0.371*** (2.89)	0.405*** (3.66)
Lerner	0.168 (0.04)	-1.554 (-0.29)	-1.727 (-0.33)
Constant	-23.436** (-1.97)	-23.294** (-2.29)	-26.467** (-2.29)
N	361	361	361
No. of groups	107	107	107
Chi ²	183.92***	246.37***	352.99***
Hansen p-value	0.16	0.27	0.26
AR 1	-2.03**	-1.97**	-2.32**
AR 2	-1.55	-1.54	-1.53
<i>Long-Term Effect of ROA</i>	2.325*** (3.19)	2.192*** (3.29)	1.928*** (3.01)

Table 11.
Robustness check: Test of a Nonlinear Relationship

System GMM panel regressions. The dependent variable is real GDP per capita growth. Variables are averaged over a 3-year time period. Dummy variables for the years are included, but not reported. The model is estimated with panel fixed-effects at the country level. The t-statistic based on Windmeijer (2005) correction of variance is reported in parentheses. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% and 1% level, respectively. Appendix A gives the definitions of the variables.

	(1)	(2)	(3)
ROA	1.834*** (2.74)	3.895*** (3.78)	0.576 (0.46)
ROA _{t-1}	-0.012 (-0.03)	-0.150 (-0.35)	0.206 (0.56)
ROA ²	0.179 (1.49)		
ROA × Q _{ROA} 1		-2.895* (-1.74)	
ROA × Q _{ROA} 2			3.422 (1.49)
ROA × Q _{ROA} 3			3.565 (1.06)
ROA × Q _{ROA} 4			2.125 (1.15)
ROA × Q _{ROA} 5			2.132 (1.29)
GDP Per Capita Growth _{t-1}	-0.086 (-1.16)	-0.082 (-0.98)	-0.136* (-1.87)
Initial GDP (log)	-0.058 (-0.12)	0.398 (0.71)	0.061 (0.14)
Education (log)	3.391 (1.42)	4.528* (1.74)	4.305 (1.39)
Inflation (log)	3.320*** (2.82)	2.918** (2.23)	3.587*** (2.59)
Openness (log)	1.931 (0.83)	3.763 (1.63)	0.203 (0.11)
Government Exp. (log)	0.374 (0.13)	0.723 (0.26)	1.685 (0.56)
Labour	0.097 (0.89)	0.004 (0.03)	0.019 (0.19)
Capital Formation	0.332*** (2.89)	0.262* (1.96)	0.316** (2.46)
Lerner	-0.311 (-0.07)	-1.323 (-0.32)	1.659 (0.34)
Constant	-23.014** (-2.27)	-23.615* (-1.95)	-21.636* (-1.75)
N	361	361	361
No. of groups	107	107	107
Chi ²	181.98***	154.83***	241.11***
Hansen p-value	0.29	0.33	0.79
AR 1	-1.85*	-1.70*	-1.93*
AR 2	-1.90*	-1.78*	-1.98*
<i>Long-Term Effect of ROA</i>	1.678*** (2.96)	3.461*** (3.60)	0.688 (0.57)

Table 12.
Robustness check: Alternative Averaging

The table presents alternative periods to average variables. We use 2-year periods and perform system GMM regressions. We use 5-year periods and perform panel fixed effects estimations with robust standard errors (the number of periods by country is not sufficient to estimate system GMM panel regressions). The dependent variable is real GDP per capita growth. Dummy variables for the years are included but not reported. The model is estimated with panel fixed-effects at the country level. The t-statistic based on Windmeijer (2005) correction of variance is reported in parentheses. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% and 1% level, respectively. Appendix A gives the definitions of the variables.

	2 Years – System GMM			5 Years – Panel Fixed Effects		
	(1)	(2)	(3)	(4)	(5)	(6)
ROA	3.626*** (4.24)	2.963*** (3.89)	2.242*** (3.72)	0.939*** (3.06)	0.819*** (2.82)	0.722** (2.39)
ROA _{t-1}	-1.501*** (-3.25)	-1.378*** (-3.25)	-0.876** (-2.24)			
Banking Crisis		-2.160 (-1.15)	-1.892 (-1.16)		-1.663* (-1.73)	-1.766* (-1.80)
ROA × Banking Crisis			0.410 (1.12)			0.177 (1.13)
GDP Per Capita Growth _{t-1}	-0.040 (-0.51)	-0.032 (-0.43)	-0.044 (-0.61)			
Initial GDP (log)	-0.816 (-1.15)	-0.839 (-1.46)	-0.863** (-2.11)	-6.367 (-1.51)	-6.037 (-1.46)	-6.362 (-1.51)
Education (log)	6.062 (1.49)	4.531 (1.23)	4.194 (1.38)	1.026 (0.14)	0.223 (0.03)	0.591 (0.08)
Inflation (log)	0.534 (0.39)	1.167 (0.87)	1.554 (1.16)	-0.791 (-0.76)	-0.675 (-0.65)	-0.588 (-0.56)
Openness (log)	-2.774 (-1.05)	-1.197 (-0.58)	-1.397 (-0.68)	-1.384 (-0.38)	-1.150 (-0.32)	-1.283 (-0.35)
Government Exp. (log)	-4.092 (-0.97)	-3.186 (-0.76)	-2.299 (-0.57)	-6.824 (-1.30)	-6.283 (-1.19)	-6.336 (-1.20)
Labour	-0.050 (-0.47)	-0.048 (-0.57)	-0.064 (-0.76)	0.020 (0.26)	0.017 (0.22)	0.018 (0.23)
Capital Formation	0.654*** (4.25)	0.605*** (3.79)	0.592*** (4.17)	0.585*** (4.11)	0.571*** (4.02)	0.572*** (4.05)
Constant	-17.930 (-1.16)	-11.430 (-0.76)	-7.918 (-0.52)	44.678 (0.87)	44.564 (0.87)	47.212 (0.92)
N	477	477	477	332	332	332
No. of groups	118	118	118	125	125	125
Chi ²	232.84***	286.18***	223.20***			
Hansen p-value	0.89	0.99	1.00			
AR 1	-3.20***	-3.29***	-3.15***			
AR 2	-1.41	-1.75	-1.76			
Adjusted R ²				0.59	0.59	0.59
F				36.02***	33.74***	31.67***
<i>LT Effect of ROA</i>	2.043*** (3.03)	1.536*** (2.63)	1.308*** (2.72)			

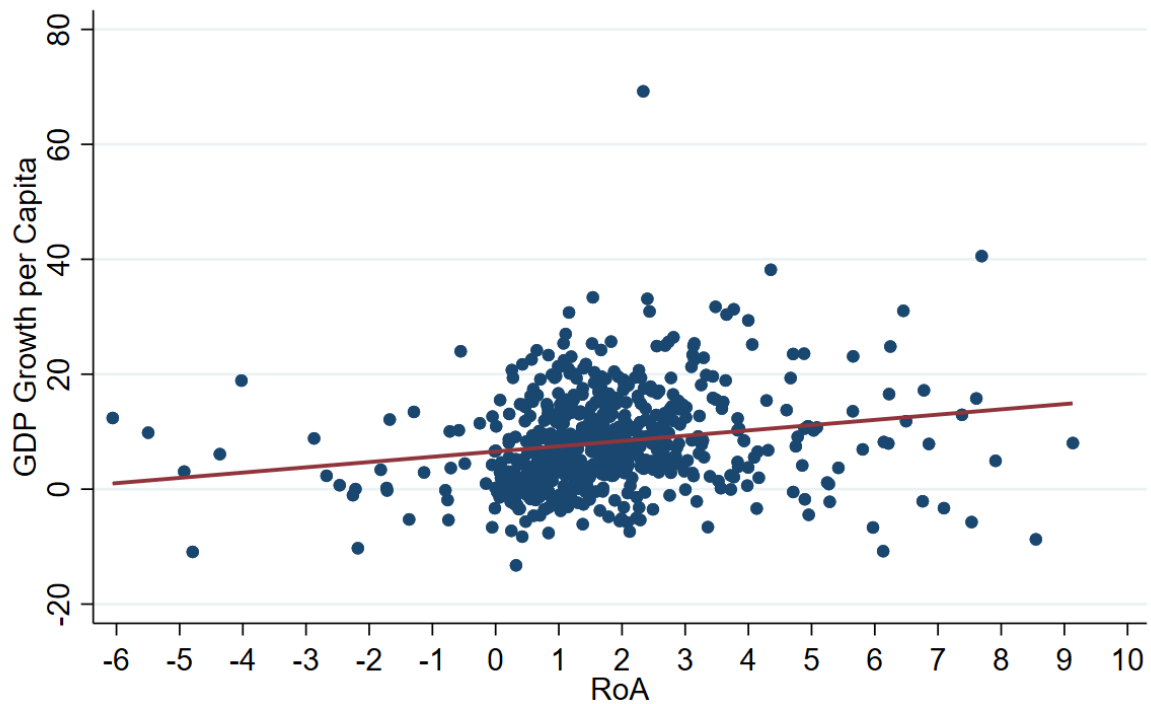
Table 13.
The role of risk

System GMM panel regressions. The dependent variable is real GDP per capita growth. Variables are averaged over a 3-year time period. Dummy variables for the years are included, but not reported. The model is estimated with panel fixed-effects at the country level. The t-statistic based on Windmeijer (2005) correction of variance is reported in parentheses. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% and 1% level, respectively. Appendix A gives the definitions of the variables.

	(1)	(2)
ROA	2.405** (2.47)	1.856* (1.90)
ROA _{t-1}	-0.105 (-0.28)	-0.651* (-1.81)
Z-Score	-0.071 (-0.64)	
Z-Score × ROA	0.014 (0.26)	
NPL		-0.313 (-1.57)
NPL × ROA		0.004 (0.06)
GDP Per Capita Growth _{t-1}	-0.095 (-1.26)	-0.079 (-1.09)
Initial GDP (log)	-0.365 (-0.68)	-1.327* (-1.95)
Education (log)	3.293 (1.36)	1.986 (0.36)
Inflation (log)	2.319* (1.80)	2.654* (1.78)
Openness (log)	2.129 (0.87)	-1.206 (-0.59)
Government Exp. (log)	-1.465 (-0.48)	-2.322 (-0.68)
Labour	0.088 (0.84)	0.243** (2.05)
Capital Formation	0.374*** (3.32)	0.462*** (4.17)
Lerner	-2.705 (-0.58)	-5.096 (-0.88)
Constant	-19.628* (-1.76)	-17.145 (-0.76)
N	361	297
No. of groups	107	88
Chi ²	175.65***	303.84***
Hansen p-value	0.31	0.76
AR 1	-1.96*	-2.39**
AR 2	-1.90*	-1.82*
<i>Long-Term Effect of ROA</i>	2.100*** (2.46)	1.117* (1.73)

Figure 1.
ROA and GDP growth

The graph below relates banks' return-on-assets on the horizontal axis and GDP growth per capita on the vertical axis. The solid line fits the result of a linear prediction of GDP growth per capita on banks' return-on-assets. Each dot represents a three-year period in a country, with 635 observations and 132 countries. The first and last percentiles have been removed.



• GDP growth per capita — Linear Prediction

GDP Growth per Capita = $6.55 + .92\text{RoA}$ $R^2=3.42\%$ $N=623$ No. of countries=132

Appendix A.

Variable definitions and sources

Variable	Description	Source
ROA	Aggregated banks' return-on-assets (% , before tax) at the country-level. Unconsolidated across countries.	Global Financial Development Database (GFDD)
GDP growth per capita	GDP per capita growth (annual %). Calculation is based on the GDP per capita (current US\$).	World Development Indicators (WDI)
GDP per capita	Value of GDP per capita at market prices (current US\$). Regressions use the initial value of this variable (<i>Initial GDP</i>).	WDI
Education	Years of schooling for population aged 25 and over. Data available on a 5-year basis; gaps are linearly extrapolated.	Barro & Lee Database (2016 edition)
Inflation	Annual variation of the consumer price index (ΔCPI) in %. Observations below -10% are dropped. In regressions, negative observations are set to zero and then apply the inverse hyperbolic sine transformation $Inflation = \ln(\Delta CPI + \sqrt{\Delta CPI^2 + 1})$	WDI
Openness	Trade (% of GDP). Regressions take the log of the ratio not in percentage.	WDI
Government Exp.	General government final consumption expenditure (% of GDP). Regressions take the log of the ratio not in percentage.	WDI
Labour	Proportion of a country's population that is employed, in percent. Ages 15 and older are considered the working-age population.	WDI
Capital Formation	Gross capital formation, in current US\$, in percent of GDP in current US\$.	WDI
Banking Crisis	Banking crisis dummy (1=banking crisis, 0=none).	GFDD
Z-Score	$\left(ROA + \left(\frac{Equity}{Assets}\right)\right) / \sigma_{ROA}$; σ_{ROA} is the standard deviation of ROA.	GFDD
NPL	Ratio of defaulting loans (payments of interest and principal past due by 90 days or more) to total gross loans.	GFDD
M2 growth	Growth of money and quasi money (annual %).	WDI, ECB Database
M3 growth	Growth of broad money (annual %).	GFDD
Bank Share	Banks' private credit scaled by the sum of banks' private credit and central bank assets.	GFDD
Private Credit	Domestic credit to private sector as a percentage of GDP.	GFDD
Rule of Law	Captures perceptions of the extent to which agents have confidence in and abide by the rules of society. Gaps for the years 1999 and 2001 are linearly extrapolated.	Worldwide Governance Indicators
Income Group	Income classification of countries by the World Bank (1=Low Income, 2=Middle Income, 3=Upper Middle Income, 4=High Income). We create the corresponding dummy variables.	WDI
Regulatory Quality	Captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Gaps for the years 1999 and 2001 are linearly extrapolated.	Worldwide Governance Indicators
ROE	Aggregated banks' return-on-equity (% , before tax) at the country-level. Unconsolidated across countries.	GFDD
GDP growth	GDP growth (annual %). Calculation is based on the GDP at market prices (current US\$).	WDI
QROA	Dummy variable for each ROA quintile (Q _{ROA1} to Q _{ROA5})	
Lerner	Measure of market power in the banking market. It compares output pricing and marginal costs.	GFDD

Appendix B. First-Stage IV Panel FE

The table below presents the first-stage of the Instrumental Variables (IV) Panel Fixed-Effects (FE) regressions. The result column is based on the model in Table 3. The variable Lerner and its lag instrument the variable ROA. Variables are averaged over a 3-year time period. Dummy variables for the years are included but not reported. We test over-identification using Hansen J-statistic, under-identification using Kleibergen-Paap test and weak instrument using Anderson-Rubin χ^2 test. T-statistic based on robust variances is reported in parentheses. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% and 1% level, respectively. Appendix A gives the definitions of the variables.

	Table 3 ROA
Lerner	4.726** (2.24)
Lerner _{t-1}	1.375 (0.82)
GDP Per Capita Growth _{t-1}	-0.008 (-0.99)
Initial GDP (log)	1.706 (1.55)
Education (log)	0.677 (0.49)
Inflation (log)	-0.067 (-0.31)
Openness (log)	-0.146 (-0.14)
Government Exp. (log)	1.991 (1.62)
Labour	0.013 (0.73)
Capital Formation	0.075*** (2.68)
Constant	-19.489 (-1.56)
N	359
No. of groups	107
Adjusted R ²	0.20
F	11.22***
$H_0 = \text{No over-identification}$	0.02
p-value	0.88
$H_0 = \text{Under-identification}$	12.71***
p-value	0.00
$H_0 = \text{Weak-Instrument}$	8.30**
p-value	0.02

Appendix C. List of countries used in analysis

This table displays the list of the 132 countries included in our analysis. We provide the GDP growth per capita and the return on assets in percentage. Figures are averaged over 1999–2013.

Country	Growth	ROA	Country	Growth	ROA
Afghanistan	6.37	0.90	Lao PDR	5.81	1.38
Albania	5.91	2.28	Latvia	5.41	0.34
Algeria	2.04	1.01	Lesotho	3.04	4.10
Argentina	2.14	0.57	Liberia	3.10	1.43
Armenia	7.45	2.75	Libya	2.57	0.97
Australia	1.70	1.19	Lithuania	5.42	-0.31
Austria	1.33	0.64	Luxembourg	1.70	0.60
Bahrain	-0.36	1.77	Macao SAR, China	8.80	1.16
Bangladesh	4.12	3.01	Malawi	1.17	6.17
Barbados	0.70	1.66	Malaysia	3.21	2.08
Belgium	1.07	0.78	Mali	1.09	1.50
Belize	1.13	4.32	Malta	1.45	0.10
Benin	1.18	1.40	Mauritania	2.00	1.81
Bolivia	2.12	1.12	Mauritius	3.42	2.04
Botswana	3.12	2.00	Mexico	0.91	0.97
Brazil	2.15	1.82	Mongolia	5.93	1.43
Brunei Darussalam	0.23	0.98	Morocco	3.10	1.50
Bulgaria	4.06	1.24	Mozambique	4.51	1.03
Burundi	-0.25	3.99	Namibia	3.50	2.54
Cambodia	6.09	0.95	Nepal	2.79	2.10
Cameroon	1.08	2.23	Netherlands	1.05	0.17
Canada	1.39	1.51	New Zealand	1.67	1.25
Central African Republic	-0.56	2.24	Nicaragua	2.33	0.67
Chile	2.67	2.20	Niger	0.34	1.78
China	9.10	1.00	Norway	0.77	0.80
Colombia	2.49	1.41	Pakistan	1.88	0.62
Congo, Rep.	2.50	2.64	Panama	4.61	1.48
Costa Rica	2.93	1.85	Paraguay	1.63	2.43
Cote d'Ivoire	-0.39	1.43	Peru	3.89	2.04
Croatia	2.03	0.89	Philippines	2.99	1.38
Cyprus	0.59	1.72	Poland	3.79	1.42
Czech Republic	2.43	1.01	Portugal	0.35	0.19
Denmark	0.55	0.84	Qatar	1.47	2.53
Dominican Republic	3.31	2.36	Russian Federation	5.19	3.89
Ecuador	1.99	-5.37	Rwanda	4.56	3.86
Egypt, Arab Rep.	2.45	0.89	Saudi Arabia	2.16	2.20
El Salvador	1.63	1.99	Senegal	1.19	2.29
Estonia	4.34	3.26	Sierra Leone	2.47	7.97
Finland	1.49	-0.09	Singapore	3.68	1.34
France	0.88	0.81	Slovak Republic	3.72	0.47

Gabon	-0.71	2.48	Slovenia	1.98	1.11
Gambia, The	0.51	6.63	South Africa	1.65	1.45
Germany	1.24	0.45	Spain	0.71	0.85
Ghana	3.81	5.99	Sri Lanka	4.35	1.28
Greece	0.10	-2.14	Sudan	3.98	1.69
Guatemala	1.12	1.33	Swaziland	0.99	3.32
Guyana	2.62	2.23	Sweden	1.74	1.62
Haiti	-0.90	1.48	Switzerland	1.07	0.98
Honduras	1.89	1.85	Syrian Arab Republic	0.75	0.57
Hong Kong SAR, China	3.42	1.75	Tajikistan	5.46	3.18
Hungary	2.26	1.57	Tanzania	3.36	3.58
Iceland	1.78	-6.26	Thailand	3.74	0.81
India	5.48	1.39	Togo	-0.10	2.52
Indonesia	3.67	0.80	Tonga	0.94	4.27
Iraq	3.56	2.76	Trinidad and Tobago	4.63	1.90
Ireland	2.25	0.47	Tunisia	2.82	-0.11
Israel	1.97	0.67	Turkey	2.52	2.92
Italy	-0.07	0.78	Uganda	3.37	4.87
Jamaica	0.26	1.50	Ukraine	4.46	1.27
Japan	0.81	0.20	United Kingdom	1.27	1.00
Jordan	2.85	1.52	United States	1.17	1.46
Kazakhstan	6.76	1.76	Uruguay	2.51	-0.03
Kenya	1.51	1.83	Venezuela, RB	1.19	2.98
Korea, Rep.	4.28	0.44	Vietnam	5.08	1.53
Kuwait	-0.21	2.10	Yemen, Rep.	1.27	2.10
Kyrgyz Republic	3.40	3.53	Zimbabwe	-0.50	6.13