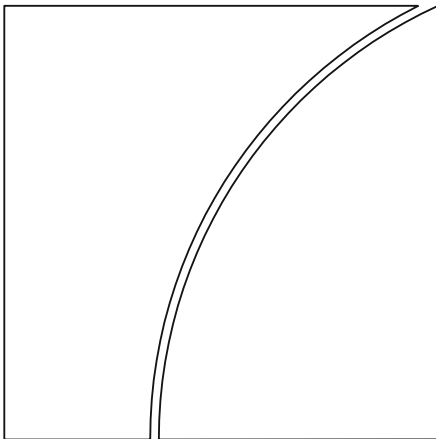




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# Determinants of bank profitability in emerging markets

by E. Kohlscheen, A. Murcia and J. Contreras

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Keywords: bank profitability, credit, risk premia, emerging markets, interest rates.

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# Determinants of bank profitability in emerging markets

E. Kohlscheen, A. Murcia and J. Contreras \*

## Abstract

We analyse key determinants of bank profitability based on the evolution of balance sheets of 534 banks from 19 emerging market economies. We find that higher long-term interest rates tend to boost profitability, while higher short-term rates reduce profits by raising funding costs. We also find that in normal times credit growth tends to be more important for bank profitability than GDP growth. The financial cycle thus appears to predict bank profitability better than the business cycle. We also show that increases in sovereign risk premia reduce bank profits in a significant way, underscoring the role of credible fiscal frameworks in supporting the overall financial stability.

JEL codes: E32, E43, G21.

Keywords: bank profitability, credit, risk premia, emerging markets, interest rates.

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\*The views expressed in this paper are those of the authors and do not necessarily reflect those of the Bank for International Settlements or the Bank of the Republic (Colombia). We would like to thank Dietrich Domanski, Leonardo Gambacorta, Dubravko Mihaljek and Christian Upper for useful suggestions.

# 1 Introduction

Banking in emerging market economies (EMEs) has seen important transformations during the last two decades. Indeed, it is difficult to overstate the magnitude of the changes that have taken place. Supported by strong domestic output growth and easy funding conditions in global markets - particularly after the great financial crisis - total bank credit to the private sector measured in US dollars, expanded ninefold since 2000 and tripled since the end of 2007 (Figure 1).<sup>1</sup> Lower borrowing costs and greater availability of funding have in turn been transmitted to the economy, boosting consumption and investment. At the same time, the rapid credit expansion has also raised debt servicing burdens of the private sector.

Evolving international conditions, turning financial cycles, as well as important changes in interest rate levels and risk premia in some EMEs have increased the need to better understand the determinants of bank profitability and resilience in EMEs. In particular, given the frequently high degree of correlation of domestic credit growth with global credit growth, one question that emerges is how a possible moderation in the rate of credit expansion in EMEs could affect bank profitability and its components. Second, given the prospect of monetary policy normalization in major economies, how would

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<sup>1</sup>To be more precise, total bank credit to the 17 countries listed in Graph 1 grew from \$2.9 tn at the end of 2000, to \$8.8 tn at the end of 2007. By mid-2017, total bank credit to the non-financial sector had reached \$26.5 tn. Corresponding figures without China are, respectively, \$1.6 tn, \$4.9 tn and \$8.3 tn.

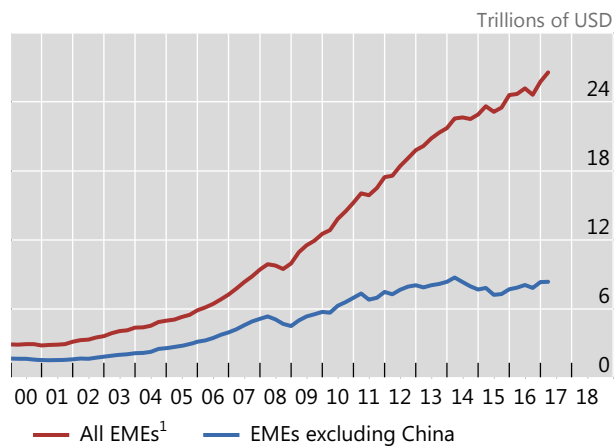
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## Bank credit to the private non-financial sector in EMEs

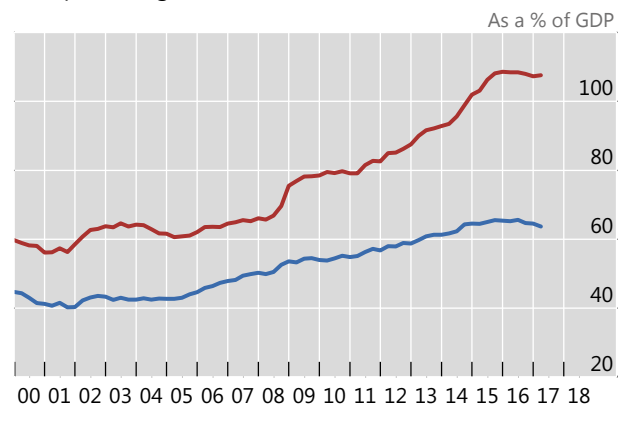
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Figure 1

In trillions of US dollars



As a percentage of GDP



1 Brazil, Chile, China, Colombia, the Czech Republic, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Poland, Russia, South Africa, Thailand and Turkey.

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changing interest rates, yield curves and risk premia impact future profitability? Third, how is profitability affected by bank size, liquidity ratios, funding and other bank specific variables. This study provides answers to all of these questions through a systematic analysis of the determinants of bank profitability and its components in EMEs, based on information contained in the balance sheets of 534 banks from 19 EMEs over a period of 15 years.

The results that emerge from our analysis show that the profitability of EME banks is affected by a variety of aggregate and bank-specific factors. First, we conclude that profitability responds positively to bank-specific credit growth. Banks with higher rates of loan growth are more profitable, suggesting that the credit cycle is key for bank profitability. Second, we find that while the level of short term interest rates is negatively correlated with bank profitability, the level of long-term interest rates is clearly positively correlated with it. This is consistent with the maturity transformation role that banks perform. Third, we find that rising sovereign risk premia bite into bank profitability in a significant way. This underscores the role of credible fiscal frameworks in supporting overall financial stability.

While there are several studies that have analyzed the determinants of bank profitability, most of the literature has focused on advanced economies (eg English (2002), Albertazzi and Gambacorta (2009), Bolt et al (2012), Alessandri and Nelson (2015), Borio, Gambacorta and Hofmann (2015)). In contrast, we focus deliberately on banks from emerging markets, which have

grown considerably during the last decade.

By and large, our results are in line with those of previous studies on advanced economies, such as Albertazzi and Gambacorta (2009) and Alessandri and Nelson (2015). This suggests that banks in EMEs are relatively similar to their advanced economies counterparts. However, our finding that, under normal conditions, the credit cycle matters more than GDP growth for bank profitability is new. The focus on EME banks - which typically operate in less sophisticated financial markets - also meant that effects of interest rates on bank profitability and its components are found to be somewhat stronger than those of the more comprehensive recent study by Claessens et al (2018).

The focus on EME banks adds to the literature, as the economic environment in which EME banks operate can differ from that of advanced economies in substantial ways. Aggregate risk considerations, for instance, tend to be much more prevalent in EMEs. Our novel finding that CDS spreads reduce EME bank returns in a way that is economically and statistically significant, for instance, points to the importance of keeping coherent macroeconomic frameworks in place, particularly with respect to fiscal accounts. Rising sovereign risks also tend to restrict banks' funding alternatives, and consequently possibilities for their expansion and overall profitability. Furthermore, they tend to induce currency depreciation, which could dampen capital flows and credit, if the currency risk-taking channel becomes dominant (Bruno and Shin (2015)).

Our study is also related to the broader financial stability literature, as bank profitability is an important predictor of financial crises (see eg Demirguc-Kunt and Detragiache (1999)). Our contribution is to highlight and quantify the relative importance of key factors that may support profitability and financial resilience in EMEs.

The remainder of this paper is organized as follows. In Section 2 we describe broad trends in bank profitability in EMEs and their relation to key economic variables. In Section 3 we estimate the main determinants of EME bank profitability. We also discuss how economic conditions affect net interest margins, non-interest income and loan loss provisions. In Section 4, we show that our main results carry over to an analysis that is based on the return on equity (ROE). Section 5 concludes and indicates possible directions for future research.

## **2 EME banks' profitability: overall trends**

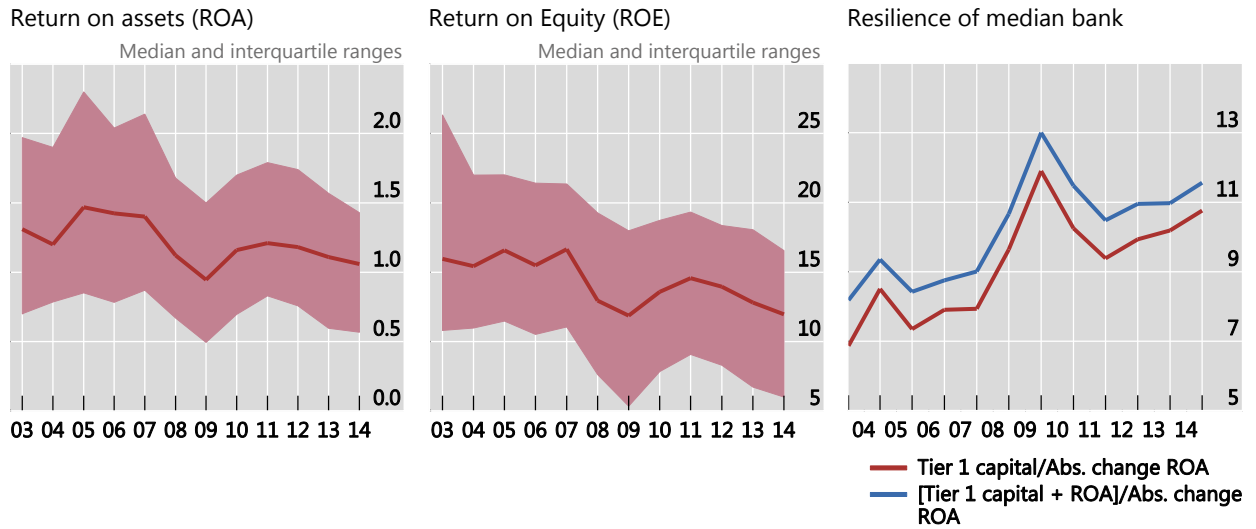
Banking sector performance in EMEs, measured by the average return on assets (ROA), was by and large on a rising trend before the global financial crisis (Figure 2, left panel). Since 2008, however, profitability has remained below pre-crisis levels. The centre panel of Figure 2 shows a relatively similar evolution for return on equity (ROE) - our second measure of bank profitability. Differences between ROA and ROE tend to reflect factors such as the underlying changes in leverage. In what follows we analyze the key drivers



## Evolution of profitability in EMEs

Median and interquartile ranges

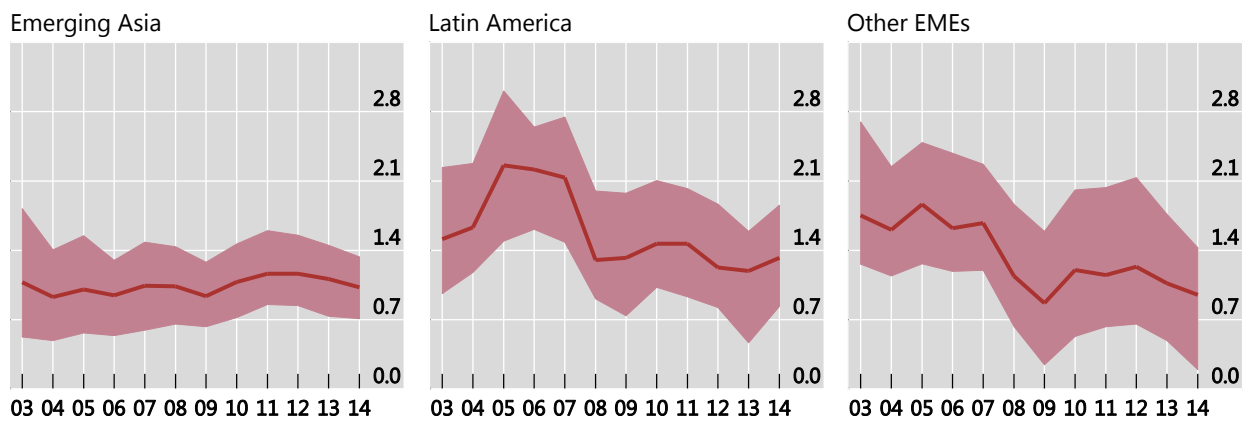
Figure 2



## Evolution of ROA by regions

Median and interquartile ranges

Figure 3



of these indicators of bank profitability and its components, including the extent to which profitability is affected by the business and the financial cycle. While we mostly employ the ROA measure as our benchmark, we check whether the conclusions carry over to ROE in the robustness section.

Despite an overall reduction in profitability, it is noteworthy that the resilience of the median EME bank - here proxied by the ratio  $(\text{tier 1 capital} / \text{total assets} + \text{ROA}) / \text{abs}(\text{change ROA})$  - increased relative to the pre-crisis period (Figure 2, right hand panel).<sup>2</sup> Stronger robustness followed from significant increases in capital ratios during the crisis and the fact that profits of the median EME bank remained positive throughout our entire sample period.<sup>3</sup> In terms of geography, Figure 3 shows that the post-crisis decline in profitability was mostly driven by non-Asian banks, were profitability had been well above that of Asian banks before the crisis.<sup>4</sup>

As a first pass, Figure 4 shows how ROAs of individual banks are related to bank-specific loan growth (left-hand panel), as well as how average profitability in a given country and year is related to the local short- and long-term interest rates (second and third panels). One can easily notice a positive relationship between the bank-specific credit growth and EME bank

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<sup>2</sup>For a similar use of the Z-score statistic as an indication of bank risk or resilience see Altunbas et al (2018).

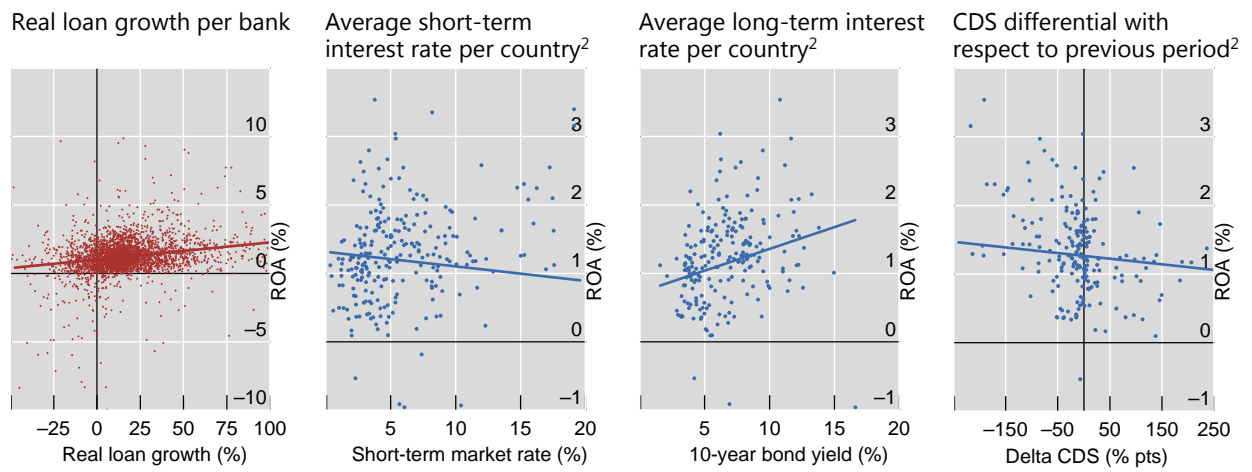
<sup>3</sup>Furthermore, bank-specific return on assets also appear to have become less volatile across time.

<sup>4</sup>GDP growth slowed somewhat relative to the pre-crisis period and policy rates fell strongly in all emerging market regions. Bank credit growth however accelerated from 6% per year in real terms on average pre-crisis to 8% post-crisis in Asia. Outside of Asia, it decelerated from 12% per year to 7% (unweighted averages).

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Correlates of bank profitability<sup>1</sup>

Figure 4



<sup>1</sup> Scales adjusted to show most data points. <sup>2</sup> Data correspond to average ROA of all banks in the sample per country and year. Therefore, each data point represents a country in a specific year.

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profits. The same can be said of the relationship with the prevailing long-term interest rates. At the same time, the second panel shows a negative relationship between short-term interest rates and the return on assets, possibly reflecting the negative effects of higher funding costs. The right-hand panel exhibits the expected negative relationship between the changes in sovereign credit default swaps (CDS), a proxy measure of countrywide prevailing risk and return on bank assets.

### **3 Empirical analysis**

The figures presented in the previous section are only indicative. To perform a systematic evaluation of the determinants of bank profitability in EMEs, we use detailed micro-level bank balance sheet data from BankScope. All private banks for which balance sheet data were available for at least 3 consecutive years and that had total assets of at least \$ 1 billion were included in the sample. This led to a sample containing 534 private banks from 19 emerging markets. The panel includes seven Asian economies, five economies from Latin America, five from central and eastern Europe, as well as South Africa and Israel. Table A1 in the Appendix provides precise details on geographic coverage. Our sample spans the period from 2000 to 2014.

### 3.1 Return on assets

Return on assets (ROA) is the simplest measure of bank profitability. It reflects the capability of a bank to generate profits from its asset management functions. Therefore it is frequently used as the key ratio for evaluation of bank profitability in the literature (eg Molyneux and Thornton (1992), Golin (2001), Claessens and Laeven (2004) and Mamatzakis and Bermpei (2016)).

To evaluate the effects of different variables on overall bank profitability, we estimate an equation containing the main factors that may affect profits. We look at both aggregate and idiosyncratic factors. Throughout we control for global effects by including a complete set of time dummies. Our baseline empirical model is specified as follows:

$$\begin{aligned} y_{i,j,t} = & \alpha + \rho_1 y_{i,j,t-1} + \alpha_1 LG_{i,j,t} + \alpha_2 size_{i,j,t} + \alpha_3 cap_{i,j,t} + \alpha_4 liq_{i,j,t} + \\ & + \alpha_5 nocore_{i,j,t} + \alpha_6 efficiency_{i,j,t} + \beta_1 GDPg_{i,t} + \beta_2 SR_{i,t} + \\ & + \beta_3 LR_{i,t} + \beta_4 CDS_{i,t} + \beta_5 \pi_{i,t} + \eta_j + \tau_t + \varepsilon_{i,j,t} \end{aligned}$$

where  $y_{i,j,t}$  represents the profitability measure of financial institution  $j$ , located in country  $i$ , at time  $t$ .

Bank-specific explanatory variables are:

$LG_{i,j,t}$ , which represents the loan growth rate of the specific institution in year  $t$ , measured in real terms (ie deflated by CPI inflation);

$size_{i,j,t}$  captures possible scale effects. It is measured as the log of the total value of the loan book in USD millions in any given year;

$cap_{i,j,t}$  represents the ratio between the capital and total assets of the respective bank;

$liq_{i,j,t}$  captures the liquidity position of the financial institution. This is proxied by the ratio between bank holdings of securities and total assets;

$nocore_{i,j,t}$  represents the share of funding that is not obtained from consumer deposits;<sup>5</sup>

$efficiency_{i,j,t}$  is a measure that is negatively related to cost efficiency, defined as the ratio between operational expenses and gross revenues.<sup>6</sup>

Our aggregate economic variables, which differ between countries include:

$GDPg_{i,t}$  that denotes the annual GDP growth rate of the host country of bank  $i$  in year  $t$ , in real terms;

$SR_{i,t}$  which represents the short-term interest, here proxied by the inter-bank rate;

$LR_{i,t}$  which corresponds to the 10-year bond yield rate.

$CDS_{i,t}$  and  $\pi_{i,t}$ , which represent the spread of the sovereign 5-year credit default swaps (a proxy for aggregate risk) and the CPI inflation, respectively.

Because of potential endogeneity of regressors, we estimate the above equation using the system GMM estimator of Arellano and Bover (1995). The dynamic model specification accommodates the tendency for bank variables to persist over time and be serially correlated. Lagged variables of explanatory variables were used as instruments in the GMM equation.  $\tau_t$

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<sup>5</sup>That is  $1 - Bankscope\_var11550/Bankscope\_var11750$ .

<sup>6</sup>Based on Bankscope's variable 18070.

<b>Determinants of return on bank assets (ROA)</b>				<b>Table 1</b>
	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>
ROA <sub>i,t-1</sub>	0.3005*** (0.1115)	0.2487*** (0.0821)	0.2514*** (0.0817)	0.2493*** (0.0711)
Real loan growth		0.0065*** (0.0024)	0.0066*** (0.0024)	0.0082*** (0.0026)
GDP growth	0.0049 (0.0121)		-0.0097 (0.0118)	0.0256 (0.0170)
GDP growth squared				-0.0049** (0.0019)
Short-term market rate	-0.0574** (0.0234)	-0.0473* (0.0263)	-0.0529** (0.0258)	-0.0308 (0.0258)
10-year bond yield	0.1388*** (0.0507)	0.1535*** (0.0515)	0.1552*** (0.0501)	0.1153*** (0.0400)
CDS	-0.0026*** (0.0009)	-0.0024** (0.0009)	-0.0027*** (0.0010)	-0.0024*** (0.0009)
CPI inflation	-0.0073 (0.0174)	-0.0248 (0.0182)	-0.0199 (0.0185)	-0.0145 (0.0166)
Log assets	-0.2256** (0.0914)	-0.1824** (0.0886)	-0.2015** (0.0883)	-0.2096** (0.0908)
Equity/total assets	0.0760*** (0.0207)	0.0754*** (0.0227)	0.0730*** (0.0221)	0.0730*** (0.0212)
Liquidity	0.0098** (0.0045)	0.0049 (0.0048)	0.0079* (0.0046)	0.0069 (0.0045)
Non-core funding ratio	-0.2566 (0.3154)	-0.4524 (0.3133)	-0.5430* (0.3130)	-0.4210 (0.3263)
1/Efficiency	-0.0290*** (0.0097)	-0.0304*** (0.0086)	-0.0304*** (0.0084)	-0.0287*** (0.0090)
Constant	3.2553** (1.2997)	2.9274** (1.1997)	3.1467*** (1.2282)	3.1868** (1.3141)
Time effects	Yes	Yes	Yes	Yes
Number of banks	534	534	534	534
Number of observations	2,747	2,747	2,747	2,747
Number of instruments	390	498	508	493
Wald chi-squared	897.5	814.03	836.47	871.56
AB test for AR(2)	0.596	0.657	0.653	0.615
Hansen test Prob>chi-squared	0.262	0.629	0.654	0.742

Note: System GMM estimation using the Arellano-Bover dynamic panel estimator. Robust standard errors are reported in parentheses. \*\*\*, \*\*, \* indicate significance at the 1%, 5%, and 10% level, respectively.

represent time effects. These capture any changes in global market conditions.

The results of the estimations are presented in Table 1. The first column includes the GDP growth as an explanatory variable. The second column uses bank-specific credit growth as a regressor. The idea here is to perform a “horse race” between these two variables, which are related to business and financial cycles, respectively. The third column adds both GDP and bank-specific credit growth simultaneously. The last column also includes a square term for GDP growth, so as to capture possible effects of severe downturns, which are typically associated with rising unemployment and increases in non-performing loans.

The bottom row of the Table shows that the Hansen test validates the instruments used in all specifications. The p-value of the J-statistic is greater than 0.10 in all cases, indicating that we cannot reject the null hypothesis that the instruments can indeed be considered exogenous.

The results indicate that the profitability of EME banks is affected by a variety of aggregate and bank-specific factors.

First, profitability responds positively to bank-specific credit growth. Banks with higher rates of loan growth are systematically more profitable. In contrast, the effects of GDP growth on ROA are generally not statistically significant. This can be seen from the first three columns, which are based on linear models. Essentially, what they show is that the credit growth indi-



cator comes out ahead in the “horse race” with the GDP growth. In other words, bank profitability in EMEs appears to respond more to credit cycles than to business cycles.

The exception to the overall low relevance of GDP growth occurs whenever GDP growth becomes strongly negative, as can be seen from the significance of the quadratic GDP coefficient in the fourth column. A visual illustration of this point is provided in Figure 5, where we plot the response of ROA to economic growth, based on the coefficients that are reported in Table 1 and Table 3 below. The figure already includes a line with the corresponding estimated response of return on equity (ROE), which we report below.

The ROA projections in the quadratic model are generally close to those of the simpler linear model (and the difference is not statistically significant at usual confidence levels). The gap, however, widens as we move from the right to the left, that is, as we move into severe economic contractions. In this case, the quadratic model projects returns that become noticeably lower, than does the more parsimonious linear model.

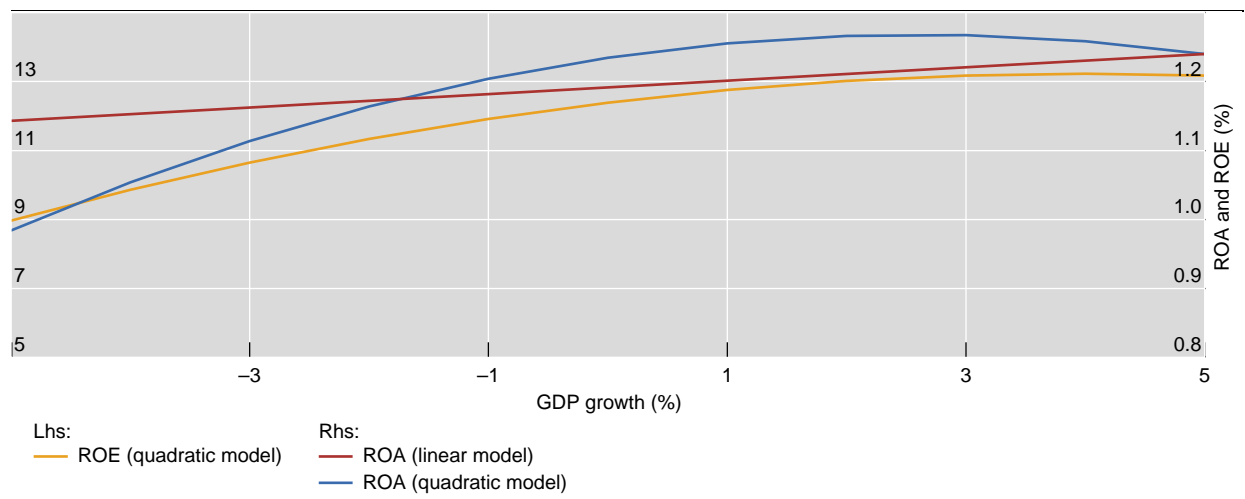
The second point to note is that short-term interest rates affect bank profitability negatively, while long-term interest rates affect it positively. An increase in the differential between the short- and long-term interest rate tends to make the banks’ business of maturity transformation more profitable. A reduction in short-term rates has the effect of reducing funding

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## EME bank returns and real annual output growth

Estimation results

Figure 5



costs, while an increase in long-term rates tends to increase revenues, as banks can charge borrowers higher rates. In this sense, EME banks are similar to their advanced economy counterparts.<sup>7</sup>

As we show later, when long-term interest rates decline, EME banks tend to look for alternative sources of revenue. The coefficients on the long-term rate variable are between two and four times larger than those on the short-term rate, which indicates that movements on the longer end of the yield curve have much stronger implications for profits. A one percentage point increase in the long-term rate raises the ROA by between 12 and 15 basis points. The greater relevance of the long-term rate is also confirmed when we use the ROE as our profitability measure.

Borio et al (2015) provide an alternative explanation for why higher short-term interest rates reduce bank profits. They show that the effects of short term interest rates on profitability depend on the elasticity of loan demand and deposit supply. Changes in the level of market rates could have quantity effects, notably influencing the volume of bank loans and deposits. To the extent that the demand for loans is more responsive (elastic) to interest rates than the demand for deposits, higher interest rates could erode bank profitability. In our empirical specification, this effect would be captured by the change in the quantity of loans (ie, the bank-specific loan growth rate).

The third key take away is that rising risk premia (proxied by higher

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<sup>7</sup>A negative correlation between profits and short-term interest rates is also reported by Hardy and Pazarbasioglu (1999) and Albertazzi and Gambacorta (2009).

sovereign CDS spreads) bite into bank profitability in a very significant way. The point estimates suggest that a 100 basis points increase in sovereign risk spreads reduces the ROA by between 24 and 27 basis points, depending on the specification. Rising sovereign risk may also lead to rating downgrades for banks, which increases bank funding costs and tends to restrain their funding options and possibilities for expansion. Risk premia also clearly affect capital flows and exchange rates.

Higher risks are also associated with depreciating exchange rates, which tend to limit the overall credit to EMEs through the currency risk taking channel. To the best of our knowledge, our paper is the first to quantify these effects on EME bank profitability.

In terms of bank specific characteristics, we find that more highly capitalized banks tend to be more profitable, which is in line with previous findings that highlight how banks with higher capital ratios face lower costs of funding due to lower prospective bankruptcy costs.<sup>8</sup> We also find that larger banks are somewhat less profitable. In addition, there is evidence that more efficient banks tend to be more profitable, which is also broadly in line with earlier findings in the literature (Goddard et al (2010), Olson and Zoubi (2011)).

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<sup>8</sup>See for instance Bourke (1989); Demirguc-Kunt and Huizinga (1999) and García-Herrero et al (2009).

**Determinants of main components of bank profitability**

Table 2

	Dependent variable		
	Net interest margin	Non-interest income	Loan loss provisions
Dependent variable <sub>i,t-1</sub>	0.7148*** (0.0931)	0.1298 (0.1091)	0.8522*** (0.0375)
Real loan growth	0.0071*** (0.0027)	-0.0045 (0.0097)	0.0018 (0.0069)
GDP growth	-0.0491*** (0.0128)	-0.3019*** (0.0954)	-0.0920*** (0.0264)
Short-term market rate	-0.0621*** (0.0178)	0.0359 (0.059)	0.1040*** (0.0369)
10-year bond yield	0.0905** (0.0452)	-0.5010** (0.2099)	-0.1939*** (0.0687)
CDS	-0.0002 (0.0007)	0.0024 (0.0021)	0.0027 (0.0017)
CPI inflation	-0.0489** (0.023)	0.5424** (0.2206)	0.0991** (0.0442)
Market capitalisation	0.0015* (0.0008)	0.0034 (0.0037)	0.0004 (0.0019)
Log assets	-0.2064*** (0.0721)	-1.471** (0.5704)	0.0786 (0.1524)
Equity/total assets	0.0357* (0.0212)	-0.0397 (0.0724)	-0.0485* (0.0262)
Liquidity	-0.0216** (0.0098)	0.0002 (0.0185)	-0.0126 (0.0095)
Non-core funding ratio	-0.0151 (0.4087)	2.5840* (1.5126)	0.7195 (0.6088)
1/Efficiency	-0.0103* (0.0061)	0.0116 (0.0089)	0.0165* (0.0086)
Constant	3.3844*** (1.1119)	15.6336*** (5.9078)	-1.1323 (1.9976)
Time effects	Yes	Yes	Yes
Number of banks	494	519	514
Number of observations	2225	2514	2413
Number of instruments	367	493	355
Wald chi-squared	1694.93	100.47	2533.8
AB test for AR(2)	0.8560	0.3810	0.1570
Hansen test Prob>chi-squared	0.3700	0.2230	0.1540

Note: System GMM estimation using the Arellano-Bover dynamic panel estimator. Robust standard errors are reported in parentheses. \*\*\*, \*\*, \* indicate significance at the 1%, 5%, and 10% level, respectively.

## 3.2 Disaggregating bank performance

Bank profitability can be divided into several more disaggregated components. Here we focus on net interest margins, non-interest income and loan loss provisions. Using the same explanatory variables as in the previous section, we estimate the determinants of these three components of profitability. The results are presented in Table 2.

### 3.2.1 Net interest margin (NIM)

The first column of Table 2 reports the estimates of the determinants of net interest margins (NIM). This measure is defined as the difference between interest rates banks charge for loans and those they pay on deposits. The positive association between long-term interest rates and NIMs is due to the maturity transformation activity that is the essence of banking.

As expected, the individual bank credit growth measure is particularly relevant for this source of profitability. Once more, this appears to underscore the role of credit cycles for banking sector profitability. Unlike long-term interest rates, higher short-term rates decrease net interest margins.<sup>9</sup>

We also find a negative relationship between GDP growth and the NIM. This result is not completely new in the literature (see eg Demirguc-Kunt and Huizinga (1999), Brock and Suarez (2000), Kasman, et al (2010)). It can be related to the fact that in good times, when credit demand is strong, banks

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<sup>9</sup>Adrian et al (2010) report similar results for the United States.

can afford to reduce their interest margin in order to gain some additional market share. Alternatively, higher volatility of business cycles in EMEs with periods of economic growth often interrupted by periods of crisis could explain this negative relationship.<sup>10</sup>

### **3.2.2 Non-interest income (NII)**

Financial institutions can substitute interest for non-interest income under specific conditions. For instance, a steeper yield curve can bring more profits from the net interest margin, whereas a flattening yield curve tends to push banks to increase non-interest revenue sources. We define the non-interest income (NII) as the ratio between total non-interest operating income and total assets.<sup>11</sup>

That banks may substitute between interest and non-interest income can be illustrated by the way banks adjust to an increase in short-term interest rates. When this happens, banks have the possibility of using derivatives in the trading book for hedging open interest rate positions. Purnanandam (2007) finds evidence that banks that are more exposed to financial stress tend to hedge risk to a greater extent than other institutions. An alternative is to diversify income sources. For instance, some non-interest income sources may provide bank an opportunity to diversify revenue through fees, bank

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<sup>10</sup>For more on this see Claeys and Vander Vennet (2008) and Kasman et al. (2010).

<sup>11</sup>Figure A1 in the Appendix shows that while non-interest income is considerably smaller than interest income for the median bank in the sample, it has been on a rising trend after the global financial crisis.

commissions, or trading activities. Some evidence of diversification benefits is presented in Smith et al (2003), Stiroh (2004), and Stiroh and Rumble (2006).

Our estimates for the determinants of non-interest income (NII) as a measure of bank profitability indicate that an increase in long-term interest rates has a negative effect on NII, therefore offsetting (at least partially) the positive effect long-term rates have on the net interest margin. Non-interest income is commonly generated by fees and commissions, or profits from bond holdings and financial trading. Since many EMEs have experienced large decreases in long-term interest rates, one can expect that the higher mark-to-market value of their bond holdings had boosted this source of revenue somewhat.

We also find that GDP growth is negatively correlated with NII. This is not surprising, as in bad times banks tend to increase their margins using other revenue sources, such as fees and commissions. At the same time, we do not find a significant relationship between credit growth and this measure of profitability. The opposite sign of the long-term interest rate coefficient on both measures of profitability (NIM and NII) could be interpreted as evidence of diversification benefits from different banking activities or pricing practices.



### 3.2.3 Loan-loss provisions (LLP)

Loan loss provisions are positively correlated with short-term interest rates and negatively with the long-term rates (Table 2, third column). The finding that provisions increase with short-term interest rates can be explained by the fact that higher short-term rates increase short-term debt rollover costs for distressed borrowers, and hence their probability of default. This can increase financial vulnerabilities and amplify the negative consequences of a recession.<sup>12</sup>

The negative sign of the coefficient of long-term interest rates could reflect the possibility that long-term rates embed expectations about future productivity and potential growth, a point also made in Quagliariello (2007) and Albertazzi and Gambacorta (2009).

A non-significant role of the business cycle on profitability measures could be due to the negative relationship between loan loss provisions and the business cycle. When GDP growth is high, provisions tend to be low, boosting banking profits. The gains from lower provisions can then be used to reduce net interest margins in order to gain market share.

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<sup>12</sup>This finding is also in line with Albertazzi and Gambacorta (2009) for advanced economies

### 3.3 Robustness

An alternative measure of bank profitability is the return on equity (ROE). Banks with higher equity ratios usually report a higher ROA, but a lower ROE. High returns on equity may however mask the higher risk associated with a greater leverage and the effect of capital regulation.

Estimates of the determinants of the return on equity (ROE) in Table 3 by and large confirm our earlier findings on bank profitability. By and large effects are qualitatively similar and also statistically significant.

More specifically, short-term interest rates are negatively correlated with bank profitability, unlike long-term rates. As before, the absolute value of the coefficient on long-term rates is more than twice as large as that for short-term rates.

Positive coefficients on bank loan growth suggest that risk taking decisions affect profitability. At the same time, the transmission of shocks to profitability depends on the level of leverage of financial institutions and the core funding ratio.

The concave relationship between GDP growth and ROE in Figure 5, which is based on the estimates from the last column in Table 3, is also broadly in line with that found for the ROA. The fit of the quadratic model is not too far from the linear model, suggesting that the linear specifications are probably sufficient for understanding the relationship between growth and profitability in most situations (Figure 5). This is true particularly

**Determinants of return on bank equity (ROE)**

Table 3

	I	II	III	IV
ROE <sub>i,t-1</sub>	0.2562*** (0.0649)	0.1860*** (0.0724)	0.1892*** (0.0720)	0.1709*** (0.0659)
Real loan growth		0.0717*** (0.0191)	0.0707*** (0.0193)	0.0833*** (0.0202)
GDP growth	0.1559 (0.1019)		0.0055 (0.0997)	0.4205*** (0.1543)
GDP growth squared				-0.0528*** (0.0168)
Short-term market rate	-0.5607** (0.2192)	-0.4745** (0.238)	-0.5108** (0.2364)	-0.3089 (0.2384)
10-year bond yield	1.6731*** (0.4566)	1.8323*** (0.4501)	1.8874*** (0.4454)	1.6013*** (0.4425)
CDS	-0.0305*** (0.0113)	-0.0327*** (0.0113)	-0.0334*** (0.0115)	-0.0315*** (0.0115)
CPI inflation	0.0289 (0.1941)	-0.0615 (0.1976)	-0.0714 (0.2066)	-0.0102 (0.2053)
Log assets	-1.7369*** (0.6214)	-1.4362** (0.6360)	-1.5976** (0.6356)	-1.6514** (0.7747)
Equity/total assets	-0.1536 (0.1770)	-0.2829* (0.1712)	-0.2983* (0.1723)	-0.3567* (0.2029)
Liquidity	0.0700 (0.0545)	0.0503 (0.0512)	0.0576 (0.0512)	0.0007 (0.0585)
Non-core funding ratio	-5.9862* (3.5544)	-9.0122** (3.5798)	-9.5183*** (3.4576)	-8.1295* (4.1913)
1/Efficiency	-0.3263*** (0.0493)	-0.3420*** (0.0483)	-0.3412*** (0.0488)	-0.3433*** (0.0741)
Constant	38.6319*** (8.5874)	38.0585*** (8.0948)	39.4448*** (8.4613)	41.3807*** (11.0946)
Time effects	Yes	Yes	Yes	Yes
Number of banks	534	534	534	534
Number of observations	2747	2747	2747	2747
Number of instruments	390	498	508	511
Wald chi-squared	552.75	464.36	417.36	331.94
AB test for AR(2)	0.3820	0.2310	0.2380	0.1710
Hansen test Prob>chi-squared	0.4740	0.7920	0.7580	0.8460

Note: System GMM estimation using the Arellano-Bover dynamic panel estimator. Robust standard errors are reported in parentheses. \*\*\*, \*\*, \* indicate significance at the 1%, 5%, and 10% level, respectively.

when GDP is growing.

## 4 Concluding Remarks

Our study has assessed and quantified the effects of key macro- and micro-economic drivers of bank profitability in emerging markets. Results are based on a relatively large dataset covering banks from 19 countries.

One of our key findings is that credit growth appears to have been more important for bank profits than output growth. This may suggest that credit cycles could actually be more relevant for explaining bank profitability than business cycles. At the same time, it also suggests that a process of bank disintermediation tends to bite into profits in a systematic way. In addition, the evolution of the domestic yield curve, and the level of long-term interest rates in particular, affect profitability. This is consistent with the maturity transformation activity of banks. Higher levels of long-term interest rates tend to increase bank profitability of banks by raising net interest margins. When long-term rates decrease, banks have to rely more heavily on other sources of income such as fees and commissions, as well as revenue derived from transactions on the bank's trading book. Short-term rates, in turn, raise funding costs and tend to reduce bank profits. Finally, we find that risk premia have important effects on bank profitability, as increases in sovereign CDS premia reduce bank profits in a significant way.

From a prudential perspective, our results would seem to suggest that

policies that reduce the amplitude of credit cycles would also have the beneficial effect of smoothing cycles in bank profitability. Effective counter cyclical policies could thus reduce the likelihood of a rapid deterioration of bank profitability or financial instability during a downturn. Finally, the significance of risk premia in explaining bank profitability suggests that credible fiscal frameworks are key for overall financial stability. Future research could aim to throw more light on the drivers of this link.

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## Sources of income

As a ratio of total assets

Figure A1



Sources: BankScope; authors' calculations.

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**Banks by country and by size**

Table A1

country	number of banks	sample period	bank sizes in 2013-2014 (total assets in million USD)		
			smallest	median	largest
Brazil	43	2006-2014	1495	6384	438375
Chile	16	2006-2014	1386	13316	51583
China	124	2005-2014	2475	23506	2736417
Colombia	15	2001-2014	1219	8168	68043
Czech Republic	19	2000-2014	1097	5411	48694
Hungary	7	2006-2014	2462	8574	48134
India	34	2005-2009	1633	7836	108418
Indonesia	28	2002-2014	1675	5278	44407
Israel	8	2007-2014	3620	31126	109485
South Korea	15	2000-2014	3028	54678	322807
Mexico	18	2000-2015	1289	14463	104912
Malaysia	25	2000-2014	2481	23550	98919
Peru	9	2006-2014	1352	10571	38744
Philippines	17	2004-2014	1762	9407	41770
Poland	22	2004-2014	1588	10958	52630
Russia	85	2002-2014	1271	3940	556393
South Africa	7	2000-2014	4367	72928	97674
Thailand	22	2000-2014	4532	25028	83727
Turkey	20	2009-2014	1565	16842	118818

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