

# Determinants of Banks' Performance: the Case of ROE Of G-SIBs in Central, Eastern and South-Eastern Europe

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## Abstract

**Purpose:** The goal of the paper is to analyse the determinants of the level of ROE (return on equity) for two groups of banks, interrelated by capital links, and their banking sectors.

**Methodology:** For the case study, we chose companies that, in 2011–2013, were designated by the Financial Stability Board as global systemically important banks (G-SIBs) and their subsidiaries operating in Central, Eastern and Southeastern Europe (CESEE) as well as their banking sectors. We sought to identify differences in the performance drivers, taking into account bank-specific and country- (or sector-) specific factors.

**Findings:** We found no significant differences in the level of ROE among the analysed groups; however, we identified a different set of determinants and their impact on ROE.

**Keywords:** performance, ROE, parent companies, subsidiaries

**JEL:** G21, G32

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## Introduction

The share of foreign capital in the banking sectors of Central, Eastern and Southeastern European countries (CESEE) is high, which is an issue not only for the economic discussion but also for the political debate in this region. As of the end of 2012, the share of foreign capital in terms of assets ranged from 29% (in Slovenia, due to the state's high share in the banking sector) to 99% (in Slovakia). In Western Europe and other industrialized countries, the share of the foreign capital is much lower (in most cases, lower than 10%), except financial centres such as Luxembourg or the UK. Thus, the issue of the foreign capital presence in the CESEE region is an important one. The decision to enter any foreign market is usually preceded by an in-depth analysis of business opportunities. The expected performance, such as ROE, is one of the factors used to decide either to enter or to maintain presence on a given market.

G-SIBs in the CESEE region also play an important role; however, their market share varies, ranging from 3% (Latvia – only 1 G-SIB subsidiary) to 34% (Poland – 13 subsidiaries) at the end of 2012. The focus on G-SIBs is motivated by the special treatment of G-SIBs by regulators, who impose step-by-step higher capital requirements and restrictive monitoring. On the one hand, higher capital requirements should make the banks safer; however, on the other hand, they are under pressure from investors to reach adequate level of ROE. Higher capital levels usually decrease the return on equity. This may force banks to search for new business opportunities that may increase the risk to their portfolios (e.g., Iwanicz-Drozdzowska, 2014). Thus, we consider it very important to monitor and analyse ROE and its determinants. Additionally, in the future, these regulations may be of great importance to the operations on local markets, outside the G-SIB country of registration. This issue requires further research.

We do not explore the parent-subsidiary nexus (e.g., Havrylchuk and Jurzyk, 2011b regarding performance; Cull and Martínez Pería, 2013, Allen et al., 2015 regarding credit growth), but we apply a standalone approach to the identification of determinants that are important for the ROE level for G-SIBs, the banking sectors of their countries of registration, the subsidiaries of G-SIBs in CESEE, and the banking sectors of the subsidiaries' countries of registration in the CESEE region. Our goal is to show how different are the levels and the determinants of ROE for those four groups. The ROE determinants model, for both G-SIBs and their subsidiaries, has, to the best of our knowledge, not been developed so far. We treat our study as a starting point for an in-depth analysis of G-SIBs' and their subsidiaries' operations in other regions.

The paper is organized as follows: the first section presents a review of the literature, the second section explains the data and methodology, and the third section presents empirical results, followed by final conclusions.

## Literature review

After the start of the political and economic transformations, the researchers began to analyse the situation in former communist countries. The interest was initially focused on the impact of reforms. At a later stage, one of the leading streams of research was banks' performance and the impact of foreign ownership (e.g., Claessens et al., 2001; Bonin et al., 2005; Lensink et al., 2008; Claeyns and Vander Vennet, 2008; Koutso-manoli-Filippaki et al., 2009; Havrylchyk and Jurzyk, 2011a; 2011b). In addition to the research on the impact of foreign capital presence in transition economies and other emerging markets, there is a body of literature on the impact of foreign capital in industrialized countries (e.g., Sturm and Williams 2008 for Australia). With regards to the performance of banks, three sub-streams of research should be distinguished: frontier efficiency analysis (prevailing), value creation and determinants of profitability. We focus on the latter.

The determinants of performance have been studied mostly through the lens of the return on assets (ROA) and the net interest margin (NIM). Havrylchyk and Jurzyk (2011b) studied the determinants of ROA, Claeyns and Vander Vennet (2008) studied the determinants of NIM, and Claessens et al. (2001) studied both. ROE was applied, for example, by Bonin et al. (2005) to performance assessment. However, more frequently ROA has been used by researchers as an aggregate measure of performance. Why have we decided to use ROE? There may be certain doubts as to whether ROA or ROE should be considered. In terms of the modelling approach, there is no significant difference between the two, as they are strongly correlated: in the considered sample the Pearson's correlation between ROA and ROE in the group of G-SIBs equals  $r=0.909$ , whereas in the group of their subsidiaries it is equal to  $r=0.801$ . Thus we decided to use ROE as the modelled variable, instead of ROA or NIM, which were explored in previous studies (e.g., Madous and de Guevara, 2004). As Brissimis et al. (2008) reported, the results of their models for ROA and NIM were similar. They decided to select NIM due to the link with the market power proved by, for example, Madous and de Guevara (2004). There is a simple link between ROA and ROE through the equity multiplier (or leverage). We decided to model ROE due to the observed increase in the equity capital of banks on the global market; higher capital requirements for banks, especially for G-SIBs; and the fact that many of the banks' operations

are off- (vs. on-) balance-sheet (e.g., Athanasoglou et al., 2008). Additionally, a bank's capital has to cover risk inherited both in assets and in off-balance-sheet exposures.

Previous studies cover either early transformation or pre-crisis periods with a focus on NIM and/or ROA. As Claessens et al. (2001) pointed out, foreign-owned banks were more profitable in developing countries and less profitable in developed ones. The larger share of foreign banks decreased the profitability and margins of domestic banks. Their study covered 80 countries (within seven economies in transition) from 1988 to 1995, using bank-level and macroeconomic data as in our study. The researchers used six performance measures, within ROA and NIM. In the case of the countries in transition, the study covered the initial stage of reforms and often unstable regulatory and economic conditions. The share of foreign capital in the banking sector assets at that stage ranged from 1% in Romania to 61% in Hungary, which was the earliest country to start reforms. It is important to note that, in the mid-90s, some CEE countries experienced a transformation banking crisis (e.g., Iwanicz-Drozowska, 2002).

Claeys and Vander Vennet (2008) built the NIM models, using market structure and efficiency variables as explanatory variables, for the CEE and Western European banks in order to find out the differences. They used 1,130 banks from 31 countries from Western and Eastern Europe for 1994–2001. The presence of foreign banks decreased the margins in the CEE. In both groups of countries, the higher operational efficiency was linked to lower NIMs. They concluded that the margins were not determined by the market structure but rather by operational efficiency and capital.

Havrylchyk and Jurzyk (2011b) explored the parent-subsidiary nexus. They covered 418 banks from 11 CEE countries for the period from 1993 to 2004 (i.e., before the global financial crisis). Foreign-owned banks were divided into greenfields and takeovers. The authors analysed the impact of the entry mode and the parent company and home country characteristics. Foreign banks, in general, did not represent higher profitability than domestic banks. However, greenfield banks earned higher ROA due to lower costs. Greenfield banks were also sensitive to the home country interest rates and parent company standing.

After about 25 years of transformation in the CESEE region, there is a question of whether and how banks in this region are different from those in highly developed countries. Following Hryckiewicz's (2014) differentiation of banking models, we may say that most of the G-SIBs operating in the CESEE region come from countries that operate under the diversified model, while G-SIBs representing the investment and "originate and distribute" models are scarce. The CESEE countries represent the

traditional banking model, focusing on deposits and credits. Moreover, even G-SIBs from the countries representing these latter models focus on traditional business only. Due to the differences in the banking sector models (traditional vs. non-traditional), we expect a different set and/or impact of determinants for the ROE level.

In comparison to previous studies, we cover mostly the crisis and post-crisis period and a higher number of post-communist countries. Our contribution to the literature is related to the identification of differences in ROE determinants for a set of traditional and non-traditional banking sectors, as well as individual banks.

## Data and methodology

We used bank-level and country-level macroeconomic and banking sector data collected from publicly available sources. The bank level data have been collected<sup>3</sup> from banks' annual statements, available on their websites or upon request for the period of 2006–2012 for 44 G-SIB subsidiaries from 15 CESEE countries and their parent companies. The data from 2006 were used to estimate the growth of the credit and equity capital. For the G-SIBs and most of the subsidiaries, we analysed consolidated reports prepared with the use of International Financial Reporting Standards or US GAAP (American and Japanese banks). In the case of some subsidiaries that did not operate within a capital group on a country level, only unconsolidated financial statements were available, which were prepared with the use of either IFRS or local accounting standards. A typical difference between IFRS and local accounting standards is their different approaches to the recognition of impairment (and thus non-performing loans, or NPL) and recognition of interest income (and thus net interest income, or NIM). However, we do not analyse NPL and NIM in this paper. The comparability of hand-collected data to payable databases available on the market is equivalent.

The information on the number of subsidiaries in a given country is provided in Table 1.

Altogether, 11 G-SIBs from nine countries<sup>4</sup> are present in the CESEE region, with UniCredit as the unquestionable leader present in 13 of the 15 countries in question. The number of G-SIBs designated by the FSB in 2011–2013 equalled 31, coming from 12 countries.<sup>5</sup>

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<sup>4</sup> These include France, Germany, Italy, Japan, Netherlands, Spain, Sweden, the UK and USA.

<sup>5</sup> The countries not involved in CESEE were China, Belgium and Switzerland.

**Table 1.** Countries and number of G-SIBs subsidiaries

Country	Number of G-SIBs subsidiaries	Names of G-SIBs
Albania	2	CreditAgricole, Societe Generale
Bosnia and Herzegovina	2	Unicredit (2 subsidiaries)
Bulgaria	3	Credit Agricole, SocieteGenerale, Unicredit
Croatia	1	Unicredit
Czech Republic	2	Societe Generale, Unicredit
Hungary	1	Unicredit
Latvia	1	Unicredit
Moldova	1	Societe Generale
Monte Negro	1	Societe Generale
Poland	13	Bank of Tokyo-Mitsubishi UFJ; BNP Paribas, Citigroup, Credit Agricole, Deutsche Bank (2 subsidiaries), ING, Nordea, Santander (3 subsidiaries), SocieteGenerale, Unicredit
Romania	4	Credit Agricole, Royal Bank of Scotland, SocieteGenerale, Unicredit
Serbia	4	BNP Paribas, Credit Agricole, SocieteGenerale, Unicredit
Slovakia	1	Unicredit
Slovenia	2	Societe Generale, Unicredit
Ukraine	6	BNP Paribas, Citigroup, Credit Agricole, Deutsche Bank, ING, Unicredit
Total	44	—

The banking sector-level data have been collected from reports and statistics prepared by central banks. We used macroeconomic data from the IMF's World Economic Outlook Database. Altogether, we have collected data for 15 CESEE countries and 12 countries of G-SIBs' registration. The banking sector-level data are not aggregates of G-SIBs only; rather, they comprise all the banks operating in a given country. In the model,

we use data for all G-SIBs in order to have a reasonable number of observations. It is justified by the fact that G-SIBs generally represent the non-traditional banking models (China was not classified by Hryckiewicz, 2014), while banks operating in CESEE represent the traditional banking model. Thus, we compare representatives of the traditional vs. non-traditional banking models, all of them labelled, directly or indirectly, as G-SIBs.

Based on the literature review, the following variables are selected as potential regressors for the ROE level. Their definitions, examples of application (or justification) and expected meanings are summarized in Table 2.

**Table 2.** Selected variables

Notation	Definition	Examples of application or justification	Expected sign for ROE model
BIG _ SHARE in the case of G-SIBs / SHARE in the case of subsidiaries / SHARE of foreign capital in the case of banking sectors	Significant shareholders with at least 5% of votes/share of strategic investor (or foreign capital) in a subsidiary (or in a banking sector)	Highly dispersed shareholders may not be able to exercise actual discipline over the management. A good proxy for the owners' influence over the company (for discussion, see, e.g., Laeven and Levine 2009); in the case of the banking sector "foreign bank share" was used by, e.g., Claessens et al. (2001).	+/-
GDP	Change of GDP	Claessens et al. (2001), Havrylchuk and Jurzyk (2011b)	+
INF	CPI	Claessens et al. (2001), Claeys and Vander Venet (2008)	+
UNEMP	Unemployment rate	A low unemployment rate should be interpreted as a satisfactory condition of both the corporate and household sector.	-
EURO	Eurozone membership	Has not been used in the reviewed literature. Regarded as an important factor due to the Eurozone crisis.	+/-
ROE	ROE	Bonin et al. 2005	modelled
D _ C	Deposits to credits	Inverted credit to deposit ratio. The ongoing global financial crisis revealed imbalance between the sources of funding and credits as a significant source of risk.	-

LEV	Leverage	Inverted equity to assets used by: Claessens et al. (2001); Claeys and Vander Venet (2008)	+
CRED _ GROWTH	Credit growth (n/n-1)	Cull and Martínez Pería (2013) and Allen et al. (2015) modelled this variable. In practice, the credit growth allows for higher return, however is procyclical.	+
CAP _ GROWTH	Equity capital growth (n/n-1)	Capital growth is important to both credit growth and the level of ROE	-
BUFFER	Capital adequacy ratio (CAR) above 8% threshold	Due to Basel 3 regulations, more attention is paid to the level of CAR and buffers. The higher the buffer is, the lower the ROE.	-
SIZE	The relation of assets to GDP	The typical size variable is the logarithm of assets. Due to the fact that we analyse banks which are systemically important, we, like Hagendorff et al. (2012) and Allen et al. (2015), used the measure of systemic size.	+/-

In our model, we have used typical country characteristics, such as the change of GDP, inflation, unemployment rate, and Eurozone membership. However, we did not control for country characteristics such as national regulations and financial safety net features (e.g., Laeven and Levine 2009). We assumed that the countries of registration of G-SIBs represent high-quality institutional arrangements, generally in compliance with the guidelines of the Basel Committee on Banking Supervision. The CESEE countries, which are mostly EU members (9 out of 15), also have high-quality institutional arrangements.

The main descriptive statistics of the variables are presented in Tables 3 and 4.

For all the variables, the standard deviation to mean ratio is at least 20% and in most cases is as high as 100%. Such a variation, partly due to differences between banks (that is, the fact that the data constitute a panel and not just a cross section, as in the case of most studies), is highly positive, as it reduces the risk of co-linearity and should facilitate identification of the parameters of the constructed model.



**Table 3.** Descriptive statistics in the ROE equations for the G-SIBs and their sectors

Variable	Observations	Mean	Std. dev.	Observations	Mean	Std. dev.
	G-SIBs			Sectors of G-SIBs		
Roe	212	0.06601	2.4990	77	0.0723	0.0960
Lev	214	17.5328	91.4883	77	18.4332	8.4992
Buffer	210	0.0614	0.0322	77	0.0496	0.0213
cap _ growth	183	0.0731	0.9412	66	0.0828	0.1039
d _ c	213	1.4980	1.8429	77	1.0261	0.2064
Gdp	214	0.0126	0.0294	77	0.0183	0.0379
Inf	214	0.0195	0.0142	77	0.0189	0.0149
Unemp	214	0.0741	0.0353	77	0.0738	0.0397
share2	214	0.1679	0.2195	77	0.0737	0.0631
Size	214	0.6711	0.7586	77	3.2075	1.4141
cred _ growth	142	0.0670	0.2121	66	0.0505	0.0873

Notes: <sup>1</sup> The observation for the Dexia in 2011 dropped as an outlier; including Dexia raises this figure up to 0,2373; <sup>2</sup> big \_ share in the case of the G-SIBs.

**Table 4.** Descriptive statistics in the ROE equations for the G-SIBs' subsidiaries and their sectors

Variable	Observations	Mean	Std. dev.	Observations	Mean	Std. dev.
	Subsidiaries			Sectors of subsidiaries		
Roe	292	0.0575	0.2154	105	0.0732	0.1249
Lev	291	10.1913	9.5415	105	9.7831	3.2673
Buffer	240	0.0839	0.1008	104	0.0826	0.0469
cap _ growth	248	0.2257	0.6010	90	0.1469	0.1624
d _ c	292	1.2349	6.7216	105	1.1107	0.4067
Gdp	308	0.0274	0.0451	105	0.0230	0.0494
Inf	308	0.1407	0.5702	105	0.3044	0.9563
Unemp	308	0.1087	0.0552	105	0.1149	0.0600
Share	287	0.8810	0.1813	104	0.7670	0.1991
Size	292	0.0694	0.0829	105	0.9756	0.2619
cred _ growth	288	0.3482	1.5403	90	0.1455	0.2322

It should be noted that the means given in tables 3 and 4 are weighted averages. In the case of macroeconomic variables, the numbers of G-SIBs and their subsidiaries from a given country are treated as weights (similarly to Claessens et al., 2001). The data used demonstrate a sufficient variance. The number of observations is, in most cases, reasonable enough for estimation purposes with the use of the typical least squares techniques, although sample sizes should not be viewed as almost "infinitely large," and the asymptotic error formulas should not be used. In view of the above limitations, the approach used in the paper is as follows: we first apply the Prais-Winsten estimator allowing for autocorrelation in the data, possibly with varying autocorrelation coefficients throughout the sample, which could be replaced with an OLS estimator should the autocorrelation not be found. While computing the standard errors of estimation, we allow for their cross-correlation and heteroscedasticity – the approach altogether is known as panel corrected standard errors (PCSE). The errors were clustered on the bank level for models using bank-level data and on the country level for models using country-level data. According to Beck and Katz (1995), FGLS errors computed in a typical way are underestimated unless the sample size is infinitely large, which could result in spurious conclusions regarding the estimation accuracy, as well as the significance of regressors. However, PCSE errors do not share that property to a high extent. For a detailed description of the robust panel standard errors and the Prais-Winsten technique, see Hoechle (2007), Beck and Katz (1995) and Davidson and MacKinnon (1993).

Regarding the bank-specific variables, the comparison of descriptive statistics in pairs of G-SIBs, the G-SIB subsidiaries and their sectors reveals no substantial differences; in most cases, the means for the compared groups are quite similar. The only differences can be observed in the case of the deposit to credit ratio, share and size variables in the cases of G-SIBs. The first two are much higher for the G-SIBs than for their subsidiaries, the last one is, however, higher for the whole sector. In the case of the size variable such relation is obvious and due to the fact that the banking sector data include data from all the banks in a given country. A higher deposit to credit ratio should be treated as a sign of a more cautious funding policy among G-SIBs. In turn, a higher mean of the share variable should be attributed to its different definition for the individual bank and the banking sector. However, such a situation proves that the share of the foreign capital in G-SIBs' countries of registration is low. In the case of the G-SIBs' subsidiaries, the credit growth and capital growth are much higher than in the case of their sectors. On the other hand, the size is much higher for the whole sector than for the subsidiaries. Both higher capital growth and credit growth may be explained by the impact of the foreign investor.

There are four groups of objects that are of interest in this study: G-SIBs, the banking sectors of G-SIBs, the subsidiaries of G-SIBs and the banking sectors of the subsidiaries of G-SIBs in CESEE. Four separate equations have been estimated, one for each of the abovementioned groups, with the ROE of particular objects in the group as the dependent variable and the independent variables given in Table 3 and 4, as defined in Table 2. The equation can be schematically written as:

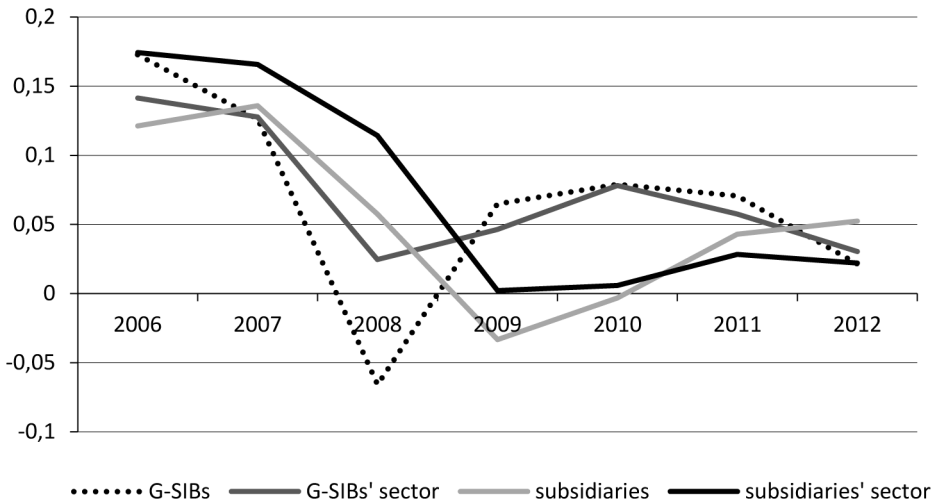
$$ROE_{s,it} = \beta_0 + x_{s,1,it} + x_{s,2,i,t-1} + \varepsilon_{it},$$

Where  $s$  represents the particular group (G-SIBs, their subsidiaries, the sector of G-SIBs, the sector of their subsidiaries),  $i$  represents the G-SIB's identifier,  $t$  stands for the time period (year),  $ROE_{s,it}$  stands for the ROE of an  $i$ -th unit of the  $s$ -th group in the period  $t$ ,  $x_{s,1,it}$  is the set of non-lagged explanatory variables (all the variables from Tables 3 and 4, except the ROE, buffer and cred\_growth),  $x_{s,2,i,t-1}$  is the set of lagged explanatory variables (buffer, cred\_growth) and  $\varepsilon_{it}$  is the error term, which is not assumed to be spherical.

The four equations allow us to identify differences in the determinants of the ROE level in the banking sectors of the CESEE and home countries of G-SIBs, as well as the population of parents and their subsidiaries. Both are important in order to explain the possible various sources of profitability.

## Empirical results

As can be observed in Tables 3 and 4, there are no big differences between ROEs of the G-SIBs, their subsidiaries and the entire banking sectors where they belong. Although the discrepancies for mean ROEs seem very low, some discrepancies can be found while following their changes over time. This refers particularly to the situation of the subsidiaries, which used to have the lowest ROE in the considered groups in 2006. However, they overtook G-SIBs in this respect in 2007–2008 and 2012. On the other hand, both the G-SIBs and the subsidiaries' entire sectors had very similar ROEs, both in 2006 and 2012. However, from the position of leaders in 2006, they moved to the trailing position in 2012. Their situation was very much the same in those two years, but it differed significantly in the 2007–2011 period, especially in the year 2008, when average ROE in the group of G-SIBs declined to almost -6.6%.

**Figure 1.** ROEs of the considered groups in 2006–2012

Note: see Table 3 note 1 regarding outliers.

The estimates of the four ROE equations are given in Table 5. While the equations for the subsidiaries and their sectors demonstrated autocorrelation (and thus are estimated using the Prais-Winsten estimator), no autocorrelation was found in the equations for the G-SIBs.

The aim of this article is to compare the sets of significant determinants of ROEs in different groups/sectors rather than to attempt to identify all their determinants for each group. Thus, we are not concerned about a low coefficient of determination in the group of G-SIBs' sectors, which is also reflected in very few significant independent variables in this case. Assuming a typical significance level of 5%, different variables were found to be significant for ROE. In the case of G-SIBs, four variables have a negative impact on the ROE level – unemployment, GDP, capital growth and leverage – while three variables have a positive impact – the share of big investors, Eurozone membership and size. In the case of the G-SIBs' banking sectors, only one factor with a positive impact (GDP) can be identified. For subsidiaries of the G-SIBs, more factors determining the level of ROE can be found. A positive impact was observed for seven variables: GDP, size of the bank, capital buffer (lagged by a year), Eurozone membership, capital growth, inflation and leverage. A negative impact was exercised only by the share of the parent company in the subsidiary's equity capital. In the case of the banking sectors in CESEE countries, the number of important factors was similar; however, their impact differed. The leverage, capital buffer (lagged by a year), inflation

and the share of foreign capital in the banking sector have a different impact on the aggregate ROE for the banking sector compared to that for individual banks. The variables with a positive impact are GDP, share of foreign capital and Eurozone membership. Further variables with a negative impact are the unemployment rate, capital buffer (lagged), inflation and leverage. While the raw estimates allow for the inference that concerns the significance and the direction of the influence of particular variables, different scales in which the variables are measured do not allow for the direct comparisons of the strength of their influence. In order to overcome this problem, standardized parameter estimates are used (see Table 6).

**Table 5.** Estimates of the ROE models

Variable	G-SIBs		Sectors of G-SIBs		Subsidiaries		Sectors of subsidiaries	
	beta error1	p-value	beta error	p-value	beta error	p-value	beta error	p-value
Lev	-0.0272	0.000	0.0005	0.832	0.0050	0.013	-0.0229	0.000
	0.0001		0.0023		0.0020		0.0066	
buffer (-1)	-0.6948	0.281	-0.3367	0.614	0.2208	0.025	-0.5363	0.000
	0.6450		0.6677		0.0984		0.1448	
cap _ growth	-0.0845	0.000	0.2320	0.241	0.0459	0.006	0.0855	0.360
	0.0211		0.1979		0.0165		0.0934	
d _ c	-0.0283	0.220	-0.0093	0.769	-0.0009	0.054	0.0384	0.164
	0.0231		0.0316		0.0004		0.0276	
gdp	-1.6718	0.014	0.8780	0.009	1.1428	0.007	1.0561	0.000
	0.6807		0.3355		0.4230		0.1689	
inf	0.0591	0.973	-0.4442	0.566	0.0133	0.021	-0.0296	0.025
	1.7260		0.7732		0.0057		0.0132	
unemp	-2.6830	0.000	-0.6255	0.226	-0.2569	0.065	-0.7110	0.000
	0.3810		0.5161		0.1391		0.1800	
share2	0.3987	0.000	-0.0376	0.807	-0.3150	0.006	0.2850	0.000
	0.1130		0.1538		0.1148		0.0647	
euro	0.3450	0.000	-0.0117	0.680	0.1043	0.022	0.1039	0.033
	0.0629		0.0285		0.0455		0.0488	

size	0.0205	0.045	-0.0073	0.247	0.2766	0.043	0.0894	0.067
	0.0102		0.0063		0.1369		0.0488	
cred _ growth (-1)	0.0372	0.712	0.0004	0.998	0.0169	0.216	0.0633	0.070
	0.1008		0.1505		0.0137		0.0350	
observations	116		55		197		74	
R2	0.98		0.22		0.38		0.61	

Notes: constants dropped in the output; <sup>1</sup> the errors provided underneath each parameter estimate are the robust panel corrected standard errors, clustered on bank level for the first and the third model and on the country level for the second and fourth model; <sup>2</sup> for the G-SIBs, the “big \_ share” is included instead of the “share” variable.

**Table 6.** Standardized estimates of the ROE models

Variable	G-SIBs	Sectors of G-SIBs	Subsidiaries	Sectors of subsidiaries
	standardized regression coefficients			
Lev	-0.996***	0.042	0.083**	-0.599***
buffer (-1)	-0.009	-0.075	0.045**	-0.201***
cap _ growth	-0.032***	0.251	0.048***	0.111
d _ c	-0.021	-0.020	-0.010*	0.125
Gdp	-0.020**	0.347***	0.089***	0.418***
Inf	0.000	-0.069	0.013**	-0.227**
Unemp	-0.038***	-0.259	-0.024*	-0.342***
Share	0.076***	-0.196	-0.099***	0.779***
euro1	0.030***	-0.008	0.045**	0.166**
Size	0.006**	-0.107	0.039**	0.188*
cred _ growth (-1)	0.003	0.000	0.045	0.118*

Notes: <sup>1</sup> for the G-SIBs, the “big \_ share” is included instead of the “share” variable; \* significant at  $\alpha > 0,1$ ; \*\* significant at  $\alpha > 0,05$ ; \*\*\* significant on  $\alpha > 0,01$ .

Comparing the standardized coefficients, one can identify several variables that were important to the level of ROE, though their impact differed. These are macroeconomic variables such as GDP, unemployment rate and Eurozone membership; and bank- or

industry-specific variables such as the leverage, share of foreign capital (or in the case of G-SIBs, share of big investors with at least 5% stake) and the growth of capital. Some differences should be pointed out. The impact of GDP is, in general, positive and statistically significant (assuming a typical significance level throughout), with the exception of the ROE model for G-SIBs. This may be explained by their diversified international activity, which is reflected in the consolidated financial statements. In the case of banking sectors as well as the subsidiaries of the G-SIBs, operations reflect the situation on the local market only. The level of unemployment was found to be significant in the ROE models for G-SIBs and the banking sectors of their subsidiaries. In the case of the subsidiaries' banking sectors, such situation may be explained by the lower wealth accumulated in a given country and, thus, the higher importance of employment to households. Additionally, the unemployment rate indirectly reflects the financial standing of companies. Its impact may be explained by the worsening financial standing of companies and households, which, via NPL, has a negative impact on financial results. The Eurozone membership has not been found to be statistically significant in the ROE model to the G-SIBs' banking sectors. A positive impact of this variable was observed for the subsidiaries, the banking sectors of the subsidiaries and G-SIBs. In those cases, the explanation is related to the reduction of the costs of maintaining cash reserves in different currencies and the reduction of transaction costs.

The influence of bank- and industry-specific variables represents even greater differences. The ROE in the case of G-SIBs reacts to the greatest elasticity to the leverage, but this reaction is negative rather than positive as expected. Leverage has a negative impact on the subsidiaries' banking sectors and a positive impact on the G-SIBs' subsidiaries (though with lower significance). On the one hand, the leverage does not include off-balance-sheet items, which in the case of big international banks usually exceed the balance sheet total. In this sense, the "true" leverage would be computed under the Basel 3 framework. This might have an impact on the results; however, Basel 3 leverage is not available for historical data. On the other hand, we may explain the impact of leverage by the risk incurred. In the case of G-SIBs, it can be supposed that the risk incurred was too high and the increase in leverage brought no profit but rather caused its decrease. Some banks reported losses, and in this case the leverage decreases the ROE level. The increase in the leverage is positive for the subsidiaries' ROE, which means that the risk they initially incurred was probably not so high as in the case of G-SIBs. For the banking sectors of subsidiaries, it is important to point out the possible effect of data aggregation.

The growth of capital was found to be statistically significant at the bank level, which should be explained by its importance to the credit activity and solvency. Its impact

was expected to be negative, but this was not the case for G-SIB subsidiaries. This means that the capital increase was invested by the subsidiaries in a profitable way, stimulating an increase in value at the group level, which has a positive impact on G-SIBs as parent companies' financial standing. The growth of capital was on average higher in the case of G-SIB subsidiaries than G-SIBs.

Importantly, the share of "big investor" was significantly large ( $\alpha > 0,01$ ) for G-SIBs with a positive impact. This may be treated as a sign that institutional investors (holding more than 5% of equity) exercise discipline over the management. In the case of the banking sectors of G-SIBs subsidiaries, this variable also has a positive impact; however, the impact on G-SIBs subsidiaries was negative. The usually high share of G-SIBs in subsidiaries' equity and its dominant role might cause a "squeezing out" of subsidiaries' profits with the use of, for example, prices of internal services. This point is of interest for fiscal authorities.

## Conclusions

The differences for mean ROEs were very low for all the analysed groups, but have been changing over time. For 2006-2008, the banking sectors of subsidiaries represented higher ROE than the banking sectors of G-SIBs. G-SIBs' subsidiaries generated higher ROE than G-SIBs in 2007-2008 and 2011-2012. The year 2008 was the most difficult for G-SIBs and their banking sectors due to the financial turmoil on the global market. Subsidiaries and banking sectors in CESEE suffered a year later.

What are the differences between G-SIBs and their subsidiaries in CESEE in ROE drivers? There are four variables whose impact differed: leverage, growth of capital, GDP and the share of big investors. For G-SIBs, their impact was generally negative, except the share of big investors. In the case of subsidiaries, their impact was exactly the opposite. Subsidiaries were able to invest increased capital in a profitable way and thus, to improve ROE. Also, the increased leverage had a positive impact on their performance due to the traditional type of business and less risk incurred. The G-SIB subsidiaries operate mostly on their home country markets, so the GDP growth improved ROE as expected. In the case of G-SIBs, all three variables had a negative impact on ROE, which may be explained by high risk exposure (leverage) and also by significant changes in the capital position, required by regulators (growth of capital) and diversified international activity, which is not reflected in GDP growth on the home country level. The share of big investors has a positive impact on G-SIBs (through discipline over the management; however, it should be noted that a few G-SIBs were



bailed out during the recent crisis and received capital injections) and a negative impact on their subsidiaries in CESEE. This negative impact requires further research; however, the tentative explanation may be linked to intra-group services or transaction.

We treat our study as a starting point for further research devoted to the CESEE banking sectors with a special focus on the determinants of profitability. The analysis may have expanded on other banks operating in the CESEE region, owned by either foreign or local capital, as well as the period covered. We find it especially interesting to explain the role and influence of the big investors.

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