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Bank ownership and drivers of credit growth in Central, Eastern and South-Eastern Europe

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ABSTRACT

In this paper, we analyse the determinants of credit growth for banks operating in 20 countries in the post-communist Central, Eastern and South-Eastern Europe (CESEE). We focus on foreign-owned banks and the parent-subsidiary nexus against the background of all banks operating in this part of Europe. Our goal is to determine whether the macroeconomic and bank-specific determinants for host countries have a similar impact on the entire group of banks operating in CESEE and on its subset of foreign-owned banks and whether the rate of credit growth could be considered *ceteris paribus* equal across the foreign-owned and the complete set of banks in the CESEE. To this end, we use panel data regressions on approximately 4,600 bank-year observations over the period from 1995 to 2014. We conclude that the determinants of banks' behaviour in the CESEE countries are consistent regardless of these banks' ownership, the period and their EU membership. Although having a foreign investor expands the set of relevant determinants, the presence of such investors does not overshadow the importance of local conditions.

KEYWORDS

credit growth, parent-subsidiary nexus, host countries, home countries

JEL CLASSIFICATION INDICES

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1. INTRODUCTION

In many emerging markets, foreign capital penetration in the banking sector is high. As of 2014, assets in post-communist Central, Eastern and South-Eastern Europe (CESEE), varied from approximately 30% (Belarus, Slovenia, and Ukraine) to more than 90% (Albania, Croatia, Czech Republic, Estonia, Lithuania, and Romania). In contrast, the share of foreign-owned banks was approximately 20% in Western Europe. The different scales of foreign ownership between the CESEE and Western European countries are expected to influence banks' policy.

As Houston et al. (1997) and Houston – James (1998) noted, there is an "internal capital market" that operates between the parent company and its subsidiaries. This internal market may not only promote expansion in local markets but also transmit financial shocks from parents to subsidiaries (Jeon et al. 2013; Peek – Rosengren 1997, 2000). The impact of the parent company and its home country situation is known as the parent-subsidiary nexus (e.g., Havrylchyk – Jurzyk 2011a for performance Allen et al. 2017; Cull – Martínez Pería 2013; Peek – Rosengren 1997, 2000 for credit growth). After the outbreak of the global financial crisis (GFC), a sudden cessation of credit activity was observed in the subsidiaries (e.g., Cull – Martínez Pería 2013), as was stronger competition for liquidity in the internal markets (e.g., Frey – Kerl 2015). These phenomena increased interest in studies on the role of foreign-owned banks in the emerging markets (e.g., De Haas – van Lelyveld 2014; Allen et al. 2017; Banai – Temesvary 2017), underlying its importance of conditions in the local markets.

The banks operating in CESEE represent the traditional banking model, which is based on taking deposits from customers and granting credits to customers. The credit growth (or credit policy) is stimulated by many factors on both the micro- and macroeconomic levels, while the growth of deposits follows banks' credit policies to ensure adequate funding. We treat credit growth as a proxy for banks' policies, which can be used as a type of "litmus test" showing the impacts of the economic environment and the parent bank. The goal of our study is to determine whether local macroeconomic and bank-specific determinants have a similar impact on the credit growth of all banks and foreign-owned banks and whether the *ceteris paribus* rate of credit growth is equal in the entire group of banks located in the CESEE countries compared to the group of foreign-owned banks located there. We employ an expanded set of regressors (which are standardized to compare the strength of influence of particular regressors) for foreign-owned banks and control for bank ownership. Thus, we evaluate whether "act globally, think locally" is applicable in the banking sectors of the CESEE countries.[1]

We provide new insight into the discussion on the impact of foreign-owned banks and show that these banks' behaviour is similar to that of the overall market. In comparison with certain recent studies, we expand the timeframe and the number of countries covered in the analysis (including all the Balkan states, Ukraine and Belarus). Moreover, we use a large set of bank-level and country-level variables that are same for the host and home countries. We also allow for a few structural breaks, which take into account the dotcom bubble, the EU pre-accession process of certain CESEE countries and the GFC, given that the analysed relationship does not need to be completely stable over time. Moreover, we control for the effects of the financial safety net, parent companies' bailouts, the political environment in host countries and EU membership by

[1]We refer to the CESEE countries as "host countries" and to the investors' countries as "home countries".

introducing appropriate variables. Our results should have practical implications for policy-making in the CESEE countries and other emerging markets.

This paper is organised as follows. In Section 2, we present a review of the extant literature, while in Section 3 we explain the data and methodology. Section 4 presents the empirical results and discussion, and Section 5 provides conclusions.

2. LITERATURE REVIEW

Due to the high share of foreign-owned banks in many emerging countries, banks' market behaviour in host countries has been analysed through the lens of market entrance (e.g., Lensink et al. 2008; Hryckiewicz – Kowalewski 2010; Cull – Martínez Pería 2013), performance (e.g., Claessens et al. 2001; Bonin et al. 2005; Claeys – Vander Vennet 2008; Lensink et al. 2008; Havrylchyk – Jurzyk 2011a, 2011b), credit activity (e.g., Cottarelli et al. 2005; De Haas – van Lelyveld 2006; Cull – Martínez Pería, 2013; Beck – Brown 2015; Bertay et al. 2015; Allen et al. 2017) and independence from parent companies (De Haas – Naaborg 2012; Anginer et al. 2017). Our study is most similar to the last two streams because we analyse credit growth in a parent-subsidiary context. Therefore, we focus on these two aspects in our literature review.

The impact of foreign ownership was regarded as an advantage before the outbreak of the GFC because foreign investors from the industrialised countries were treated as a source of stability for their local subsidiaries. This thinking was the case in, for instance, De Haas – van Lelyveld (2006). After 2008, however, many parent banks faced financial difficulties, and foreign-owned banks reduced their lending more than domestic-owned and state-owned banks. This phenomenon was analysed by Cull – Martínez Pería (2013), De Haas – van Lelyveld (2014), and Allen et al. (2017), indicating the negative impact of a deteriorating home country and parent bank situation on the subsidiary's credit growth. In Section 3, we will explain the differences in empirical strategies employed in these studies because the approaches to account for the parent-subsidiary nexus have differed to a great extent.

Cull – Martínez Pería (2013) analysed the credit growth of banks in Eastern Europe (EE, 8 countries) and Latin America (LA, 6 countries) over the 2004–2009 period, i.e., pre-crisis and crisis periods, with approximately 1,700 bank-year observations. In the pre-crisis period, foreign-owned banks in EE expanded their credit activity more quickly than domestic-owned banks, while foreign-owned banks in LA did not. During the crisis years, foreign-owned banks in EE reduced their lending more than domestic banks (especially in the corporate sector), while the differences between these two groups of banks in LA were not pronounced. During the GFC, state-owned banks in LA acted countercyclically, but this was not the case for state-owned banks in EE.

De Haas – van Lelyveld (2014) covered 48 multinational banking groups operating worldwide, their subsidiaries (199) and domestic banks (202), with a focus on the 2008–2009 period. Subsidiaries of foreign banks slowed their credit growth "about three times as fast as domestic banks". This slowdown was especially the case for subsidiaries that relied heavily on wholesale funding from a parent bank. During the crisis periods in a host country, however, foreign bank subsidiaries did not reduce their lending, while domestically owned banks did. This pattern underlines the important role of internal capital and liquidity markets in a multinational banking group.

Allen et al. (2017) analysed approximately 400 banks from CEE in 1994–2010 and indicated that during a host country crisis, the credit growth of foreign-owned banks was constant or increased, while credit declined in the case of state-owned banks, except during the GFC. The parent bank's financial condition was found to be statistically significant only during the crisis periods.

One of the grounds for cutting lending was reduced access to liquidity. A study based on a unique dataset of German multinational banks and their subsidiaries by Frey – Kerl (2015) concluded that after the collapse of Lehman Brothers, local deposit funding attracted by subsidiaries was a stabilising factor for lending, while reliance on short-term wholesale funding was a destabilising factor. However, the high return on equity (ROE) of subsidiaries protected these banks from deleveraging within the banking group due to profitability seeking. Moreover, there was an increase in competition for liquidity on the internal market because the German banks focused on stabilising lending in their home markets. Moreover, a survey conducted among bank managers by De Haas – Naaborg (2012) showed that subsidiaries were strongly integrated with the parent companies in the case of capital allocation and credit steering; thus, the managerial impact of the parent company was high.

The link between parents and subsidiaries has also been investigated from the regulatory perspective. Anginer et al. (2017) showed that tougher regulation and supervision in the host country protected subsidiaries from shocks from their parent banks. If a subsidiary was more independent in decision-making and had more deposit funding, the risk of its default was lower. Moreover, Ongena et al. (2013) indicated that restrictive regulation and supervision in the home country affected group-wide activities in foreign markets and led to lower lending standards in the host countries. Parent banks were seeking new risk-taking opportunities to increase their profitability. This behaviour may also explain the widespread presence of foreign capital in CESEE. On the other hand, foreign ownership may not always be positive for the emerging markets because these banks may suffer from contagion from the home country or on a group-wide basis.

3. METHODOLOGY AND DATA

Following an in-depth review of the literature, we select macro- and micro-economic independent variables as potential regressors (Table 1). As in numerous studies, our dependent variable is credit growth in real terms (e.g., Wu et al. 2011; Allen et al. 2017). Our empirical strategy is different from that of the previous studies. For example, in Cull – Martínez Pería (2013), De Haas – van Lelyveld (2014) and Allen et al. (2017), no home country macroeconomic variables were used. Allen et al. (2017) used a limited number of parent bank characteristics. Moreover, the parent bank variables were used only in separate regressions. Our approach differs considerably from that of the previous studies, and it is explained below.

Among the selected independent variables, there are two important macroeconomic characteristics, namely, the growth of GDP in real terms (e.g., De Haas – van Lelyveld 2006, 2010, 2014; De Haas et al. 2015; Allen et al. 2017) and the change in nominal interest rates (e.g., Iwanicz-Drozdowska – Witkowski 2016); both are important for the credit demand and supply sides. The bank-level microeconomic variables cover the CAMELS-based approach that is widely used in the regulatory practice and research. For almost 50 years, the CAMELS

Table 1. Selected variables

Notation	Definition	Expected sign	Source of data
GDP_growth	Change in GDP in real terms (year over year, %), $(GDP_t - GDP_{t-1})/GDP_{t-1}$	+	WB database
NIR_change	Nominal interest rate change (year over year, %), $(NIR_t - NIR_{t-1})/NIR_{t-1}$	−	WB database and central banks websites
BIG_SHARE (parents only)	Significant shareholders with at least 5% of votes; dummy variable (1=yes)	+/−	Annual statements and websites
SUBSIDIARY OWNER	Type of the ownership dummy variable: development (1), domestic private (2), foreign (3), state (4)	+/−	Annual statements and websites, Bankscope, own
BAILOUT (parents only)	Dummy variable for Model 3 (1=yes)	−	Iwanicz-Drozdowska et al. 2016a, marked as MID
STATE_OWNED (parents only)	Dummy variable for Model 3 (1=yes)	+/−	Annual statements and websites, Bankscope, own
CRISIS	Dummy variable (1 if crisis occurred, otherwise 0)	−	IMF, Iwanicz-Drozdowska et al. 2016a, marked as MID
FSN_index	Compound index for financial safety net, ranging from 1 (weak) to 4 (strong)	+/−	Iwanicz-Drozdowska et al. 2016b, marked as TIBE
PARTY	Ruling party dummy: C, CL, CR, L, R	+/−	Parline database, own
ROE	Profit after tax to average equity (%)	+/−	Bankscope
D_L	Deposits from customers to loans to customers (%)	+	Bankscope
CAP	Capital ratio, defined as the ratio of equity to assets (%)	−	Bankscope
NIM	Net interest margin (%)	+	Bankscope
IMPAIR_ASSETS	Impairment charges to assets (%)	−	Bankscope
EQUITY_growth	Equity capital growth (%) in real terms (n/n−1); in national currency	+	Bankscope and WB database for inflation
LOAN_growth	Loans growth (%) in real terms (n/n−1); in national currency	Dependent variable	Bankscope and WB database for inflation

methodology has been one of the most popular approaches to assess a bank's financial strength (e.g., Lopez 1999; Sinkey 1979; Varga et al. 2020). This approach requires knowledge about a bank's capital adequacy (C), asset quality (A), management (M), earnings (E), liquidity (L) and sensitivity to market risks (S). Due to the content of bank financial statements, we do not include the management and sensitivity to market risk components because they are not presented.

The crisis dummy aims to show the impact of the financial crisis (both in the 1990s and during the GFC). This step is in line with Cull – Martínez Pería (2013), De Haas – van Lelyveld (2010, 2014), and Allen et al. (2017). For this purpose, we use information from three sources: Laeven – Valencia (2008), Costa-Navajas – Thegeya (2013), and Iwanicz-Drozdowska et al. (2016a). Control variables, such as a bailout dummy, a financial safety net (FSN) index and the ruling party dummies, cover new research aspects, as indicated in the literature. As parent banks suffered to a different extent during the GFC, we introduce the bailout dummy for parent banks to underline whether a given parent bank required any state aid (Iwanicz-Drozdowska et al. 2016a). Additionally, we introduce a dummy variable for parents showing whether they are (or become) state owned. This approach helps identify whether state ownership also matters on a cross-border basis. The FSN index (Iwanicz-Drozdowska et al. 2016b), which is a proxy for a FSN, is motivated by the role of regulation and supervision, as shown by Anginer et al. (2017). The political party dummies refer to the work of Micco – Panizza, (2004) and Bertay et al. (2015); however, we do not take into consideration the years of political elections. We expect that changes in the ruling party may impact credit growth (either in a negative way or in a positive way).[2]

Banks in the host countries are marked as[3] state-owned, owned by development banks (foreign),[4] domestic private-owned and foreign-owned with a bank as a parent company, according to the type of the owner. We take into account the share of votes and actual control over the bank, which are very important in the case of state-owned banks. In practice, for the state-owned banks, the shareholding of 20 or 25% is sufficient to exercise control under conditions in which the other shareholders are dispersed. This classification is important in our baseline model, in which we introduce ownership dummies to identify differences in credit growth among banks with different owners. In parallel, for parent banks, we use the big share dummy (shareholding of 5% or more) to determine whether less-dispersed ownership may have any impact on the parent-subsidiary relations. Less-dispersed ownership may bring more independence for the management board.

The sample includes banks from the following countries: Albania, Belarus, Bosnia, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Kosovo, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Serbia, Slovenia, Slovakia and Ukraine. The data were collected

[2]A different credit growth model is proposed in the monograph by Iwanicz-Drozdowska et al. (2018); the emphasis is placed on different potential determinants of the banks' credit activity. While the model presented in this article caters to such non-mainstream factors as the ruling party, in the monograph, the focus is mostly on aggregate indicators such as the *Z*-score.

[3]So far, three types of banks have been differentiated: state-owned, domestic private-owned and foreign-owned.

[4]Development banks are treated as a separate group of foreign investors for three reasons. First, their investment is not strictly commercial and profit-oriented. Second, their financial statements are different from commercial bank financial statements, so one cannot use the same set of parent variables. Third, the development banks are not subject to the same set of regulations as the commercial banks.

from Bankscope (bank-level only); the World Bank database; central banks' websites; papers by Laeven – Valencia (2008) and Costa-Navajas – Thegeya (2013), both marked as IMF; a paper by Iwanicz-Drozdowska et al. (2016a), marked as MID; a paper by Iwanicz-Drozdowska et al. (2016b), marked as TIBE; and the Parline database. We also use hand-collected data on banks' ownership structures from 1995 to 2014 and ruling political parties. In our sample, there are 4,600 bank-year observations for the period from 1995 to 2014. Bank-level data are presented in the local currency. The results based on the local currency take into account changes in the foreign exchange rate of the local currency for loans (and other items) denominated in the foreign currencies; this approach has a meaningful impact on the amount of loans presented in financial reports in the case of substantial depreciation (increase in value of loans) or appreciation. We do not know, however, the exact currency structure of loan portfolios in the CESEE banks because this kind of information has not been presented in sufficient detail in financial reports of banks for the period of our analysis. Therefore, this factor is not reflected in our study.

The data used in the model consist of a panel of an almost complete set of banks located in the countries being considered. Given the panel nature of the data, the schematic functional form of the linear/linearised model can be written as follows:

$$\text{Loan\_growth}_{it} = x_{it}^{'}\beta + \alpha_i + \varepsilon_{it}, \tag{1}$$

where the dependent variable is the credit growth in real terms of the total value of loans granted by the i-th bank in year t compared with year $t-1$, $x_{it}^{'}$ represents the characteristics of the bank and selected macroeconomic variables of the country in which the bank is located, β stands for the vector of parameters, α_i represents the individual time-constant bank effects, and ε_{it} is the error term. Alternatively, the cross-bank homogeneity of the banks could be reflected by assumptions regarding the error term in a model with no individual effects:

$$\text{Loan\_growth}_{it} = x_{it}^{'}\beta + \varepsilon_{it}, \tag{2}$$

where the dependent variable is the credit growth in real terms of the total values of loans granted by the i-th bank in year t compared with year $t-1$, $x_{it}^{'}$ represents the characteristics of the bank and selected macroeconomic variables of the country where the bank is located in model (1) and of the country where the bank's parent is located in models (2) and (3), β stands for the vector of parameters and ε_{it} represents the error term.

In this paper, we use specification (2) without individual effects. However, we allow for heteroscedasticity and bank-specific first-order autocorrelation. There are a few reasons for adopting this approach:

- It is doubtful whether there are any systematic autonomic (in the sense of not being caused by the variables included as regressors) characteristic drifts of banks' credit growth because it is the change (and not the level) of loans that is modelled. Furthermore, using the relative instead of absolute value of the change in credit volume wipes out the differences due to bank size only.
- The dataset used in the estimation process contains numerous items and consists of a closed population of banks in the observed 20 countries over the 1995–2014 period (however, the observations from 1995 are used only to compute the difference in the value of loans over the 1995–1996 period). The fact that the dataset consists of a complete and closed population suggests that the individual effects – if they were to be included in the model – should be of a

fixed rather than random character. However, the parameters in β would then be identified using the within-bank basis only.

- The generalised least squares (GLS) approach that is used to estimate the above specification allows the use of the total within-bank and between-bank information and accounts for the heteroscedasticity and bank-specific first-order autocorrelation, which are suggested by the use of appropriate tests.[5] Given that there is a total of 525 banks in the sample, over 1,000 parameters must be estimated in the first step of the feasible GLS procedure; however, the total number of observations used for estimation purposes equals 3,553 (the minimum number of a single bank time series = 2, the maximum number of a single bank time series = 15, while the average number of a single bank time series = 6.77) for the model based on national currency data, which should be viewed as sufficient to capture the covariance structure of the error term.

We also control for mergers and acquisitions. Observations in the year of the merger were eliminated. A similar approach was applied by De Haas – van Lelyveld (2014). Apart from the technical difficulties, the bank should not be treated as the same bank after merging, and the time series of the observations on – theoretically – the same bank indeed do not reflect the data on the same statistical unit. Additionally, 1% of the observations with the highest increase in credit value were eliminated. These were basically two types of banks: (1) the above-described mergers and (2) very small banks that recorded low changes in credit volume in absolute terms but a huge change in relative terms. The banks with unnaturally high increases in loan value are thus treated as outliers (with the 14,800% p.a. increase being the top absolute real change as opposed to the median of approximately 15.91%) and eliminated to avoid affecting the estimates of the model.

This fact should be emphasised, while the results should be considered robust. First, in Tables 2–4, which contain the estimation results, it can be observed that replacing, adding or eliminating certain subgroups of variables from the main model does not result in major changes to the inference. In a few cases, replacing a group of factors with other factors results in the loss of significance of a subset of variables; however, such a case is not common, and no change in the direction of the statistically significant influence of a variable is observed. Second, the specification was estimated with the use of a few typical approaches (fixed effects, random effects, pooled OLS, and GLS with a general first-order autocorrelation without heteroscedasticity). We do not provide the full results here; instead, we base the robustness confirmation primarily on the changes in model structure rather than the method of estimation because these approaches do not take sufficient account of the non-spherical error term and, thus, are not fully adequate in view of the LR and Wooldridge test results. Nevertheless, it is worth mentioning that these methods provided similar results but found fewer of the variables to be statistically significant. This difference occurred for two reasons. First, the individual effects included in the RE and FE approaches take over some of the more persistent characteristics of the banks. Second, and more

[5]The procedure consists of first checking for heteroscedasticity with the use of a likelihood-ratio (LR) test. The test is feasible because the estimates of the model, with heteroscedasticity being the only distortion from sphericity estimated with iterated GLS, are equivalent to the estimates obtained with the maximum likelihood (ML) estimator. Thus, the homoscedastic structure is nested within the heteroscedastic structure, and a typical LR test can be used, which empirically yields the P-value at the <0.05 level in almost all cases analysed in the article. Wooldridge's (2002) test for autocorrelation is then used to check for the necessity to allow for the first-order autocorrelation. Though simple, Drukker (2003) confirmed in a simulation study that Wooldridge's test has good size and power properties in moderate and large samples, which is the case here. Again, the P-value < 0.05 in all the considered cases.

importantly, failing to address the non-sphericity of the error term increases the variance of the error term and consequently suggests a lack of statistical significance of more variables because of the higher error of the estimation. Nevertheless, as in the case of different specification analyses, the core conclusions do not change, irrespective of the disputable appropriateness of the aforementioned approaches, except for the feasible GLS used in this article, which specifically handles the stochastic structure of the model, as confirmed by the tests.

We estimate three models. Model 1 is run for all banks operating in the CESEE countries with the use of bank-level and host country-level variables (all banks model). In this model, we include ownership dummies to identify whether the type of owner has any impact on credit growth. Model 2 covers foreign-owned banks and includes subsidiary bank-level variables and macroeconomic variables of the host and home countries. Model 3, in contrast to Model 2, adds microeconomic variables for the parent bank. Models 2 and 3 are called foreign-owned bank models. The difference between Models 2 and 3 is the type of parent company. In Model 2, we account for all foreign investors, including banks, development banks, investment funds and finance companies, while in Model 3, only banks are included as investors. The difference in bank-year observations is approximately 300. Moreover, Model 2 may be treated as a first-step extension of variables included in the estimations.

Descriptive statistics are presented in Appendix. It should be noted that the means and standard deviations of particular regressors are substantially different. Given that in this paper, we not only attempt to identify the key determinants of credit growth but also to compare the strength of their impact, we present the complete results of the estimated models and provide the standardised coefficients in the baseline model. This approach allows us to waive the problem of the different scales in which particular variables are measured, which in turn could provide misleading conclusions regarding their relevance. This effect, we believe, should be investigated apart from the formal statistical significance.

4. EMPIRICAL RESULTS

We estimate baseline models for the full sample and models with structural breaks and the division of the CESEE countries into EU members and non-EU members. An explanation of our approach is given in each section. The standardised coefficients are provided in the row under the non-standardised coefficients for the baseline models.[6]

4.1. Baseline model

Table 2 presents the results of the full sample estimations (Models 2.1, 2.2 and 2.3). Notably, the impact of the credit growth determinants remains similar regardless of bank ownership with very few exceptions, such as the host bank's impairment charges[7] in Model 2.2 or the equity growth of the host bank. We comment on this issue in a later part of the text. We treat the

[6]In the case of other models, the standardised coefficients are omitted in the article for brevity but are available from the authors on request.

[7]Impairment charges reflect in profit and loss account the cost of allowances (reserves) for non-performing loans and other impaired assets. These names are used under the framework of IAS 39.

Table 2. Model estimates of credit growth determinants for different models (full sample)

Variable	Model (2.1)	Model (2.2)	Model (2.3)
GDP_growth (host)	2.476*** (46.98)	2.195*** (23.79)	2.109*** (26.27)
	0.219	0.189	0.197
NIR_change (host)	−0.00437*** (−4.49)	−0.00456* (−2.54)	−0.00166 (−1.51)
	−0.0125	−0.0141	−0.00520
SUBSIDIARY OWNER (private)	0.0667 (1.76)		
	0.150		
SUBSIDIARY OWNER (foreign)	0.105** (2.77)		
	0.236		
SUBSIDIARY OWNER (state)	0.0807* (2.12)		
	0.181		
CRISIS (host)	0.0601*** (6.62)	0.123*** (6.35)	0.117*** (6.23)
	0.0329	0.0564	0.0573
FSN_index (host)	−0.0916*** (−29.59)	−0.120*** (−17.76)	−0.0746*** (−9.19)
	−0.135	−0.163	−0.107
CL.PARTY (host)	−0.0823*** (−24.17)	−0.0244* (−2.18)	−0.0413** (−2.76)
	−0.185	−0.0538	−0.0984
CR.PARTY (host)	−0.0674*** (−15.25)	−0.000311 (−0.03)	−0.0316* (−2.14)
	−0.151	−0.000687	−0.0754
L.PARTY (host)	−0.0609*** (−3.86)	−0.0536* (−2.26)	−0.113*** (−4.05)
	−0.137	−0.118	−0.269
R.PARTY (host)	−0.0730*** (−7.20)	−0.0365* (−2.04)	−0.0795*** (−3.89)
	−0.164	−0.0807	−0.190
ROE (host bank)	0.0625*** (9.04)	0.0467** (2.59)	−0.0104 (−0.49)
	0.0557	0.0293	−0.00676
D_L (host bank)	−0.00135*** (−3.95)	0.000958 (1.61)	0.000450 (0.40)
	−0.0308	0.0293	0.0162
CAP (host bank)	−0.0309 (−0.92)	0.125*** (4.13)	−0.330*** (−9.78)
	−0.00753	0.0258	−0.0569
NIM (host bank)	1.495*** (24.92)	1.634*** (10.20)	2.847*** (14.20)
	0.131	0.120	0.195

(continued)

Table 2. Continued

Variable	Model (2.1)	Model (2.2)	Model (2.3)
IMPAIR_ASSETS (host bank)	−−0.478*** (−5.67)	0.704*** (3.55)	−0.832** (−3.20)
	−0.0380	0.0446	−0.0482
EQUITY_growth (host bank)	−0.00353*** (−4.28)	0.139*** (24.54)	0.133*** (22.17)
	−0.0405	0.199	0.209
GDP_growth (home)		0.780*** (7.48)	0.631*** (4.74)
		0.0521	0.0450
NIR_change (home)		−0.0186*** (−3.96)	−0.00758 (−1.35)
		−0.0290	−0.00990
CRISIS (home)		−0.0314*** (−4.89)	−0.0367*** (−4.56)
		−0.0299	−0.0384
BIG_SHARE (parent)			−0.0320*** (−4.27)
			−0.0330
BAILOUT (parent)			0.0407*** (3.44)
			0.0316
STATE_OWNED (parent)			0.0312* (2.56) 0.0232
FSN_index (home)			−0.0559*** (−8.56)
			−0.0869
ROE (parent)			0.0247*** (7.48)
			0.0352
D_L (parent)			0.00474 (0.67)
			0.00475
CAP (parent)			0.531*** (4.54)
			0.0510
NIM (parent)			0.445* (1.97)
			0.0248
IMPAIR_ASSETS (parent)			−0.451 (−1.58)
			−0.0187
EQUITY_growth (parent)			0.000495 (0.74)
			0.0421

(continued)

Table 2. Continued

Variable	Model (2.1)	Model (2.2)	Model (2.3)
LOAN_growth (parent)			−0.00163 (−1.02)
			−1.383
_cons	0.253*** (6.47)	0.275*** (13.39)	0.312*** (13.59)
N	4,602	2,464	2039

Sources: Based on the WB database, Bankscope, central bank websites, bank annual statements, IMF, MID, TIBE, Parline, and hand-collected data.
Notes: *t* statistics are in parentheses.
* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$. Standardised betas are presented in the row underneath the main estimate and *t* statistic. Model (2.1) - credit growth in national currency for all banks in CESEE; Model (2.2) – credit growth in national currency for foreign-owned banks in CESEE with home country macroeconomic data; Model (2.3) – credit growth in national currency for foreign-owned banks in CESEE with home country macroeconomic data and parent bank data.

models presented in Table 2 as the baseline models. Although we provide the exact *P* value for the significance tests in the discussion, wherever we use the concept of the significance of a variable, we mean $P = 0.05$.

Model 2.1 (estimated from the sample of all banks in the CESEE countries) confirms a positive influence of GDP growth, net interest margin (NIM), ROE and crisis in the host country on the rate of credit growth. The increase in nominal interest rates, impairment charges, the growth of equity, the ratio of deposits to loans and a better-developed FSN have negative impacts on banks' credit growth. The analysis of the standardised coefficients shows that the growth of credit is, to a large extent, determined by three factors: GDP growth, NIM (positively) and FSN index (negatively). Other factors have a far lower impact. On the one hand, GDP growth may be regarded as a proxy for credit demand (e.g., De Haas – van Lelyveld 2014). On the other hand, credit growth may stimulate economic growth; however, thus far, there has been mixed evidence of this phenomenon for the CESEE countries (Koivu 2012; Petkovski – Kjosevski 2015). We treat GDP growth here as a proxy for credit demand. The NIM is the leading indicator for traditional banks focused on deposits and loans, which allows them to increase overall profitability. The overall profitability is, however, counterbalanced by impairment charges. These ratios may be regarded as a "carrot and stick" (NIM – "carrot", impairment charges – "stick") driving banks' credit growth and profitability. A well-developed FSN usually requires banks to pay more contributions for its tasks, but at the same time, it exercises a more restrictive policy that reduces banks' potential for credit growth. The impact of a crisis is not as expected. If the crisis occurred in a CESEE country, it has a positive impact. This effect may be associated with the extensive credit growth of foreign-owned banks using an opportunity to increase their market share and, in parallel, domestic-owned banks being forced to follow their competitors in adopting such a policy. Our findings for foreign-owned banks are in line with those of Allen et al. (2017).

Ownership dummies have been included in the model, with ownership by a development bank treated as a reference category. The banks owned by any other parent (foreign, state, or domestic private capital) represent *ceteris paribus* higher credit growth in the analysed period.

Another set of dummies was introduced to control for the political situation of a country with a centrally oriented government as the reference category. In the case of all non-central parties, there was a *ceteris paribus* average slower credit growth. The periods of non-central governments did not coincide with slower economic growth (on average, GDP growth was highest during centre-right government tenures and lowest during centre-left government tenures). The impact of the political party dummies may be explained by potential reforms or legal changes implemented by the non-central parties. These reforms and changes have discouraged lending (and/or borrowing) and are confirmed by most of the estimated models in which the dummies for the non-central parties are statistically significant with a negative impact.

Model 2.2 (for foreign-owned banks with home country macroeconomic variables) shows some differences in the impact when compared to Model 2.1. The ratio of deposits to loans is not statistically significant, while the ratio of equity to total assets is statistically significant. The signs of the coefficients of both variables are found positive. The signs of the impairment charges and the growth of equity are also found positive. This finding underlines the different role of funding and capital in foreign-owned banks, showing that these banks may be more aggressive in their credit policies and expand when facing higher impairment charges. The impact of the home country macroeconomic variables is as expected. The inclusion of the home country macroeconomic characteristics shows, however, that the roles of the host country and host bank-specific variables are strong. The major positive impact (reflected in standardised betas) is confirmed by the host bank's growth of equity capital, GDP growth in the host country and NIM. The leading role of equity growth, as well as its change in sign in comparison with Model 2.1 may be explained by the owners' group-wide capital management policy (e.g., De Haas – Naaborg 2012), i.e., when the owners provide new equity capital or agree to accumulate profits, they request a certain return, which is generated by loans in traditional banks. This condition implies the growth of credit. The strongest negative impact is caused by the FSN index of a host country, while the impact of other macroeconomic variables is far lower (crisis "at home", changes in interest rates in the home and host countries).

In Model 2.3 (for foreign-owned banks with a bank as a parent with a full range of parent bank and home country variables), the strongest positive impacts are from the growth in the host bank's equity, GDP growth of the host country and the subsidiary's NIM, while the strongest negative impacts are from the FSN index of host and home countries and the ratio of equity to assets of the subsidiary. This model gives similar results to those of Model 2.2; however, minor differences can again be noticed. The first difference is that the statistical significance of changes in nominal interest rates in the host and home countries is not confirmed. Thus, the credit growth of foreign-owned banks is not sensitive to any changes in nominal interest rates, which may be explained by easy access to financing in the case of large international banks and the attractiveness of lending activities for their business models. Furthermore, the parent's NIM has a positive impact; thus, the changes in nominal interest rates play an indirect role in the host's credit growth. The impact of ROE is not statistically significant, while the signs of the impacts of equity on total assets and impairment charges have become negative, which is in line with our expectations. Moreover, the equity to total assets and ROE ratios of the parent bank are both statistically significant, with a positive impact. These differences and the impact of the parent bank variables indicate strong integration with the parent bank and a more conservative approach, which is not the case for non-bank parents. Likewise, in Model 2.2, the impact of the host country and host bank variables is strong, and home country and parent bank variables have lower impacts on the subsidiaries' credit growth.

Bailout and ownership dummies of parent companies provide interesting results. Bailout, which denotes the years in which any state financial aid has been provided to a parent bank, has a positive impact. Thus, it was beneficial to both host countries (as there was no considerable cut in lending because of the parent's financial difficulties) and to parent banks (due to possibly improving consolidated profits arising from subsidiaries' good business). Having a large investor holding of at least 5% of the parent's shares (which was observed in approximately 1,500 cases) was able to *ceteris paribus* slow down the credit growth, meaning that the owners exercised more control over the market expansion. This effect may be explained by a greater focus on risk by large investors. The specific owner is the state. We have 194 bank observations with parent banks owned by the state (except bailout cases; in 27 out of 194 cases, there are state-owned parents from China, Russia, Turkey, Israel and Slovenia). In contrast to other large investors, state-owned parents have sped up the credit growth of their subsidiaries, which may reflect their interest in strengthening their international role. State-ownership is rather rare in the home countries; however, it was intensified after the outbreak of the GFC when, under the framework of state aid, some banks were fully nationalised or a government agency became their major owner (e.g., Dexia and some Greek banks). Although the impact of state-ownership is positive, we need to keep in mind its limited scope throughout the whole period (e.g., Bank of China; Bank of Moscow, Sberbank and VTB Banks from Russia; Birlesik, Halk and Ziraat from Turkey; NKBM from Slovenia) and its regional focus on mostly Balkan states.

In summary, there are several factors that strongly determine the market expansion of banks regardless of their ownership. These factors are the economic conditions of a host country (positive), the NIM of a host bank (positive) and the FSN of a host country (negative). Similar to Frey – Kerl (2015), high profitability, measured in this study by NIM, which reflects profits of traditional banking, prevented banks from deleveraging. The strong negative impact of a well-developed FSN confirms the findings of Anginer et al. (2017) on the role of regulations. For foreign-owned banks, the internal capital market plays a significant role in their credit expansion, even stronger (according to standardized coefficient) than the local macroeconomic conditions, which is reflected in the meaning of the equity growth ratio. The banking crisis in a host country did not cause any damage to the credit growth due to market expansion of foreign-owned banks and the imitation strategy of other banks. However, the banking crisis in the home country largely halted the credit growth of foreign subsidiaries, which is a sign of a crisis transfer.

4.2. Structural breaks

In period covered by this study, world economies have faced serious changes, especially as a result of the GFC, which affected countries to a various degree. Therefore, there is a risk of non-stability of the parameters of the model over time, which can result in misleading conclusions if the likely non-stability is not accounted for. To address this problem, we divide the period into 3 sub-periods – before 2001 (including 2001), from 2002 to 2007 and after 2007 – thus accounting for structural breaks in 2002 and 2008. Both years, namely, 2001 and 2007, were marked by crisis. In 2001, the so-called dotcom bubble burst, while in 2007, the first wave of the GFC began as a subprime crisis in the US. Moreover, the second period, from 2002 to 2007, was a pre-accession or early accession period for many CESEE countries. Therefore, many changes in the market were stimulated by the accession process and implementation of the EU regulations. The results of the estimations for different periods are presented in Table 3.

Table 3. Model estimates of credit growth determinants for different periods (before 2001, 2002–2007, after 2007)

Variable	Model (3.1)	Model (3.2)	Model (3.3)
GDP_growth (host, before 2001)	3.377*** (30.86)	1.622** (3.22)	2.094** (2.61)
GDP_growth (host, 2002–2007)	2.725*** (11.57)	3.394*** (14.47)	2.831*** (10.52)
GDP_growth (host, after 2007)	1.304*** (29.45)	1.123*** (14.17)	0.859*** (7.37)
NIR_change (host, before 2001)	−0.287*** (−12.26)	−0.217** (−3.21)	−0.303** (−2.72)
NIR_change (host, 2002–2007)	−0.0828** (−3.14)	0.0177 (0.55)	0.0639 (1.87)
NIR_change (host, after 2007)	−0.00209* (−2.39)	−0.00280 (−1.69)	−0.000425 (−0.37)
SUBSIDIARY OWNER (private, before 2001)	−0.102 (−1.24)		
SUBSIDIARY OWNER (foreign, before 2001)	0.0170 (0.21)		
SUBSIDIARY OWNER (state, before 2001)	−0.0652 (−0.79)		
SUBSIDIARY OWNER (develop, 2002–2007)	−0.345*** (−3.89)		
SUBSIDIARY OWNER (private, 2002–2007)	−0.249** (−2.62)		
SUBSIDIARY OWNER (foreign, 2002–2007)	−0.200* (−2.11)		
SUBSIDIARY OWNER (state, 2002–2007)	−0.331*** (−3.45)		
SUBSIDIARY OWNER (develop, after 2007)	−0.335*** (−3.58)		
SUBSIDIARY OWNER (private, after 2007)	−0.305*** (−3.42)		
SUBSIDIARY OWNER (foreign, after 2007)	−0.341*** (−3.82)		
SUBSIDIARY OWNER (state, after 2007)	−0.308*** (−3.43)		
CRISIS (host, before 2001)	0.0801*** (6.55)	0.426*** (8.76)	0.488*** (5.80)
CRISIS (host, after 2007)	0.0730*** (5.82)	0.138*** (11.22)	0.106*** (7.02)
FSN_index (host, before 2001)	−0.117*** (−10.74)	−0.108* (−2.18)	−0.222*** (−3.39)
FSN_index (host, 2002–2007)	−0.0107 (−0.75)	−0.0399* (−2.27)	−0.0684*** (−3.78)
FSN_index (host, after 2007)	−0.0351*** (−6.11)	−0.0294*** (−3.33)	−0.0158 (−1.60)

(continued)

Table 3. Continued

Variable	Model (3.1)	Model (3.2)	Model (3.3)
CL.PARTY (host, before 2001)	−0.170*** (−11.22)	−0.163*** (−4.44)	−0.147 (−1.53)
CR.PARTY (host, before 2001)	−0.0604*** (−3.91)	−0.123*** (−3.34)	−0.115 (−1.19)
L.PARTY (host, before 2001)	0.0638* (2.38)	0.169 (1.93)	0.297* (2.11)
R.PARTY (host, before 2001)	−0.0373 (−1.81)	−0.105* (−2.41)	−0.0817 (−0.84)
C.PARTY (host, 2002–2007)	0.120*** (4.08)	−0.244* (−2.25)	−0.652** (−3.23)
CL.PARTY (host, 2002–2007)	0.0263 (1.25)	−0.277** (−2.61)	−0.752*** (−3.74)
CR.PARTY (host, 2002–2007)	−0.0309 (−1.38)	−0.318** (−3.02)	−0.763*** (−3.80)
L.PARTY (host, 2002–2007)	0.102** (2.98)	−0.195 (−1.89)	−0.734*** (−3.51)
R.PARTY (host, 2002–2007)	-	−0.292** (−2.64)	−0.715*** (−3.51)
C.PARTY (host, after 2007)	0.0209 (1.28)	−0.431*** (−4.30)	−0.602** (−3.07)
CL.PARTY (host, after 2007)	0.0244 (1.69)	−0.399*** (−3.96)	−0.594** (−3.03)
CR.PARTY (host, after 2007)	0.0646*** (4.52)	−0.391*** (−3.88)	−0.582** (−2.97)
L.PARTY (host, after 2007)	0.0498* (2.29)	−0.340*** (−3.30)	−0.598** (−3.02)
R.PARTY (host, after 2007)	-	−0.429*** (−4.19)	−0.643** (−3.26)
ROE (host bank, before 2001)	0.0615*** (5.70)	−0.00705 (−0.08)	0.00140 (0.01)
ROE (host bank, 2002–2007)	−0.150** (−2.99)	−0.595*** (−8.33)	−0.535*** (−7.63)
ROE (host bank, after 2007)	0.0356*** (6.27)	0.0369** (2.82)	0.000701 (0.03)
D_L (host bank, before 2001)	−0.00570*** (−4.40)	−0.00458* (−2.13)	−0.00709** (−3.22)
D_L (host bank, 2002–2007)	−0.000570 (−0.90)	0.000132 (0.15)	−0.000940 (−0.97)
D_L (host bank, after 2007)	−0.00875** (−2.74)	−0.00400 (−0.94)	−0.000385 (−0.06)
CAP (host bank, before 2001)	0.450*** (6.36)	0.396 (1.46)	−0.0219 (−0.06)
CAP (host bank, 2002–2007)	−0.327*** (−4.31)	0.0903 (0.76)	−0.339* (−2.53)
CAP (host bank, after 2007)	−0.197*** (−7.46)	−0.0516 (−1.77)	−0.243*** (−5.23)
NIM (host bank, before 2001)	0.571*** (8.83)	0.370 (0.56)	1.794 (1.72)
NIM (host bank, 2002–2007)	1.958*** (8.68)	2.012*** (7.09)	2.591*** (9.05)
NIM (host bank, after 2007)	2.681*** (26.48)	2.122*** (26.20)	1.790*** (10.00)
IMPAIR_ASSETS (host bank, before 2001)	−0.641*** (−3.39)	3.165* (2.02)	−3.259 (−1.55)
IMPAIR_ASSETS (host bank, 2002–2007)	0.0132 (0.04)	−0.969 (−1.53)	−1.490 (−1.83)
	−0.329*** (−3.43)	0.0640 (0.85)	−0.514** (−2.76)

(continued)

Table 3. Continued

Variable	Model (3.1)	Model (3.2)	Model (3.3)
IMPAIR_ASSETS (host bank, after 2007)			
EQUITY_growth (host bank, before 2001)	−0.00389*** (−7.34)	0.262*** (10.00)	0.143*** (4.01)
EQUITY_growth (host bank, 2002–2007)	0.126*** (9.82)	0.334*** (14.40)	0.337*** (17.99)
EQUITY_growth (host bank, after 2007)	0.0903*** (18.53)	0.0958*** (18.41)	0.0882*** (9.26)
GDP_growth (home, before 2001)		-1.141* (-2.25)	-0.603 (-0.89)
GDP_growth (home, 2002–2007)		1.682*** (5.07)	1.795*** (5.39)
GDP_growth (home, after 2007)		0.682*** (6.60)	0.558*** (3.68)
NIR_change (home, before 2001)		0.0284 (1.65)	0.157* (2.56)
NIR_change (home, 2002–2007)		−0.275*** (−7.77)	−0.192*** (−4.27)
NIR_change (home, after 2007)		−0.0151** (−2.85)	−0.00749 (−1.13)
CRISIS (home, before 2001)		−0.205*** (−3.39)	−1.183*** (−4.11)
CRISIS (home, 2002–2007)		0.0441 (0.82)	−0.105 (−1.34)
CRISIS (home, after 2007)		0.0380*** (4.79)	0.0294** (3.20)
BIG_SHARE (parent, before 2001)			−0.175*** (−4.78)
BIG_SHARE (parent, 2002–2007)			0.0100 (0.73)
BIG_SHARE (parent, after 2007)			−0.0224* (−2.07)
BAILOUT (parent, before 2001)			-
BAILOUT (parent, 2002–2007)			−0.181 (−1.02)
BAILOUT (parent, after 2007)			0.00831 (0.66)
STATE_OWNED (parent, before 2001)			0.125 (0.93)
STATE_OWNED (parent, 2002–2007)			0.125 (1.75)
STATE_OWNED (parent, after 2007)			0.0440** (3.09)
FSN_index (home, before 2001)			−0.0237 (−0.50)
FSN_index (home, 2002–2007)			0.118*** (5.28)
FSN_index (home, after 2007)			−0.0137 (−1.94)
ROE (parent, before 2001)			−0.170 (−0.79)

(continued)

Table 3. Continued

Variable	Model (3.1)	Model (3.2)	Model (3.3)
ROE (parent, 2002–2007)			0.201* (2.29)
ROE (parent, after 2007)			0.0133*** (3.30)
D_L (parent, before 2001)			0.00106 (0.02)
D_L (parent, 2002–2007)			−0.0357* (−2.08)
D_L (parent, after 2007)			−0.00349 (−0.20)
CAP (parent, before 2001)			1.031 (1.42)
CAP (parent, 2002–2007)			0.772** (2.98)
CAP (parent, after 2007)			−0.0797 (−0.54)
NIM (parent, before 2001)			0.601 (0.46)
NIM (parent, 2002–2007)			−2.103*** (−4.34)
NIM (parent, after 2007)			0.473 (1.65)
IMPAIR_ASSETS (parent, before 2001)			8.717 (0.95)
IMPAIR_ASSETS (parent, 2002–2007)			34.21*** (14.63)
IMPAIR_ASSETS (parent, after 2007)			−1.149*** (−3.84)
EQUITY_growth (parent, before 2001)			−0.0105 (−0.88)
EQUITY_growth (parent, 2002–2007)			0.0238* (2.04)
EQUITY_growth (parent, after 2007)			0.000643 (1.07)
LOAN_growth (parent, before 2001)			0.00221 (0.38)
LOAN_growth (parent, 2002–2007)			−0.0276 (−1.66)
LOAN_growth (parent, after 2007)			−0.00190 (−1.32)
_cons	0.368*** (4.25)	0.416*** (4.23)	0.674*** (3.48)
N	4,602	2,464	2,039

Sources: Based on the WB database, Bankscope, central bank websites, bank annual statements, IMF, MID, TIBE, Parline, and hand-collected data.
Notes: *t* statistics are in parentheses.
* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$. Model (3.1) – credit growth in national currency for all banks in CESEE; Model (3.2) — credit growth in national currency for foreign-owned banks in CESEE with home country macroeconomic data; Model (3.3) – credit growth in national currency for foreign-owned banks in CESEE with home country macroeconomic data and parent bank data.

The estimates of the models that consider structural breaks lead to several differences in comparison with the baseline model, which emphasises the need to account for the instability of the modelled relationship over time. Both host and parent banks adjust to changing market conditions, including the crisis events. However, host country GDP growth, a GFC dummy and the growth of equity of the host bank remain significant throughout all periods and models. There were no crisis events between 2002 and 2007, while some CESEE countries were hit by the crisis in 2008 or afterwards. The ownership structure in Model 3.1 shows differences in comparison with the baseline model (the reference category is ownership by development banks before 2001). Except for foreign ownership before 2001, banks exhibited *ceteris paribus* lower credit growth than the reference category. This condition may be explained by the specific role played by international development banks during that period to support the economic transformation process.

In the case of other macroeconomic variables for the host and home countries, it can be observed that the *ceteris paribus* change in the level of the host's nominal interest rates has a significant and negative impact for all periods only in Model 3.1 (in line with the baseline results). While the baseline Model 2.3 has not confirmed any impact of changes in the level of interest rates in the host and home countries, accounting for structural breaks allowing the extraction of differences over time and capturing their significance. Before 2001, the impact of interest rates of the host countries was found to be negative, while the impact of the home countries was found to be positive. Between 2002 and 2007 and after 2007, there was a negative impact of interest rates of the home countries (after 2007 only in Model 3.3). Combining all periods eliminated the differences. These differences may be explained by the increasing role of foreign financing from parent companies or from financial markets. We also observe that home country GDP growth has a positive impact, except for the period before 2001. Thus, the initial period of foreign ownership (until 2001) is different from the two other periods in terms of the impact of the home country macroeconomic characteristics. This finding reflects the lower integration during that period of time and the immaturity of the CESEE banking sectors.

The impact of the hosts' FSN index is negative throughout all periods; however, it is not statistically significant in all models. The home country FSN index represents a different impact than in the baseline model. In Model 3.3, this factor is statistically significant only in the second period with a positive impact, contrary to the baseline findings. This result suggests that the FSN in home countries has been unable to stop credit expansion outside these countries.

Significant differences between the influence of the bank-specific characteristics of host banks in different periods are found. The NIM is one of the key variables of the baseline model, as confirmed by these estimations, except during the initial period models for foreign-owned banks (3.2 and 3.3). Another key variable – equity growth – has a confirmed positive impact for foreign-owned banks and for all banks after 2001. The impact of ROE is negative between 2002 and 2007 and positive after 2007 (however, in Model 3.3, the impact is not statistically significant). These differences indicate that between 2002 and 2007, the increase in ROE did not go "hand in hand" with credit growth, and credit expansion was not linked to effective capital management. The ratio of deposits to loans is statistically significant, with a negative impact before 2001 throughout the models and after 2007 in Model 3.1, while in the baseline estimations, it is statistically significant only in Model 2.1. This finding shows that during the initial period, traditional funding influences credit growth, while afterwards, it loses its importance, and host banks rely on other sources of financing, e.g., parent banks or the interbank market.

This situation changed somewhat after the outbreak of the GFC. In models with structural breaks, the ratio of equity to total assets (CAP) is statistically significant in Model 3.1 for all periods and in Model 3.3 from 2002. Initially, this factor has a positive impact in Model 3.1, followed by a negative impact in Models 3.1 and 3.3. This pattern may be explained by more relaxed capital rules during the initial period before the implementation of the EU regulations. The impact of the impairment charges is comparable with the baseline models; however, it is not statistically significant for all periods.

Until 2001, no parent bank variable was found to be significant. This finding shows that the initial period is different in terms of group-wide management. In 2002–2007, ROE, CAP, impairment charges and the growth of equity have a positive impact on the subsidiaries' credit growth, while NIM and the deposits-to-loans ratio have negative impacts. This finding shows the positive impact of support from parent companies during times of economic prosperity, but if the parent's home market was attractive in terms of NIM and/or it applied more prudent liquidity management, the subsidiary credit growth slowed. After 2007, only a parent's ROE, with a positive impact and impairment charges, with a negative impact, exhibited statistical significance. This change may be explained by the greater focus on overall profitability and destructive credit losses, which occurred after the outbreak of the GFC among international banks.

In the case of the political party dummies, we find mixed evidence. The reference category is the "centre" party before 2001. In the all-banks model, the impact of political wings differs among periods. Before 2001, banks exhibited lower credit growth when the ruling party was different from the reference category. Afterwards, the credit growth was *ceteris paribus* higher. This effect may be explained by a more favourable economic situation in the second period when politics may have played no significant role and many CESEE countries prepared for the EU accession. Moreover, in the second period, there was a switch from a left-wing to centre-left government, while in the third period, there was a switch from a centre-left to a centre-right government. Such changes may be followed by economic reforms that stimulate the economy, at least for a short-term horizon. In models with foreign-owned banks only, the impact of different political wings is generally negative, though quite often not statistically significant. This pattern indicates that foreign-owned banks pay less attention to the host country politics than other banks.

The impact of certain variables was strong and consistent throughout all periods in the all-banks model. These variables include the host's GDP growth (positive impact) and FSN index (negative impact). The role of other variables with strong impacts has changed over time, reflecting a changeable market situation. In the last two periods, growth of equity and NIM sped up credit growth, which was a sign that banks became more aggressive in their lending policies. The credit growth, however, has slowed in the recent period as a result of regulatory restrictions regarding funding and capital requirements (respectively, the deposits-to-loans ratio and CAP). Interest rates curtailed the credit growth strongly in the two initial periods. All these trends show the changing patterns of banks' policies; however, the overall economic situation and FSN always played significant roles.

According to the models for foreign-owned banks only (3.2 and 3.3), the impact of the host country or host bank variables has remained strong throughout all periods. In Model 3.2, before 2001, only a crisis "at home" has a strong negative impact, while in the second period, the level of interest rates in the home country has an impact. In Model 3.3, the impact of parent banks

was the strongest between 2002 and 2007 and much less important in the initial period and after the outbreak of the GFC (with a negative impact of impairment charges).

In sum, the impact of home countries and parents is rather moderate throughout all periods, and "think globally, act locally" seems to be a leitmotif. Our findings are contrary to those of Cull – Martínez Pería (2013), De Haas – van Lelyveld (2014), Allen et al. (2017), but we cover a longer post-crisis period than the previous studies. This difference also means that the impact of the GFC has not been long lasting and that the initial transfer of shock from the parents and home country gradually faded away.

4.3. Heterogeneity of the countries

We divide the CESEE countries into EU and non-EU members. Such a differentiation is made due to different levels of financial and economic development and financial infrastructure in both groups, thus controlling for the heterogeneity of countries. The CESEE countries that joined the EU are generally better developed and have fulfilled a certain scope of accession criteria, including more demanding bank regulations. The results of the estimations are presented in Table 4.

Although the impact of GDP growth (host's and home, where applicable) and the host's FSN is consistent in all models, we find differences between non-EU and EU-based host banks. In general, there are more factors with an impact on credit growth for non-EU banks. This is the case especially for foreign-owned banks with parent companies in the banking sector.

In the full sample model (4.1) for the EU-based banks, the host's growth of equity capital, GDP growth and NIM are found to have a positive (and strong) impact, while a negative impact is confirmed for the FSN index (strong), impairment charges and CAP. For the non-EU banks, the host's GDP growth and NIM (positive), as well as interest rates and FSN index (negative), play crucial roles in credit growth. The growth of equity is found to have a negative impact in these cases, which underlines the considerable role of equity capital in more advanced economies and the fact that more capital is needed in less stable environments. The other differences are related to CAP (negative for the EU banks), ROE and crisis in the host country (positive for the non-EU banks). The differences may be considered to arise from the more cautious policy of the EU-based banks due to capital adequacy regulations and more aggressive, profit-seeking policy in the case of the non-EU-based subsidiaries. The reference category for the ownership dummy is a bank that is owned by a development bank in a non-EU country. The banks with other ownership in the non-EU countries represent *ceteris paribus* higher credit growth, while their peers in the EU member countries represent lower credit growth. This difference fits the idea of more cautious EU-based vs. more aggressive non-EU-based policies. For the political party dummy, the reference category is "centre" in a non-EU country. In most cases, credit growth has been lower in the non-EU countries and higher in the EU countries in comparison to the reference category. This finding shows the lower impact of politics in more developed countries. Moreover, the EU accession process was treated as the top priority in many CESEE countries, regardless of the political philosophy.

In the case of the foreign-owned banks model (4.2), the change in the level of nominal interest rates in the host country, ROE, and the crisis dummy are statistically significant only for banks from the non-EU countries. CAP is statistically significant for the EU-based host banks with a negative impact. The impacts of two home country variables – change in interest rates

Table 4. Model estimates of credit growth determinants for different models – EU and non-EU

Variable	Model (4.1)	Model (4.2)	Model (4.3)
GDP_growth (non-EU host)	2.937*** (40.66)	2.426*** (16.20)	2.569*** (15.79)
GDP_growth (EU host)	1.616*** (20.01)	1.506*** (12.08)	1.540*** (9.64)
NIR_change (non-EU host)	−0.161*** (−11.43)	−0.0677** (−3.18)	−0.0424 (−1.58)
NIR_change (EU host)	−0.00295*** (−5.76)	−0.00276 (−1.78)	−0.00143 (−0.86)
SUBSIDIARY OWNER (non-EU, private)	0.0504 (1.11)		
SUBSIDIARY OWNER (non-EU, foreign)	0.119** (2.62)		
SUBSIDIARY OWNER (non-EU, state)	0.0375 (0.81)		
SUBSIDIARY OWNER (EU, develop)	−0.0720 (−1.21)		
SUBSIDIARY OWNER (EU, private)	−0.0234 (−0.45)		
SUBSIDIARY OWNER (EU, foreign)	−0.0770 (−1.47)		
SUBSIDIARY OWNER (EU, state)	−0.0543 (−1.01)		
CRISIS (non-EU host)	0.170*** (14.17)	0.327*** (11.50)	0.375*** (11.93)
CRISIS (EU host)	−0.0238*** (−5.26)	−0.00615 (−0.57)	−0.00644 (−0.40)
FSN_index (non-EU host)	−0.0752*** (−14.11)	−0.0817*** (−8.91)	−0.0366** (−3.24)
FSN_index (EU host)	−0.0577*** (−7.95)	−0.0676*** (−6.60)	−0.0523*** (−4.85)
CL.PARTY (non-EU host)	−0.0681*** (−18.32)	0.0206* (2.00)	0.0596** (3.23)
CR.PARTY (non-EU host)	−0.0594*** (−8.96)	0.0382*** (3.93)	0.0645*** (3.40)
L.PARTY (non-EU host)	0.0338* (2.14)	0.0125 (0.57)	0.00945 (0.28)
R.PARTY (non-EU host)	−0.0443** (−3.25)	0.0374 (1.73)	0.0478 (1.67)
C.PARTY (EU host)	0.185*** (6.01)	0.0650 (1.59)	0.0916 (1.77)
CL.PARTY (EU host)	0.0500*** (3.35)	0.0210 (0.63)	0.0605 (1.28)
CR.PARTY (EU host)	0.0974*** (6.81)	0.0576 (1.64)	0.0889 (1.81)
L.PARTY (EU host)	−0.122*** (−4.15)	−0.151** (−2.84)	−0.0760 (−1.05)
R.PARTY (EU host)	-	−0.0561 (−1.47)	0.00165 (0.03)
ROE (non-EU host bank)	0.0902*** (7.62)	0.108*** (5.76)	0.00577 (0.15)
ROE (EU host bank)	0.0120 (1.15)	−0.0415 (−1.59)	0.00832 (0.30)
D_L (non-EU host bank)	−0.00444*** (−3.56)	−0.000509 (−0.54)	−0.00186 (−1.69)
D_L (EU host bank)	0.00488 (1.11)	0.000490 (0.09)	−0.0245** (−2.62)

(continued)

Table 4. Continued

Variable	Model (4.1)	Model (4.2)	Model (4.3)
CAP (non-EU host bank)	−0.0239 (−0.65)	0.000854 (0.04)	−0.390*** (−8.75)
CAP (EU host bank)	−0.211** (−3.15)	−0.558*** (−5.90)	−0.749*** (−4.99)
NIM (non-EU host bank)	1.477*** (20.15)	1.079*** (7.94)	1.911*** (7.76)
NIM (EU host bank)	1.192*** (8.90)	1.657*** (6.83)	1.511*** (4.88)
IMPAIR_ASSETS (non-EU host bank)	−0.348** (−3.00)	1.086*** (3.46)	−0.124 (−0.32)
IMPAIR_ASSETS (EU host bank)	−0.807*** (−4.64)	−1.301*** (−3.84)	−1.137** (−2.80)
EQUITY_growth (non-EU host bank)	−0.00342*** (−8.60)	0.263*** (29.60)	0.220*** (15.39)
EQUITY_growth (EU host bank)	0.106*** (12.64)	0.118*** (10.07)	0.124*** (9.54)
GDP_growth (home, non-EU host)		0.877*** (4.83)	0.648** (2.86)
GDP_growth (home, EU host)		0.917*** (6.61)	0.675** (3.21)
NIR_change (home, non-EU host)		−0.0103 (−1.51)	−0.00745 (−1.18)
NIR_change (home, EU host)		−0.0402*** (−7.64)	−0.00725 (−0.35)
CRISIS (home, non-EU host)		−0.0132 (−0.98)	−0.0130 (−0.80)
CRISIS (home, EU host)		−0.0158* (−2.01)	−0.0278** (−2.88)
BIG_SHARE (parent, non-EU host)			−0.0247* (−2.08)
BIG_SHARE (parent, EU host)			−0.00714 (−0.60)
BAILOUT (parent, non-EU host)			−0.0149 (−0.60)
BAILOUT (parent, EU host)			0.0641*** (4.66)
STATE_OWNED (parent, non-EU host)			0.0737** (3.28)
STATE_OWNED (parent, EU host)			−0.0296 (−1.44)
FSN_index (parent, non-EU host)			−0.0633*** (−6.49)
FSN_index (parent, EU host)			−0.0337*** (−3.77)
ROE (parent, non-EU host)			0.0334*** (4.22)
ROE (parent, EU host)			0.0139 (1.60)
D_L (parent, non-EU host)			0.000160 (0.01)
D_L (parent, EU host)			0.0113 (0.48)
CAP (parent, non-EU host)			0.439** (2.89)
CAP (parent, EU host)			−0.0548 (−0.24)
NIM (parent, non-EU host)			−0.191 (−0.63)

(continued)

Table 4. Continued

Variable	Model (4.1)	Model (4.2)	Model (4.3)
NIM (parent, EU host)			0.982 (1.91)
IMPAIR_ASSETS (parent, non-EU host)			−0.876* (−2.49)
IMPAIR_ASSETS (parent, EU host)			−0.695 (−1.30)
EQUITY_growth (parent, non-EU host)			0.000958 (0.72)
EQUITY_growth (parent, EU host)			−0.000979 (−0.90)
LOAN_growth (parent, non-EU host)			−0.00251 (−0.90)
LOAN_growth (parent, EU host)			0.00210 (0.78)
_cons	0.193*** (4.13)	0.190*** (8.86)	0.211*** (6.12)
N	4,602	2,464	2,039

Sources: Based on the WB database, Bankscope, central bank websites, bank annual statements, IMF, MID, TIBE, Parline, and hand-collected data.
Notes: *t* statistics are in parentheses.
* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$. Model (4.1) – credit growth in national currency for all banks in CESEE; Model (4.2) – credit growth in national currency for foreign-owned banks in CESEE with home country macroeconomic data; Model (4.3) – credit growth in national currency for foreign-owned banks in CESEE with home country macroeconomic data and parent bank data.

and crisis "at home" – are statistically significant only for the EU-based banks. We identified a stronger impact of home country variables for the EU-based banks and, therefore, stronger integration within a group.

Regarding Model 4.3, more parent bank and home country variables are statistically significant for the non-EU-based banks than for the EU-based subsidiaries, which is contradictory to conclusions drawn from Model 4.2. However, these are the host country and subsidiary variables that demonstrate the strongest impact on credit growth. This difference may be interpreted as a sign of more restrictive monitoring of investments outside the EU by parent banks. The ownership issues of a parent bank also have an impact on subsidiaries' credit growth. For the EU-based subsidiaries, the occurrence of a bailout has a positive impact, while for the non-EU-based subsidiaries, state ownership has a positive impact. It is worth emphasizing that in some non-EU countries, state-owned banks from Russia and Turkey have expanded considerably. Moreover, having at least one significant investor matters (negatively) to the non-EU-based subsidiaries. Thus, the EU countries benefited from the state aid provided to parent banks in their home countries, while investments in the non-EU-based banks have been strongly monitored by institutional investors, except when the state is an owner.

The crises in a host country have a positive impact on credit growth only for the non-EU-based banks, while the EU-based foreign-owned banks reduced their lending in the case of home country crises in both models (4.2 and 4.3). This finding shows different reactions to crisis events in both groups of countries and confirms the stronger integration of banks in the EU market. A

host country crisis creates new opportunities for the expansion of foreign-owned banks in less-developed markets due to the regulatory "push" effect (Ongena et al. 2013). The EU member countries from CESEE are absorbed in full EU standards for banking sector regulations; therefore, there are no gaps or any space for regulatory arbitrage to be used by foreign investors. In more integrated markets, however, this effect has been reduced by home country crises. Taking into account political party dummies, we again observe generally higher credit growth than that for the reference category in both groups of countries, except when there is a left-wing party.

In summary, the impact of the host country and host bank variables remains strong throughout all models, taking into account the heterogeneity of countries. More home country and parent bank variables are important for the non-EU-based subsidiaries than for the EU-based subsidiaries in respective models. Therefore, even if they are less integrated due to the lack of access to the common EU market, they are still integrated on a group-wide basis into the group's policy and are monitored carefully. Additionally, home bank regulators and large investors may request that parent banks pay special attention to their businesses outside the EU.

5. CONCLUSIONS

As our study suggests, the determinants of banks' credit growth in CESEE are consistent regardless of their ownership, the period and their EU membership. Although having a foreign investor expands the set of statistically significant determinants, it does not overshadow the importance of the host country conditions and subsidiaries' financial position. The impact of the local environment remains significant for foreign-owned subsidiaries; thus, "think globally, act locally" is applicable to the CESEE banking sectors. The impact of home countries and parents is found to be moderate throughout all sub-periods, i.e., before 2001, from 2002 to 2007 and after 2007. Subsidiaries outside the EU are strictly monitored by their parent companies and seem to be even more integrated into the group's policy than the EU-based subsidiaries. The tentative explanation for this phenomenon is that parent banks are aware of the higher risk in the non-EU countries and are less confident about the quality of the institutional environment. However, the non-EU countries seem to be more attractive for foreign owners, probably due to a less restrictive supervisory approach and a potentially higher return on risk.

The impact of the ruling political party should not be regarded as consistent for all banks and all periods. During the economic boom, their impact seems to be negligible; during the beginning of the transition or periods of slower economic growth, their impact is different and, we claim, depends on the scope of implemented economic reforms and their role for the banking sector. In the case of foreign-owned banks, this impact is less evident in the EU countries.

Our findings can be used for policy-making. First, a well-developed FSN in host countries is necessary for policy makers to have a "good night's sleep". In other words, over-relaxed supervisory standards in the host countries may threaten banks' safety and soundness and, therefore, a country's financial stability. This consideration is especially important at an early stage of the presence of foreign-owned banks, when the impact of parents and the home country is rather weak, as shown in our study.

Second, any crisis event either at home or in a host country is important for credit growth. As our results show, a crisis in the host country provides the opportunity to expand lending by foreign-owned banks (mostly in the non-EU countries), while a "crisis at home" slows it down (mostly in the EU countries). Moreover, under certain conditions, a "crisis at home" may lead to

exit from the host market (e.g., Allied Irish Bank, KBC). Host country policy makers and supervisors should monitor the situation of foreign investors and their home countries to be prepared for a potential shock transfer. We argue that this monitoring is especially important in the case of the CESEE countries, which are part of a banking union and do not have the autonomy to supervise banks in their host countries independently.

Third, our results show that parents' financial position supported credit expansion during the boom (2002–2007) and somewhat reduced it afterwards. Some interesting findings are related to bailout and state ownership. A bailout dummy was introduced to reflect financial difficulties faced by parent banks followed by state aid, and its impact is surprisingly positive for only EU-based subsidiaries. This result shows, on the one hand, that the CESEE countries play a significant role for parent banks and, even in the case of financial troubles, a parent bank maintains its interest in local markets. On the other hand, we may conclude that bailouts, which are often criticised, are helpful not only "at home" but also in the host countries. State ownership of a parent bank also supports credit growth (mostly in the non-EU countries). We speculate in this case that the increase in market share also leads to an increase in the political influence in a given region.

The impact of a bank's ownership on the credit supply requires further investigation, especially through the lens of the economic growth of host countries. Therefore, we postulate that it is necessary to reveal details regarding intra-group transactions (including historical transactions) to analyse the role of ownership in greater detail. Limited access to information may distort the actual picture.

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APPENDIX

Table A1. Descriptive statistics for models 2.1, 3.1, 4.1

Variables	Mean	Std. Dev.	Min	Max
LOAN_growth (host bank)	0.221544	0.398814	−0.88966	3.570269
GDP_growth (host)	0.026026	0.041032	−0.1435	0.109016
NIR_change (host)	0.002107	1.450007	−0.91687	20.81818
Crisis (host)	Exists in 6.54% cases			
FSN_index (host)	1.920061	0.614448	0	3.75
ROE (host bank)	0.028576	0.350158	−7.6627	5.7017
D_L (host bank)	1.203823	1.810901	0	89.66666
CAP (host bank)	0.159103	0.158407	−4.4621	1.0000
NIM (host bank)	0.048897	0.033782	−0.2071	0.4067
IMPAIR_ASSETS (host bank)	0.012304	0.024518	−0.225	0.549719
EQUITY_growth (host bank)	0.181381	0.601894	−8.60654	17.08253

Note: Based on the WB database, Bankscope, central bank websites, bank annual statements, IMF, MID, TIBE, Parline, and hand-collected data.

Table A2. Descriptive statistics for models 2.2, 3.2, 4.2

Variables	Mean	Std. Dev.	Min	Max
	0.204662	0.389125	−0.655523	3.568318
GDP_growth (host)	0.0247	0.040291	−0.143501	0.109016
GDP_growth (home)	0.009361	0.030969	−0.142169	0.106442
NIR_change (host)	0.00613	1.469851	−0.916869	20.81818
NIR_change (home)	−0.107115	0.337141	−0.95093	8.196108
crisis (host)	0.049903	0.217798	0	1
crisis (home)	0.286822	0.452387	0	1
FSN_index (host)	2.018411	0.587446	0	3.75
ROE (host bank)	0.042061	0.276488	−2.7177	5.7017
D_L (host bank)	1.099931	2.188209	0	89.66666
CAP (host bank)	0.146137	0.155860	−4.4621	0.9998
CAP (parent)	0.080670	0.097527	−1.3448	0.9164
NIM (host bank)	0.048801	0.032241	−0.0126	0.2614
IMPAIR_ASSETS (host bank)	0.011927	0.019835	−0.065217	0.240741
EQUITY_growth (host bank)	0.187972	0.638494	−5.805336	17.08253

Note: Based on the WB database, Bankscope, central bank websites, bank annual statements, IMF, MID, TIBE, Parline, and hand-collected data.

Table A3. Descriptive statistics for Models 2.3, 3.3, 4.3

Variables	Mean	Std. Dev.	Min	Max
LOAN_growth (subsidiary)	0.18634	0.363985	−0.598473	3.568318
GDP_growth (host)	0.024154	0.040218	−0.143501	0.109016
GDP_growth (home)	0.008107	0.030845	−0.142169	0.10482
NIR_change (host)	−0.004006	1.42796	−0.916869	20.81818
NIR_change (home)	−0.112125	0.292149	−0.911136	2.25
BIG_SHARE (parent)	0.756711	0.429191	0	1
BAILOUT (parent)	0.141062	0.348185	0	1
STATE_OWNED (parent)	0.106796	0.308942	0	1
crisis (host)	0.049115	0.216169	0	1
crisis (home)	0.3004	0.458563	0	1
FSN_index (host)	1.827099	0.599865	0.25	3.75
FSN_index (home)	2.041405	0.581561	0	3.75
ROE (host bank)	0.049902	0.269635	−1.6182	5.7017
ROE (parent)	0.011741	0.599812	−9.9229	1.8571
D_L (host bank)	1.038375	1.011032	0	17.76
D_L (parent)	0.832242	0.304133	0	3.099684
CAP (host bank)	0.133980	0.144220	−4.4621	0.9890
CAP (parent)	0.080670	0.097527	−1.3448	0.9164
NIM (host bank)	0.045442	0.028677	−0.0067	0.2614
NIM (parent)	0.026621	0.022126	−0.0138	0.125
IMPAIR_ASSETS (host bank)	0.011648	0.018577	−0.065217	0.221135
IMPAIR_ASSETS (parent)	0.007974	0.012335	−0.017951	0.124209
EQUITY_growth (host bank)	0.188215	0.675389	−5.805336	17.08253
EQUITY_growth (parent)	2.601581	38.74218	−7.977138	750.4303
LOAN_growth (parent)	10.37712	384.1173	−0.788892	16060.15

Note: Based on the WB database, Bankscope, central bank websites, bank annual statements, IMF, MID, TIBE, Parline, and hand-collected data.

Table A4. Descriptive statistics for dummy variables (all models)

	Frequency	%
Owner		
Development bank	77	2.13
Domestic private	1,036	28.71
Foreign	2,180	60.40
State	316	8.76
Party		
C	303	8.40
CL	1,173	32.50
CR	1,466	40.62
L	342	9.48
R	325	9.01

Note: Based on Bankscope, bank annual statements, Parline database, and hand-collected data.