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## **Panel Estimation of the Impact of Foreign Banks Presence on Selected Banking Indicators in Macedonia<sup>1</sup>**

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### **Abstract**

The latest global financial and economic crisis reignited the debate on the costs and benefits of foreign bank presence. While discussions on the optimal financing model of foreign owned banks are ongoing, the consensus on the benefits of foreign banks presence is not a matter of dispute. Given the large and enduring foreign presence in the Macedonian banking system, we try to empirically test some of the traditional channels of the foreign banks impact on the banking system behaviour. We employ panel estimation method with a pooled mean group estimator. The results do confirm the thesis that foreign banks presence in Macedonia supports the competition in the banking system in the long run, visible through the narrowing of some of the profitability indicators. Yet, what they also suggest is that it happens via rise in the operational costs - commonly result of the new investments of foreign owners in knowledge and technology. On the other hand, the interest income component is positively affected by the change in the foreign banks presence. The findings suggest that the observed trend of falling share of interest income in interest earning assets and falling operational costs, on a long run can be explained by other fundamental factors, rather than the actual dynamics of foreign bank presence. The availability of bank funding is one of those fundamentals, which can explain the adjustment in the interest income, in particular.

JEL: C23, F21, G21

Key Words: foreign banks presence, banking indicators, international investment, panel estimates, pooled mean group estimator.

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## **1. Introduction**

The process of financial integration has marked the economic scene in the last couple of decades. It has been a cornerstone of the economic transition in the countries of Central-Eastern and South-Eastern Europe, enabling faster real convergence. One dimension of the financial integration is the internationalization of the banking system. In many economies, the entry of foreign owned banks into the banking system was the first step towards the global financial market. The establishment of foreign subsidiaries and entrance of foreign capital were modalities of internationalization of the banking system. It enabled quite rapid modernization of the banking system, facilitated international trade in these economies, and enabled additional funding for supporting growth.

The empirical literature has strived in many occasions to empirically test the specific impact of foreign bank entry on the performances of the domestic banking system. The studies in general deal with the efficiency and profitability of the banks. This mainly refers to interest and non-interest income, profitability, the operational efficiency, and the loan loss provision, as a cost indicator.

The Macedonian economy has a large foreign bank presence in the domestic banking system. The aim of this research is to investigate some of the traditional channels of the foreign banks impact on the banking system behavior. The research motivation is twofold. First, to complement the studies on the impact of foreign bank presence with an empirical investigation on the Macedonian case. Second, to tackle a question, which came to the fore on the backdrop of the recent global crisis – the question on whether the conventional benefits of foreign bank presence are debatable, or not.

In the paper we employ panel estimation technique, with a pooled mean group estimator, which allows us to disentangle between the short-term and long-term relationship among variables of interest. We test the impact of foreign bank presence on banks' profitability and banks' efficiency. The results do confirm the thesis that foreign banks presence in Macedonia impact the narrowing of the profit margins. Yet, what they also suggest is that it happens via rise in the operational costs - commonly result of the new investments of foreign owners in knowledge and technology. On the other hand, the interest income component rises with the increase of the foreign banks presence. The findings suggest that the observed trend of falling share of interest income in interest earning assets (ex-post interest rate) and falling operational costs in the Macedonian economy, on a long run can be explained by other fundamental factors, rather than the actual

dynamics of foreign bank presence. The availability of bank funding is one of those fundamentals, which can explain the adjustment, in the ex-post interest rate, in particular.

The paper is organized as follows. The first part surveys the empirical literature on the impact of foreign capital on banks performances. The second part deals with the hypothesis and the expected findings. The third part presents the data and the methodology. The fourth part explains the main results and the fifth section concludes.

## **2. Literature Review**

The impact of foreign capital on the domestic banking system is a well-researched issue in the economic literature. There is a vast literature that focuses on the general costs and benefits of the foreign bank presence in the host countries. In addition, several studies more specifically explored the spillovers of the entrance of foreign banks on specific balance sheet positions, thus assessing its impact on the changes of competition in the banking industry. In this section we will review several studies which relate more closely to our research work, and hence have higher relevance for the specific research question that we explore.

Claessens, Demirguc-Kunt and Houzinga (2001), on a sample of 7900 banks from 80 countries, for the 1988-1995 period, examine the effect of foreign banks presence on domestic banking market. They investigate how interest rate margins, overhead costs, taxes paid and profitability differ between domestic and foreign banks. The study reveals that foreign banks have higher profitability than domestic banks in the developing countries, and vice versa in developed ones. In general, the study shows that foreign banks presence is on average linked with lower profitability, lower costs and narrower interest rate spread among the domestic banks.

The model of Claessens at al. (2001) was augmented further by Hermes and Lensink (2003). They use data on 990 banks, from 48 countries for the 1990-1996 period. The results of the study show that the foreign bank entry in countries at lower development stage is related to higher costs and spreads for the domestic banks. On the other hand, at higher development stage, foreign banks entry has lesser effect on domestic banks.

Martinez Peria and Mody (2004) analyze the effect of increasing foreign participation and high concentration levels in the banking sectors' market structures in developing countries on bank spreads during the late 1990s. Their findings suggest that foreign banks were able to charge lower spreads relative to domestic banks. They also differentiate between acquisition of banks and establishment of new foreign bank on a sample of Latin America countries. Their research reveals lower interest rate spread of new foreign banks, compared with the spread of the acquired banks. The overall level of foreign bank participation seemed to influence spreads indirectly, primarily through its effect on administrative costs. Bank concentration was positively and directly related to both higher spreads and costs.

Fries and Taci (2005) explore the cost efficiency of the banks in Eastern Europe, concluding that the costs are lower in countries with larger foreign banks presence. To understand the

transformation of banking in the post-communist transition, they examine the cost efficiency of 289 banks in 15 East European countries. They find that banking systems in which foreign-owned banks have a larger share of total assets have lower costs and that the association between a country's progress in banking reform and cost efficiency is non-linear. Early reform stages are associated with cost reductions, while costs tend to rise at more advanced stages. Private banks are more efficient than state-owned banks, but there are differences among private banks. Privatized banks with majority foreign ownership are the most efficient and those with domestic ownership are the least.

In the research study of Uiboupin (2005), on a sample of ten countries and 319 banks, for the 1995 – 2001 period, a panel estimation of the effects of foreign bank entry on selected banking indicators has been done. The results show that larger foreign bank presence implies lower profitability, lower interest and non-interest income and lower loan loss provisions. On the other hand, there is no firm conclusion on the link between the foreign bank presence and operational costs of the banking system. This study is the referent one for the Macedonian model, explored in this paper.

### 3. Hypotheses and the foundation of empirical model

Following the work of Uiboupin (2005), we assess the impact of the foreign bank presence in the domestic banking system through its effect on several banking specific variables – profitability, net-interest income, non-interest income, operational costs and loan loss provisions. The set of variables of interest is derived from a very simple model, which assumes that each bank is striving to maximize its profit function. Banks' profit is a function of their income and costs.

$$\pi = nii + noniii + oc + llp \quad (1)$$

Where:

$\pi$  = profit

$nii$  = net-interest income

$nonii$  = non-interest income

$oc$  = operational costs

$llp$  = loan loss provisions.

It is assumed that initially banks in foreign ownership have lower presence in the domestic banking system, and then it rises subsequently. The increase of the foreign bank presence between the two periods causes changes in the profit level and its structure. These changes can be caused by foreign bank entry, but also by the changes in the strategies of domestic banks, induced by the growing competition.

A priori hypothesis for the linkage between the change of the share of foreign capital and the banking variables of interest is quite difficult to be given. The link between the two is largely conditioned on the characteristics of the economy in general and the specifics of the domestic banking system. For instance, the deepness of the financial intermediation, the market structure, the elasticity of the credit demand are specific features which can affect the channels and the intensity of the impact of foreign banks entry. Nevertheless, some general views/hypotheses of the potential spillover channels of the foreign bank presence on the domestic banking system should be given. Again, we will refer to the hypothesis explored in Uiboupin (2005).

*Interest income, or the ex-post interest rate and net interest income (the ex-post spread)* are in general inversely related to an increasing foreign bank presence. Yet, the empirical results yield contrasting conclusions. Part of them do not reveal statistically significant linkage between foreign bank presence and interest income. On the other hand, some of the research does show



positive correlation in the short run, while on a long run the increase of the foreign bank presence relates to a decline of interest rate and the spread, as well. There are also studies, which condition the link between the two on the economic development level. At a lower level, the link is positive, and the foreign bank entrance is associated with higher costs and margins. At a higher level, the effects seem to be less clear. Yet, as the increase of the foreign bank capital usually yields to a higher competition in the banking system, *a priori hypothesis implies negative correlation between the foreign bank presence and the interest rate spread*. The same hypothesis pertains to the total interest income, which is expected to decline with the rising foreign bank presence and rising competition.

*The expected impact of the foreign bank entry on the non-interest income is more obscure.* It can imply rise of the non-interest income, in a case when the banks are striving to compensate the fall of the interest income, through non-interest revenues. On the other hand, the growing competition might create pressures for reduction of prices of banking services, and hence of the non-interest income, reflecting banks' efforts for increasing their market share in all the segments of banking activities.

*The correlation between the foreign banks entry and the operational costs is assumed as inverse.* The foreign bank entry is assumed to imply positive spillover effects through implementation of new technologies, know-how and hence higher efficiency of the banking system. Yet, in this context, it is important to distinct between the short run and long run effects. In the long run, there are no dilemmas regarding the positive impact of foreign banks entry on the banking system efficiency. In the short run, the nature of the linkage is not straightforward, as the entrance of foreign capital in the first phase might cause increase of operational costs and decline of the banks' efficiency. There are two main causes for this negative relationship. First, domestic banks can respond to the entrance of foreign capital and the growing competition with investments in new technological infrastructure, human resources, diversification of the supply of banking products, which in the short run increases the level of operational costs. Second, if the foreign banks entrance is done through acquisition of domestic banks, the adjustment process towards the working concept of the parent bank, in the short run can increase the level of operational costs.

*The relationship between the profitability and the presence of foreign capital in the domestic banking system is also assumed inverse.* The growing competition pressures, the struggle to increase the market share on both deposit and the credit market are factors, which result in

decrease of the prices of banking services with concomitant increase in the yields of savings in the banking system. This results in narrowing of the interest rate margins and the profitability of the banking system.

*General theoretical hypothesis for the impact of foreign capital on loan loss provisions is very difficult to define.* The entrance of foreign banks on the domestic market is connected with more efficient procedures and techniques for credit risk assessment. This should result in improvement of the quality of the credit portfolio and decline in the loan loss provisions. On the other hand, the increase of the competition level can ease the lending standards below the optimal level, lead to deterioration of the selection process, and hence it can worsen the quality of the credit portfolio. Therefore, the linkage of the foreign bank presence and the loan loss provisions is conditioned on the specific circumstances and banks' behaviour.

#### 4. Data and methodology

The choice of the variables, included within the research derives from the profit maximizing function and the profit decomposition to its subcomponents. We measure the foreign banks' presence in the Macedonian banking system by the change in the share of the number of foreign banks in the total number of banks<sup>2</sup>. Bank specific variables of interest, whose behaviour is estimated, as a reaction to changes in foreign presence, are: profitability of the banking system, interest income, non-interest income, operational costs and loan loss provisions (variables maximizing the profit function in equation 1). Apart from the foreign bank presence, we also use several bank specific variables as explanatory/exogenous within the model – non-interest earning assets, market share measured as the share of the assets of an individual bank in total assets of the banking system, short and long-term deposits and other short-term funding and the equity of the individual banks. The following table provides basic information on data definition and descriptive statistics. More detailed description of the variables is provided in Appendix 1.

Table 1: Data definitions and descriptive statistics (bank specific variables)

		Mean	Maximum	Minimum	Std. Dev.	Observations
<b>ALINT</b>	interest income/interest earning assets	0.22	2.44	-0.26	0.16	852
<b>LLP</b>	loan loss provision/total assets	0.31	3.16	0.00	0.30	852
<b>NONIII</b>	non-interest income/total assets	0.08	0.56	-0.02	0.06	852
<b>OC_A</b>	operational cost/total assets	0.12	0.46	0.05	0.07	852
<b>ROAA</b>	return on assets	-0.01	0.40	-1.32	0.18	852
<b>FBA</b>	foreign bank assets/total assets	0.67	0.96	0.09	0.21	902
<b>FBN</b>	number of foreign banks	0.55	0.78	0.18	0.19	897
<b>NEATA</b>	non-interest earning assets/total assets	0.29	1.02	0.02	0.19	897
<b>MS</b>	market share	0.06	0.37	0.00	0.08	897
<b>SL_A</b>	short and long-term funding/assets	0.64	0.90	0.04	0.18	897
<b>E_A</b>	equity/assets	0.27	0.93	0.03	0.20	897

Source: NBRM, balance sheets of the individual banks.

<sup>2</sup> We consider a bank as foreign bank if the share of foreign capital in its ownership structure equals or exceeds 50%. We have also tried with alternative measure on foreign bank presence, the share of foreign banks assets in total assets in the banking system. In most of the cases, the results were not significant.

The source of the data is the National bank of the Republic of Macedonia, and the balance sheets of the individual banks were used. The end sample includes twelve out of fifteen banks<sup>3</sup>, with a market share at end of the sample period, i.e. at the end of the second quarter of 2015 of 90%. The frequency of the data is quarterly and the time span starts at the first quarter of 2000 and ends at the second quarter of 2015. Details on the data series such as decomposition into within and between dimensions, as well as change by bank and over time are presented in the Appendix 2, 3 and 4.

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<sup>3</sup> For a small number of banks data was not available at the beginning of the period, a gap that was overcome by using the assumptions that the first available observation for each variable holds for the period for which data is not available. Within the period of estimation, three mergers occurred.

Table 2 – Summary of selected papers, techniques and variables used

<b>Paper</b>	<b>Time period of estimation</b>	<b>Countries of estimation</b>	<b>Countries of analysis</b>	<b>Techniques</b>	<b>Variables</b>
Claessens, Demirguc-Kunt and Houzinga (2001)	1988-1995	All OECD countries, developing countries and economies in transition	7900 banks from 80 countries	weighted least squares	net interest margins, overhead costs, taxes and profitability
Fries and Taci (2005)	1994–2001	post - communist, Eastern European countries	289 banks in 15 countries	stochastic efficiency frontier panel estimation	total cost, loans, deposits, overhead costs to total asset, country-level data (GDP per capita, bank concentration, density of demand, share of foreign banks in total assets, banking reform index) and control variables
Martinez Peria and Moody (2004)	1994-1999	developing countries	Argentina, Chile, Colombia, Mexico, and Peru	panel fixed effects	liquidity, administrative cost, NPLs, bank market share, equity real output, foreign bank participation, concentration, etc.
Hermes and Lensink (2003)	1990-1996	low and high developed countries	990 banks from 48 countries	panel fixed effects	net interest and net non-interest income to total assets, before tax profits to total assets, total overhead costs to total assets, loan loss provisioning to total assets
Uiboupin (2005)	1995–2001	Central and Eastern European countries	319 banks in 10 countries	Arellano-Bond dynamic panel estimation	net interest margin, non-interest income, before-tax profits, overhead costs and loan loss provisions

## 5. Modelling issues

The choice of the estimation method is defined by our sample i.e. the estimation method employed in the paper is the panel approach. Panel data is a rich source of information, as one individual cross-section (bank, company, region, and country) can be followed in a specific time dimension. The advantage of the method is that it enables us to control for the heterogeneity of the units, it gives more informative data, more variability, more efficient estimates and it can capture certain effects which cannot be captured with the cross section and time series estimates.

We follow general to specific approach and start by estimation of a simple static, fixed effects panel model, similarly to what has been used in Claessens et al. (2001). The results of the empirical estimates support the a priori theoretical assumptions on the impact of foreign bank presence on some of the important banking variables. Yet, the estimations imply serious cross-section dependence (correlation) in residuals. This suggests that the results of the fixed effects panel estimates are biased and certain dynamics should be included in the model estimation. Although we try to address the problem, by estimating specification with cross section SUR, the results are not satisfactory.<sup>4</sup>

The approach and methods on how to include dynamics are conditioned on the specifics of the data set defined by the number of cross-sections and the time units. In this particular case, we apply the pooled mean-group estimator (PMG) that is a somewhat different methodology compared with the previous studies (Table 2- Summary). There are several reasons for the applied panel technique: 1) this method is a preferred one when the number of time series is relatively larger than the cross-section ( $T > N$ ), as is in our case -- limited number of cross-sections (15 domestic banks) and 900 observations.<sup>5</sup> Pesaran and Smith (1995) show that for large  $T$ , traditional panel techniques such as fixed effect (FE), instrumental variables (IV), Generalized Method of Moments (GMM) estimators can produce inconsistent and potentially very misleading estimates of the average values of the parameters in dynamic panel data model. This eliminates the possibility from applying the most common GMM and IV estimations as used in some of the previous studies 2) the PMG estimator allows for common long-run coefficients and

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<sup>4</sup> Details are not included to not burden the main text. All estimations are available upon request.

<sup>5</sup> 15 years of quarterly data

heterogeneous short-run dynamics (Blackburne & Frank, 2007). Often in empirical studies, only the long-run parameters are of interest. So is the case in our study. The focus is on the long-run effect of the impact of the foreign banks on certain banking variables, so the estimator adequately addresses the main research question 3) this method is suitable for unbalanced panels and even gaps in the data, as is the case with our data set.

The pooled mean-group estimator or PMG (Pesaran, Shin and Smith 1997, 1999) is a technique to estimate nonstationary dynamic panels in which the short-run parameters are heterogeneous across groups. The model is an autoregressive distributive lag (ARDL) which in the dynamic panel specification takes the following form (Blackburne and Frank, Stata Journal, 2007):

$$y_{i,t} = \sum_{j=1}^p \lambda_{i,j} y_{i,t-j} + \sum_{j=0}^q \delta_{i,j} X_{i,t-j} + \mu_i + \varepsilon_{i,t} \quad (2)$$

with  $p$  lags of the dependent variable  $y$  (*alint*, *nonii*, *oc*, *roaa*, *llp*) and  $q$  lags of the independent variables  $X$ .  $i$  indexes the banks,  $t$  the time,  $\mu_i$  are the fixed effects (i.e. the bank-specific constants) and  $\varepsilon_{i,t}$  is the error term.  $T$  has to be large enough such that the model can be fitted for each group separately.

The first equation can be rewritten in its error-correction form as:

$$\Delta y_{i,t} = \gamma_i (y_{i,t-1} - \theta X_{i,t}) + \sum_{j=1}^{p-1} \lambda_{i,j}^* \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \delta_{i,j}^* \Delta X_{i,t-j} + \mu_i + \varepsilon_{i,t} \quad (3)$$

The first part of (3),  $\gamma_i (y_{i,t-1} - \theta X_{i,t})$ , gives the long-run relationship between the variables, while the remaining part gives the short-run relationship. More precisely, the matrix of coefficient  $\theta$  gives the long-run coefficients on the explanatory variables,  $\gamma_i$  gives the error-correction terms,  $\lambda_{i,j}^*$  gives the coefficients on the differenced-lags of the dependent variable and  $\delta_{i,j}^*$  gives the coefficients on the differenced explanatory variables. It should be noted that all these matrices, except  $\theta$  have a subscript  $i$ , which means that the short-run coefficients will be different for different banks, while the long-run coefficients will be same.

## 6. Results

The first-round findings suggest that the foreign bank presence in the Macedonian banking system has enabled stronger competition, which has translated into lower profitability, through an increase in operational costs, though the impact of the foreign banks is positive on the interest income. The effect on non-interest income and loan loss provisions turns out not to be significant. In the next part of this section, we will elaborate on the results in more details.

Table 2: Panel Results – estimates using the number of foreign banks (FBN) as proxy for foreign bank presence

Dependent variable/ explanatory variable	ALINT	DLNONII	DLOC	DROAA	DLLP
	1	2	3	4	5
DLNEATA	0.099853** 2.0613	-0.0580 -1.2008	-0.073125*** -2.4658	-0.0060 -0.7680	-0.144632*** -2.6758
DLE_A	0.0454 0.6052	-0.246065*** -2.6451	0.097942** 1.9399	0.0015 0.0670	0.0598 0.5957
DLMS	0.1456 1.4984	-0.612009*** -4.6197	-0.440234*** -5.4909	-0.059279* -1.8601	-0.317473** -2.1552
DLSL_A	-0.395006*** -3.7004	0.1166 0.6078	0.0370 0.4601	0.0109 0.2332	-0.450927*** -2.8163
DLFBN	0.596955*** 6.0199	0.0075 0.0769	0.446207*** 5.8048	-0.116172*** -5.0871	0.1373 1.2198
ECT	-0.638039*** -7.1579	-0.567273*** -11.7656	-0.506745*** -7.5531	-0.555078*** -9.3493	-0.369729*** -11.2306
Total panel (unbalanced) observations	770	769	792	777	777

t-statistics is reported. \*\*\*p<0.01, \*\*p<0.05, \*p<0.1

The empirical estimates of the impact of *foreign bank presence on the share of total interest income in the interest-earning assets do not comply with the hypothesis* for an inverse relation between the two (results in column 1, table 2). This is also the case in the other referent empirical studies (see summary of results in Table 5). In most papers, this variable has been insignificant or has the expected sign when the level of economic development is included in the regressions (Hermes and Lensik, 2003). We argue that the results for Macedonia reflect the specific characteristics of the banking system. Namely, at the beginning of the sample period (2000 until 2002, but in some parts of the later period as well), the share of foreign banks' assets in the total assets was larger than the share of the number of foreign banks in the total number of banks. This setup allows the few foreign banks with relatively large market share to adjust to



the policy of high interest rates. As the number of foreign banks increases, competition pressures should rise as well. Although, the newcomers might not have large individual market share as the incumbents, jointly they form a new core and create competition pressures, thus enabling fall in the interest rates and easier access to financing. Yet, the results indicate that in the long run, there are other factors, rather than foreign bank presence itself, which can explain the observed trend of falling ex-post interest rate (appendix 5). One of the factors might be the rising funding of the banking system, which was the first mode of the financial deepening, allowing more rapid credit growth and decline in costs of financing. The negative and significant long-term coefficient in front of our funding variable seems to support the thesis.

The estimate of the *impact of foreign banks presence on the non-interest income reveals negative relationship between the two*, though the results are not significant (results in column 2, table 2). The negative relation between the non-interest income and the foreign bank presence can be related to the competition factor and banks' policy to attract clients and increase the market share, which customarily involves not only decrease of the interest rates, but also competitiveness in the non-interest components of the price of the banking products and prices of other banking services. The competition pressures are usually triggered by the foreign banks, and then translated into the behaviour of the banking system in general. Insignificant coefficient on the non-interest income is also found in Uiboupin (2015).

The reaction of the *efficiency of the banking system to the rising foreign bank presence seems to prove the thesis of an inverse relation*. The estimates reveal positive correlation between the operational costs, as a proxy for the efficiency and the foreign banks presence, measured with the number of foreign banks (results in column 3, table 2). Hence, at the early stages, it seems that the entrance of foreign banks requires new investments for new technology, expertise, information for overcoming the information asymmetry when entering a new market. After certain time, as the competition rises and the volume of activities increases, the overhead costs should decline as well. This finding is also in line with Zajc (2002) and Hermes and Lensik (2003) and previous research on Macedonian economy. Vaskov et al. (2015) find also that the foreign bank entrance leads to rise in operational costs (based on a stochastic frontier approach) and provide other research with the same findings, such as Hasan and Hunter (1996), Chang et al. (1998), Green et al. (2004), Zajc (2006), Borovička (2007).<sup>6</sup>

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<sup>6</sup> More information on the findings in Vaskov et al., "Estimation of the efficiency of the Macedonian banks-the stochastic frontier approach", NBRM Working paper, 2015

The results on the *impact of foreign banks on the profitability of the banking system do confirm the a priori hypothesis* on falling profitability margins through the competition channel, when foreign banks presence increases, as is the case in most of the other empirical research (results in column 4, table 2).

The panel estimates point to a *positive relation between the foreign bank presence and the loan loss provisions* (results in column 5, table 2) though the results are not significant (same as in Claessens et al., 2001, Zajc, 2002 and Uiboupin, 2005). The “usual suspect” for this type of connectedness is the growing competition and the aggressiveness of the banks to increase their market share, particularly when the foreign bank enters the market. Hence, credit terms are becoming laxer, the information asymmetry problem neglected and the risk aversion reduced. At a point in time, when the rising credit portfolio matures, its quality deteriorates and loan loss-provisioning increases. Yet, we should interpret the results with certain caution. First, the results are not statistically significant. Also, though the competition might induce higher risk-taking, yet the entrance of foreign banks commonly brings improved systems for risk management and evaluation of the clients’ credit worthiness. Hence, one should expect enhanced capacity of the banks to deal with the credit risk and to protect the soundness of their balance sheets.

Table 3: Panel Results – estimates using the number of foreign banks (FBN) as proxy for foreign bank presence and interaction variable for the period before the crisis

<b>Dependent variable / explanatory variable</b>	<b>ALINT</b>	<b>DLNONII</b>	<b>DLOC</b>	<b>DROAA</b>	<b>DLLP</b>
	1	2	3	4	5
DLNEATA	0.206365*** 6.237096	-0.059465* -1.6615	-0.034105* -1.7949	-0.046622*** -3.3417	-0.174584*** -2.9078
DLE_A	-0.05865 -0.87961	0.0966 1.0916	0.226682*** 5.3321	0.081787*** 3.6206	-0.0970 -0.9529
DLMS	0.03672 0.38074	-0.261044** -2.1095	-0.616722*** -9.3849	0.0287 0.8058	-0.405561*** -2.4801
DLSL_A	-0.723514*** -5.55730	-0.35334** -2.5194	0.0422 0.8140	-0.0145 -0.2590	-0.332161** -1.9307
DLFBN	0.741749** 2.30921	0.2528 0.6973	0.1718 0.8845	-0.247760*** -2.2728	0.4387 1.2609
DLFBN*DUM	-0.43656 -1.21223	-0.2784 -0.6777	-0.1706 -0.7976	0.1935 1.5266	-0.3181 -0.8383
ECT	-0.652195*** -12.4019	-0.544475*** -10.4361	-0.623029*** -11.7205	-0.509901*** -6.0618	-0.389291*** -11.1594
DUM	-0.012636** -2.2400	-0.015116*** -2.6154	-0.0027 -0.6519	-0.0038 -1.4967	0.0006 0.0827
Total panel (unbalanced) observations	785	785	822	777	777

t-statistics is reported. \*\*\*p<0.01, \*\*p<0.05, \*p<0.1  
DUM= Dummy variable for the period up to 2008 Q2 (before the crisis)

We continue by testing the robustness of the results. Several approaches were applied. The first one is by including an interaction variable - number of foreign banks and a dummy for the period before the crisis. The basic idea was to check whether the expansion period (rapid economic growth, foreign inflows, increase of the financial intermediation) before the crisis has influenced the effect of the foreign banks, having in mind that their presence increased up to 2008 and then stabilized. The estimation (Table 3) shows that the interaction term is not significant. Our results are robust and unchanged, with the exception in overhead costs equation where the presence of the foreign bank's is insignificant.

Table 4: Panel Results – estimates using the number of foreign banks (FBN) as proxy for foreign bank presence and variable for the period of the crisis

Dependent variable / explanatory variable	ALINT	DLNONII	DLOC	DROAA	DLLP
	1	2	3	4	5
DLNEATA	0.155106*** 5.090948	-0.0158 -0.4075	-0.29584*** -6.637787	0.007429 1.042841	-0.117282*** -3.00678
DLE_A	-0.00066 -0.01103	0.166045* 1.8585	0.059565* 1.605421	0.000954 0.048013	0.06690 0.84502
DLMS	0.02433 0.28137	-0.359843*** -2.6087	-0.774729*** -11.53692	-0.087942*** -3.13132	-0.506966*** -4.43463
DLSL_A	-0.627417*** -4.88137	-0.416315** -2.4239	0.19466** 2.087347	0.06856 1.583452	-0.562036*** -3.48073
DLFBN	0.182297*** 2.04942	0.0343 0.2783	0.578865*** 6.95461	-0.118182*** -4.864412	0.16188 1.47705
CRISES	0.05251 5.21809	-0.0228 -1.5787	0.032315*** 3.480824	-0.006064*** -2.910957	-0.00840 -0.74613
ECT	-0.674244*** -13.1427	-0.507442*** -13.0113	-0.436953*** -7.4066	-0.52685*** -8.24247	-0.400746*** -9.44752
Total panel (unbalanced) observations	785	801	777	777	777

t-statistics is reported. \*\*\*p<0.01, \*\*p<0.05, \*p<0.1  
CRISIS: for the period q3 2008: q4 2009

The second approach was to check whether the global financial crisis from 2008 influenced the behaviour of the banks variables and changes the impact of the foreign bank presence. We include a dummy variable for the q3 2008-q4 2009 period. The results are presented in Table 4. The dummy variable does not influence the value nor the significance of the estimated coefficients on the foreign bank presence and is only significant in the ROAA and overhead cost equation.

Finally, we checked the robustness of the results by shortening the estimation period, by estimating a balanced panel and by including net-interest income as one of the variables of interest and none of the tests proved to have significant influence on the estimated coefficients. For clarity these estimations are not presented but are available at request.

Table 5: Summary of results and comparison with earlier studies with share of foreign banks (FBN)

**Summary of results and comparison with earlier studies with share of foreign banks (FBN)**

		Net interest margin	ALINT	Non- interest income NONII	Overhead costs OC	ROAA	Loan loss provisions LLP
Claessens et al. (2001)	FBN	NS		-	-	-	NS
Zajc (2002)	FBN	NS		-	+	-	NS
Hermes and Lensink (2003)	FBN	+		+	+	-	+
	FBN*DCGDP	-		-	-	+	-
Uiboupin (2005)	FBN	-		NS	NS	NS	-
	FBN	-		NS	+	NS	NS
	FBN*DCGDP	+			-		
	FBN	NS		-	NS	NS	-
	FBN*MSHARE			+			+
Mitreska and Bojcheva- Terzijan (2016)	FBN	+		NS	+	-	NS

*Note:*

*+ indicates a significant positive coefficient*

*- indicates a significant negative coefficient*

*NS indicates a relationship that is not statistically significant*

## 7. Conclusion

One of the important channels of the financial integration process is the entrance of foreign capital in the domestic banking system. There is a vast empirical literature on the cost and benefits of foreign banks presence for the overall banking system and the economy in general. The findings differ, as the specific circumstances differ, and heterogeneity in the behaviour is present. Nevertheless, the general inference, at a lower level of development in particular, points to a positive impact of foreign bank presence. It improves the financial infrastructure, enhances the access to financial services, and acts as a "lodestone" for additional foreign investments in the other segments of the economy.

The latest global crisis questioned the financing model of foreign banks and some aspects of their behaviour during crisis. However, the core benefits of the foreign bank ownership do not seem to be under suspicion. Given the large and long-lasting foreign bank presence in the Macedonian banking system, we try to empirically test the link between the dynamics of the foreign bank presence and several important banking indicators. As we employ panel an estimation technique, with a pooled mean group estimator, the estimates allows us to test both the long and short-term impact. Our focus is still on the long-run relationship, as we do try to answer the question how the foreign banks presence, fundamentally impact banks' behaviour.

We test the foreign presence impact on several variables of interest – interest and non-interest income, operational costs, profitability and loan-loss provisioning. More specifically, we try to answer the question whether the observed long-term trend of declining share of interest income, non-interest income and operational costs in the total assets is impacted fundamentally by the rising foreign presence. The results indicate that there are other factors, rather than foreign bank presence itself, which can explain the dynamics of the ex-post interest rate. One of the factors might be the rising funding of the banking system, which was the first mode of the financial deepening, allowing more rapid credit growth and decline in costs of financing. The negative and significant long-term coefficient in front of our funding variable seems to support the thesis. As dominant part of the financing comes from domestic deposits, and not through foreign financing, the direct impact of foreign banks in this mechanism cannot be detected. Of course, the indirect impact, which is not examined here, is probably large. It pertains to the better expertise of foreign owners to create attractive products and attract deposits, as well as to their indirect impact in attracting foreign investors in other segments of the economy. It increases the inflow of capital, improves the state on the labour market, and thus creates additional channels for

supporting the deposit base. The impact on the operational costs is positive supporting the thesis that the rise of foreign ownership, very often increases the operational costs, due to the investments in expertise and technology. The cost channel is probably the channel through which the increase in foreign ownership affects the narrowing of the return on assets detected in the empirical estimates. The long-term impact on non-interest income and loan-loss provisions did not prove to be statistically significant. We also factored in the fact the foreign bank presence was on a rising path until 2008 and then stabilized in our estimates. In addition, given the magnitude of the latest global crisis in 2008, that changed shortly the behaviour of some indicators, we have tried to test its relevance for our first-round estimates. The results do not seem to differ much. We have also tested the robustness of the results, by deploying different estimation periods, balanced panel sample, as well as net-interest income as variable of interest. The results proved to be quite robust to the changes.

## Appendix 1. Definition of the variables

<b>Variable</b>	<b>Description</b>
<b>ALINT</b>	Ratio of net interest income to interest earning assets. Net interest income is the difference between interest income and interest expenses. Interest earning assets refer to regular loans, CB bills and Treasury bills.
<b>LLP</b>	Ratio of loan loss provisions to individual bank assets.
<b>NONIII</b>	Ratio of non-interest income to individual bank assets. Non - interest income refers to income derived from fees, other net financial income and other income (excluding non-regular income).
<b>OC_A</b>	Ratio of operating costs to individual bank assets.
<b>ROAA</b>	Return on average assets as a ratio of net income to individual bank assets.
<b>FBA</b>	Ratio of foreign bank assets to individual bank assets.
<b>FBN</b>	Ratio of number of foreign banks* to total number of banks in the banking system.
<b>NEATA</b>	Ratio of non-interest earning assets to individual bank assets. Non-interest earning assets refer to the difference between total assets and interest earning assets by bank.
<b>MS</b>	Ratio of individual bank assets to total assets of the banking system.
<b>SL_A</b>	Ratio of short and long term deposits and other non-deposit short term funding (including bank deposits) to individual bank assets.
<b>E_A</b>	Ratio of equity (capital and reserves) to individual bank assets.

Note:

All amounts are in MKD (000).

Data is given for the end date by quarters for the period 2000-2015.

\*A bank is considered foreign if the share of foreign capital in its ownership structure equals or exceeds 50%.

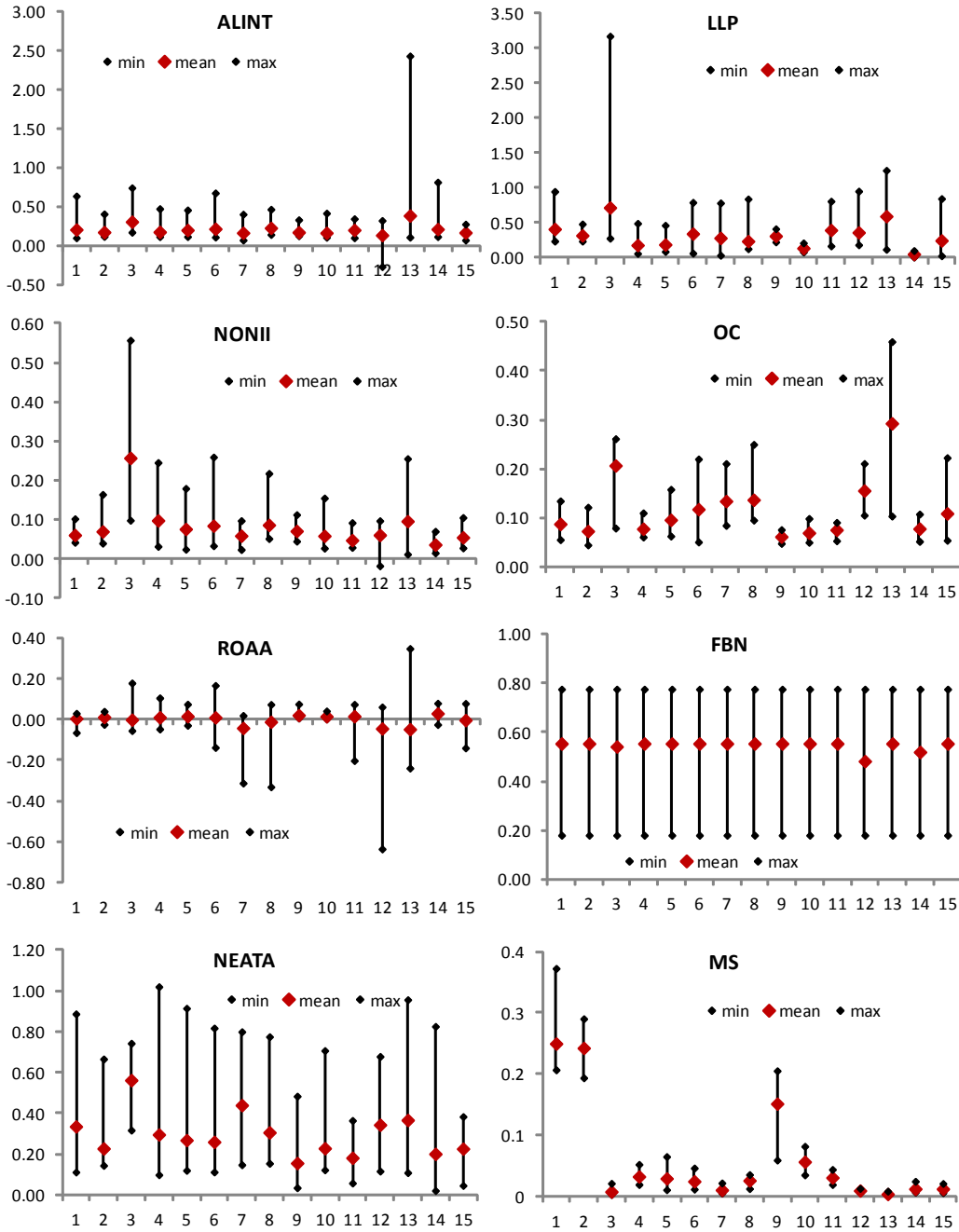
Source: NBRM



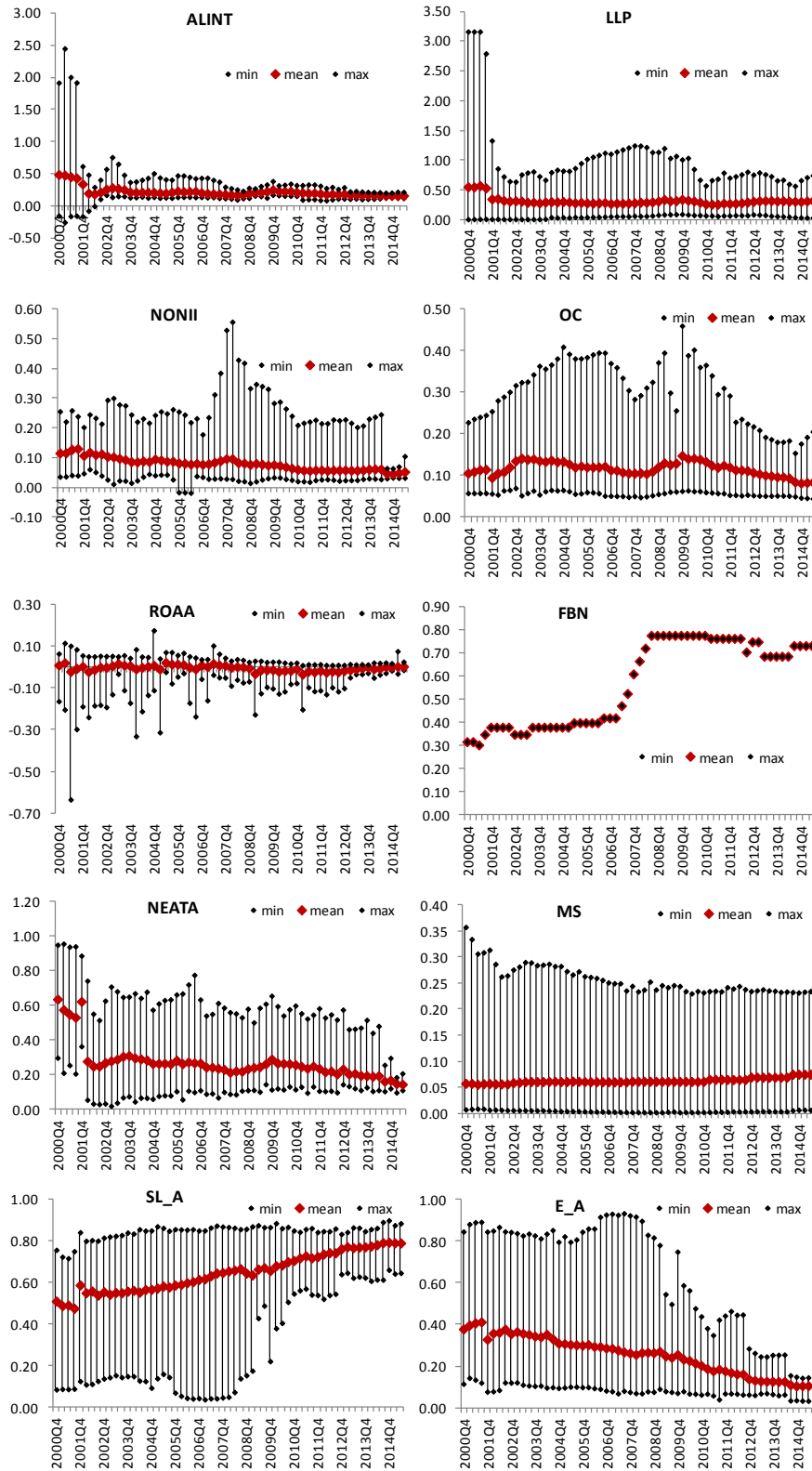
Appendix 2. Descriptive statistics, between and within variation in the sample

Variable		Mean	Std. Dev.	Min	Max	Observations
Bank	overall	8	4.3	1.0	15.0	N = 930
	between		4.5	1.0	15.0	n = 15
	within		<b>0</b>	<b>8</b>	<b>8</b>	<b>T = 62</b>
ALINT	overall	0.22	0.16	-0.26	2.44	N = 852
	between		0.06	0.14	0.39	n = 15
	within		0.15	-0.19	2.26	T = 56.8
LLP	overall	0.31	0.30	0.00	3.16	N = 852
	between		0.17	0.05	0.71	n = 15
	within		0.26	-0.16	2.76	T = 56.8
NONIII	overall	0.08	0.06	-0.02	0.56	N = 852
	between		0.05	0.04	0.26	n = 15
	within		0.04	-0.08	0.38	T = 56.8
OC	overall	0.12	0.07	0.05	0.46	N = 852
	between		0.06	0.06	0.29	n = 15
	within		0.04	-0.07	0.28	T = 56.8
ROAA	overall	0.00	0.05	-0.64	0.35	N = 897
	between		0.02	-0.05	0.03	n = 15
	within		0.05	-0.59	0.39	T = 59.8
FBA	overall	0.67	0.21	0.09	0.96	N = 902
	between		0.01	0.65	0.67	n = 15
	within		0.21	0.09	0.98	T = 60.1333
FBN	overall	0.55	0.19	0.18	0.78	N = 897
	between		0.02	0.48	0.56	n = 15
	within		0.19	0.18	0.84	T = 59.8
NEATA	overall	0.29	0.19	0.02	1.02	N = 897
	between		0.11	0.16	0.56	n = 15
	within		0.16	0.00	1.02	T = 59.8
MS	overall	0.06	0.08	0.00	0.37	N = 897
	between		0.08	0.00	0.25	n = 15
	within		0.02	-0.03	0.18	T = 59.8
SL_A	overall	0.64	0.18	0.04	0.90	N = 897
	between		0.13	0.34	0.83	n = 15
	within		0.13	0.26	1.15	T = 59.8
E_A	overall	0.27	0.20	0.03	0.93	N = 897
	between		0.15	0.11	0.61	n = 15
	within		0.13	-0.25	0.67	T = 59.8

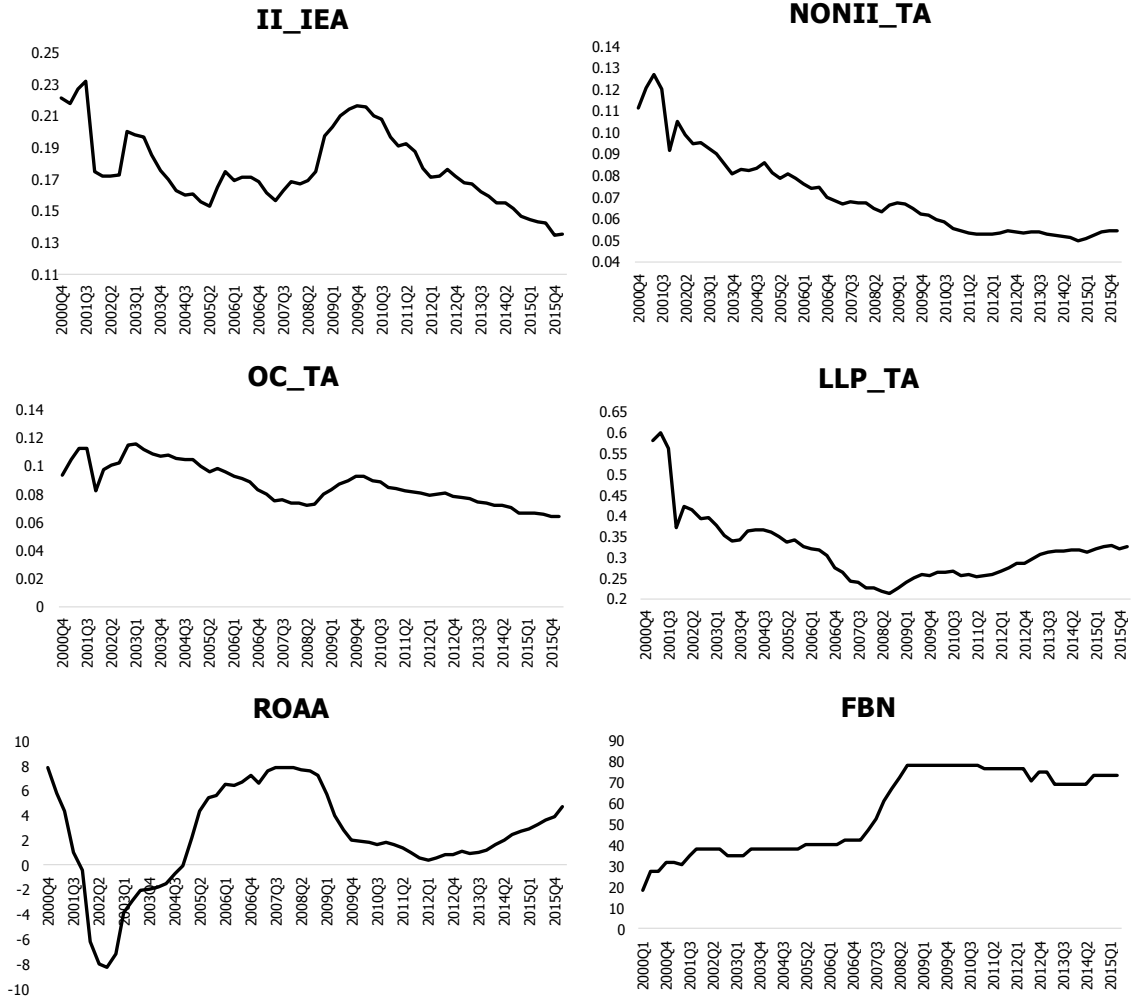
Appendix 3. Descriptive statistics, variability by bank



## Appendix 4. Descriptive statistics, variability by time



Appendix 5. Dynamics of the dependent variables and the foreign bank presence at the banking system level (in %, annualized)



Source: NBRM, banking system balance sheet data.

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