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DETERMINANTS OF BANK PROFITABILITY IN THE SOUTH EASTERN EUROPEAN REGION

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ABSTRACT

The aim of this study is to examine the profitability behaviour of bank-specific, industry-related and macroeconomic determinants, using an unbalanced panel dataset of South Eastern European (SEE) credit institutions over the period 1998-2002. The estimation results indicate that, with the exception of liquidity, all bank-specific determinants significantly affect bank profitability in the anticipated way. A key result is that the effect of concentration is positive, which provides evidence in support of the structure-conduct-performance hypothesis, even though some ambiguity arises given its interrelationship with the efficient-structure hypothesis. In contrast, a positive relationship between banking reform and profitability was not identified, whilst the picture regarding the macroeconomic determinants is mixed. The paper concludes with some remarks on the practicality and implementability of the findings.

1. Introduction

The financial system of the South Eastern European (SEE) countries is characterised by the dominant role of the banking sector, with the capital market segment for long-term finance being illiquid and, in some cases, underdeveloped, while non-bank financial intermediaries, such as life insurance companies and private pension funds, are still at an embryonic stage of development (European Commission [EC], 2004). Yet, the recent reforms, aiming to liberalize and consolidate the existing banks, as well as to attract foreign ones in the SEE banking sector, were, to a large extent, quite successful. As a result, the legal, institutional, regulatory, and supervisory framework of financial institutions has been consistently improved and strengthened. These remarks explain why banking activities and performance have attracted the attention of practitioners, policy makers, and researchers alike, making the investigation of bank profitability in the SEE countries a more relevant issue today than in earlier times.

This paper seeks to examine the effect of bank-specific, industry-related and macroeconomic variables on the profitability of the SEE banking industry (namely Albania, Bosnia-Herzegovina, Bulgaria, Croatia, FYROM, Romania and Serbia-Montenegro) over the period 1998-2002. It focuses on two main directions: Firstly, while a number of studies have examined the effects of internal and external factors on bank profitability in several countries and geographic regions, as far as we are aware of, hardly any systematic research has been carried out for the rapidly evolving SEE region; and secondly, while distinguishing between the structure-conduct-performance (SCP) and the efficient-structure (EFS) hypotheses, we also account for the effect of the reform process, that took place during this period, and the macroeconomic environment on profitability.

The rest of the paper is organized as follows. Section 2 reviews and evaluates the reform process observed in the SEE banking sector over the last decade. Section 3 provides a background of the existing literature, relating bank profitability to its determinants. Section 4 describes the data and the econometric methodology, while Section 5 presents and analyses the empirical results. Conclusions and some policy suggestions are offered in the final section.

2. Banking reform in the SEE countries

Even though banking system restructuring was quite profound over the last decade in most SEE countries, there is still much to be done for their financial systems to be classified in the category of developed markets. The comparison of the development of the banking sector (measured by the credit to the private sector as a percentage of GDP) with the size of the capital market (measured by the stock market capitalization as a percentage of GDP) in the SEE countries reveals the relative importance of bank intermediation.[1] As it appears, from a first glimpse, banks constitute the spinal cord of financial systems in the region.

Despite faster development in the second half of the 1990s, when relatively stable financial and macroeconomic conditions emerged, the quantity and quality of banking products and services still lag behind that of other emerging markets and the European Union (EU). This occurs mainly due to the unsound macroeconomic policies applied in the region and the market inefficiencies observed in the SEE countries in the previous decades, factors that, in many cases, resulted in severe crises.[2] As a result, loans to the private sector, on average, stood at about one-eighth of the credit provided by the euro area banking system, where domestic credit reached 120 per cent of GDP in 2002 (European Central Bank [ECB], 2004). This implies that the banking sector in the SEE countries, in spite of the recent expansion, has still ample field for further financing the economies' investment and growth needs, if macroeconomic and institutional stability is enhanced.

During the last few years, the governments of the SEE countries, with the collaboration and assistance of international financial institutions, have taken concrete and far-reaching measures to reform their financial institutions and markets. This process

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[1] Considering two of the largest economies in the SEE region in 2002, namely Croatia and Bulgaria, credit to the private sector was 44 per cent and 18 per cent of GDP, respectively, while stock market capitalization was 16 per cent and 4 per cent of GDP, respectively (European Bank for Reconstruction and Development [EBRD], 2004). In Romania, the only exception to the dominance of banks, domestic credit to the private sector stood at 8 per cent of GDP in 2002, while stock market capitalization was at 10 per cent of GDP.

[2] These crises include the strong economic shock that hit FYROM in the first half of 1999, the hyperinflation and hostility in Serbia-Montenegro during the previous decade, the political instability in Bosnia-Herzegovina in the same time period, the collapse of the pyramid scheme in Albania in 1996-97, the crisis in Romania in 1997-98 and the severe crisis in Bulgaria in 1996-97 (one of the world's worst banking crises in recent history, when 14 out of the 35 commercial banks failed).

included the restructuring, rehabilitation and privatisation of state-owned banks, the liquidation of insolvent institutions and an improvement in the administrative efficiency and capability of the banking sector. Other factors that enhanced banking intermediation were the establishment of new prudential regulation and tighter supervision, an improvement of accounting and disclosure standards, the adoption of better techniques for risk evaluation and asset and liability management and, last but not least, the involvement of foreign investors.

Table 1 provides a comprehensive chronological account of important regulatory events with references to the most important banking legislation - as well as their amendments - enacted during the last decade. These laws have increased the attractiveness of the SEE banking system for foreign investment, strengthened prudent standards and practices in the banks' operations, enhanced corporate governance, and improved efficiency in the banking operations and supervision. Deposit insurance schemes have also played an important stabilizing role, as they improved confidence and thereby decreased the risks for swift changes in funding, i.e. the deposit base.

Finally, macroeconomic factors, such as fiscal and monetary discipline, the gradual reduction of interest rates and risk premiums, the rise of expected lifetime income in the region and an increasing money demand have all positively contributed to the development of financial markets. These developments enhanced the ongoing rise and broadening of intermediation in the SEE region. As a result, the structure of the banking industry in the SEE economies altered significantly during the period 1998-2002. Table 2 reports a decline in the number of banks operating in all countries reviewed, except from Albania and Bulgaria. This decline is quite substantial in Bosnia-Herzegovina and Serbia-Montenegro.[3] Especially in the latter case, less than half of the banks survived during the period examined (50 banks in 2002 compared with 104 in 1998), due to the closure of unsound financial institutions and the consolidation of smaller banks initiated in 2000. The reduction in the number of credit institutions in most SEE countries was fuelled largely by increased regulatory capitalization requirements (a policy aimed at bringing

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[3] Serbia has the largest number of banks in the SEE region, reflecting the relatively larger size of the Serbian population and economy, as well as a more fragmented sector compared to the other SEE countries.

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the banking sector closer to the EU capital adequacy and liquidity standards) and competition from foreign banks (EC, 2004).

3. Literature review

In the literature, bank profitability, typically measured by the return on assets (ROA) and/or the return on equity (ROE), is usually expressed as a function of internal and external determinants. Internal determinants are factors that are mainly influenced by a bank's management decisions and policy objectives. Such profitability determinants are the level of liquidity, provisioning policy, capital adequacy, expenses management and bank size. On the other hand, the external determinants, both industry-related and macroeconomic, are variables that reflect the economic and legal environment where the credit institution operates.

Liquidity risk, arising from the possible inability of a bank to accommodate decreases in liabilities or to fund increases on the assets' side of the balance sheet, is considered an important determinant of bank profitability. The loans market, especially credit to households and firms, is risky and has a greater expected return than other bank assets, such as government securities. Thus, one would expect a positive relationship between liquidity and profitability (Bourke, 1989). It could be the case, however, that the fewer the funds tide up in liquid investments the higher we might expect profitability to be (Eichengreen and Gibson, 2001).

Changes in credit risk may reflect changes in the health of a bank's loan portfolio (see Cooper et al., 2003), which may affect the performance of the institution. Duca and McLaughlin (1990), among others, conclude that variations in bank profitability are largely attributable to variations in credit risk, since increased exposure to credit risk is normally associated with decreased firm profitability. This triggers a discussion concerning not the volume but the quality of loans made. In this direction, Miller and Noulas (1997) suggest that the more financial institutions are exposed to high-risk loans, the higher the accumulation of unpaid loans and the lower the profitability.

Even though leverage (overall capitalization) has been demonstrated to be important in explaining the performance of financial institutions, its impact on bank profitability is ambiguous. As lower capital ratios suggest a relatively risky position, one would expect a negative coefficient on this variable (for a thorough discussion see Berger, 1995b). However, it could be the case that higher levels of equity would decrease the cost of capital, leading to a positive impact on profitability (Molyneux, 1993). Moreover, an increase in capital may raise expected earnings by reducing the expected costs of financial distress, including bankruptcy (Berger, 1995b). Indeed, most studies that use capital ratios as an explanatory variable of bank profitability (e.g. Bourke, 1989; Molyneux and Thornton; 1992; Goddard et al., 2004) observe a positive relationship. Finally, Athanasoglou et al. (2005), suggest that capital is better modelled as an endogenous determinant of bank profitability, as higher profits may lead to an increase in capital (also see Berger, 1995b).

For the most part, the literature argues that reduced expenses improve the efficiency and hence raise the profitability of a financial institution, implying a negative relationship between an operating expenses ratio and profitability (Bourke, 1989). However, Molyneux and Thornton (1992) observed a positive relationship, suggesting that high profits earned by firms may be appropriated in the form of higher payroll expenditures paid to more productive human capital.[4] In any case, it should be appealing to identify the dominant effect, in a highly transitional banking environment like the SEE's.

Bank size is generally used to capture potential economies or diseconomies of scale in the banking sector. This variable controls for cost differences and product and risk diversification according to the size of the credit institution. The first factor could lead to a positive relationship between size and bank profitability, if there are significant economies of scale (see Akhavein et al. 1997; Bourke, 1989; Molyneux and Thornton, 1992; Bikker and Hu, 2002; Goddard et al., 2004), while the second to a negative one, if increased diversification leads to lower credit risk and thus lower returns. Other

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[4] A guess would be that such a relationship is observed in *developed* banking systems, which hire high quality and, therefore, relatively high cost staff. Hence, providing that the high quality staff is sufficiently productive, such banks will not be disadvantaged from a relative efficiency point of view.

researchers, however, conclude that few cost savings can be achieved by increasing the size of a banking firm, especially as markets develop (Berger et al., 1987; Boyd and Runkle, 1993; Miller and Noulas, 1997; Athanasoglou et al., 2005). Eichengreen and Gibson (2001), suggest that the effect of a growing bank's size on profitability may be positive up to a certain limit. Beyond this point the effect of size could be negative due to bureaucratic and other reasons. Hence, the size-profitability relationship may be expected to be non-linear.

In Section 2, we suggested that the new regulatory framework in the SEE countries significantly increased the attractiveness of its banking system for foreign investors. In the period under consideration there was a notable entry of foreign banks, which were looking for acquisition opportunities in the promising – yet underdeveloped – SEE banking system. Foreign ownership may have an impact on bank profitability due to a number of reasons: First, the capital brought in by foreign investors decrease fiscal costs of banks' restructuring (Tang et al., 2000). Second, foreign banks may bring expertise in risk management and a better culture of corporate governance, rendering banks more efficient (Bonin et al., 2005). Third, foreign bank presence increases competition, driving domestic banks to cut costs and improve efficiency (Claessens et al., 2001). Finally, domestic banks have benefited from technological spillovers brought about by their foreign competitors. For these reasons, an examination of the impact of foreign ownership on the profitability of SEE banks is a useful exercise.

The literature concentrating on the relationship between competition and performance in the banking sector includes the structural and the non-structural approaches (for a recent overview of this literature see Berger et al., 2004). The structural approaches embrace the structure-conduct-performance (SCP) hypothesis and the efficient structure (EFS) hypothesis. These hypotheses investigate, respectively, whether a highly concentrated market causes collusive behaviour among the larger banks, resulting in superior market performance, and whether it is the efficiency of larger banks that enhances their performance. On the other hand, the non-structural approaches, which arose from the developments in the new empirical industrial organization (NEIO)

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literature,[5] test competition through the use of market power, thus stressing the analysis of banks' competitive conduct in the absence of structural measures.

The SCP hypothesis, which has been partly backed up theoretically within the context of the NEIO literature by Bikker and Bos (2005), asserts that banks are able to extract monopolistic rents in concentrated markets by their ability to offer lower deposit rates and to charge higher loan rates, as a result of collusion or other forms of non-competitive behaviour. The more concentrated the market, the less the degree of competition. The smaller the number of firms and the more concentrated the market structure, the greater is the probability that firms in the market will achieve a joint price-output configuration that approaches the monopoly solution. Thus, firms in more concentrated markets will earn higher profits (for collusive or monopolistic reasons) than firms operating in less concentrated ones, irrespective of their efficiency. Yet, the EFS hypothesis posits that concentration may reflect firm-specific efficiencies (see Berger, 1995a). Since more efficient firms may be expected to capture a higher market share, one way of distinguishing between the market power and efficient structure theories is to include both market share and concentration in the profitability equation (Eichengreen and Gibson, 2001). If concentration then becomes insignificant, this goes against the SCP hypothesis.[6]

The literature lacks formal verification of the effect of deregulation on bank profitability, which might be essential for banking industries undergoing major restructuring. Some dated evidence, since the issue does not concern developed banking systems (e.g. Edwards, 1977), suggests that deregulation reduces the number of credit institutions, while increasing their size. However, as discussed above, the direction of such an effect is unclear; thus far it is not possible to determine whether changes in the intensity of regulation strengthen or weaken performance. Moreover, the contestable

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[5] The NEIO literature was pioneered by Iwata (1974), and strongly enhanced by Bresnahan (1982 and 1989) and Panzar and Rosse (1987).

[6] The validity of the SCP and the EFS hypotheses have frequently been tested for banking industry and provide policy makers measures of market structure - either concentration or market share - and performance as well as their interrelationship (see Gilbert, 1984; Bourke, 1989; Hannan, 1991; Molyneux and Thornton, 1992; Molyneux, 1993; Lloyd-Williams et al., 1994; Eichengreen and Gibson, 2001).

market theory,[7] and regulation theory in general, point out the importance of entry barriers in enhancing profitability, while some other regulatory interventions may have an opposite effect. Mamatzakis et al. (2005) provide evidence that a non-collusive behaviour among banks is in operation in the SEE banking industry, suggesting the existence of a contestable market. For example, entry restrictions are supported as being necessary for the prevention of ruinous competition, unsafe and unsound banking practices, and bank failures. In contrast, other studies on transition countries have highlighted the fact that the financial reform process positively affects banks' profitability and that banking sector reform is a necessary condition for the development and deepening of the sector (Fries and Taci, 2002).

Bank profitability is sensitive to macroeconomic conditions despite the trend in the industry towards greater geographic diversification and larger use of financial engineering techniques to manage risk associated with business cycle forecasting. Generally, higher economic growth encourages banks to lend more and permits them to charge higher margins, as well as improving the quality of their assets. Neely and Wheelock (1997) use per capita income and suggest that this variable exerts a strong positive effect on bank earnings. Demirguc-Kunt and Huizinga (2000) and Bikker and Hu (2002) attempted to identify possible cyclical movements in bank profitability - the extent to which bank profits are correlated with the business cycle.[8] Their findings suggest that such correlation exists, although the variables used were not direct measures of the business cycle. A direct measure of the business cycle, namely cyclical output, was used by Athanasoglou et al. (2005) for the Greek banking industry.

A widely used proxy for the effect of the macroeconomic environment on bank profitability is inflation. Revell (1979) introduces the issue, noting that the effect of inflation depends on whether banks' wages and other operating expenses increase at a faster rate than inflation. The question is how mature an economy is so that future inflation can be accurately forecast and thus banks can accordingly manage their

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[7] In a contestable market active firms are vulnerable to "hit and run" entry. For its existence, sunk costs must be largely absent. In the banking industry, some argue that most of the costs are fixed but not sunk, making it contestable (see Whalen, 1988).

operating costs. As such, the relationship between the inflation rate and profitability is ambiguous and depends on whether or not inflation is anticipated. An inflation rate fully anticipated by the bank's management implies that banks can appropriately adjust interest rates in order to increase their revenues faster than their costs and thus acquire higher profits. On the contrary, unanticipated inflation could lead to improper adjustment of interest rates and hence to the possibility that costs could increase faster than revenues. Most studies (e.g. Bourke, 1989; Molyneux and Thornton, 1992) observe a positive relationship between inflation and bank performance.

4. Data and determinants of bank profitability in the SEE region

We use annual bank level and macroeconomic data from seven SEE countries (Albania, Bosnia-Herzegovina, Bulgaria, Croatia, FYROM, Romania and Serbia-Montenegro) over the period 1998-2002.[9] The bank variables are obtained from the BankScope database, the macroeconomic variables (including inflation and per capita income) from the IMF's International Financial Statistics (IFS) and the banking reform index from the European Bank for Reconstruction and Development (EBRD). The dataset is unbalanced, it was reviewed for reporting errors and other inconsistencies and it covers approximately 80% of the industry's total assets (including 71 banks in 1998, 91 in 1999, 107 in 2000, 121 in 2001 and 132 in 2002).

Table 3 lists the variables used to proxy profitability and its determinants (we also include notation and the expected effect of the determinants according to the literature), and Table 4 presents country averages. In choosing the proxies for bank profitability, namely ROA and ROE, we follow the literature, and we measure both as running year averages.[10] For the whole region the period average ROA stands at 1.2 per cent, while the average ROE is 8.8 per cent.

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[8] Demirguc-Kunt and Huizinga (2000) used the annual growth rate of GDP and GNP per capita to identify such a relationship, while Bikker and Hu (2002) used a number of macroeconomic variables (such as GDP, the unemployment rate and interest rate differentials).
[9] We restrict the analysis to commercial and savings banks.
[10] For an analysis on the differences between ROA and ROE, see Athanasoglou *et al.* (2005).

4.1 Bank-specific determinants

The ratio of loans to assets (LA), serving as a proxy for liquidity, stands at an average of 42 per cent over the examined period, which is quite lower than the European average (ECB, 2004). A better proxy for liquidity would be the ratio of liquid assets to total assets, however data is unavailable. Another alternative is the ratio of loans to deposits, which has the major disadvantage that it indicates nothing about the liquidity of the bank's remaining assets or the nature of its other liabilities.

Regarding credit risk we use the average loan loss provisions to total loans ratio (LLP), which is close to 4 per cent in the region. The poor quality of the stock of credit was inherited from the old regime, where credit risk evaluation was negligible, and credit policy was used as an instrument by the government to fit the needs of the centrally planned economy (Stubos and Tsikripis, 2005). Despite the improvement observed over the period examined in the loan portfolio quality, the LLP ratio is still much higher in the region relatively to the European one.

Similarly, the average equity to assets ratio (EA), widely used in the empirical research as the key capital ratio, is about 17 per cent, much higher than the European average (even though it varies significantly across countries). The reasons behind this low financial leverage exploited in the region are the ongoing restructuring process of state-owned financial institutions, the relatively low credit expansion and banks' compensation for the poor access to other sources of funds. Although the high ratio might be reassuring from the point of sound financial management, it also confirms the existence of a high-risk level in lending operations and the high degree of liquidity and non-banking items on banks' balance sheets.

The overheads efficiency ratio (OEA), i.e. the ratio of operating expenses to total assets, is the best proxy for the average cost of non-financial inputs to banks (Fries and Taci, 2005). Operating expenses consist of staff expenses, which comprise salaries and other employee benefits (including transfers to pension reserves and administrative

expenses).[11] On average, this ratio stands at 5.4 per cent in the SEE region, much higher than the respective one observed in the EU (1.7 per cent in 2002; see Organisation for Economic Cooperation and Development [OECD], 2003). Over the period examined, the ratio of operating expenses to total assets exhibits a downward trend.

We use real banks' assets (logarithm) to capture the possible relationship between bank size (S) and profitability and their square in order to capture the possible non-linear relationship. Clearly, the average bank size in Albania and Croatia is the largest among the SEE countries, while the smallest one is that of FYROM. Overall, the banking sector includes small financial institutions with limited country coverage.

The relationship between foreign ownership and profitability is examined through the inclusion in the model of a binary dummy variable for foreign banks (Dfo), as well as interaction dummies between ownership and bank characteristics (liquidity, capitalization and risk). The interaction dummies are included to examine whether some variables have a different impact on foreign and domestic banks. Although the ownership information is often incomplete, we are able to determine the nature of the controlling interest in virtually all cases. However, we are unable to consider changes of ownership during the sample period because the BankScope database provides ownership information for only one year (the same strategy is followed by Bonin et al., 2005).

4.2 Industry-related determinants

Regarding the industry-related variables, the SEE banking sector is, on average, characterised by relatively high concentration, much higher than that observed in other European markets (ECB, 2004). In Table 4 we report the 3-firm concentration ratio (CR_3) and the Herfindahl-Hirschman Index (HHI)[12] based on balance sheet aggregates, both calculated on the basis of the present sample; the average HHI stands at 2,141 in the SEE banking region.[13] The banking concentration ratio seems to decline in all SEE countries

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[11] Administrative expenses include various types of bank expenses associated with bank operations, such as the adoption of new information technology, depreciation, legal fees, marketing expenses, or non-recurring costs related to bank restructuring. Provisions for loans losses are not included in operating expenses.

[12] The HHI is calculated as the sum of the squared market shares in total assets of the individual banks. Note that the index is calculated on a county-specific basis.

[13] The recent literature tends to suggest application of market power measures, estimated using non-structural approaches. We looked into these approaches but lack of data regarding bank inputs (and

during the period 1998-2002, in spite of the fact that the number of banks is reduced in most of the SEE countries.[14] As discussed above the market share (MS) of individual banks is also included in order to distinguish between the SCP and the EFS hypotheses, again measured on the basis of country-specific subsamples.

In this paper, we introduce the EBRD index of banking system reform in the SEE countries to identify the progress in areas such as: i) the adoption of regulations according to international standards and practices, ii) the implementation of higher and more efficient supervision, iii) the privatisation of state-owned banks and iv) the write-off of non-performing loans and the closure of insolvent banks. This index provides a ranking of progress for liberalization and institutional reform of the banking sector, on a scale of 1 to 4+. A score of 1 represents little change from a socialist banking system apart from the separation of the central bank and commercial banks, while a score of 4+ represents a level of reform that approximates the institutional standards and norms of an industrialized market economy. On the basis of this index, SEE countries get an average score around 2.8 in 2002, most of them coming up from much lower levels observed in 1998. Overall, these scores imply that, despite the improvement that took place lately in the banking system of the SEE countries, still this sector has not reached the level of EU practice (with a score of 4+).

4.3 Macroeconomic determinants

Likewise, differences among the SEE countries in the average value of the macroeconomic variables are significant. To capture the effect of the macroeconomic environment we use inflation (INF) and real per capita income (RGC). The average SEE inflation rate is much higher compared with that of the EU, while real per capita income is much lower, standing on average at €2,362, the highest being observed in Croatia

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especially information on bank personnel) injects difficulties in the estimation of conjectural variations that we are unable to overcome at least for Bosnia, Bulgaria and Serbia.

[14] The apparent reduction of concentration does not come as a surprise, partly because the state-owned banks, prior to their privatisation to strategic (and mostly foreign) investors, suffered from a sharp drop in their market share, and partly due to the ongoing consolidation effort of the sector to clean up its operations (Gelos and Roldos, 2004).

(€4,874) and the lowest in Albania (€1,320).[15] Finally, we account for the financial crises discussed in Section 2, by including separate time dummies for FYROM (1999) and Romania (1997-1998).[16]

5. Econometric specification

To test the relationship between bank profitability and the bank-specific, industry-related and macroeconomic determinants described above, we estimate a linear regression model of the following form:[17]

$$\Pi_{its} = c + \sum_{j=1}^{J} \beta_j X_{its}^{j} + \sum_{l=1}^{L} \beta_l X_{ts}^{l} + \sum_{m=1}^{M} \beta_m X_{ts}^{m} + \varepsilon_{its}$$

$$\varepsilon_{its} = v_i + u_{its},$$

(1)

where Π_{its} is the profitability of bank i at time t for country s, with $i = 1,...,N$; $t = 1,..., T$; $s = 1,...,S$, c is a constant term, the Xs are explanatory variables (grouped into bank-specific, industry-related and macroeconomic determinants, j, l and m respectively) and ε_{its} is the disturbance, with v_i capturing the unobserved bank-specific effect and u_{its} the idiosyncratic error. This is a one-way error component regression model, where v_i ~IIN $(0, \sigma_v^2)$ and independent of u_{its} ~IIN $(0, \sigma_u^2)$.

We apply the least squares methods of fixed effects (FE) and random effects (RE) models. Under a FE model the v_i's are considered fixed parameters to be estimated,[18] while under a RE model the v_i's are assumed to be random and the estimation method is

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[15] We have decided against using other macroeconomic determinants in the same estimated equations to avoid multicollinearity. Instead of inflation we used the lending rate (no interbank money market rate is available for all the countries reviewed) with very similar results. Also, instead of per capita income we used the unemployment rate, which is a better business cycle measure, again the results being similar. The short time dimension of the panel does not allow use of cyclical output measures similar to those employed by Athanasoglou et al. (2005).

[16] We did not include dummies for Bulgaria or Serbia. The crisis in Bulgaria was prior to our sample period and the developments in Serbia were long-lasting and, therefore, cannot be captured by single period time dummies.

[17] The linearity assumption is not binding. Bourke (1989), among others, suggests that any functional form of bank profitability is qualitatively equivalent to the linear.

[18] In this case we transform the dependent and independent variables and then apply OLS to the transformed data to obtain the so-called *within* estimator.

generalized least squares (GLS).[19] There is strong evidence that our specification follows a RE model as the Hausman test indicates (the relevant p-values are 0.243 and 0.144 for the ROA and ROE equations respectively).[20] We have also considered two and three-stage least squares (3SLS) estimators, in the spirit of Altunbas and Molyneux (1994), in order to identify possible biases in the parameters due to endogeneity of the capitalization and/or liquidity variables. However, the estimates are remarkably similar to the RE estimates and hence they are not reported.

Moreover, due to the substantial differences that exist in the banking environments of the SEE countries, we should test for potential cross-country and time effects. Failing to account for these might bias the estimates in unknown magnitudes and directions. We test for country and time effects by including country- and time-specific dummies, respectively, in eq. (1). Thus, the econometric model is expanded as follows:

$$\Pi_{its} = c + \sum_{j=1}^{J} \beta_j X_{its}^J + \sum_{l=1}^{L} \beta_l X_{ts}^L + \sum_{m=1}^{M} \beta_m X_{ts}^M + \gamma D_{s-1} + \varepsilon_{its},$$

$$\varepsilon_{its} = v_i + \lambda_t + u_{its},$$

(2)

where D stands for the country-specific dummy variables and λ_τ counts for the unobservable time effects.[21]

We test these hypotheses separately as well as jointly, and we present the results in Table 5. The relevant Lagrange Multiplier (LM) tests clearly show that only country-specific dummy variables are needed, as the time effects are insignificant. Hence, we proceed with the estimation of the following specification:[22]

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[19] This method uses cross-section weights for every observed bank i at time t, and the true variance components, in order to produce a matrix-weighted average of the within and the *between* (which is obtained by regressing the cross section averages across time) estimators (see Baltagi, 2001).

[20] Furthermore, the estimation results indicate that individual effects are not present, since the relevant F-test is insignificant even at the 1 per cent level. Even though it is still possible to commit a statistical error in rejecting fixed effects for various reasons (see Wooldridge, 2002, pp. 288-289), the facts that the cross sectional dimension of the panel is much wider than the depth of the time series and that the panel does not include the full population of banks, further supports the use of a RE model.

[21] In the literature, this is referred as an unbalanced two-way error component model.

[22] We repeated the Hausman test for this final specification, the results again favouring the RE model.

$$\Pi_{its} = c + \sum_{j=1}^{J} \beta_j X_{its}^{J} + \sum_{l=1}^{L} \beta_l X_{ts}^{L} + \sum_{m=1}^{M} \beta_m X_{ts}^{M} + \gamma D_{s-1} + \varepsilon_{its},$$

$$\varepsilon_{its} = v_i + u_{its}.$$

(3)

6. Empirical results

Tables 6 and 7 contain the estimated parameters and t-statistics obtained from the application of RE to the model of eq. (3), using ROA and ROE, respectively, as the independent variable. The estimated equations seem to fit the panel reasonably well, as indicated by the Wald tests and R-squared values, having fairly stable coefficients among the alternative models. In these equations we include a dummy variable to account for the 1997-98 crisis in Romania (D_{rc}), which was found to be negative and statistically significant. In contrast, the dummy variable for FYROM was dropped from the final estimations, since it was never found to be statistically significant. The first column of Tables 6&7 gives the preferred model. A comparison of the first and second columns allows us to distinguish between the SCP and the EFS hypotheses (see discussion in Section 3). The third column includes the EBRD index (but excludes the macroeconomic variables, since EBRD was found to be highly collinear with both INF and RGC), and the fourth includes an interaction dummy between foreign ownership and credit risk.

The effect of bank-specific variables is in line with expectations, with the notable exception of the liquidity risk variable (LA), which is positive but insignificant. The explanation may be that the SEE banking system still lacks the resources to meet the liquidity standards of the developed banking systems, maintaining an illiquid position to prevent failures. In contrast, the credit risk variable (LLP) is negatively and significantly related to bank profitability, showing that the SEE banks should focus more on credit risk management, which has been proved problematic in the recent past. Serious banking problems have arisen from the failure of banks to recognise impaired assets and create reserves for writing-off these assets. An immense help towards smoothing these anomalies would be provided by improving the transparency of the financial systems, which in turn will assist banks to evaluate credit risk more effectively and avoid problems associated with hazardous exposure.

Comment [HG1]: The way this was written, it suggested that testing between SCP and EFS requires the exclusion of MS. In fact, people usually run equation (2) and, if concentration is significant, they they run equation 1, that is include MS to enable an interpretation of the significance of concentration to be extracted – that is, is it an SCP effect or an EFS effect.

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The positive and highly significant coefficient of the capital variable, especially when ROA is used as the dependent variable, comes as no surprise.[23] The SEE financial system is far from being characterized as a perfect capital market with symmetric information, under which the impact of increased capital on profitability would be negative (Berger, 1995b). Therefore, SEE banks, through stronger capitalization, can (*i*) reduce the expected costs of financial distress and (*ii*) credibly transmit the expectation of better performance.

The operating expenses variable presents a negative and significant effect on profitability. This implies a lack of competence in expenses management, since banks pass part of increased cost to customers and the remaining part to profits, possibly due to the fact that competition does not allow them to "overcharge". Clearly, efficient cost management is a prerequisite for the improved profitability of the SEE banking system (the high elasticity of profitability to this variable denotes that banks have much to gain if they improve their managerial practices), as this sector has not reached the maturity level required to link quality effects pending from increased spending to higher bank profits.

The estimated equations when ROA is the dependent variable show that the effect of bank size on profitability is usually positive and statistically significant, while the relationship is linear (the square of bank assets is negative but insignificant). This provides evidence for the economies of scale theory. The European Commission (1997), in investigating the cost characteristics of various European banking sectors, reported that as banking systems approach a higher level of sophistication in terms of technology and productivity, opportunities from exploiting economies of scale might be quite limited. Hence, we expect this relationship to weaken over time.

Regarding foreign ownership, our findings show that foreign banks operating in the SEE countries perform significantly better in terms of both ROA and ROE than domestic banks. This finding is not surprising in light of previous research regarding transition economies (see Bonin et al., 2005). In particular, we explored two of the possible reasons: First, we tested for superior risk management of foreign banks by

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[23] The results are very similar whether capital is measured as an exogenous or an endogenous variable (corresponding to least squares or two-stage least squares methods, respectively).

estimating an alternative equation that includes an interaction dummy between foreign ownership and credit risk, Dfor (see column 4 of Tables 6&7). The results indicate that this dummy is not significantly different from zero, suggesting no significant differences between foreign and domestic banks. Also, we used an interaction dummy between foreign ownership and capital (not reported in the tables), which was found to be positive and statistically significant ($t_{ROA} = 6.60$, $t_{ROE} = 1.88$). The latter results suggest that capital is a more important determinant of the profitability for foreign banks.

The empirical results also show that concentration positively affects bank profitability but only when profitability is measured by ROA. Some further ambiguity arises due to the fact that the relevant t-statistic falls (whilst, however, remaining marginally significant at the 5% level) when MS enters the estimated model. As observed in other studies (Smirlock, 1985; Evanoff and Fortier, 1988; Altunbas and Molyneux, 1994), when both market share and concentration variables are included in the model, the latter loses its explanatory power. Since here concentration remains significant, the SCP hypothesis cannot be rejected. It can be noted, however, that the significance of concentration does fall when MS is included, perhaps indicating some relevance of the EFS hypothesis. Since a researcher could rely on non-structural measures of competition, this is a desideratum for future research.

The EBRD index suggests a negative and significant effect on bank profitability, confirming the contestable market theory at least at this stage of market development. The improvement in the regulatory framework, the observed significant credit expansion and the gradual adoption of sound macroeconomic policies, have all positively contributed to competition. While competition could lower financial intermediation costs and contribute to an improvement in economic efficiency, it could reduce market power and the profitability of banks. Thus, it appears that reform, at this stage of financial system sophistication, causes banks to offer increasingly competitive margins on loans and deposits, which in turn lowers profitability.

Finally, inflation positively and significantly affects profitability. This implies that, with inflation, bank income increases more than bank costs, which may be viewed as the result of the failure of bank customers (comparative to bank managers) to forecast future inflation. Therefore, above normal profits can be extracted from the asymmetric

information evidently present in the SEE financial market. On the other hand, real GDP per capita does not seem to present any significant effect on bank profitability (even though the results strengthen when ROE is used), a result that is somewhat surprising. One possible explanation is that the tight monetary policy of the examined period constrains bank lending. Thus, as soon as price stability is achieved, we should expect a stronger relationship between economic growth and bank profits, through increased lending, improvement in bank asset quality, enhancement of borrowers access to the SEE markets and decrease in supervisory toughness as well as uncertainty associated with macroeconomic instability.

6. Concluding remarks

In this paper, we have analysed the effect of a carefully selected set of determinants on bank profitability in the SEE region. Our study involved three phases: (*i*) a brief description of the banking system under review; (*ii*) a discussion of the determinants of bank profitability; (*iii*) the empirical testing of a random effects model, followed by the presentation of the results and some policy implications.

The empirical results provide a rigorous consensus that the SEE countries need a stable, profitable and efficient banking system in order to finance both private and public investment and expenditures. As shown in this analysis, the increasing levels of financial reform (closely related to general economic growth) and improvement in the structure of the credit institutions' aggregated balance sheet, are joint (albeit contrary) determinants of bank profitability. Thus, as integration facilitates the actual or potential market entry of foreign institutions to the financially less developed market, SEE domestic credit institutions will find themselves exposed to increased competitive pressure from more sophisticated and cheaper foreign intermediaries. Enhancement of bank profitability, as a condition for enabling national banking sectors to survive in a single market by affording competitive interest rates, requires new standards in risk management (capital and credit) and operating efficiency, which, according to the evidence presented here, crucially affects profits.

As the SEE banking industry continuously evolves, changes in industry composition and the macroeconomic environment have a direct impact on the aggregate performance of the industry. Concentration is positively (and usually significantly) correlated with bank profitability even when market share is also included in the estimated model (implying we cannot reject the SCP hypothesis). Some support fro the EFS hypothesis is perhaps found in the fact that concentration is strengthened when MS is included. Finally, with respect to the macroeconomic variables, inflation has a strong effect on profitability, while bank profits are not significantly affected by real GDP per capita fluctuations, probably owing to the small sample period. However, as financial systems develop and the reform process ends, both the current and future rates of economic growth are likely to have an enhanced impact on bank profitability.

We contend that further research of the rapidly developing SEE financial sector should highlight the patterns of competition in banking (probably within the context of the NEIO literature when relevant data becomes available), the effects of privatisation on price-cost margins and the overall level of technical and allocative efficiency. At a broader level of analysis, the SEE case testifies to the interrelation between these microeconomic issues, political strategies and economic policy choices.

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Table 1
Chronology of important regulatory events

Country	Bank regulation
Albania	▪ Law on the Bank of Albania (1992, 1997) ▪ Law on Banks in the Republic of Albania (1992, 1998) ▪ Principles of Bank Licensing (1994, 2003) ▪ Law on Deposit Insurance (2002)
Bosnia-Herzegovina	▪ Law on the Central Bank of Bosnia and Herzegovina (1997) ▪ Banking Law (1997, 2000, 2002) ▪ Law on Privatisation of Enterprises and Banks (1998) ▪ Law on Deposit Insurance (2000, 2002) ▪ Law on Payment Systems (2001)
Bulgaria	▪ Act on the Bulgarian National Bank (1991, 1997, 1998, 1999) ▪ Law on Banks and Credit Activity (1992, 1997, 1998, 1999, 2001) ▪ Law on Privatisation of Enterprises and Banks (1997) ▪ Law on Bank Deposit Guarantee (1999) ▪ Law on Bank Bankruptcy (2002)
Croatia	▪ Law on the National Bank of Croatia (1992) ▪ Law on Banks and Savings Banks (1993) ▪ Law on Bank Rehabilitation (1994) ▪ Law on Deposit Insurance (1997) ▪ New Banking Law (1998, 2002)
FYROM	▪ Banks and Savings Houses Act (1993, 1996) ▪ Law on Deposit Insurance (1997) ▪ New Banking Law (2000, 2002, 2003) ▪ Law on the National Bank of FYROM (2002)
Romania	▪ Act on Banking Activities (1991) ▪ Law on Deposit Insurance (1996) ▪ The Bank Insolvency Act (1998) ▪ The National Bank of Romania Act (1998) ▪ The Banking Law (1998, 2001, 2002) ▪ The New Banking Law (2003)
Serbia-Montenegro	▪ Law on Banks and Other Financial Organisations (1988, 2001) ▪ Law on Accounting (2001) ▪ Law on Bank Rehabilitation, Bankruptcy and Liquidation (2001) ▪ Law on the National Bank of Yugoslavia (2002)

Source: Mamatzakis et al. (2005).

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Table 2
Financial sector indicators

Year	Albania		Bosnia-Herzegovina		FYROM		Romania		Bulgaria		Serbia-Montenegro		Croatia	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
1998	10	85.6	na	na	24	1.4	36	75.3	34	56.4	104	90.0	60	37.5
1999	13	81.1	61	75.9	23	2.5	34	50.3	34	50.5	75	89.0	53	39.8
2000	13	64.8	56	55.4	22	1.1	33	50.0	35	19.8	81	90.9	43	5.7
2001	13	59.2	49	17.3	21	1.3	33	45.4	35	19.9	54	68.0	43	5.0
2002	13	54.1	40	6.3	20	2.0	31	43.6	34	14.1	50	35.6	46	4.0

Source: EBRD (2004) survey of central banks.
Note: NB stands for the number of banks (number of commercial and savings banks, excluding cooperative banks), and SB for the asset share of state-owned banks (share of total assets of majority state-owned banks in total bank sector assets). The state includes the federal, regional and municipal levels, as well as the state property fund and the state pension fund. State-owned banks are defined as banks with state ownership exceeding 50 per cent, end-of-year.

Table 3
Definitions, notation and expected effect of the explanatory variables of bank profitability

		Variable	Measure	Notation	Expected effect
Dependent variable		Profitability	Net profits (before taxes) / assets or Net profits (before taxes) / equity	ROA or ROE	
Determinants	Bank-specific	Liquidity	Loans / assets	LA	Positive
		Credit risk	Loan loss provisions / loans	LLP	Positive
		Capital	Equity / assets	EA	Negative
		Operating expenses management	Operating expenses / assets	OEA	Negative
		Size	ln (real assets) and ln (real assets) ^{2}	S and S^2	?
		Foreign ownership	Binary dummy variable equal to one for foreign banks	Dfo	?
		Market share	Market share (in terms of assets) of individual banks	MS	?
	Industry-related	Banking system reform	EBRD index of banking system reform	EBRD	?
		Concentration	Herfindahl-Hirschman index	HHI	?
	Macroeconomic	Inflation	Current period inflation rate (consumer prices)	INF	?
		Economic activity	Real per capita income	RGC	Positive

Table 4
Country averages of the dependent and independent variables (1998-2002)

	Albania	Bosnia-Herzegovina	Bulgaria	Croatia	FYROM	Romania	Serbia-Montenegro	SEE region
ROA	1.90	1.05	1.46	0.95	2.05	1.02	0.67	1.17
ROE	23.11	7.35	9.71	9.17	6.62	9.30	5.10	8.83
LA	22.10	47.25	38.06	52.88	40.07	36.07	35.99	42.30
LLP	2.25	4.57	3.37	2.88	6.22	3.27	4.80	4.14
EA	7.90	16.18	15.32	15.36	24.15	19.06	16.79	16.86
OEA	2.72	6.31	5.57	4.45	5.23	6.52	5.69	5.42
S	12.13	10.96	11.75	12.02	10.75	11.86	11.48	11.62
MS	20.00	6.67	4.32	3.57	10.17	5.00	6.82	5.95
CR$_3$	93.30	61.93	50.58	65.49	84.81	68.71	67.22	65.78
HHI	5,784	1,725	1,123	1,835	3,660	2,398	2,289	2,141
EBRD	2.20	2.30	3.00	3.30	2.70	2.60	1.40	2.60
RGC	1,320	1,364	1,800	4,874	1,878	1,933	1,685	2,362
INFL	5.30	1.22	8.05	4.17	2.42	37.15	41.83	18.88

Source: Fitch-IBCA BankScope database, own estimations and International Monetary Fund (for the macroeconomic variables).
Note: ROA: Profits (before tax) / Total Assets; ROE: Profits (before tax) / Total Equity; LA: Loans / Total Assets; LLP: Loan Loss Provisions / Total Loans; EA: Equity / Total Assets; OEA: Operating Expenses / Total Assets; S: ln (Total Assets); MS: Market Share; CR$_3$: 3-firm concentration ratio (in terms of total assets); HHI: Herfindahl-Hirschman Index (in terms of total assets); EBRD: EBRD Index on banking reform; RGC: Real GDP per capita; INF: Inflation rate. Figures are means in € for the RGC, and percentages for all other variables (except of HHI and S) over the period 1998-2002. Further descriptive statistics can be provided upon request.

Table 5
Tests for country-specific and time effects

Model	LM test	p-value
$D_2 = D_3 \ldots = D_S = 0$	$\chi^2 (6) = 28.40$	0.000
$\lambda_2 = \lambda_3 \ldots = \lambda_T = 0$	$\chi^2 (4) = 2.09$	0.719
$D_2 = D_3 \ldots = D_S = \lambda_2 = \lambda_3 \ldots = \lambda_t = 0$	$\chi^2 (10) = 29.38$	0.001

Note: Ds represent country dummies and λ_t time dummies.

Table 6
Estimation results using RE (dependent variable: ROA)

	(1)		(2)		(3)		(4)	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	-20.747	-2.47	-19.646	-2.34	-12.310	-1.45	-21.232	-2.45
LA	0.005	0.65	0.003	0.43	0.003	0.46	0.001	0.18
LLP	-0.162	-5.65	-0.154	-5.43	-0.153	-5.35	-0.166	-5.13
EA	0.163	8.54	0.163	8.56	0.158	8.25	0.161	8.33
OEA	-0.137	-2.65	-0.136	-2.63	-0.143	-2.77	-0.143	-2.74
S	2.663	2.03	2.290	1.77	1.712	1.32	2.630	1.99
S^2	-0.088	-1.66	-0.065	-1.26	-0.042	-0.83	-0.087	-1.63
MS	0.030	1.89					0.028	1.78
HHI	0.044	1.92	0.045	2.32			0.041	1.88
EBRD					-0.775	-2.07		
INF	0.027	2.07	0.026	2.17			0.031	2.31
RGC	0.013	0.30	0.012	0.28			0.035	1.05
Dfo	1.567	2.12	1.598	2.26			1.554	2.10
Dfor							0.013	0.31
Drc	-1.513	-2.02	-1.495	-2.01	-2.046	-2.97	-1.614	-2.43
Dalb	1.443	1.23	1.146	1.01	1.545	2.06	1.040	0.89
Dbos	1.541	2.35	1.888	3.03	0.771	1.55	1.900	2.48
Dbul	0.998	1.82	1.164	2.17	0.536	1.24	1.150	1.92
Dfyr	-0.065	-0.08	0.156	0.21	0.130	0.25	-0.291	-0.38
Dser	-0.884	-1.59	-0.614	-1.14	-1.353	-2.06	-1.213	-2.32
Dcro	-0.118	-0.21	-0.090	-0.17	-0.325	-0.70	-1.055	-1.09
Wald test	165.11		161.62		156.98		160.63	
R^2	0.341		0.334		0.316		0.350	
No of obs.	325		325		325		325	

Note: ROA: Profits (before tax) / Total Assets; LA: Loans / Total Assets; LLP: Loan Loss Provisions / Total Loans; EA: Equity / Total Assets; OEA: Operating Expenses / Total Assets; S: ln (Total Assets); MS: Market Share; HHI: Herfindahl-Hirschman Index (in terms of total assets); EBRD: EBRD Index on banking reform; RGC: Real GDP per capita; INF: Inflation rate; Dfo: Dummy variable for foreign ownership (takes the value 1 if a bank is foreign); Dfor: Interaction dummy between foreign ownership and credit risk; Drc: Dummy variable to account for the 1998 banking crisis in Romania. The variables Dalb, Dbos, Dbul, Dfyr, Dser and Dcro are country dummies.

Table 7

Estimation results using RE (dependent variable: ROE)

	(1)		(2)		(3)		(4)	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	-35.358	-0.67	-30.679	-0.59	20.182	0.39	-35.181	-0.67
LA	0.014	0.29	0.004	0.08	0.014	0.29	0.012	0.25
LLP	-0.447	-2.39	-0.396	-2.14	-0.390	-2.08	-0.481	-2.36
EA	0.224	1.87	0.222	1.86	0.175	1.46	0.221	1.86
OEA	-0.809	-2.56	-0.801	-2.55	-0.839	-2.65	-0.810	-2.57
S	2.351	0.29	0.457	0.06	-3.744	-0.47	2.286	0.29
S^2	0.017	0.05	0.136	0.43	0.297	0.94	0.020	0.06
MS	0.166	1.72					0.163	1.69
HHI	0.172	1.46	0.201	1.89			0.171	1.46
EBRD					-2.970	-1.85		
INF	0.207	2.25	0.200	2.37			0.204	2.31
RGC	0.371	1.81	0.394	1.93			0.391	1.86
Dfo	9.145	2.44	10.123	2.62	11.126	2.77	9.543	2.50
Dfor							0.117	0.42
Drc	-0.296	-0.06	-0.309	-0.07	-4.613	-1.05	-0.325	-0.09
Dalb	21.724	2.96	19.597	2.78	17.746	3.87	21.175	2.88
Dbos	11.439	2.40	13.276	2.98	2.667	0.86	11.460	2.41
Dbul	7.561	2.04	8.400	2.34	1.310	0.49	7.475	2.01
Dfyr	0.417	0.09	1.327	0.29	-1.573	-0.48	0.165	0.03
Dser	-5.877	-1.71	-4.418	-1.33	-6.209	-1.52	-5.892	-1.83
Dcro	-8.246	-1.41	-8.892	-1.53	-3.135	-1.09	-8.927	-1.48
Wald test	117.87		114.90		103.44		118.11	
R^2	0.298		0.283		0.241		0.308	
No of obs.	320		320		320		320	

Note: ROE: Profits (before tax) / Total Equity; LA: Loans / Total Assets; LLP: Loan Loss Provisions / Total Loans; EA: Equity / Total Assets; OEA: Operating Expenses / Total Assets; S: ln (Total Assets); MS: Market Share; HHI: Herfindahl-Hirschman Index (in terms of total assets); EBRD: EBRD Index on banking reform; RGC: Real GDP per capita; INF: Inflation rate; Dfo: Dummy variable for foreign ownership (takes the value 1 if a bank is foreign); Dfor: Interaction dummy between foreign ownership and credit risk; Drc: Dummy variable to account for the 1998 banking crisis in Romania. The variables Dalb, Dbos, Dbul, Dfyr, Dser and Dcro are country dummies.