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The Determinants of Profitability in the Banking Industry: Empirical Research on Selected Balkan Countries

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The determinants of bank profitability in general, and of the impact of market structure and efficiency on bank performance in particular, remain a much- researched topic in bank performance analysis. The purpose of this article is to investigate the relevance of the structure-conduct-performance (SCP) hypothesis versus the efficiency hypothesis in explaining bank performance by analyzing 127 commercial banks from six Balkan countries (Slovenia, Croatia, Serbia, Bosnia and Herzegovina, Montenegro, and Macedonia) over the period 2005–2009. In order to account for the dynamic nature of bank profits, it uses a GMM estimator in testing the determinants of bank profitability. The estimation results suggest that profits persist to some extent, indicating that the deviation from a perfectly competitive market structure is marginal. In addition, the findings suggest that efficiency is significantly and positively associated with profitability, whereas the industry concentration variable is insignificant in explaining profitability, indicating support in favor of the efficiency hypothesis. Moreover, among the bank-specific control variables, only size is reported insignificant, and the rest of the variables affect bank profitability in the anticipated manner. Finally, the results suggest that neither inflation nor economic growth has an impact on bank profitability.

Keywords: bank profitability, bank-specific control variables, efficiency hypothesis, macroeconomic variables, structure-conduct-performance hypothesis

JEL Classification: G21, C22, C51, C58.

In the field of industrial organization, the association between market structure and performance has been extensively researched. For the most part, two different hypotheses are used for the purpose of explaining the relationship between concentration and performance. The structure-conduct-performance (SCP) paradigm states that concentration leads to market power, which, in turn, affects performance and profitability. On the other hand, the efficiency hypothesis suggests

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that higher efficiency in operations is what leads to concentration and, in turn, to higher performance. The topic of what determines bank profitability is particularly relevant in the context of the banking industry, as financial intermediaries play a very important role in the operation of every economy. Although the relative importance of banks varies substantially in different economies and different time periods, it is widely accepted that banks are essential for the performance of every modern economy. The stability of the financial system relies on the assumption that banks are sound and profitable enough to resist adverse shocks (Flamini, McDonald, and Schumacher 2009). Levine (1997) and Rajan and Zingales (1996) argued that the economic literature offers both theoretical and empirical evidence suggesting a positive relationship between developments in the financial sector and economic growth. Thus, the health of the financial sector is crucial to the health of the general economy, and because of this, the study of the determinants of bank profitability has been of great importance in the economic literature.

Traditionally, in most cases, research into what determines bank profitability and the extent to which market structure or efficiency explains better performance is done by introducing market share or industry concentration as an explanatory variable of profitability. In such studies, market share is often used as a proxy for efficiency. However, the present article differs from other studies conducted in this area in several aspects. First, so far as can be determined, there are only a few articles testing the relevance of the SCP hypothesis versus the efficiency hypothesis on bank profitability in the context of South East European countries, but none of them focuses on the Balkan countries. In the past two decades, the financial systems of these countries have undergone many reforms affecting their macroeconomic and institutional stability. Although the reforms have been successful in improving the institutional and supervisory framework of their financial institutions, the financial markets of these countries still lag behind the quality of developed markets in the EU (European Commission 2011). Following the ratio of total assets of all banks in the industry to GDP for each of the countries, it is clear that the role of banks remains central in the financing of economic activity. Second, the article extends previous studies by adding a bank-specific variable explaining individual bank cost efficiency. The efficiency estimates are obtained from Atanasovska (2015). They are derived using a stochastic frontier analysis and provide a different view of bank efficiency unlike the typical accounting measures. Thus, the main purpose of this article is to assess the relevance of the SCP and efficiency hypotheses in explaining the performance of the banking industry in six countries (Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, Serbia, and Slovenia) over the period 2005–2009. More specifically, the article aims to answer the following research question: Does greater market concentration lead to higher bank profits, or does higher bank technical efficiency cause higher bank accounting profits? Considering the reforms that have been carried out in these countries, and since they have contributed to an increased level of competition, it is expected that higher technical efficiency would cause a higher market share and consequently higher bank profits.

THEORETICAL BACKGROUND

A review of the literature shows that the issue of bank profitability has been investigated from the perspective of different theories or hypotheses. Initially, conventional price theory resulted in

the structure-conduct-performance paradigm. This hypothesis is a general statement on the determinants of market performance (Mamatzakis and Remoundos 2003). By investigating the relationship between industry structure and performance, proponents of the Harvard school of thought argued that firms in more concentrated markets would earn more profits irrespective of their efficiency. This is because concentrated industries are generally associated with more market power (Carlton and Perloff 2005, 239). In other words, the SCP paradigm proposes that high barriers of entry lower the cost of collusion between firms, and this in turn results in higher than normal profits for all market participants (Evanoff and Fortier 1988). Thus, measures of industry structure can be used for explaining the differences in market performance across industries. Bain (1951) was the pioneer in structure-profitability studies. He analyzed the relationship between rates of return, industry structure, and barriers of entry, looking at American manufacturing industries in the period 1936–1940. Based on his results, he presented the hypothesis that profits should be higher in industries with high concentration ratios and high barriers to entry, suggesting that concentration leads to noncompetitive behavior among economic agents. Following Bain's research, Mann (1966) investigated the relationship between seller concentration, barriers of entry, and profits. By examining the correlation between profits and his own estimates of barriers to entry, Mann (1966) confirmed Bain's findings, suggesting that the results hold valid even for the period following the Great Depression. By using the price-cost margin as a measure of performance, Collins and Preston (1968) attempted to identify the relationship between market concentration and industrial performance by observing the food-manufacturing industry. They also found a significant positive relationship between price-cost margins and concentration. The SCP paradigm is one of the most tested hypotheses in the industrial organization literature (Evanoff and Fortier 1988), and it has been criticized on many grounds, among which is the weak theoretical framework of the concentration-performance relationship.

The Chicago school of thought offered an alternative view of the relationship between market structure and performance by introducing the efficiency hypothesis. Demsetz (1973) challenged the traditional SCP paradigm by arguing that there is no reason to assume that competitive behavior does not lead to market power. In his view, companies that explore better ways to satisfy consumers' needs, and employ better technology in their production processes are more likely to enjoy a certain degree of market power with respect to their rivals. His research results gave rise to an alternative explanation regarding the positive relationship typically found between industry structure and performance. He argued that the superior efficiency of large firms is the reason that some firms acquire greater market share, which results in an increased level of concentration. Thus, firms gain greater profits not due to collusive behavior, but because of their higher efficiency (comparative superiority). Following Mann (1966) and Demsetz (1973), Webster (1996) made an attempt to further investigate the relationship between concentration and profitability by including a measure of economies of scale. In other words, Webster (1996) tried to determine whether or not the impact of concentration on profitability varies with economies of scale. His results suggested that the nature of the concentration-performance relationship changes with the prevailing scales of economies, suggesting that superior talent and technology is what drives efficiency, which, in turn, leads to a greater share and higher profits.

In empirical testing, the SCP and efficiency hypotheses have both frequently been evaluated with mixed results. Lloyd-Williams, Molyneux, and Thornton (1994), Berger (1995), and Mendes and Abreu (2003) find evidence in support of the SCP hypothesis, whereas studies

conducted by Staikouras and Wood (2004) and Seelanatha (2010) reveal that the traditional SCP argument does not hold valid in the context of Sri Lanka and European banking sectors. As mentioned previously, in order to distinguish between the SCP and efficiency hypotheses, researchers in the past included market share as an independent variable with a positive coefficient usually supporting the efficiency paradigm (Staikouras and Wood 2004). At this point, it is important to mention that the conclusions will depend on whether market share can be considered a good proxy for efficiency rather than market power. To solve this problem, the discussion in this article tries to distinguish between the SCP and efficiency hypotheses in evaluating the main determinants of bank performance in selected Balkan countries by including a measure of efficiency directly in the model.

MODEL SPECIFICATION AND DATA

Background

The Balkan countries provide an interesting context for analyzing bank profitability. Although these countries are different in terms of history, their banking sectors went through similar transition processes. Each country was faced with a delayed implementation of major economic reforms due to political events. This resulted prolonged inadequate bank regulation that finally led to a financial crisis that took place in the late 1990s. Subsequent to such crises, governments changed their former policies, and the processes of liberalization, consolidation, and privatization took place. In the transition process, the banking sectors were transformed from the former socialist mono-bank systems to market-oriented, privately owned sectors (Fang, Hasan, and Marton 2008). Although this restructuring process received considerable interest, very few articles focus on the former Yugoslav countries. One possible reason for this is the unavailability of data; it is only recently that sufficient necessary and reliable data became available to permit an empirical analysis of the banking industry (Fang, Hasan, and Marton 2008).

Discussion

As can be observed from Column 1 in Table 1, aside from Montenegro and Slovenia, in all other counties there has been a decrease in the total number of banks for the observed period. The increased number of bank mergers taking place in the last decade can explain this. The growing population of mergers and acquisitions changed the level of bank concentration and introduced significant changes in the structure of the banking industry in these countries. Following Akhavein, Bergerand, and Humphrey (1997), Erel (2011), and Shobhana and Deepa (2012), some of the main reasons for the growing tendency of banks to merge are (1) the increased need to achieve economies of scale, (2) opportunities for greater diversification and, by definition, lower risk, and (3) acquiring synergies of expert management. Columns 2 and 3 present the assets share of foreign-owned and state-owned banks, respectively. From these columns, the conclusion can be made that the banking sectors in the sample countries are largely foreign-owned and that the share of state-owned (or domestic-private) banks is very small. The ratio of nonperforming loans to total loans presented in Column 4 gives information about the quality of the credit portfolio of the banks in every country. In view of the ongoing economic

and financial crisis, the increasing values of this ratio are not considered a surprise. The last column shows that the EBRD index has either increased or stayed the same throughout the years, suggesting that, for the most part, reforms have taken place in the countries under investigation.

The Model

This article employs an unbalanced panel using annual data for all six Balkan countries—Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, Serbia, and Slovenia—during the period 2005–2009. The main rationale behind the chosen time-period lies in the availability of data. Namely, the main source of bank-specific information is the Bankscope database, and for the banks that are the subject of the present investigation, more complete information was available for the period after 2005. Moreover, as mentioned previously, the article tries to add to the existing body of literature by introducing a cost-efficiency variable in the profitability model. Since this variable was estimated for a period between 2000 and 2009, the period of analysis was chosen to correspond with that of the cost-efficiency estimates. In terms of other data, the macroeconomic variables were obtained from the World Bank database, and the index for banking reform was obtained from the European Bank for Reconstruction and Development (EBRD). It should be mentioned that there are some measurement problems with the explanatory variables included in the model. Namely, the data used in the analysis were obtained from the Bankscope database, and therefore it depends on how many banks in each country are reporting balance and income sheet data to Fitch-IBCA. An additional problem is related to the loan loss provision ratio, as banks keep changing their methodology for calculating this ratio, causing problems of inconsistency with the data.

In order to test the relevance of the SCP and efficiency hypotheses in explaining the performance of the banking industry in the selected Balkan countries, Equation (1) is specified:

$$\Pi_{it} = \alpha + \beta_{conc} CONC + \beta_{ms} MS + \beta_{ce} CE + \beta_{nii} NII + \sum_{j=1}^{j} \beta_j CV_{it}^{j} + \varepsilon_{it} \quad (1)$$

where Π_{it} is the profitability of bank i in year t, with i = 1, 2, . . ., I; t = 1, 2, . . ., T. α is a constant term, β is the estimated coefficient for concentration (*CONC*), market share (*MS*), and the efficiency variables of cost efficiency (*CE*) and the accounting measure of efficiency (*NII*), *CV* is a vector representing control variables, and ε_{it} is the disturbance, which is thr sum of the unobserved bank-specific effect[1] and the idiosyncratic error[2] ($\varepsilon_{it} = u_{it} + v_i$).

Following Berger (1995), Mamatzakis and Remoundos (2003), Goddard, Molyneux, and Wilson (2004), Athanasoglou, Brissimis, and Delis (2008), and Flamini, McDonald, and Schumacher (2009), bank profits show a tendency to persist over time. This reflects "impediments to market competition, informational opacity and/or sensitivity to regional/macroeconomic shocks to the extent that these are serially correlated" (Athanasoglou, Brissimis, and Delis 2008, 126). In other words, due to market structure imperfections or high sensitivity to autocorrelated regional or macroeconomic factors, profits remain persistent over time (Flamini, McDonald, and Schumacher 2009). Therefore, it was decided to opt for a dynamic transformation of Equation (1). Additionally, in the opinion of Mamatzakis and Remoundos (2003) a

dynamic model incorporates more information, and as a result the detrimental factors of profitability are more efficiently estimated.

The transformed model is Equation (2):

$$\Pi_{it} = \alpha + \gamma\Pi_{i,t-1} + \beta_{conc}CONC_{at} + \beta_{ms}MS_{it} + \beta_{ce}CE_{it} + \beta_{nii}NII_{it} + \sum_{j=1}^{j}\beta_j CV_{it}^{j} + \varepsilon_{it} \quad (2)$$

where $\Pi_{i,t-1}$ is the lagged profitability by one period, and the coefficient γ is the speed of adjustment to equilibrium. The γ coefficient takes values from 0 to 1. A value close to 0 reflects high speed of adjustment, and suggests a relatively competitive market structure, whereas a coefficient value close to 1 implies less competitive markets and slower adjustment.

Following Maudos (1998), Mamatzakis and Remoundos (2003), Staikouras and Wood (2004), Athanasoglou, Delis, and Staikouras (2006), Athanasoglou, Brissimis, and Delis (2008), Dietrich and Wanzenried (2009), and Sayilgan and Yildirim (2009), bank profitability is measured using two alliterative ratios: (1) the return on average assets (ROA), and (2) return on average equity (ROE). ROA signals how efficiently management is using its assets to generate profit. In other words, it reflects the ability of a bank's management to generate earnings from the bank's assets (Dietrich and Wanzenried 2009). Although ROA is considered the most common ratio for analyzing bank performance in the literature, it has been criticized for being biased due to off-balance-sheet activities (Athanasoglou, Brissimis, and Delis 2008; Dietrich and Wanzenried 2009). The second profitability measurement used here is the return on average equity (ROE). ROE reflects how much profit is earned on the funds invested by shareholders. According to Athanasoglou, Brissimis, and Delis (2008) and Dietrich and Wanzenried (2009), the return on shareholders' equity measurement disregards the higher risk that is associated with a high leverage; thus, ROE is not the best profitability indicator. Nevertheless, for the purposes of this article, both ROA and ROE are considered as profitability measures in analyzing bank performance.

Variables Specification

The control variables included in the model are further divided into three categories: (1) bank-specific, (2) industry-specific, and (3) macroeconomic. Table 2 lists the definitions, notations, and expected effects of all the variables used in the model.

Concentration

The validity of the SCP hypothesis is examined by using the Herfindahl-Hirschman Index (HHI), which is one of the most commonly used measurements of industry concentration. The HHI is calculated as the sum of the squared market shares of each firm in the industry (Carlton and Perloff 2005, 247). Following the definitions of the U.S. Department of Justice, a market with HHI below 1,000 points is considered a competitive marketplace; a market in which the HHI is between 1,000 and 1,800 points is considered to be moderately concentrated; and one in which the HHI is in excess of 1,800 points is considered to be highly concentrated (Federal Register, 2008).

As can be observed from Table 3, the banking industries of Bosnia and Herzegovina (with the exception of 2005) and Serbia are characterized as competitive. The HHI places Croatia,

Macedonia (with the exception of 2005), and Slovenia in the group of moderately concentrated banking industry. Finally, the banking industry of Montenegro is considered highly concentrated.

Market Share

As mentioned previously, the market share variable is included for the purpose of distinguishing between the SCP and efficiency hypotheses. It is measured in terms of the assets of individual banks. In the opinion of Smirlock (1985) and Evanoff and Fortier (1988), the concentration variable losses its explanatory power when the market share variable is included in the model. Smirlock (1985) argues that such a finding does not support the notion that concentration leads to monopoly power and implies that "any effect of concentration previously reported in studies is due to the correlation between profitability and the omitted market share variable" (Smirlock 1985, p. 81). Therefore, such a scenario would provide evidence in favor of the efficient structure hypothesis.

Efficiency

In order to account for individual bank efficiency, two variables are used: (1) net interest income over total earning assets, and (2) estimated cost-efficiency. In terms of the net interest income, this article follows the approach of Demirguc-Kunt and Huizinga (1999), who use the accounting value of a bank's net interest income over total assets as a proxy for efficiency. In addition, an alternative measure of efficiency is the cost-efficiency variable (Atanasovska 2015). Individual cost-efficiency scores are estimated using stochastic frontier analysis, a well-known parametric approach, for the period 2000–2009 for eight transition economies, among which are Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, Serbia, and Slovenia. The analyses of bank profitability in this article use the estimated cost efficiencies for the period 2005–2009. As mentioned previously, this measure represents an addition to the accounting measure of efficiency and provides a different view of efficiency.

Credit Risk

Athanasoglou, Delis, and Staikouras (2006) suggest that variations in bank profitability are, for the most part, dependent on variations in credit risk. In the present article, as is the case in most articles investigating determinants of bank profitability (Athanasoglou, Brissimis, and Delis 2008; Athanasoglou, Delis, and Staikouras 2006; Dietrich and Wanzenried 2009; Mamatzakis and Remoundos 2003; Mendes and Abreu 2003; Staikouras and Wood 2004; Sufian 2009), the average loan loss provisions to total loans is used as a proxy for individual banks' credit risk.

Size

In the opinion of Staikouras and Wood (2004), Athanasoglou, Delis, and Staikouras (2006), Pasiouras and Kosmidou (2007), and Flamini, McDonald, and Schumacher (2009), bank size is considered an important determinant of profitability. As in many other empirical studies of banking industry, total assets are used as a proxy for a bank's size.

Equity to Total Assets Ratio

Following Demirguc-Kunt and Huizinga (1999), Mamatzakis and Remoundos (2003), Naceur (2003), Pasiouras and Kosmidou (2007), Athanasoglou, Brissimis, and Delis (2008), and Sufian (2009), the equity to total assets ratio is considered as a proxy for the capital variable. Considering the expected sign, the conventional risk-return hypothesis suggests a negative relationship. An opposing view suggests that the lower risk associated with a high equity to assets ratio increases bank creditworthiness, and reduces the cost of funding which should have a positive impact on profitability. Considering the conflicting views, the sign of correlation between the equity to total assets and profitability is ambiguous. Therefore, a positive relationship is expected between this ratio and profitability.

Ownership

The effect of ownership on bank profitability is captured by using the literature's suggestion for the use of a dummy variable that equals 1 for foreign-owned banks and 0 for domestic banks. It should be mentioned that it was not possible to consider changes in the ownership variable during the sample period due to data unavailability; namely, Bankscope offers ownership information for only one year (the same strategy is followed by Bonin et al. 2003 and Athanasoglou, Delis, and Staikouras 2006). Considering the expected sign, as suggested by Demirguc-Kunt and Huizinga (1999) and Bonin et al. (2003), in developing countries foreign banks report greater profits than their domestic counterparts. Therefore, banks in foreign ownership are expected to be more profitable.

The EBRD Index of Banking Sector Reform

The EBRD index is on a scale of 1 to 4+, with 1 representing little progress beyond the establishment of a two-tier system,[3] and 4+ representing the full convergence of banking laws and regulations with advanced industrial economic norms and standards (EBRD Transition Report 2010). Athanasoglou, Delis, and Staikouras (2006) argue that the EBRD index has a negative effect on profitability. In their opinion, if the reforms in the banking sector are successful, then the results, such as an improved regulatory framework, credit expansion, and sound macroeconomic policies, will positively contribute to competition. Higher competition will reduce the market power and profitability of banks.

Inflation

Macroeconomic risk is accounted for by controlling for inflation. As suggested in the literature, inflation is measured by the consumer price index (CPI). Following Perry (1992), Staikouras and Wood (2004), and Flamini, McDonald, and Schumacher (2009), the extent to which inflation affects bank profitability depends on whether future movements in inflation are fully anticipated. If firms can fully anticipate future inflation rates, this will positively affect their profitability because they will be able to appropriately adjust interest rates in order to increase revenue. On the other hand, an unexpected change could raise costs due to imperfect adjustments of the interest rates (Flamini, McDonald, and Schumacher 2009).

GDP Growth

Demirguc-Kunt and Huizinga (1999), Mendes and Abreu (2003), Naceur (2003), Pasiouras and Kosmidou (2007), Kallura and Bham (2008), Dietrich and Wanzenried (2009), Flamini, McDonald, and Schumacher (2009), and Sufian (2009) suggest that GDP growth has a positive effect on profitability. In line with that, a positive relationship between GDP growth and bank performance is expected as the demand for lending increases during expansion and decreases during recessions (Dietrich and Wanzenried 2009).

EMPIRICAL RESULTS

This section presents the descriptive statistics, the estimation method, and the empirical results of the research. As mentioned previously, this article uses an unbalanced panel data set of 127 commercial banks from six countries (Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, Serbia, and Slovenia).The number of banks included in the analysis does not correspond to the total number of banks that were active in each of the periods under analysis (Table 1). The reason behind this is that for some of the banks, information on various balance sheet categories were missing from the Bankscope database. In order to increase the validity and reliability of the study, in any case in which such activity was feasible, the researchers included the missing data manually by extracting information directly from banks' annual reports and publicly available documents. All data included in such manner were carefully checked and scaled so as to correspond to the form and structure of the information extracted from Bankscope. For example, if new information extracted from annual statements was stated in the local currency, the necessary conversion was carried out.

Descriptive Statistics

Table 4 presents the summary statistics for the variables used in the model.

TABLE 1
Key Characteristics of Banking Sectors in the Six Former Yugoslav Republics, 2005–2010

	Total no. of banks		*% of asset share of foreign-owned banks*		*% of asset share of state-owned banks*		*% bank nonperforming loans to total loans*		*EBRD index of banking sector reforms*	
	2005	*2010*	*2005*	*2010*	*2005*	*2010*	*2005*	*2010*	*2005*	*2010*
Bosna and Herzegovina	33.0	30.0	90.9	94.5	3.6	0.8	5.3	11.4	2.7	3.0
Croatia	34.0	32.0	91.3	91.0	3.4	4.1	6.2	11.2	4.0	4.0
Macedonia	20.0	18.0	51.3	50.3	1.6	1.4	15.0	9.0	2.7	3.0
Montenegro	10.0	11.0	87.8	87.1	5.1	0.0	5.3	21.0	2.3	3.0
Serbia	43.0	34.0	66.0	75.3	23.9	16.0	20.2	16.9	2.7	3.0
Slovenia	25.0	25.0	22.6	29.5	12.0	16.7	2.5	3.6	3.3	3.3

Source: Regional Economic Data, EBRD (2010).

TABLE 2
List of Variables Used

Variable	*Measure*	*Notation*	*Expected effect*
Dependent variable			
Profitability	Net profits before taxes/assets or net profits before taxes/equity	ROA and ROE	
Determinant			
Concentration	Herfindahl-Hirschman index	CONC	?
Market share	Individual bank assets/assets of all banks in country	MS	?
Efficiency	(1) Cost efficiency	MS	?
	(2) Net interest income = Net interest income/average earning assets	NII	Positive
Control variable			
Bank-specific			
Size	Total assets	SIZE	?
Loan loss provisions patio	Loan loss provisions/gross loans	LLPGL	Negative
Capital	Equity/total assets	EA	?
Ownership	Dummy variable equals 1 for banks 51% or over in foreign ownership	OW	Positive
Industry-related			
EBRD index for banking system reforms	Values from 1 to 4+	EBRD	Negative
Macroeconomic			
Cyclical output	GDP growth rate	GDPG	Positive
Inflation	Current period inflation rate measured by CPI	INF	?

TABLE 3
HHI by Country for the Period 2005–2009

Country	*2005*	*2006*	*2007*	*2008*	*2009*
Bosnia and Herzegovina	1,163.17	997.49	870.35	984	987.69
Croatia	1,468.21	1,412.8	1,407.82	1,449.41	1,496.21
Macedonia	1,848.04	1,707.2	1,666.18	1,617.8	1,706.92
Montenegro	2,600.17	2,244.71	2,306.2	2,422.84	2,016.37
Serbia	828.31	717.9	668.25	664.31	712.47
Slovenia	1,552.81	1,527.1	1,579.78	1,471.03	1,431.47

On average, banks in the sample have an average return on assets of 0.7% over the period 2005–2009. The standard deviation and the other statistics point out that there are large profitability differences among banks in the sample. The same holds true for the return on equity, the second profitability measure. Also observed is a large heterogeneity in the variable measuring concentration. This is due to the differences between the countries presented in Table 3. Market share also varies significantly between the banks included in the sample. The minimal value of the market share variable is 0 because bank total assets data for some banks in particular years are missing. In terms of bank-specific variables, although variation between banks with regard to

TABLE 4
Summary Statistics

Variable	*Obs.*	*M*	*SD*	*Min*	*Max*
ROA	737	0.7001444	2.82641	−28.11	28.74
ROE	737	4.545783	16.11504	−106.64	124.36
CONC	756	1,290.644	449.5989	664.3105	2600.167
MS	753	4.846519	6.725017	0	41.44505
CE	558	0.8925269	0.0590307	0.36	0.99
NII	734	5.70517	3.527725	0.76	24.57
SIZE	736	12.68226	1.537653	8.933225	16.81124
EA	736	17.79379	12.82217	2.84	92.36
LLPGL	741	0.0226201	0.0472331	−0.07054	0.6077954
OW	756	0.6190476	0.4859424	0	1
EBRD	756	3.179048	0.5096004	2.33	4
INF	756	4.686191	3.917868	−0.74	16.12
GDPG	756	2.754907	3.925724	−8.01	10.7

TABLE 5
Diagnostic Tests for OLS

Test	*Ho*	*χ^2 or F-statistic*	*p-value*	*Decision*
Heteroscedasticity test	Constant variance	693.05	0	Sufficient evidence to reject Ho
Specification test	No omitted variables	38.2	0	Sufficient evidence to reject Ho

TABLE 6
Comparison Between OLS, FE, and RE Models

Model	*Hypothesis tested*	*F-statistic/ χ^2 (p-value)*	*Decision*
One-way FE vs. OLS	Ho: All $u_i = 0$	2.3 0	Sufficient evidence to reject Ho: Estimate FE
One-way RE vs. OLS	Ho: RE is insignificant, OLS is BLUE	31.6 0	Sufficient evidence to reject Ho: Estimate RE
FE vs. RE	Ho: FE and RE do not differ substantially (can use RE)	78.9 0	Sufficient evidence to reject Ho: Estimate FE

the ratio of loan loss provisions to gross loans is not particularly noticeable, it still points out significant differences between the banks in the sample. There is also a large heterogeneity in the variable measuring bank capital strength. The equity to total assets ratio varies significantly among banks in the sample. The minimal value of this ratio is 2.84, whereas the maximum value is 92.36. The descriptive statistics of the macroeconomic variables also point to a great many variations between countries. On average, the GDP growth is 2.75% which would be considered

significant if the sample consisted only of highly developed economies (Dietrich and Wanzenried 2009). The great variation in the GDP growth rate is explained by the fact that the sample contains countries at different levels of economic development. This is also confirmed by the EBRD index of banking system reform.

Econometric Methodology

The article relies on a GMM estimator for the purpose of studying the relevance of the SCP and efficiency hypotheses in explaining the performance of the banking industry in the six selected Balkan countries. In order to arrive at the preferred econometric model of profitability determinants, it uses a four-step approach. More specifically, the process of econometric specification includes the following steps: (1) testing for stationarity of the panel dataset[4] using a test for unbalanced panel; (2) comparing OLS (ordinary least squares), FE (fixed effects), and RE (random effects) models; (3) dynamic transformation of the static profitability model in order to solve for the biasedness and inconsistency of the estimates[5] (Athanasoglou, Brissimis, and Delis 2008; Flamini, McDonald, and Schumacher 2009); and (4) checking for robustness.

We start with the static profitability model, which takes the following form in Equation (3):

$$ROA_{it} = \alpha + \beta_1 CONC_{at} + \beta_2 MS_{it} + \beta_3 CE_{it} + \beta_4 NII_{it} + \beta_5 SIZE_{it} + \beta_6 EA_{it} + \beta_7 LLPGL_{it} + \beta_8 OW_{it} + \beta_9 EBRD_{at} + \beta_{10} INF_{at} + \beta_{11} GDPG_{at} + \varepsilon_{it} \quad (3)$$

In line with Athanasoglou, Brissimis, and Delis (2008), nonstationarity is tested by using the Fisher test. The null hypothesis of unit root is rejected for all variables, which is expected since the investigation covers a relatively short period of time. Hence, specification of the model will continue without excluding any of the variables.

All economic models are specified on two levels as (1) statistical models, and (2) economic models. In order to choose the best statistically specified model, diagnostic tests are performed. As stated at the beginning of this segment, this begins with a classical OLS estimator, and then is modifiedt step-by-step, justifying the final use of a GMM estimator. The results of the OLS estimation are summarized in the Table 5.

According to the heteroscedasticity test, there is sufficient evidence to reject the null hypothesis of constant variance. In other words, the test provides evidence that the error variances increase as the predicted values of the dependent variable increase. The specification test reported also provides sufficient evidence to reject the null hypothesis of correct specification. Overall, the diagnostic results indicate that this is not the most suitable model for the data; hence we continue by estimating FE and RE models. The literature suggests that in static relationships, least square methods of fixed effects and random effects can be applied in estimating the model (Athanasoglou, Brissimis, and Delis 2008; (Athanasoglou, Delis, and Staikouras 2006; Mamatzakis and Remoundos 2003; Naceur 2003; Staikouras and Wood 2004). However, if profits persist over time, and the relationship is dynamic, these models will produce biased and inconsistent results (Athanasoglou, Brissimis, and Delis 2008; Baltagi 2001; Greene 2011).

Table 6 presents tests that have been performed in order to decide which model is the most appropriate for estimation.

In comparing the classical OLS to the FE model, the *F*-test is considered. According to this test, there is sufficient evidence to reject the null hypothesis, and therefore it is more appropriate to use the FE model rather than OLS. The Breusch-Pagan test is used for comparing the classical OLS and RE models. The test indicates that there is sufficient evidence to reject the null hypothesis that the OLS estimation is blue; therefore, the RE model is preferred. Since the conclusion is not clear, the effect models are compared using the Hausman test. The Hausman test provides sufficient evidence to reject the null hypothesis of no systematic difference between the coefficients of the two models in both periods. In other words, the Hausman test suggests that the random effects u_i are correlated with the regressors; thus the FE model is preferred. The conventional wisdom also implies reasons for preferring FE models. The literature suggests that it is best to avoid estimating RE models when working withan unbalanced panel. While one-way and two-way FE models can be estimated with no problems, the RE models report diagnostic failures, such as the presence of heteroscedasticity, which makes the *t*-statistics and *F*-statistics inefficient. Moreover, as the profitability model might suffer from omitted variable bias due to unobservable factors like quality of management, the FE model is considered more appropriate. Finally, it does not lead to loss of degrees of freedom, which is very important in this case.[6] Diagnostic tests of the FE model are summarized and presented further.

Following the results presented in Table 7, it is clear that the estimated FE model fails the main conditions of a well-specified model, since all reported hypotheses can be rejected at the conventional level of significance (5% level of significance). According to the tests, there is sufficient evidence to reject the null hypothesis of homoscedasticity at the conventional level of significance. Furthermore, there is sufficient evidence to reject the null hypothesis of normality in the residual. Finally, the model fails the assumption of the first-order autocorrelation in residuals. This is not surprising, since one would expect profitability in one period to be affected by profitability in the previous period. Following Greene (2011), autocorrelation in the residuals could be a result of missing dynamics. In other words, it takes time for changes in bank-specific, industry-specific, and macroeconomic variables to affect bank profitability to the full extent.

Following Gujarati (2006), the problem of inefficient *t*-stats and *F*-stats (heteroscedasticity) can be overcome by using White's heteroscedasticity adjusted standard errors. The failure of the normality is also not considered critical, as the OLS estimators are still blue. However, the existence of the first-order correlation in the residual is considered a problem, since it leads to inefficient coefficients. Hence, looking at the diagnostics of the FE model, it is clear that the model is wrongly specified. For these reasons, it was decided to opt for dynamic transformation of the profitability model. Following Bond (2002) even in a situation when the coefficient on the lagged dependent variables is not of direct interest, allowing for dynamics in the process may be

TABLE 7
FE Model Diagnostic Tests

Diagnostic test	*Hypothesis*	*P -value*	*Decision*
Cross-sectional dependence	Zero cross- dependence	N/A	—
Group-wise heteroscedasticity	Homoscedasticity	0	Sufficient evidence to reject Ho
Serial correlation	No first-order correlation in residuals	0.0015	Sufficient evidence to reject Ho
Normality	Normality in residuals	0	Sufficient evidence to reject Ho

crucial for recovering consistent estimates of other parameters. Moreover, dynamics are introduced in order to solve for some of the "omitted information." Namely, there are many factors that influence bank profitability but cannot be measured or for which data cannot be obtained. One example of this is quality of the management. The lagged profitability variable contains some additional information about the process of bank profitability in the previous period, and including it in the model accounts for some variables that influence bank profitability but are not included in the model.

The transformed model is as follows in Equation (4):[7]

$$ROA_{it} = \alpha + \gamma ROA_{i,t-1} + \beta_1 CONC_{at} + \beta_2 MS_{it} + \beta_3 CE_{it} + \beta_4 NII_{it} + \beta_5 SIZE_{it} + \beta_6 EA_{it}$$

$$+\beta_7 LLPGL_{it} + \beta_8 OW_{it} + \beta_9 EBRD_{at} + \beta_{10} INF_{at} + \beta_{11} GDPG_{at} + \varepsilon_{it} \quad (4)$$

As stated previously, the literature suggests that profits have a tendency to persist over time. In other words, it takes time for profits to converge toward their long-run equilibrium values (Goddard, Molyneux, and Wilson 2004). The dynamic nature of the model prevents the usage of standard OLS estimators, which will produce biased and inconsistent coefficient. Following Mamatzakis and Remoundos (2003), Goddard, Molyneux, and Wilson (2004), Athanasoglou, Brissimis, and Delis (2008), and Flamini, McDonald, and Schumacher (2009), in order to solve for the errors and biases, the Arellano-Bond General Methods of Moments (GMM) approach is used. Following Gujarati (2006) for a model with many panel units, few periods, and under the assumption of no correlation in the idiosyncratic errors, the GMM estimator removes the panel-specific heterogeneity. Moreover, this approach offers an advantage for dealing with potential endogeneity. Statistical theory suggests that endogeneity arises when there is a correlation between the independent variables and the present or past values of the error term (Gujarati 2006, 701). More specifically, it accounts for the loop of causality between the independent and dependent variables. The model may suffer from the issue of endogeneity due to the simultaneous nature of the basic model. As elaborated previously, the positive relationship typically found between structure and performance can be explained in one of two ways. It could be the case that high levels of industry concentration lower the cost of collusion, thereby leading to higher profits (Smirlock 1985), meaning that conduct influences performance. On the other hand, there is also evidence that performance influences conduct such that firms with superior efficiency obtain greater market share. Thus, the endogeneity inherent in the structure-profitability relationship may cause biased and inconsistent estimates. For these reasons, industry concentration and market share are modeled as endogenous variables.

In order to design a suitable model, it is first necessary to confirm that industry concentration and market share are better modeled as endogenous variables. This is tested by running the same model twice, the first time with concentration and market share treated as strictly exogenous, and the second time as endogenous variables. The results from the Sargan test support the hypothesis that concentration and market share are better modelled as endogenous variables. Namely, when modeled as endogenous, the results from the Sargan test of over-identifying restrictions do not provide enough evidence to reject the null hypothesis suggesting that the over-identifying restrictions are valid. In terms of other endogeneity concerns, the literature suggests that capital should also be modeled as an endogenous variable. Following Athanasoglou, Brissimis, and Delis (2008), banks that expect to have better performance transmit this information through higher capital. In the context of the present article, the Sargan test does not support the

hypothesis that capital is an endogenous variable. This is in line with findings offered by Islam and Nishiyama (2016). Namely, the authors find that capital should be treated as endogenous when profitability is measured using ROE, which is not the case in the basic model.

In conclusion, the difference GMM model seems to fit the panel data reasonably well. The Wald test rejects the null hypothesis of joint insignificance of the parameters, indicating fine goodness of fit, and the Sargan test suggests that the instruments are valid. Furthermore, although the Arellano and Bond test for autocorrelation indicates the presence of first-order autocorrelation, this still does not make the estimates inconsistent. Following Arellano and Bond (1991), estimates would be suggested inconsistent if second-order autocorrelation is present. This is not the case with the model. Table 8 presents the results of the Sargan test and the Arellano-Bond test for zero autocorrelation in first-differenced errors which are used to examine instrument validity, and autocorrelation in the differenced error term.

Empirical Results

The dynamic panel estimation reflects the direction of change in profitability for a given change in the explanatory variables for any individual bank from year to year. Table 9 reports the empirical results of the preferred model using ROA as the profitability variable.

TABLE 8
Instrument Validity Tests

Test	*Hypothesis tested*	*p-value*	*Decision*
Sargan	Ho: over-identifying restrictions are valid	0.8005	Insufficient evidence to reject Ho
M1	Ho: no first-order autocorrelation in differenced error term	0.0323	Sufficient evidence to reject Ho at 5% level of significance
M2	Ho: no second-order autocorrelation in differenced error term	0.7791	Insufficient evidence to reject Ho

TABLE 9
Preferred GMM Estimation Results

Variable	*Coef.*	*SE*	*z*	*p -value*
ROA L1.	0.114565	0.0590087	1.94	0.052
CONC	−0.0000306	0.0021325	−0.01	0.989
MS	0.0849877	0.1153003	0.74	0.461
CE	5.644029	3.4206236	1.65	0.099
NII	0.2415621	0.0739515	3.27	0.001
SIZE	1.065167	0.9668152	1.1	0.271
EA	0.1347488	0.0333845	4.04	0
LLPGL	−58.72292	4.830347	−12.16	0
EBRD	−1.783813	0.9295091	−1.92	0.055
INF	0.0288338	0.0674101	0.43	0.669
GDPG	0.0842444	0.0919555	0.92	0.36

The magnitude and significance of the coefficient of the lagged dependent variable confirms the dynamic nature of the model (significant at 10% level of significance) which further justifies the use of GMM dynamic panel estimation of the model. The estimated coefficient of 0.11 reflects a relatively competitive market structure. It suggests that the deviation from perfect competition is marginal and that bank profits adjust relatively fast to their long-run equilibrium levels. The reported coefficient is lower than the one reported in Athanasoglou, Brissimis, and Delis (2008), which may indicate greater efficiency of the considered banks as compared to the Greek banking sector.

As can be seen from Table 9, both proxies for efficiency are positive and statistically significant, which provides evidence in favor of the efficiency hypothesis; namely, the NII_{it} variable is positive and highly significant, whereas cost efficiency is significant at the 10% level of significance. Moreover, both industry concentration and market share are reported to have no direct effect on bank profitability. Neither of these variables is statistically different from zero, which is contrary to the findings offered by Smirlock (1985), who argued that a bank's superior efficiency will be translated into greater market share, and once market share is accounted for in the bank profitability model, industry concentration will become insignificant in explaining bank profit rates. The findings suggest that using the market share variable as an efficiency measurement may be misleading. This is tested by excluding the bank efficiency measurements (cost efficiency and net interest income variables) and re-estimating the model. The market share variable continues to be insignificant, suggesting that it does not reflect efficiency (Table 10). In addition, the industry concentration variable also remains insignificant, suggesting that even the efficiency variables are excluded from the model, there is still no evidence in support of the SCP hypothesis.[8]

In terms of the control variables, there is no evidence of any relationship between bank size and profitability, and the estimated coefficient is positive but insignificant. A possible explanation for this is that banks will try to grow faster even at the expense of their profitability (Athanasoglou, Brissimis, and Delis 2008). These results are in line with the results of Goddard, Molyneux, and Wilson (2004) and Athanasoglou, Brissimis, and Delis (2008), who also use a GMM estimator for analyzing the determinants of bank profitability.

The equity to total assets ratio is positive and highly significant, suggesting that well-capitalized banks are more profitable. The results from this study are consistent with expectations as well as with most empirical evidence concerning bank profitability (Demirguc-Kunt and Huizinga 1999; Liu and Wilson 2010; Mamatzakis and Remoundos 2003; Mendes and Abreu 2003; Pasiouras and Kosmidou 2007; Staikouras and Wood 2004). The positive relationship

TABLE 10
Comparison

Model without efficiency variables		*Model with efficiency variables*			
CONC	*MS*	*CONC*	*MS*	*CE*	*NII*
0.000333	-0.0612836	-0.0000306	-0.0849877	5.644029	0.2145621
-0.733	-0.488	-0.989	-0.461	-0.099	-0.001

TABLE 11
Robustness Test, Comparison

Variable	*ROA (dependent variable)*		*ROE (dependent variable)*	
	Coef.	*P Value*	*Coef.*	*P Value*
CONC	-0.0000306	0.989	-0.01356	0.106
MS	0.0849877	0.461	-0.30127	0.584
CE	5.644029	0.099	28.65689	0.043
NII	0.2415621	0.001	1.627483	0
SIZE	1.065167	0.271	2.439602	0.52
EA	0.1347488	0	0.416759	0.005
LLPGL	-58.72292	0	-194.32	0

between equity ratio and bank profitability suggests that banks with sound capital will be able to pursue business opportunities and resist negative shocks better, which, in turn, will make them more profitable.

The ratio of loan loss provision to total loans is negatively and highly significantly related to bank profitability. This suggests that banks should focus more on credit-risk management in the future, since serious problems may arise from the failure of banks to recognize impaired loans (Athanasoglou, Delis, and Staikouras 2006). These results are in line with the work of Mendes and Abreu (2003), Staikouras and Wood (2004), Athanasoglou, Delis, and Staikouras (2006), Athanasoglou, Brissimis, and Delis (2008), and Liu and Wilson (2010).

The EBRD index of banking sector reform suggests a negative and significant effect on bank profitability. This result indicates that banking system reforms have positively contributed to competition. According to Athanasoglou, Delis, and Staikouras (2006), the improved regulatory framework, credit expansion, and the adoption of sound macroeconomic policies led to higher levels of competition, which, in turn, lowered profitability.

Turning to the macroeconomic variables, the inflation variable appears not to assert a significant statistical impact on profitability. This is in line with the results presented by Mamatzakis and Remoundos (2003), Staikouras and Wood (2004), and Athanasoglou, Brissimis, and Delis (2008). The economic growth does not reflect any aspect of bank profitability. The estimated coefficient is positive, but insignificant.

Robustness Checking

An important finding of this research is that the efficiency variables (cost efficiency obtained with stochastic frontier analysis and net income interest income over total earning assets) represent significant determinants of bank profitability, and that industry concentration is insignificant in explaining profitability variations. In order to confirm the validity of the findings, a robustness check is performed (see Table 11).

The findings from the preferred GMM estimator remained to some extent robust even after the model was estimated using a secondary measurement of profitability, the return on equity (ROE). Namely, robustness tests suggest that efficiency has a robust effect on bank profitability, since both variables remain significant even after the dependent variable is changed.

Furthermore, both industry concentration and market share remain insignificant in explaining changes in banks' profitability. In terms of the other controlled variables, the findings from the robustness test suggest that the equity to total assets ratio, the loan loss provision ratio, and the net interest income ratio have a robust effect on bank profitability since they are always reported statistically significant.

CONCLUSION

This article specifies an empirical framework for investigating the relevance of the SCP and efficiency hypotheses in explaining the performance of the banking industry by estimating a profitability model. So far, there have been very few econometric studies examining the applicability of SCP or the efficiency hypothesis in explaining bank profitability. Moreover, none of them focuses on banks in the Balkan countries. These countries have undergone major reforms with respect to their financial sectors. Although the reform processes began at the beginning of the 1990s, the sectors continued to improve and implement restructuring processes after 2000. The improvement of the sectors was accompanied by increased interest among foreign financial institutions to expand in these countries. The fact that the reform processes continued represents an interesting context for analyzing bank profitability in these countries. Investigation into profitability determinants will allow policymakers to observe areas in which adjustments need to be made for the purpose of improving banks' performance and the instruments with which these adjustments can be achieved.

Following Weiss (1974), the vast majority of studies that use manufacturing data support the positive relationship typically found between concentration and profitability; hence, it is logical to expect the same result in studies analyzing the determinants of bank profitability. However, the results have been inconclusive, and thus one of the main purposes of this article is to distinguish between the traditional and alternative hypotheses explaining the relationship between industry concentration and bank profitability.

The regression model presented in this article includes the influence of two efficiency variables, one an accounting measure and one obtained with stochastic frontier analysis, which, together with the industry concentration and the market share variable serve the purpose of distinguishing between the traditional SCP and efficiency hypotheses. These factors together with the other included control variables about banks, macroeconomic conditions, and industry environment contribute to a better understanding of what determinates bank profitability.

The use of the GMM as the best estimation technique for the model finds evidence in support of the efficiency hypothesis, because both proxies for efficiency included in the regression are positive and statistically significant. Additionally, the effects of industry concentration and market share are found insignificant in explaining profitability. The analysis further suggests that using the market share variable as an efficiency measurement may be misleading, as the variable is not reported significant even if other efficiency proxies are excluded from the model. These findings have significant policy implications, particularly for developing economies, such as the countries included in this analysis: namely, the evidence in favor of the efficiency hypothesis indicates that policymakers and governmental authorities need to focus on policy reform aimed at enhancing banks' efficiency and, in turn, solving allocative inefficiency. This is particularly relevant for Bosnia and Herzegovina, Macedonia, Montenegro, and Serbia, which

still lag behind their counterparts in developed economies in terms of quality of financial markets and are currently in the process of introducing new regulations and banking reforms.

With regard to the other control variables, the findings suggest that capital is important in explaining bank profitability in the sense that better-capitalized banks appear to be more profitable. The effect of bank size does not provide evidence of economics of scale in the banking industry, since the estimated coefficient is not reported significant. In addition, credit risk, as measured by the ratio of loan loss provision to total loans, is found to have a statistically significant and negative impact on bank profitability, indicating that banks should focus more on credit-risk management in the future.

The results concerning the EBRD index of banking sector reform indicate a negative and significant effect of bank reforms on bank profitability confirming that banking system reforms increase the level of competition in the banking sectors of the sample countries, and furthermore decrease bank profitability. The estimated negative coefficient is in line with the theory of contestable markets.

Regarding the macroeconomic variables, this thesis finds that inflation has no impact on bank profitability. Moreover, economic growth does not reflect any aspect of bank profitability, since the estimated coefficient is reported insignificant.

In conclusion, the empirical results provide evidence that efficiency is one of the main determinants of bank profitability, but not the only one. Profitability of banks is defined by a combination of bank-specific and industry-specific variables. In terms of limitations, as mentioned previously, the article is characterized by some measurement problems related to the explanatory variables. In addition, foreign bank penetration is an important issue, but due to data unavailability, it was not fully investigated in the article. Moreover, for the same reason, the article also does not consider the impact of mergers and acquisitions on financial performance. In this context, future research on the topic of bank profitability should be directed toward addressing these two issues.

NOTES

1. The unobserved bank-specific effect captures all unobserved, time-constant factors that affect profitability (Wooldridge 2005).
2. Idiosyncratic error is defined as a time-varying error, and represents the unobserved factors that change over time and affect bank profitability (Wooldridge 2005).
3. The two-tier banking system underlines (1) the separation between central banks and commercial banks, and (2) that commercial banks are in direct contact with companies (Athanasoglou, Delis, and Staikouras 2006).
4. The literature suggests testing for stationarity in the case of large time series. Although, only six years are used in the analysis, unit root testing is still conducted. In the case of unbalanced panel data set, the Fisher-type panel unit root tests are suggested (Choi 2001; Maddala and Wu 1999).
5. Estimates will be biased and inconsistent due to the correlation between unobserved panel-level effects and the lagged dependent variable (Flamini, McDonald, and Schumacher 2009).
6. As mentioned previously, not enough data are available for the countries of interest; hence, preserving degrees of freedom is very important.
7. Since it was not possible to consider changes in the ownership variable during the sample period, this variable is excluded from the dynamic model.
8. It is also important to mention that additional tests were conducted for the purpose of investigating whether the two efficiency measurements included in the model capture different aspects of bank efficiency. More specifically, the model was run twice, including the efficiency variables separately. The findings show that the NII_{it} variable remains highly significant in the model where the cost

efficiency variable is excluded, and this does not change when the cost-efficiency variable is included. Such findings indicate that there is no transfer of effect, but rather that the two variables capture different aspects of efficiency.

REFERENCES

Akhavein, J. D., A. N. Bergerand, and D. B. Humphrey. 1997. "The Effects of Megamergers on Efficiency and Prices: Evidence from a Bank Profit Function." *Review of Industrial Organization* 12 (1):95–139. doi:10.1023/A:1007760924829.

Arellano, M., and S. Bond. 1991. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *Review of Economic Studies* 58 (2):277–97. doi:10.2307/2297968.

Atanasovska, V. 2015. "Cost Efficiency and Determinants of Market Structure in Banking Sector—The Case of South Eastern European Countries." Unpublished PH.D. diss., Staffordshire University.

Athanasoglou, P. P., N. S. Brissimis, and D. D. Delis. 2008. "Bank-Specific, Industry Related and Macroeconomic Determinants of Bank Performance." *Journal of International Financial Markets, Institutions and Money* 18 (2):121–36. doi:10.1016/j.intfin.2006.07.001.

Athanasoglou, P. P., D. M. Delis, and K. C. Staikouras. 2006. "The Determinants of Bank Profitability in the South Eastern European Region." Working Paper No. 10274, Bank of Greece, Athens, Greece. http://www.bankofgreece.gr/BogEkdoseis/Paper200647.pdf

Bain, J. S. 1951. "Relation of Profit Rate to Industry Concentration." *Quarterly Journal of Economics* 65 (3):293–324. doi:10.2307/1882217.

Baltagi, B. H. 2001. *Econometric Analysis of Panel Data*, 2nd ed. Chichester, UK: John Wiley & Sons.

Berger, A. N. 1995. "The Profit-Structure Relationship in Banking-Tests of Market-Power and Efficient-Structure Hypotheses." *Journal of Money, Credit, and Banking* 27 (2):235–64. doi:10.2307/2077876.

Bond, S. 2002. "Dynamic Panel Models: A Guide to Micro Data Methods and Practice." Working Paper No. 59556, Institute for Fiscal Studies, London, UK. doi:10.1920/wp.cem.2002.0902.

Bonin, P. J., I. Hasan, and P. Wachtel. 2003. "Bank Performance, Efficiency and Ownership in Transition Economies." Paper presented at the 9th Dubrovnik Economic Conference, Dubrovnik, Croatia, June 26–28. http://nbhnetra.hnb.hr/dub-konf/9-konferencija-radovi/bonin-hasan-wachtel.pdf

Carlton, D., and J. Perloff. 2005. *Modern Industrial Organization*, 4th ed. Harlow, UK: Pearson.

Choi, I. 2001. "Unit root tests for panel data." *Journal of International Money and Finance* 20: 249–272.

Collins, N. R., and L. E. Preston. 1968. *Concentration and Cost Price Margins in Food Manufacturing Industries*. Berkeley, CA: University of California Press.

Demirguc-Kunt, A., and H. Huizinga. 1999. "Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence." *World Bank Economic Review* 13 (2):379–408. doi:10.1093/wber/13.2.379.

Demsetz, H. 1973. "Industry Structure, Market Rivalry and Public Policy." *Journal of Law and Economics* 16 (1):1–9. doi:10.1086/466752.

Dietrich, A., and G. Wanzenried. 2009. "What Determines the Profitability of Commercial Banks? New Evidence from Switzerland." Paper presented at the 12th Conference of the Swiss Society for Financial Market Research, Geneva, Switzerland, April 3, 2009.

Erel, I. 2011. "The Effect of Bank Mergers on Loan Prices: Evidence from the United States." *Review of Financial Studies* 24 (4):1068–1101. doi:10.1093/rfs/hhp034.

European Bank for Reconstruction and Development. 2010. Transition Report 2010. Recovery and Reform. http://www.ebrd.com/downloads/research/transition/tr10.pdf.

European Commission. 2011. "The Former Yugoslav Republic of Macedonia 2011 Progress Report." Staff Working Paper 1203, European Commission, Brussels, Belgium. http://ec.europa.eu/enlargement/pdf/key_documents/2011/package/mk_rapport_2011_en.pdf

Evanoff, D. D., and D. L. Fortier. 1988. "Re-evaluation of the Structure-Conduct-Performance Relationship in Banking." *Journal of Indian School Political Economy* 19 (3):182–92.

Fang, Y., I. Hasan, and K. Marton. 2008. "Bank Efficiency in Southeastern Europe." *Economics of Transitions* 19 (3):495–520. doi:10.1111/j.1468-0351.2011.00420.x.

Federal Register 73, No. 242, Notices 7. 2008 December 16. 76361–76362. Washington, DC: General Printing Office. https://www.gpo.gov/fdsys/pkg/FR-2008-12-16/pdf/E8-29603.pdf; https://www.justice.gov/atr/horizontal-merger-guidelines-0#15

Flamini, V., C. McDonald, and L. Schumacher. 2009. "The Determinants of Commercial Bank Profitability in Sub-Saharan Africa." Working Paper No. 09/15, International Monetary Fund, Washington, DC. https://www.imf.org/external/pubs/ft/wp/2009/wp0915.pdf

Goddard, J., P. Molyneux, and O. S. J. Wilson. 2004. "The Profitability of European Banks: A Cross-Sectional and Dynamic Panel Analysis." *The Manchester School* 72 (3):363–81. doi:10.1111/j.1467-9957.2004.00397.x.

Greene, H. W. 2011. *Econometric Analysis*, 7th ed. Upper Saddle River, NJ: Pearson Education.

Gujarati, D. 2006. *Basic Econometrics*, 4th ed. New York, NY: McGraw Hill.

Islam, S., and S. Nishiyama. 2016. "The Determinants of Bank Profitability: Dynamic Panel Evidence from South Asian Countries." *Journal of Applied Finance & Banking* 6 (3):77–97. http://www.scienpress.com/Upload/JAFB/Vol%206_3_6.pdf

Kallura, R. S., and K. S. Bham. 2008. "An Empirical Analysis of Profitability Determinants in Indian Commercial Banks During Post Reform Period." *ICFAI Journal of Industrial Economics* 5 (4):37–56. http://www.iupindia.in/1108/IJIE_Commercial_Banks_37.html

Levine, R. 1997. "Financial Development and Economic Growth: Views and Agenda." *Journal of Economic Literature* 35 (June):688–726. http://www.jstor.org/stable/2729790

Liu, H., and O. S. J. Wilson. 2010. "The Persistence of Bank Profit." *Journal of Banking and Finance* 35 (11):2881–90. doi:10.1016/j.jbankfin.2011.03.015

Lloyd-Williams, M., P. Molyneux, and J. Thornton. 1994. "Market Structure and Performance in Spanish Banking." *Journal of Banking and Finance* 18:433–43. doi:10.1016/0378-4266(94)90002-7.

Maddala, G. S., and S. Wu. 1999. "A comparative study of unit root tests with panel data and a new simple test." Oxford Bulletin of Economics and Statistics 61: 631–652.

Mamatzakis, C. E., and C. P. Remoundos. 2003. "Determinants of Greek Commercial Banks Profitability, 1989–2000." *Spoudai* 53 (1):84–94. http://spoudai.unipi.gr/index.php/spoudai/article/download/1174/1253

Mann, H. M. 1966. "Seller Concentration, Barriers to Entry and Rates of Return in 30 Industries, 1950–1960." *Review of Economics and Statistics* 48:296–307. doi:10.2307/1927085.

Maudos, J. 1998. "Market Structure and Performance in Spanish Banking Using a Direct Measure of Efficiency." *Applied Financial Economics* 8 (2):191–200. doi:10.1080/096031098333177.

Mendes, V., and M. Abreu. 2003. "Do Macro-Financial Variables Matter for European Bank Interest Margins and Profitability?" Paper presented at the 2nd CIEF Workshop European Integration and Banking Efficiency, Lisbon, Portugal, October 30–31. http://ecomod.net/sites/default/files/document-conference/ecomod2003/Abreu.pdf

Molyneux, P., and J. Thornton. 1992. "Determinants of European Bank Profitability: A Note." *Journal of Banking & Finance* 16:1173–78. doi:10.1016/0378-4266(92)90065-8.

Naceur, S. B. 2003. "The Determinants of the Tunisian Banking Industry Profitability: Panel Evidence." Paper presented at the 10th Annual Conference of the Economic Research Forum (ERF), Marrakesh, Morocco, December 16–18. http://www.mafhoum.com/press6/174E11.pdf

Pasiouras, F., and K. Kosmidou. 2007. "Factors Influencing the Profitability of Domestic and Foreign Commercial Banks in the European Union." *Research in International Business and Finance* 21 (2):222–37. doi:10.1016/j.ribaf.2006.03.007.

Perry, P. 1992. "Do Banks Gain or Lose from Inflation?" *Journal of Retail Banking* 14 (2):25–30.

Rajan, R. G., and L. Zingales. 1996. "Financial Dependence and Growth." Working Paper No. 5758, Natural Bureau of Economic Research, Cambridge, MA. doi:10.3386/w5758

Sayilgan, G., and O. Yildirim. 2009. "Determinants of Profitability in Turkish Banking Sector: 2002–2007." *International Research Journal of Finance and Economics* 28:207–14. http://www.internationalresearchjournaloffinanceandeconomics.com/ISSUES/irjfe_28_18.pdf

Seelanatha, L. 2010. "Market Structure, Efficiency and Performance of Banking Industry in Sri Lanka." *Banks and Bank Systems* 5 (1):20–31. http://businessperspectives.org/journals_free/bbs/2010/BBS_en_2010_1_Seelanatha.pdf

Shobhana, V. K., and N. Deepa. 2012. "Impact of Mergers and Acquisitions on the Shareholder Wealth of the Select Acquirer Banks in India: An Event Study Approach." *Journal of Bank Management* 11 (2):26–37. http://www.iupindia.in/1205/Bank%20Management/Impact_of_Mergers_and_Acquisitions.html

Smirlock, M. 1985. "Evidence of the (Non)relationship Between Concentration and Profitability in Banking." *Journal of Money* 17 (1):69–83. doi:10.2307/1992507.

Staikouras, C. K., and E. G. Wood. 2004. "The Determinants of European Bank Profitability." *International Business and Economics Research Journal* 3 (6):57–68. doi:10.19030/iber.v3i6.3699.

Sufian, F. 2009. "The Determinants of Bank Profitability in a Developing Economy: Empirical Evidence from the China Banking Sector." *Journal of Asia-Pacific Business* 10 (4):281–307. doi:10.1080/10599230903340205.

Webster, A. L. 1996. "The Concentration-Profitability Relationship in American Industry: A Varying Parameters Model." *Journal of Applied Business Research* 12 (4):45–72. doi:10.19030/jabr.v12i4.5783.

Weiss, L. W. 1974. "The Concentration Profits Relationship and Antitrust." In *Industrial Concentration: The New Learning*, edited by H. J. Goldschmidt, H. M. Mann, and J. F. Weston,Boston, 184–233. MA: Little, Brown & Co.

Wooldridge, J. M. 2005. *Introductory Econometrics: A Modern Approach*, 3rd ed. Mason, OH: Thomson South-Western.