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Article

Determinants of Profitability in the Banking Sector: An Analysis of Post-Soviet Countries

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Abstract: The purpose of this paper is to identify the determinants of bank profitability in 13 post-Soviet countries. Within this scope, annual data between 1996 and 2016 is analyzed by using fixed effects panel regression and the Generalized Method of Moments (GMM). It is concluded that loan amount, non-interest income and economic growth are significant indicators of profitability. Moreover, the 2008 global mortgage crisis has a negative influence on bank profitability in post-Soviet countries. According to the estimation results, there is a positive relationship between non-interest income and economic growth with profitability. This result shows that when non-interest income of the banks increases, such as credit card fees and commission, it affects the financial performance of the banks, positively, and contributes to bank profitability. Another result of this study is that economic growth positively influences bank profitability. This result allows us to conclude that higher GDP comes with higher bank profitability for post-Soviet countries. Lastly, there is a negative relationship between loan-to-GDP ratio and profitability of the banks in post-Soviet countries. This means that when the ratio of total loans to GDP increases, it affects financial performance of the banks in a negative way. While considering this result, it is recommended that banks in post-Soviet countries should focus on ways to increase their non-interest income. Additionally, it is also significant for these banks to be careful and risk averse when lending to their customers.

Keywords: profitability; banking sector; panel regression; Generalized Method of Moments (GMM) methods; post-soviet countries

JEL Classification: G00; G10; G21

1. Introduction

Due to their intermediary function between lenders and borrowers, banks have an important role for all economies. On one side, savers can have a chance to gain interest income with their excess funds. On the other side, thanks to the money creation function of the banks, not only can investors reach the money they need for their business activities, but also consumers are able to spend their future income. In other words, banks contribute investment and consumption amounts in a country. These functions of the banks help to accelerate economic activity. In addition to the benefits above, the banking sector helps to reduce unemployment in a country by employing many people in their branches. In short, the banking sector plays an essential role for economies (Yüksel et al. 2015).

Keeping a nation's savings in deposit accounts, and lending more of them, thanks to the money creation process, allows banks to make high profits. However, especially after globalization, banks had to manage different types of risks, such as credit risk, liquidity risk, interest rate risk, and currency risk. In the last 20 years, there have been many banking crises in the world since these risks could not be managed, accurately. These crises caused significant losses for the economies affected. As a result of these crises, many people lost their jobs and a lot of companies went bankrupt. Therefore, banks should manage their risks and assets well in order to be profitable and for economies to be stable (Dincer et al. 2016). Because of banking-related economic problems, studies on bank profitability are very important for identifying problems and avoiding economic risks.

Starting from the early studies, bank profitability has become one of the most popular topics in the banking literature. While most of the studies in this subject are related to persistency, convergence and efficiency, the aspect of profitability has a special importance in the literature. For this reason, especially after the late 1970s, many international studies have been carried out regarding the determinants of profitability. With the development of contemporary econometric analysis methods, studies after 1990 conducted experimental analysis and mainly focused on sets of countries (Tunay and Mukhtarov 2016, p. 689).

Bank profitability refers to the difference between the profit amount obtained from the assets and expense of the liabilities. In the literature, bank profitability is stated as a function of both micro and macro determinants. Micro variables consist of the accounts in the balance sheet and income statement. Therefore, they are also named as bank-specific variables. On the other hand, macro variables are not related to the internal process of the banks, but they affect profitability in a significant way. Size, capital, risk management, expense management, marketable securities and non-performing loans are generally considered micro variables (Güngör 2007, pp. 42–43). Inflation, interest rate, GDP growth and tax rate are used as macro variables.

The Union of Soviet Socialist Republics (USSR), which was founded in 1922, was the largest country in the world with respect to its surface area. Additionally, more than 293 million people lived in the Union. However, this country collapsed in 1991 due to economic, social and political reasons. After the collapse, the Soviet Union divided up into 15 separate and independent countries (Borjas and Doran 2012). Each of these countries tried to develop their economic system after collapse. Within this context, they aimed to implement a free market economy instead of having a command economy. Because it was impossible to make this change with the regulations from communist system, they sped up the implementation of new legal regulations. Additionally, these countries immediately implemented some serious regulations on banking systems and central banking, which constitute amongst the most important steps towards transition to a free market economy. Thus, central banks in the first step and commercial banks in the second step formed a two-step banking system, together.

This paper contributes to the current literature in different ways. First, it investigates one of the hot topics in the literature: "the influencing factors of bank profitability". Second, there is a lack of studies in the literature that examines post-Soviet countries regarding this topic. This study helps to fill this gap in the literature by investigating bank profitability in the case of post-Soviet countries. Third, it is the first study that investigates the bank profitability of post-Soviet countries by employing fixed effect panel regression and the Generalized Method of Moments (GMM). Using such advanced methods and robust standard errors, the results of this study present some important recommendations to banks of the post-Soviet countries to increase their profitability. In addition, the findings of this study can be used by policymakers as a tool for policy measurement purposes.

This paper is organized as follows: Section 1 presents an overview of existing literature and the formulation of the hypothesis. Sections 2 and 3 give descriptions of the data and research methodology, respectively. Section 4 covers the econometric results and interpretations, Section 5 concludes this study with policy implications.

2. Literature Review

Banking sector profitability is a very popular topic among empirical researchers. Owing to this aspect, there are many studies in the literature which analyze factors that affect bank profitability. Table 1 shows some of these studies in details.

According to Table 1, most of the studies underlined the importance of macroeconomic factors with respect to bank profitability. Al-Jafari and Alchami (2014) analyzed the profitability of the banking sector in Syria. According to the results of GMM analysis, they reached a conclusion that the inflation rate affects bank profitability. Moreover, Demirgüç-Kunt and Huizinga (1999) also analyzed the banking sector in 80 different countries by using regression analysis. They defined a positive relationship between the inflation rate and profitability of the banks. However, Saeed (2014) made a conclusion that inflation rate affects bank profitability negatively for banks in UK.

Table 1. Similar studies in the literature.

Authors	Scope	Method	Result
Molyneux and Thornton (1992)	18 European countries	Regression	Defined that higher capital and interest rate will increase the profitability of the banks.
Demirgüç-Kunt and Maksimovic (1998)	30 different countries	Regression	Identified that there is a positive relationship between size and profitability of the bank.
Demirgüç-Kunt and Huizinga (1999)	80 different countries	Regression	Determined that inflation rate positively affects profitability of the banks.
Abreu and Mendes (2001)	4 European Union (EU) countries	Regression	Identified that a high amount of capital increases bank profitability.
Goddard et al. (2004)	6 EU countries	Generalized Method of Moments (GMM)	Determined that there is a positive relationship between bank size and profitability.
Tunay and Silpar (2006)	Turkey	Regression	Determined that bank size, inflation rate and economic growth have a significant influence on profitability.
Kiganda (2014)	Kenya	Regression	Identified that macroeconomic factors do not affect bank profitability in Kenya.
Saeed (2014)	UK	Regression	Concluded that inflation rate affects bank profitability negatively whereas bank size has a positive influence.
Al-Jafari and Alchami (2014)	Syria	GMM	Reached a conclusion that inflation rate and economic growth affect bank profitability.
Dawood (2014)	Pakistan	Regression	Identified that capital adequacy influences bank profitability.
Lipunga (2014)	Malawi	Regression	Defined bank size as the most important factor of bank profitability.
Chowdhury (2015)	United Arab Emirates	GMM	Determined that higher capital improves bank profitability.
Aftab et al. (2015)	Pakistan	Regression	Reached a conclusion that private banks are more profitable in comparison with others.
Boitan (2015)	European Union	Granger Causality Analysis	Defined GDP growth rate as having a positive and high influence on the profitability of banks.
Gyamerah and Amoah (2015)	Ghana	Regression	Concluded that risk management plays an important role with respect to the profitability of the banks.
Duraj and Moci (2015)	Albania	Regression	Macroeconomic variables are as important as bank specific variables in order to evaluate profitability.
Nisar (2015)	Pakistan	Regression	Determined that a high amount of non-performing loans leads to a decrease in profitability of banks.
Petria et al. (2015)	European Union	Regression	Identified economic growth as a significant indicator of bank profitability.
Buchory (2015)	Indonesia	Regression	Concluded that loan to deposit ratio and capital adequacy ratio do not have significant effect on the profitability of the banks.
Noman et al. (2015)	Bangladesh	GMM	Defined that real interest rate affects the probability of the banks negatively whereas capital adequacy, size and inflation rate have a positive influence.

Table 1. Cont.

Authors	Scope	Method	Result
Alshatti (2015)	Jordan	Regression	Identified liquidity ratio as very significant in order to increase profitability.
Pradhan and Shrestha (2016)	Nepal	Regression	Determined that higher capital adequacy ratio positively affects the profitability of banks.
Aydemir and Ovenc (2016)	Turkey	Regression	Understood that bank profits in Turkey are sensitive to interest rates
Alhassan et al. (2016)	Ghana	DAE	Defined a positive relationship between size and profitability of the banks.
Garcia and Guerreiro (2016)	Portugal	Regression	Reached a conclusion that interest rate has no effect on the profitability of the banks.
Albertazzi et al. (2016)	Italy	Regression	Decrease in economic growth is the main cause of low profitability of Italian banks.
Ariyadasa et al. (2016)	Sri Lanka	VECM	Identified interest rate and non-performing loans as having a negative effect on bank profitability.
Menicucci and Paolucci (2016)	35 European banks	Regression	Concluded that size and capital ratio are important determinants of banks' profitability.
Tan et al. (2016)	China	GMM	Identified credit risk as negatively related to bank profitability.
Opoku et al. (2016)	Ghana	Regression	Determined that non-performing loans have a negative effect on bank profitability.
Terinte et al. (2016)	Romania	Regression	Identified independent auditors as influencing bank profitability.
Islam and Nishiyama (2016)	South Asia	GMM	It was defined that interest rate positively affects bank profitability.
Anarfi et al. (2016)	Ghana	Regression	Concluded that bank size and deposit do not affect bank profitability.
Regehr and Sengupta (2016)	US	Regression	Reached a conclusion that there is a direct relationship between size and profitability of banks.
Deng (2016)	US	Regression	Defined GDP growth as having a positive influence on bank profitability.
Djalilov and Piesse (2016)	8 transition countries	GMM	Concluded that credit risk, capital, size, concentration, GDP growth, inflation, financial freedom and property rights influence bank profitability
Hanna (2016)	Syria	Regression	Identified a negative relationship between bank profitability and non-performing loans.
Javid (2016)	Pakistan	Regression	Defined that macroeconomic factors as having no effect on bank profitability.
Kolapo et al. (2016)	Nigeria	Regression	Defined size of the banks as having no effect on bank profitability.
Laryea et al. (2016)	Ghana	Regression	Identified non-performing loans as affecting the profitability of the banks negatively.
Hu and Xie (2016)	China	Structural Equation Modeling	Concluded that risk-taking is positively related to profitability of the banks.
Pradhan (2016)	Nepal	Regression	Determined that higher credit to asset ratio increases the profitability of banks.
Khatun and Siddiqui (2016)	Bangladesh	Regression	Defined capital adequacy ratio as positively affecting profitability of banks.
Ozili (2016)	Africa	GMM	Determined that higher capital amount increases the profitability of African banks.
Wali Ullah et al. (2016)	Bangladesh	Regression	Identified a positive relationship between economic growth and profitability.
Jabra et al. (2016)	BRICS countries	GMM	Concluded that bank capital has the greatest positive effect on bank profitability.
Ahmad et al. (2016)	78 Asian and 89 American banks	Regression	Determined that bank-specific variables rather than macroeconomic variables influence bank profitability.

Source: Authors' own elaborations.

In addition to these, some studies indicated the relationship between economic growth and bank profitability. [Boitan \(2015\)](#) tried to understand the factors that influence bank profitability in European Union (EU) countries. According to the results, a high and positive Granger causality is found from GDP growth rate to the bank profitability. Furthermore, [Petria et al. \(2015\)](#); [Albertazzi et al. \(2016\)](#); [Deng \(2016\)](#) and [Wali Ullah et al. \(2016\)](#) also showed that GDP growth affects bank profitability by using regression analysis in their studies. Additionally, [Al-Jafari and Alchami \(2014\)](#) used a GMM approach and identified that economic growth has a positive relationship with bank profitability. Parallel to this study, [Djalilov and Piesse \(2016\)](#) also reached the similar conclusion by using the same method. [Duraj and Moci \(2015\)](#) also stated that macroeconomic variables are important indicators of bank profitability for Albania, too.

Furthermore, some studies also identified that bank specific variables also have an influence on bank profitability ([Kiganda 2014](#); [Javaid 2016](#); [Ahmad et al. 2016](#)). The study of [Jabra et al. \(2016\)](#) evaluated the profitability of the banks in BRICS (Brazil, Russia, India, China, South Africa) countries. They used the GMM approach and results showed that the capital adequacy ratio has a positive influence on bank profitability for BRICS countries. [Chowdhury \(2015\)](#); [Noman et al. \(2015\)](#) and [Ozili \(2016\)](#) also reached a similar conclusion by using the same method in their studies. Moreover, by using regression analysis, [Molyneux and Thornton \(1992\)](#); [Abreu and Mendes \(2001\)](#); [Dawood \(2014\)](#); [Pradhan and Shrestha \(2016\)](#) and [Khatun and Siddiqui \(2016\)](#) identified capital adequacy as the most important factor which influences bank profitability. By contrast with these studies, [Buchory \(2015\)](#) concluded that the capital adequacy ratio does not have a significant impact on the profitability of the banks in Indonesia.

Additionally, with respect to the bank-specific variables, the non-performing loans ratio was emphasized in many other studies in the literature. [Tan et al. \(2016\)](#) and [Djalilov and Piesse \(2016\)](#) identified that the non-performing loans ratio negatively affects the profitability of banks by using a GMM approach. Similarly, [Ariyadasa et al. \(2016\)](#) reached the same conclusion for Sri Lanka by using a vector error correction model. In addition to these studies, [Nisar \(2015\)](#) analyzed the determinants of bank profitability in Pakistan by using a regression method. It was determined that a high amount of non-performing loans leads to a decrease in profitability of the banks. Also, [Opoku et al. \(2016\)](#) and [Hanna \(2016\)](#) underlined a similar aspect by using the same method.

Bank size shows up as another important factor of bank profitability according to many studies in the literature. [Goddard et al. \(2004\)](#) tried to understand the influencing factors of bank profitability in 6 European Union member countries. They used a GMM approach to achieve this objective and according to the results, they found a positive relationship between bank size and profitability. Furthermore, [Alhassan et al. \(2016\)](#); [Demirgüç-Kunt and Maksimovic \(1998\)](#); [Tunay and Silpar \(2006\)](#); [Lipunga \(2014\)](#); [Menicucci and Paolucci \(2016\)](#) and [Regehr and Sengupta \(2016\)](#) also reached the same conclusion by using different methods in their studies. On the other side, [Anarfi et al. \(2016\)](#) and [Kolapo et al. \(2016\)](#) concluded that the size of the banks does not have any significant effect on bank profitability.

Regarding the bank-specific variables, some other determinants were also emphasized in empirical studies. For example, [Terinte et al. \(2016\)](#) focused on the bank profitability in Romania by using regression analysis. They reached a conclusion that if the auditors perform their works independently, this situation positively influences the bank profitability. [Alshatti \(2015\)](#) also determined that liquidity ratio is very significant for the banks in order to increase their profitability. In addition to these studies, [Aftab et al. \(2015\)](#); [Gyamerah and Amoah \(2015\)](#); [Pradhan \(2016\)](#) and [Hu and Xie \(2016\)](#) determined that effective risk management plays an important role with respect to the profitability of banks.

While considering these studies, it is understood that there are numerous studies that focused on the profitability of banks. It was also determined that various types of the analysis methods, such as regression, GMM, Granger causality analysis and data envelopment analysis were used in these studies. Moreover, it is observed that the influencing factors of bank profitability changes across countries. Most of the empirical studies focused on the countries in European Union and US.

To our best knowledge, there are not enough studies for some regions like the post-Soviet countries. Therefore, we hope to contribute to the literature by filling this gap through the analysis of this paper.

3. Data and Methodology

3.1. The Data

This study aims to identify the influencing factors of bank profitability in post-Soviet countries. Within this context, annual data for the periods between 1996 and 2016 are considered. A panel data set consisting 13 countries is created from the data which is provided from [World Bank \(2018a, 2018b\)](#) and annual financial reports of the banks. There are 15 post-Soviet countries, but 13 of them are analyzed in this study because the data for other 2 countries could not be obtained. The data of following countries is used in the analysis: Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Moldova, Russia, Tajikistan and Ukraine.

3.2. Variables Used in the Analysis

After analyzing similar studies in the literature, we decided to use 8 different variables in our analysis. Table 2 shows 8 different variables and their explanations. Out of these variables, 5 are bank specific variables whereas 3 are macroeconomic variables. Since our analysis are country level, all bank-specific variables are aggregated to the country level, and are reflected as macro variables.

Table 2. Details of the variables used in the study.

Variables	Details	References
Capital	Capital Adequacy Ratio	Molyneux and Thornton (1992) ; Ahmad et al. (2016) ; Hanna (2016) ; Djalilov and Piesse (2016) ; Menicucci and Paolucci (2016)
Inflation Rate	$(CPI_t - CPI_{t-1}) / CPI_{t-1}$	Kiganda (2014) ; Saeed (2014) ; Al-Jafari and Alchami (2014)
Loans/Deposits Ratio	Total Loans/Total Deposits	Hanna (2016) ; Regehr and Sengupta (2016) ; Menicucci and Paolucci (2016)
Loans/GDP Ratio	Total Loans/GDP	Regehr and Sengupta (2016) ; Menicucci and Paolucci (2016) ; Alhassan et al. (2016)
Size	Total Assets/GDP	Regehr and Sengupta (2016) ; Menicucci and Paolucci (2016) ; Demirgüç-Kunt and Maksimovic (1998)
Non-Interest/Interest Income	Non-Interest Income/Interest Income	Javaid (2016) ; Albertazzi et al. (2016) ; Nisar (2015)
Interest Rate	Deposit Interest Rate	Ariyadasa et al. (2016) ; Boitan (2015) ; Noman et al. (2015) ; Saeed (2014)
Economic Growth	$(GDP_t - GDP_{t-1}) / GDP_{t-1}$	Kiganda (2014) ; Saeed (2014) ; Al-Jafari and Alchami (2014)

Source: Authors' own elaborations.

Starting with the bank-specific variables, capital adequacy ratio represents the capital amount of the bank in comparison with its risks. The effect of capital adequacy ratio on the profitability of the banks is uncertain. Some studies found a negative relationship between these two variables because a higher amount of capital means giving less credit to the customers ([Buchory 2015](#)). Some other studies underlined that a high capital adequacy ratio improves the image of the bank which will contribute to profitability positively ([Molyneux and Thornton 1992](#); [Abreu and Mendes 2001](#); [Djalilov and Piesse 2016](#); [Saeed 2014](#)). The next bank-specific variables are loans to deposits ratio and loans to GDP ratio. Deposit amount refers to the source of income for the banks. Because of this condition, there should be positive relationship between deposit amount and the profitability of the banks ([Duraj and Moci 2015](#); [Buchory 2015](#); [Alshatti 2015](#); [Saeed 2014](#)). On the other hand, the effect of the loans amount on the profitability of the banks is controversial. The quality of the loans is the main reason behind this situation ([Ahmad et al. 2016](#); [Hanna 2016](#); [Regehr and Sengupta 2016](#); [Menicucci and Paolucci 2016](#)). The sign of the loans to GDP ratio will show us the quality of the loans in post-Soviet countries. If it is negative, we can interpret this result as the quality of loans in post-Soviet countries being low, and if it is positive, vice versa. By taking loans to deposit ratio as an independent

variable, we tried to understand what is happening to bank profitability when the loans/deposits ratio increases. Additionally, the amount of total assets demonstrates the size of the banks. Because bigger sized banks can benefit from economies of scale, there should be positive relationship with this variable and profitability (Djalilov and Piesse 2016; Saeed 2014). Interest income and non-interest income represents the revenue generated by the banks, and it was expected that the effect of them on profitability should be positive (Albertazzi et al. 2016; Nisar 2015). However, we investigated what happens when their share changes.

In addition to bank-specific variables, 3 different macroeconomic variables were also used in this study. First of all, the effect of interest rate on profitability is uncertain. Some studies concluded that there is a positive relationship between these two variables because higher interest rate increases interest income of the banks (Javaid 2016; Saeed 2014). In contrast, some other studies emphasize that the interest rate influences the profitability of banks negatively (Noman et al. 2015). The main reason behind this situation is that the maturity of the deposits is much shorter than the maturity of the loans in a bank. Due to this condition, when the interest rate increases, the deposits will be affected much earlier than the loans, so net interest margin will decrease. Furthermore, the effect of the inflation rate on profitability depends on whether it can be anticipated or not. When it is anticipated, banks can easily adapt their interest rate according to this expected inflation rate. Hence, this situation has a positive impact on profitability (Molyneux and Thornton 1992; Islam and Nishiyama 2016). On the other hand, if there is an unanticipated change in the interest rates, then there should be a negative relationship between these two variables (Noman et al. 2015; Ariyadasa et al. 2016). Last but not least, since economic growth shows the improvement in the economy, the effect of this variable on profitability should be positive (Djalilov and Piesse 2016; Javaid 2016; Saeed 2014; Ahmad et al. 2016).

Before the analysis, we carried out a correlation analysis between our dependent and independent variables to see the possible relationships and the direction of the relationships. Table 3 shows the correlation analysis between variables. Accordingly, GDP growth has the highest correlation relationship with our independent variable returns on equity (ROE), and the correlation is positive as expected. Following GDP growth, non-interest/interest income has the second highest correlation relationship with ROE, and this is a positive relationship, too. Loans to GDP ratio and size variables have negative correlation relationships with ROE, and the strength of the relationships are higher compared to the remaining variables. With regard to the remaining variables, the inflation rate has a very weak and positive correlation relationship with the independent variable ROE. According to Table 3, the capital adequacy ratio (CAR) has also a weak positive correlation relationship with our independent variable. The relationship between interest rate and ROE is negative, and weak. Finally, the loans to deposits ratio has the lowest correlation between ROE and yet the relationship is positive. One should remember that these correlation relationships just represent some introductory statistics in our data set, they do not represent the final estimation results. However, they can give us some clues about the forthcoming regression results. We cannot tell anything about the significance but, obviously, we can expect that the sign of GDP growth, non-interest income/interest income ratio, CAR, inflation rate and loans/deposits ratio will be positive, while loans/GDP ratio, interest rate and size will be negative.

Figure 1 shows the mean ROE and mean GDP growth rate for 13 post-Soviet countries for the 1996–2016 period. One can see that the slopes of GDP growth and ROE curves have the same sign and are moving together for 1996–2016. The positive and strong correlation between ROE and GDP growth can be seen from the synchronic movements of these variables. Moreover, Figure 1 indicates a structural breakdown at year 2009 for both variables.

Table 3. Correlation between the variables.

Variables	Returns on Equity (ROE)	Inflation Rate	Loans/Deposits	Capital Adequacy Ratio (CAR)	Loans/GDP	Interest Rate	Size	GDP Growth	Non-Interest/Interest Income
ROE	1								
Inflation Rate	0.0352	1							
Loans/Deposits	0.0051	−0.0553	1						
CAR	0.0263	0.0301	−0.2097	1					
Loans/GDP	−0.2273	−0.2282	0.4086	−0.5881	1				
Interest Rate	−0.0464	0.0492	0.0534	0.1362	−0.1	1			
Size	−0.1111	−0.0609	0.0881	−0.2843	0.256	−0.1912	1		
GDP Growth	0.3	−0.0617	−0.0257	0.0675	−0.1846	0.0592	−0.1294	1	
Non-interest/Interest Income	0.2956	0.0262	−0.1387	0.038	−0.1942	−0.2195	−0.1112	0.0698	1

Source: Authors' own elaborations from the panel data set.

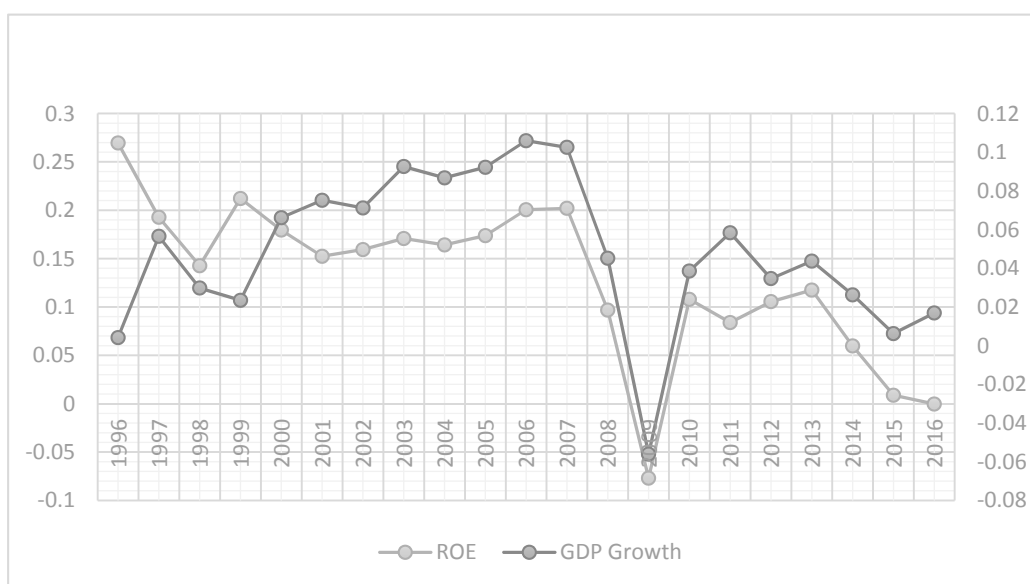


Figure 1. Returns on equity (ROE) and GDP growth in 13 post-Soviet countries (mean, 1996–2016). **Source:** Authors’ own elaborations from the panel data set.

Figure 2 shows the mean ROE and mean loans to GDP ratio for 13 post-Soviet countries for the 1996–2016 period. We can see the negative strong relationship between ROE and loans to GDP ratio for the 1996–2016 period. While the loans/GDP ratio increases during the time, the ROE decreases. We can see a reverse structural breakdown for the loans to GDP ratio in the year 2009. One can conclude that the high loans/GDP ratio is harmful to bank profitability for these 13 post-Soviet countries for the period 1996–2016.

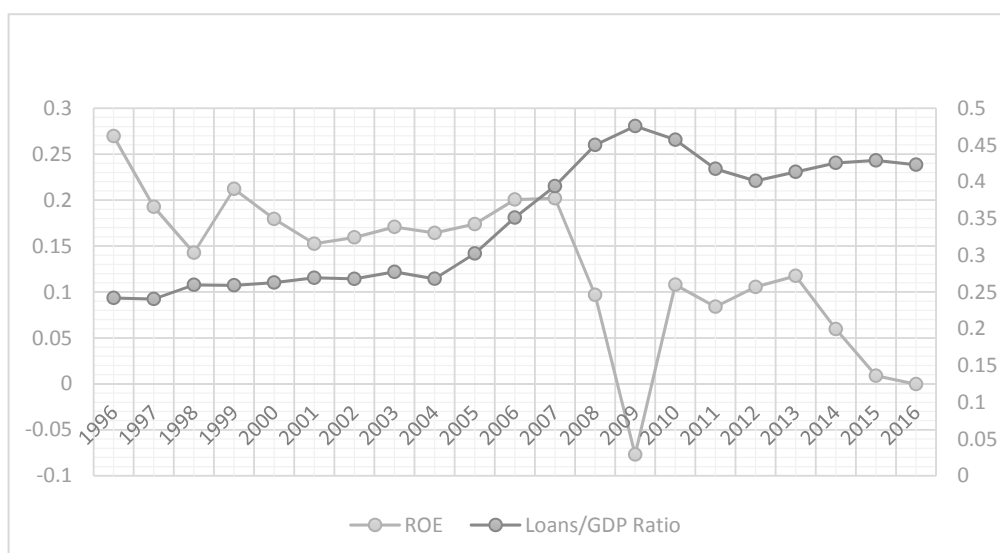


Figure 2. ROE and loans to GDP ratio in 13 post-Soviet countries (mean, “1996–2016”). **Source:** Authors’ own elaborations from the panel data set.

Figure 3 shows the mean ROE and non-interest income to interest income ratio for 13 post-Soviet countries for the 1996–2016 period. One can easily see the strong positive correlation between these two variables. High ROE comes with high non-interest income/interest income ratio, and vice versa for low ROE.

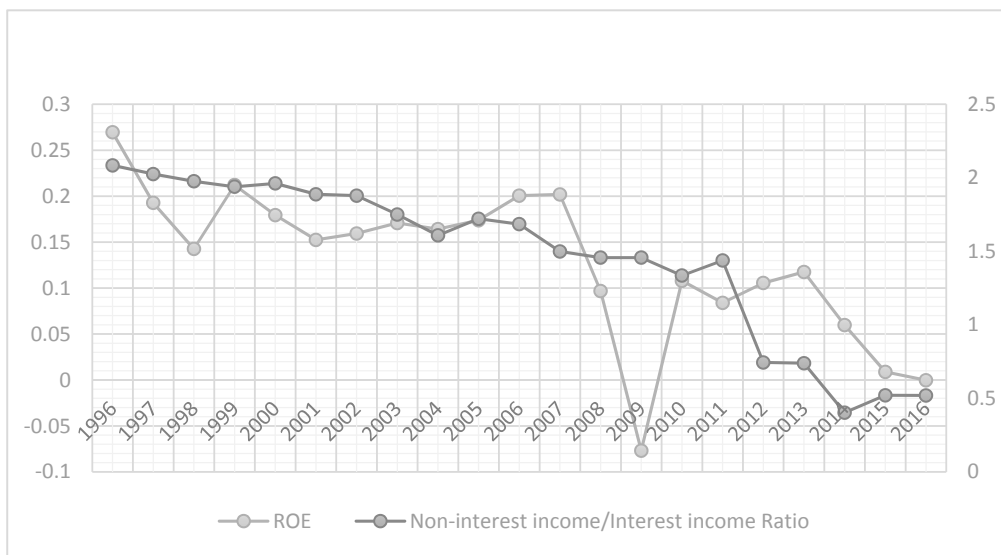


Figure 3. ROE and non-interest income/interest income ratio in 13 post-Soviet countries (mean, “1996–2016”). **Source:** Authors’ own elaborations from the panel data set.

Since it is observed from the figures above that the dependent variable ROE and most of the independent variables were affected by the 2009 crisis, we decided to use a dummy variable as a crisis indicator in our analysis to produce more consistent results.

3.3. Methodology

This study uses a panel data set consisting of 13 countries (Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Moldova, Russia, Tajikistan and Ukraine) and 21 years (1996–2016). The estimated model is formed from the following model created by Naudé and Saayman (2005):

$$Y_{it} = a + \sum_{k=1}^K B_k X_{kit} + \varepsilon_{it} \tag{1}$$

where “Y” represents the dependent variable, “X” refers to the independent variables from X_1 to X_k and B represents the coefficients. Additionally, “a” and “ε” stand for constant term and error term, respectively. Moreover, “i” represents cross-sectional units (countries) and “t” shows the time (years).

The Generalized Method of Moments (GMM) was developed by Arellano and Bond (1991) and was used in panel data regression analysis. The GMM estimator considers the lag value of the dependent variable as an independent variable. The details of this estimator are emphasized below.

$$Y_{it} = Y_{it-1} + \sum_{k=1}^K B_k X_{kit} + \varepsilon_{it} \tag{2}$$

Following Equation (2), the dependent and independent variables are demonstrated in the following equation:

$$ROE_{it} = \rho ROE_{it-1} + \gamma INF_{it} + \eta L/D_{it} + \lambda CAR_{it} + \omega L/Y_{it} + \delta INT_{it} + \theta SIZE_{it} + \chi GROWTH_{it} + \zeta N/I_{it} + \psi DUM_{it} + \varepsilon_{it} \tag{3}$$

where ROE represents returns on equity, INF represents inflation, L/D represents loans to deposits ratio, CAR represents capital adequacy ratio, L/Y represents loans to GDP ratio, INT represents interest rates, SIZE represents assets to GDP ratio, GROWTH represents GDP growth rate, N/I represents non-interest to interest income ratio and DUM represents the dummy variable for 2009 financial crisis.

For the analyses of this study, fixed effects panel regression and GMM models are used. Econometric results are always sensitive to the methodology which is used in the estimations. That is why we used robust standard errors in both with fixed effects and GMM estimations. However, the fixed effects model may include endogeneity problem due to its econometric structure. To eliminate the possible endogeneity, we used GMM approach developed by [Arellano and Bond \(1991\)](#). Test statistics are presented together with the estimation results. Since we applied a robust VCE (variance covariance matrix) to our analysis, the Sargan test statistic cannot be calculated. However, we applied the Arellano–Bond (AR) test for zero autocorrelation in first-differenced errors ([Stata 2018](#)). Rejection of no autocorrelation of an order 1 AR test does not imply that a dynamic specification is needed (lagged variables remain valid) and rejection of no autocorrelation of order 2 implies that the GMM estimator is not consistent and does not satisfy the Arellano–Bond model assumptions.

4. Empirical Results and Discussion

In the analyses of this study, two different estimations were performed by using panel regression and the GMM approach. The details of fixed effect panel regression and GMM models are demonstrated in [Table 4](#).

Table 4. Fixed effects and Generalized Method of Moments (GMM) estimation results for bank profitability.

Dependent Variable: ROE		
Independent Variables	GMM	Fixed Effects
Lag ROE	0.161 (0.144)	
Inflation Rate	0.0129 (0.0381)	0.0331 (0.0400)
Size	−0.000924 (0.00163)	−0.00173 (0.00143)
Loan/Deposit Ratio	0.00188 (0.0135)	0.0137 (0.0152)
CAR	−0.373 (0.268)	−0.0556 (0.307)
Loan/GDP Ratio	−0.255 *** (0.0823)	−0.317 *** (0.0791)
Interest Rate	−0.128 (0.441)	−0.0137 (0.268)
Economic Growth	0.839 *** (0.196)	0.546 ** (0.219)
Non-Interest/Interest Income	0.0120 ** (0.00582)	0.0164 ** (0.00556)
2009 Crisis Dummy	−0.0870 ** (0.0416)	−0.107 * (0.0509)
Constant	0.202 ** (0.102)	0.187 *** (0.0584)
Observations	247	273
R-squared	-	0.281
Number of countrynum	13	13
Prob > F	-	0.0001
Prob > chi2	0.0000	-
AR(1)	0.0250	-
AR(2)	0.1641	-

Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. **Source:** Authors' estimations.

According to Table 4, both fixed effect panel regression and GMM approaches give similar results. This situation proves that the results are consistent. It is identified that non-interest income/interest income ratio is significant in both approaches. Because the coefficients are positive in both estimations (0.0120 and 0.0164), it can be said that there is a positive and significant relationship between non-interest income/interest income ratio and profitability of the banks. This result shows that focusing on the new alternatives to make profit, such as taking commission and credit card fees, would result with a positive influence on the financial performance of the bank. [Javaid \(2016\)](#); [Albertazzi et al. \(2016\)](#); [Nisar \(2015\)](#) also reached the same conclusion in their studies.

In addition to the non-interest income/interest income ratio, it is determined that economic growth is also significant in both fixed effect panel regression and system GMM approaches. Since the coefficients are 0.839 and 0.546, it is concluded that there is a positive relationship between economic growth and the profitability of the banks. The main reason behind this situation is that during the expansion times, banks make more profit. This conclusion was reached in many different studies in the literature ([Djalilov and Piesse 2016](#); [Javaid 2016](#); [Saeed 2014](#); [Ahmad et al. 2016](#)).

Another important result of the analysis is that there is a negative relationship between loans to GDP ratio and the profitability of the banks in post-Soviet countries since the coefficients are negative (−0.255 and −0.327) and significant. Although the loans are important ways to earn income for the banks, when banks lend too much for this purpose, it has a negative effect on their financial performance. The main reason for this is that sometimes banks are not selective when lending to the customers in order to increase their income. Because of that, there is a significant risk of giving loans to people who have low credibility. Hence, these customers may have difficulty paying back the loan amount to the banks. Thus, this has a negative influence on the profitability of the banks. [Menicucci and Paolucci \(2016\)](#); [Alhassan et al. \(2016\)](#) also reached a similar conclusion in their studies.

Furthermore, it is also concluded that the coefficient of dummy variable for 2009 financial crisis is significant and negative in both methods. This situation gives information that the 2009 global financial crisis had a negative influence on the profitability of the banks in post-Soviet countries. In other words, it is determined that in the period of the 2009 global mortgage crisis, there was an important decrease in the effectiveness of the banking sector in these countries. Thus, it caused a significant decline in the profitability of the banking sector.

F probability and chi2 probability statistics indicate that our models are significant. Moreover, AR(1) and AR(2) test results satisfy Arellano–Bond model assumptions and there is no need for a dynamic specification in our model. Robust standard errors are used in both estimations.

5. Conclusions

This study aimed to determine the influencing factors of the profitability in banking sector for 13 post-Soviet countries. Annual data for the periods between 1996 and 2016 are analyzed by using fixed effects panel regression and the GMM approach. There are 15 post-Soviet countries, however, we had to remove 2 countries from the analysis because their data is unavailable.

Test statistics show the consistency of results and model significance. It is concluded both fixed effect panel regression and GMM approaches give similar results. Firstly, it is defined that as non-interest income/interest income ratio increases, it positively influences the profitability of the banks in post-Soviet countries. It would be a better policy for post-Soviet banks not to depend only/mostly on interest income. It is advised that the banks give importance to new ways make profit such as credit card fees and commissions. It is seen that this would contribute to bank profitability positively.

In addition to the non-interest/interest income, it is also determined that economic growth is also significant in both fixed effect panel regression and GMM approaches. Since the banks are more profitable during expansions and less profitable during recessions, they are advised to be more careful when lending to their customers, and to assess their risks well during recessions.

Furthermore, it is also concluded that there is a negative relationship between loans to GDP ratio and the profitability of the banks in post-Soviet countries. This result shows the low quality of the loans advanced in post-Soviet countries. If banks lend a large sum to customers in an uncontrolled way (without a proper risk assessment), people with low credibility can use these loans. These are called NINJA (no income, no job, no assets) loans in the literature. Therefore, these people may have difficulty in paying back these debts to the banks. Consequently, this leads to lower financial performance for these banks. Ergo, banks in post-Soviet countries should be selective while lending to customers. Moreover, regulatory institutions are advised to keep the loans/GDP ratio under control in these countries.

It is believed that for the future research, a new study that compares the financial performance of these banks with an original methodology, would be very beneficial.

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