Evidence on Economic Growth and Financial Development in Montenegro

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Macroeconomic development must be supported by a stable and efficient financial system. There are many different measures of financial development that are suggested when the relationship between growth and financial system is analyzed. In this paper we will identify the most important indicators of the financial development in Montenegro. Due to the fact that in the last decade Montenegrin financial market has been developing, we want to see if that fact had an influence on the economic growth, as well as if there is significant positive relationship between the growth and financial development. The intention of this article is to use principal components in order to examine correlation among indicators and find means or main components. This technique has the advantage of giving more general measures of financial development rather than individual variables for bank or stock market development. It could be concluded that it is difficult to identify the specific components of the financial system most associated with the economic growth.

Key words: economic growth, financial development, principal component analysis

Introduction

Montenegrin economy is a small open euroized economy. In the last fifteen years, particularly since its independence in 2006, Montenegro has achieved a significant progress measured in the increase of the gross domestic product (GDP). The major driver for this economic growth is definitely a high inflow of the foreign direct investments (FDIS). In terms of the share of FDIS in gross domestic product, Montenegro has been a leading economy in the group of European economies in transition in the pre-crisis period. One of the main drivers of FDIS was the process of privatization. These inflows were

dominantly oriented towards the service sector, especially banking, telecommunications, energy, trade and real estates. It resulted in the high growth of deposits and thus the development of the banking sector, as well as on the capital market development. On one hand, as the result of the sale of property and real estate, a part of the money was deposited in the banking system in the form of deposits. On the other hand, through the process of foreign investments, credible foreign companies arrived on the Montenegrin market and became important clients of the banking system.

However, the global financial crisis severely hit Montenegrin economy which was highly integrated into the regional and global trends. The economy is still dealing with the consequences of the collapse of the lending boom in 2008. The financial crisis influenced the deterioration of asset quality and weakened banks 'portfolios, finally leading to a credit contractions. The situations showed the vulnerability of Montenegrin banking sector. After seven years, there are some signs of the recovery, with the acceleration of the economic activity and a slow credit growth.

In the last years, much progress within the legal, regulatory and supervisory frameworks has been made in the development of Montenegrin financial system but further progress is nevertheless required. However, during this very volatile period, the development of viable financial sectors was perceived to be an especially challenging task. That is why we found interesting to analyze the linkage between measures of financial development and economic growth in Montenegro in the previous decade. When dealing with this topic, there are many opened questions. While the significant body of empiric literature investigated the relationship between financial development and economic growth, there is still a lot of space for more information especially in country specific cases, likewise in small euroized economies still in transition process.

One of the main tasks is to deal with the measuring of financial development. There are many different measures of financial development that have been suggested in the literature but two main ones are useful to consider: financial intermediaries and stock market development. The first are supposed to measure the level of development of financial intermediaries and the second to measure the size and efficiency of the stock market. As suggested by Saci and Holden (2008), the amount of foreign direct investment is important measure too, especially given the significance FDIS have had for Montenegrin economy.

Out of different variables we use for the measuring of financial

development, we use the method of principal components analysis to extract the financial development measure expressed through the principal components. While individually, the variables in the paper might not seem as a perfect measure of financial development, together, due to the correlation between them, they could give more important information about the financial system in Montenegro.

In the second section, a selective literature review of the relationship between financial development and economic growth is presented. We also present a brief overview of the financial development process in Montenegro in the third section. The fourth section gives a brief presentation of used data and methods. In the fifth section, the empirical results of the model measuring relationship between extracted principal components and economic growth in Montenegro are presented. The conclusions are presented in the sixth section.

Literature Review

Ever since the beginning of the twentieth century, there have been numerous studies of the relationship between financial development and economic growth. Some of the most relevant for this analysis are listed in the next paragraphs.

For example, Shumpeter (1912) stated that financial development through innovative entrepreneurship promotes economic growth. King and Levine (1993) examined this relationship on the sample of 80 countries for the period 1960–1989 and found the strong positive correlation between higher levels of financial development and economic growth rate. We have to emphasize that the finance-growth link is very complex, and that it depends on the stage of economic development of the country (countries) studied (Djalilov and Piesse 2011). Also, Al-Yousif (2002) concluded that the relationship between financial development and economic growth differs for different countries because each country has a different economic policy and a different institutional efficiency that is important for implementation of this economic policy. This can be confirmed by literature, so the brief overview of the studies dealing with empirical analysis of this link, is presented in the following paragraphs.

Several papers analyzed the relation between finance and growth in a single country. For example, Guiso, Sapienza, and Zingales (2004) found that financial development improves competition in the economy and so impacts the economic growth. Bertrand, Schoar, and Thesmar (2007) showed that reducing the government intervention in banking sector promotes growth through more efficient

resource allocation in France. Obradovic and Grbic (2015) examined the causal relation between the financial development and economic growth in Serbia, based on the quarterly data for the period 2004–2011. They found that economic growth contributes to the financial deepening, and that there is a significant unidirectional causality that runs from, on one side, a positive enterprise credit to GDP and a household credit to GDP to economic growth, on the other side. A causal relation is confirmed between the share of bank credits to non-financial private sector in total domestic credits and economic growth rate.

Regarding emerging and developing countries, there are very few research studies about the link between financial development and economic growth. Levine, Loayza and Beck (2000) found a positive impact of financial development on growth, and, in their large model with various variables, a positive and negative growth of inflation on growth, depending on the variable of financial development used. Koivu (2002) analyzed this relation for twenty-five transition countries in the period of 1993–2000. The results showed that the financial spread and the amount of nonperforming loans in banking sector positively influence economic growth. However, the banking sector credit to the private sector has a negative impact on growth, which can be explained by the banking crisis in the analyzed countries in 1990s. Dawson (2003) showed that financial development had no significant impact on the economic growth, for thirteen transitional countries in the Central and Eastern Europe. So, in this case, the economic growth was not limited by the underdevelopment of financial sector. Neimke (2003) explored the same link for another twenty-five transition countries in the period 1989–2000, using bank and stock market indicators. The results indicate that finance positively affected growth through investments and better resource allocation. He concluded that all transition economies suffer from outdated capital stocks. So, only the economies that have stimulated investment have boarded on a positive growth path. Beside the investment channel the financial sector influences the overall growth rate through the total factor productivity channel. The efficient financial markets play an important role in guiding the transition economies into the direction of higher growth paths and better standards of living.

On the other hand, Gillman and Harris (2004) analyzed the relation between financial development and growth for twenty-seven countries in the period 1965–1995. The findings indicate that when including the investment rate, the financial depth does not positively

affect the growth. Financial development is not robustly significant in this model, although a negative stand-alone effect on growth were found in some specifications. This suggests that in previous results a positive effect of financial development may have been obtained because financial development is proxying the rate of return to physical capital. Including this proxy through the investment rate, the level of financial development is found no longer important.

Mehl, Vespro, and Winkler (2005) investigated the relation between the financial development and growth for nine countries in Southeast Europe. They found that this relation is a negative one, which was explained in a way that less developed financial environment did not affect the economic growth.

Saci and Holden (2008) investigated the finance-growth relation using the annual panel data for thirty developing countries. They used the principal components analysis with the 10 financial development variables and five variables claimed to be important for growth. The results indicate that economic growth is related to a general measure of financial development, the stock market development and, to a lesser extent, government consumption.

Cojocaru et al. (2016) examined the finance-growth link in the former Communist countries of Central and Eastern Europe and the Commonwealth of Independent States in the period of 1990–2008. They found that measures of financial market efficiency and competitiveness are more important than the size of the market in terms of promoting economic growth.

Financial Development in Montenegro: Background

Banking sector of Montenegro virtually collapsed during the 1990s, as the country (at the time part of Federal Republic of Yugoslavia, a federation it made with Serbia) experienced one of the biggest episodes of hyperinflation in the world's history, amidst the break-up of communist Yugoslavia in a war (1992–1995), which primarily affected other ex-Yugoslav republics. In the spring of 1999 the country also went through a NATO bombing campaign against FR Yugoslavia, although being hit to a significantly lesser extent than Serbia.

Montenegro paved its way towards independence years before the independence referendum was held (2006), most notably through adoption of the Deutsche mark as the country's co-official currency with the Yugoslav dinar, in November 1999. Eventually, Montenegro abandoned the dinar altogether and unilaterally adopted the euro in March 2002, which since then has been the only legal tender in the country. It is in that period (1999–2002) that the Central Bank

of Montenegro (CBM) was established, which since then has been mandated with the following functions: banking regulation and supervision (recently including a broader, financial stability mandate), foreign reserves management, fiscal agent operations, payment system operations and, last but not least, research and statistics tasks.

Montenegro's financial system is banco-centric, as the firms are financed almost exclusively through banks, and the local stock exchange basically serves for secondary trading. In general, talking about financial institutions, banks (currently 14) are the most important financial intermediaries in Montenegro, comprising about 90% of financial institutions' assets. Out of them, foreign-owned banks (especially those which are subsidiaries of foreign banking groups) are the biggest, covering some 75% of total banks' assets. The insurance sector grew at an average rate of 3% in the last five years. Nine of 11 insurers are foreign subsidiaries, with 95% of total premiums. The rest of the nonbanking financial systems play a very minor role. The turnover on the capital market is very low and the bond market is very thin.

The history of modern Montenegrin banking can be divided into two distinct periods, 2001–2008 and 2009–2015. The first period was characterized by a rapid credit growth, fueled by massive amounts of FDIS the country was receiving (which in turn was contributing to a rise of deposits in the banking sector) and additionally supported by local banks' borrowings from their foreign parents. In other words, that was the period of a high loan-to-deposit ratio (up to 150%) and a high share of foreign borrowings in banks' total liabilities (up to 30%). Partially due to global financial crisis, but mostly due to unsustainable development model of the economy and stock exchange and real estate bubbles that formed in parallel, the tide changed in the autumn of 2008. First years of the period 2009–2015 were characterized by a sharp decrease in deposits, falling credit, soaring non-performing loans, huge losses that banks suffered, and consequentially by necessary recapitalizations by foreign owners (including a state intervention in the case of an important domestic bank). In parallel, foreign parents started to cut the borrowings (in a process called deleveraging), which continued until this day, so that at end-2015 borrowings constituted only 7.5% of banks' total liabilities. Deposits finally recovered to their pre-crisis levels in 2015 and at end-2015 stood at their historical maximum. Similarly, the situation for credit growth and non-performing loans stabilized only in 2015. At the end of 2015, annual credit growth was 0.8% (positive again, after several years), credit-to-deposit ratio was 90.9%, whereas the

share of non-performing loans, although significantly reduced in the meantime, was still in the range 12–13% (data from CBM).

Regarding regulatory standards, the Central Bank of Montenegro has been following the Basel rules as quickly as possible, whereas the latest Basel package (so-called Basel III), i.e. its EU equivalents – capital recruitments regulation and directive (CRD IV/CRR), should be implemented by the end of 2017, including both law and sub-regulatory acts.

Stock market in Montenegro saw similar developments as banking sector, except that the crash that followed the peak was extremely sharp (about 80%) and turnovers fell substantially, i.e. the market has never recovered. The stock market received enormous amounts of FDI money (especially from 2005 to 2007), but due to its shallow-ness, low levels of corporate governance in Montenegrin companies and weak protection of minority shareholders' rights, it proved to be only a field for highly speculative, short-term gain investments. A bubble formed relatively quickly, and could have only survived had the massive FDI inflows continued. As that was not possible, the bubble eventually burst, leaving an average boom-time investor with huge losses. Apart from that, stock market has never really served as source of financing for companies, and IPOS or offerings in gen-eral have been virtually non-existent. An exception is an offering of government bonds in March 2014, although the government other-wise has satisfied the bulk of its financing needs through so-called eurobond offerings abroad. Weak financial reporting, undeveloped corporate governance and weak protection of minority shareholders' rights persist as the most important factors that hinder stock market growth and development even today.

Data and Methodology

In this paper we use quarterly data for 2006–2015 from Montenegro. The data is taken from the Central bank of Montenegro and National Statistical Office (NSO). The reason why we focus here on data sam-ple from 2006 is the fact that our NSO doesn't provide data from the previous period on the majority of the variables treated in this paper. It is mostly due to the independence in 2006. The choice of variables representing financial development indicators are chosen as origi-nally presented in Saci and Holden (2008). Since financial develop-ment is very complex concept, we used many measures of the size of financial intermediation and of the efficiency of the financial sector. Because of the special characteristics of Montenegrin economy, es-pecially due to the euroization and therefore lack of monetary policy,

we had to use some proxy for the data which Montenegrin Central bank does not produce (for example, monetary aggregates).

cba – The ratio of commercial banks' assets to all bank assets (commercial banks' assets + cbm assets) is frequently used as a measure that indicates an expansion of the financial sector (Levine, Loayza and Beck 2000). It represents a degree to which commercial banks versus the central bank allocate savings (Levine, Loayza and Beck 2000; Rioja and Velv 2004; Saci and Holden 2008).

dcgdp – Domestic credit to the private sector as a percentage of gdp is the most frequently used indicator for the level of financial services. It is one of the main measures of financial development used in recent empirical studies (Shan, Morris, and Shan 2005; Zang and Kim 2007). Higher level of this ratio indicates lower transaction costs and higher levels of financial services and therefore greater financial intermediary development (Saci and Holden 2008).

dcdep – We used the ratio of domestic credit to the private sector to the total deposits as a proxy for the efficiency of the banking sector. The ratio indicates the degree of efficiency in transferring savings into private investments. Higher ratio implies the more efficient banks in allocating capital to investors (Lynch 1994).

dep – In order to proxy the measure for the overall size of the financial intermediary sector, we used the ratio of deposits to gdp. Liquid liabilities m3 as a percentage of gdp (m3/gdp) is used at Rioja and Velv (2004), Saci and Holden (2008), and Cojocaru et al. (2016). This measure indicates the level of the liquidity provided to the economy.

hs – A structure of the financial system is important information when analyzing the development level of the financial system. Households' savings and time deposits to households' demand deposits ratio are used to assess the importance of its different components. Since the households' demand deposits reflects the function of money as a means of payment, the households' savings and time deposits are proxy for the broad money indicator, reflecting the importance of the savings. Hence, this indicator should give the evidence of the country's level of financial development.

Stock market is one very important component of the financial system in the country. Therefore, to measure its development, we used the ratio of stock market capitalization to gdp. As literature suggests, stock market size is expected to positively associate with the market ability to allocate capital and manage risk (Arestis, Demetriades, and Luitel 2001; Saci and Holden 2008).

setmc – For measuring stock market size we used the stock ex-

TABLE 1 Financial Development Variables

CBA	Commercial banks' assets to all bank assets
DCgdp	Domestic credit to the private sector as a percentage of GDP
DCdep	Domestic credit to the private sector to the total deposits
DEP	Deposits to GDP
HS	Households' savings and time deposits to households' demand deposits
MC	Market capitalization to GDP
SETmc	Trading volume of the stock market to the market capitalization
SETgdp	Stock exchange turnover to GDP
FDI	Foreign direct investment to GDP
PC1–PC3	Principal components of nine variables listed above

change turnover ratio. It presents the trading volume of the stock market relative to the market capitalization, i.e. its size. This indicator reflects well market liquidity (Rousseau and Watchtel 2002).

SETgdp – As a measure for the stock market activity we used the ratio of stock exchange turnover to GDP. It is good indicator measuring trading volume relative to the size of the economy, reflecting both liquidity and size of the market (Beck and Levine 2002).

FDI – Besides all this financial variables, we consider an additional variable that is very important for the economic growth in Montenegro. FDI had an extremely important role for the Montenegrin economy in the last ten years. Therefore, the ratio of foreign direct investment to GDP is used.

As a dependent variable in our model, we used data on quarterly GDP from 2006 to 2015. We used the first difference logarithm of the series in order to solve non-stationarity problem. A model in this paper is estimated using ordinary least square method.

All measures of financial system development are measured in natural log units.

The list of variables is summarized in table 1 and table 2 presents the simple correlation coefficients between all the variables. As noted in the table 2, a lot of variables have significant correlation, with the highest positive being 0.818 for DCgdp and DCdep, 0.771 for SETgdp and FDI, 0.722 for HS and GDP, and 0.708 for CBA and DCdep. These results suggest that there might be some redundancy in the data, provided by our chosen variables.

Principal Components Analysis (PCA) is one of the most frequently used multivariate data analysis. The main objective of principal component analysis is to decrease the dimensionality in data. PCA could be considered as a projection method which projects observations

TABLE 2   Correlations of the Variables

Var.	CBA	DCdep	DCgdp	DEP	FDI	HS	MC	SETmc	SETgdp
DCdep	0.708*	1.000							
DCgdp	0.585*	0.818*	1.000						
DEP	0.115	0.110	0.656*	1.000					
FDI	−0.084	0.165	0.193	0.076	1.000				
HS	0.648*	0.371*	0.433*	0.331*	−0.449*	1.000			
MC	−0.262	−0.031	0.128	0.216	0.575*	−0.544*	1.000		
SETmc	−0.193	0.204	0.083	−0.198	0.671*	−0.684*	0.590*	1.000	
SETgdp	−0.288	−0.079	−0.150	−0.201	0.771*	−0.703*	0.678*	0.699*	1.000
GDP	0.186	−0.034	0.330*	0.692*	−0.432*	0.722*	−0.365*	−0.725*	−0.617*

NOTE   Significant at 5% level.

from an n-dimensional space with n variables to a k-dimensional space (where $k < n$), in a way to conserve the maximum amount of information from the initial dimensions. This mathematical procedure transforms a number of correlated variables into a usually smaller number of uncorrelated variables called PCs. The first component extracted accounts for a maximum amount of total variance in the observed variables. The second component extracted will account for a maximum amount of variance in the data set that was not accounted for by the first component. With each new component there is progressively less and less amount of variance and that is why only few components are worth retaining and interpreted.

Let us formalize principal components analysis (according to Johnson and Wichern 2007). Let the N-dimensional random vector $X = X_1,\dots,X_N$ has the covariance matrix Σ with eigenvalues $\lambda_1 \geq \lambda_2 \geq \cdots \geq \lambda_N \geq 0$. If $\omega_i = (\omega_{i1},\dots,\omega_{iN})$ is N-dimensional vector, where $i = 1,\dots,N$, then we can define linear combinations as:

$$Y_i = \omega_i' X = \sum_{j=1}^{N} \omega_{ij} X_j. \tag{1}$$

These linear combinations of variables $X_1,\dots,X_N$ are also random variables with variance and covariance:

$$VarY_i = \omega_i' \sum \omega_i, \qquad i = 1,\dots,N$$
$$Cov(Y_i, Y_j) = \omega_i' \sum \omega_j, \qquad i,j = 1,\dots,N \tag{2}$$

The principal components are uncorrelated linear combinations of $Y_1, Y_2,\dots, Y_N$ whose variances in (2) are as large as possible. Since $Var(Y_i)$ can easily be increased by multiplying any ω_i by some scalar, in the definition of principal components we need the weight vectors to have a unit norm, therefore $\omega_i' \omega_i = 1$.

TABLE 3 KMO and Bartlett's Test

Kaiser-Meyer-Olkin measure of sampling adequacy		0.655
Bartlett's test of sphericity	Approximate χ^2	191.691
	Degrees of freedom	36.000
	Significance	0.000

We therefore define:

- the first principal component PC1 as a linear combination $Y = \omega_i' X$ with maximal variance, subject to restriction $\omega_i' \omega_i = 1$.
- the second principal component PC2 as a linear combination $Y_2 = \omega_2'$, $Y_1 = \omega_1' X$ with maximal variance, subject to restrictions $\omega_2' \omega_2 = 1$ and $Cov(Y_1, Y_2) = 0$.
- i-th principal component (for $i \leq N$) as a linear combination $Y_i = \omega_i' X$ with maximal variance, subject to restrictions $\omega_i' \omega_i = 1$ and $Cov(Y_1, Y_2) = 0$ for all i,j.

Empirical Results

First thing we do is checking sampling adequacy for our nine variables indicating financial development. It is done by Kaiser-Meyer-Olkin measure and Bartlett's test of sphericity.

The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy is a statistic which indicates the proportion of variance in variables which is common variance, i.e. which might be caused by underlying factors. High values (close to 1.0) generally indicate that a principal component analysis may be useful with data. If the value is less than 0.50, the results of the PCA probably won't be very useful. We have obtained the value of this measure equal to 0.655, which is satisfactory.

Bartlett's test of sphericity tests the hypothesis that correlation matrix is an identity matrix, which would indicate that selected variables are unrelated and therefore unsuitable for structure detection. Small values (less than 0.05) of the significance level indicate that a PC analysis may be useful with your data. Our signature level is lower than 0.05 so it indicates that our data is suitable for PC analysis. Table 3 shows two tests which indicate the suitability of the data for our further analysis.

After testing the additional assumptions of PCA, we proceed to the extraction process. We chose selections to produce a solution using principal components extraction, which is then rotated for the ease of interpretation. We selected VARIMAX type of rotation. In the table 4 we can see initial eigenvalues, total percentage of variance ex-

TABLE 4 Total Variance Explained

Comp.	Initial eigenvalues			Rotation sums of squared loadings		
	(1)	(2)	(3)	(1)	(2)	(3)
1	4.265	47.384	47.384	3.685	40.945	40.945
2	1.649	18.326	65.710	2.064	22.930	63.875
3	1.117	12.414	78.124	1.282	14.249	78.124
4	0.750	8.331	86.455			
5	0.431	4.786	91.241			
6	0.345	3.830	95.070			
7	0.278	3.085	98.156			
8	0.117	1.296	99.451			
9	0.049	0.549	100.000			

NOTES Column headings are as follows: (1) total, (2) percentage of variance, (3) cumulative percentage.

plained per variable and cumulative percentage. Also, the rotated components are displayed.

This first section of the table shows the Initial Eigenvalues. The Total column gives the eigenvalue, or amount of variance in the original variables accounted for by each component. The percent of Variance column gives the ratio, expressed as a percentage of the variance accounted for by each component to the total variance in all of the variables. The Cumulative percent column gives the percentage of variance accounted for by the first n components.

We decided that eigenvalues greater than 1 are to be extracted (according to Kaiser criteria), so the first three principal components form the extracted solution.

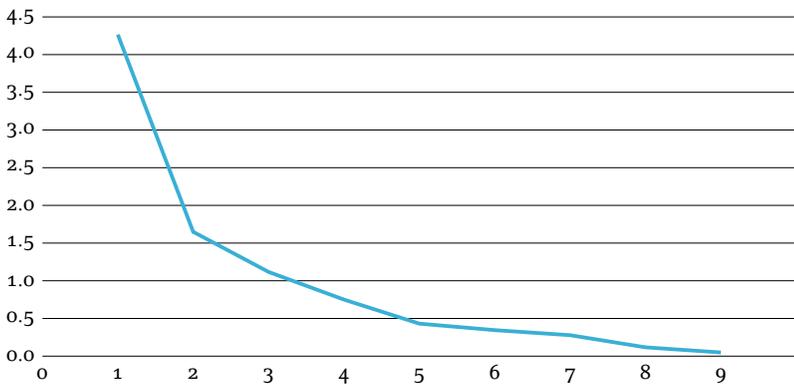The second section of the table 4 shows the rotated components.

FIGURE 1 Scree Plot

TABLE 5 Rotated Component Matrix Component

Variable	Component		
	1	2	3
CBA	0.138	0.837*	0.098
Dcdep	0.572*	0.763*	0.007
FDI	0.872*	−0.020	0.054
SETgdp	0.873*	−0.004	−0.017
SETmc	0.866*	0.071	−0.234
Dcgdp	0.790*	0.483*	−0.184
DEP	0.224	−0.717*	0.264
HS	0.614*	0.167	−0.453*
MC	−0.118	−0.025	0.952*

NOTES Extraction method: principal component analysis; rotation method: varimax with Kaiser normalization. Rotation converged in 5 iterations. All abbreviations used in the model are explained in table 1.

They explain nearly 78.124% of the variability in the original nine variables, so we considerably reduce the complexity of the data set by using these three components.

We also looked at the scree plot (figure 1) which shows the eigenvalues for initial components. It is used to help determine the optimal number components to retain in the solution. For a good analysis, this chart will look roughly like the intersection of two lines. Generally, the factors you want to keep are the ones on the steep slope. The ones on the shallow slope contribute relatively little to the solution, and can be excluded. From our scree plot we can also decide to select three components.

Rotation is a method used to simplify interpretation of extracted components. Often, the relationships between the observed variables and the unrotated factors can be complex. For instance, several observed variables may load on more than one component, making interpretation difficult. Since we have extracted three components, interpretation for them can be seen in table 5 where component matrix is shown. In table 5 we marked the highest loading for each variable and can see which component every variable gives to the highest contribution.

From this rotation component matrix, our set of nine variables can be subdivided in three components, and by looking at the highest contribution we can name these components. First component can be named as *a general measurement of financial development.* As we can see, it has a positive contribution from most of variables used – five of them. The second component can be named as *the effi-*

TABLE 6   OLS Estimation Results

Variable	Coefficient	t-Statistic	Prob.
DLGDP(−1)	−0.129	−1.969	0.059
PC1	0.011	3.148	0.004
PC2	0.007	2.452	0.021
PC3	−0.005	−1.557	0.131
D2009Q1*	−0.137	−9.356	0.000
D2010Q2*	−0.056	−3.819	0.001
D2010Q4*	0.086	5.825	0.000
D2012Q1*	−0.073	−4.866	0.000
D2007Q1*	0.083	5.560	0.000
Constant	0.019	7.134	0.000

NOTES   No. of observations = 38, adjusted R^2 = 0.867, SE of regression = 0.014, F-statistic = 27.955 (0.000), Breusch-Godfrey serial correlation LM test = 0.708 (0.594). *The regression includes dummy variables for modelling some sudden changes (shocks) in the data.

ciency of the banking sector since the highest positive contribution is given by two variables (CBA and DCdep), while negative contribution is given by variable measuring percentage of deposits in GDP; the third one could be named *a stock market development* because the highest contribution is given by variable measuring market capitalization to GDP.

After extracting these three components of financial development, we modelled regression to analyze how those components affect the GDP in Montenegro. So, dependent variable is first difference of logarithm of GDP and the independent variable is, beside named components, a lagged dependent variable. Estimated model is shown in table 6. We used the OLS method for estimation of our regression.

There are two main reasons for choosing these specific dummy variables in the aforementioned model. The one lies in the fact that there was a high inflow of the FDI in Montenegro at the end of 2006 and in the beginning of 2007 causing enormous trade volume on the stock market (D2007Q1), and the sharp peak in the commercial bank assets in the end of 2008 and beginning of 2009 (D2009Q1). The second reason for using the other dummy variables is to eliminate obvious extraordinary deviations from the normal movement in order to achieve more precise estimates of controlled factors (observed after plotting variables of the model and based on residuals). According to the results of the model reported in table 6, the first and the second principal components have significant positive influence on GDP, while the third component does not show a significant relation

to dependent variable. The results of serial correlation LM test are satisfactory as indicated with Breusch-Godfrey test statistic.

The results presented within our model suggest that economic development measured by the first difference of natural logarithm of GDP is positively related to general financial development and the efficiency of the banking sector. Our model did not confirm the positive influence of the stock market development on the economic development.

We are aware that presented results are limited since our data set is quite poor. Namely, there are many variables that should be included in the model but they are not reported because they are unavailable. For example, data on quarterly real GDP growth are not published by Montenegrin national statistical office. Very short time series are also a significant obstacle for more advanced econometric modelling. That is why we decided to employ the simplest model.

Conclusion

In this article, we empirically assess the relationship between financial and economic development in Montenegro from 2006 to 2015. We found this country specific example very interesting because Montenegro went through various changes of financial system, starting from the transition processes and passing across the financial crisis, leaving financial system very vulnerable. Since Montenegrin financial system is very simple and undeveloped, we wanted to identify the main elements of financial development and to investigate which one had the most important role in stimulating economic development. We employed nine indicators representing our financial system and, in order to reduce the multicolinearity problem, we used the principal component analysis to extract few measures of the financial development.

Our results indicated that three of nine components are worth retaining for the further analysis. The regression results show that financial development has a positive effect on economic development. Economic development is found to be influenced by general financial development and the efficiency of the banking sector. However, our results are based on a shorter time series so the use of more sophisticated econometric techniques is limited for this sample span. It would be interesting, if additional data is available, to verify how the relationship between financial development and economic growth will change especially as Montenegrin economy continues to mature. Moreover, additional research could be done, particularly in the light of financial development in euroized economy. How-

ever, it is the first paper regarding this topic that actually applies to
Montenegro.

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