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STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH (THE CASE OF BELGRADE STOCK EXCHANGE)

The paper researches the relationship between the development of stock exchange and economic growth on the example of Serbia in the period from 2002 to 2011. We use the quarterly data on real GDP growth, market size and trade volume reported regularly by the Belgrade Stock Exchange. The stock market size is assessed with the ratio of the total share market capitalization to GDP, whereas the trade volume is used to construct 2 indicators. The first one is the ratio of trade volume (stock turnover) to GDP, while the second one is the ratio of trade volume to the market capitalization (also known as the turnover ratio). Both indicators entered the dataset to portray the liquidity of stock exchange. The employed methodology indicates that both stock market liquidity proxies Granger cause economic growth, while it rejects the significance of market capitalization. The results indicate that quality of stock market matters more than its size.

Keywords: *stock market development, economic growth, Granger causality, Republic of Serbia.*

JEL classifications: *O16, G10, E22.*

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РОЗВИТОК ФОНДОВОГО РИНКУ І ЕКОНОМІЧНЕ ЗРОСТАННЯ (ЗА ДАНИМИ БЄЛГРАДСЬКОЇ ФОНДОВОЇ БІРЖІ)

У статті досліджено взаємозв'язок між розвитком біржі і економічним зростанням на прикладі Сербії в період з 2002 по 2011 рік. Використано квартальні дані по реальному зростанню ВВП, розміру ринку і об'єму торгівлі на Бєлградській біржі. Розмір фондового ринку оцінено співвідношенням загальної капіталізації ринку до ВВП, тоді як об'єм торгівлі використано для побудови двох показників. Перший з них є відношенням об'єму торгівлі (оборот акцій) до ВВП, другий — відношення об'єму торгівлі до капіталізації ринку (також відомий як коефіцієнт оборотності). Обидва показники відображають ліквідність фондової біржі. Дана методологія показала, що обидва показники ліквідності фондового ринку впливають на економічне зростання за формулою причинності Грейнджера, значення ринкової капіталізації зведено до нуля. Результати також показали, що якість фондового ринку важливіша, ніж його розмір.

Ключові слова: *розвиток фондового ринку, економічне зростання, причинність по Грейнджеру, Республіка Сербія.*

Таб. 4. Рис. 1. Літ. 30.

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РАЗВИТИЕ ФОНДОВОГО РЫНКА И ЭКОНОМИЧЕСКИЙ РОСТ (ПО ДАННЫМ БЕЛГРАДСКОЙ ФОНДОВОЙ БИРЖИ)

В статье исследуется взаимосвязь между развитием биржи и экономическим ростом на примере Сербии в период с 2002 по 2011 год. Использованы квартальные данные по реальному росту ВВП, размеру рынка и объему торговли на Белградской бирже. Размер фондового рынка оценен соотношением общей капитализации рынка к ВВП, в то время как объем торговли использован для построения двух показателей. Первый из них

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представляет собой отношение объема торговли (оборот акций) к ВВП, в то время как второй — отношение объема торговли к капитализации рынка (также известный как коэффициент оборачиваемости). Оба показателя в наборе данных отображали ликвидность фондовой биржи. Используемая методология показывает, что оба показателя ликвидности фондового рынка влияют на экономический рост по формуле причинности Грейнджера, значение рыночной капитализации сведено к нулю. Результаты также показали, что качество фондового рынка важнее, чем его размер.

Ключевые слова: развитие фондового рынка, экономический рост, причинность по Грейнджеру, Республика Сербия.

1. Introduction. Stock exchanges might be vitally linked to the development of modern market economies. By enabling efficient allocation of capital, stock exchange facilitates large-scale investment projects, and simultaneously encourages economic growth. Sometimes, investors avoid investing directly in a company if they cannot easily withdraw their invested funds once they are in need of them. However, due to stock exchange, they are less cash constrained since they "by assumption" can buy and sell shares any time. Therefore, one of the most important advantages of stock exchanges relative to traditional credit channels lies in the liquidity of investment that it supports. Defined as possibility to trade continuously, liquidity makes both process of investment and disinvestment smooth and less risky.

The total annual share turnover at developed stock exchanges of the world exceeds GDP figures, which speak the best about the great significance and power that these institutions have, and the key role they are playing in the development of contemporary economy.

This paper investigates the causal relationship between the development of stock exchange and economic growth in Serbia. The paper is structured as follows. The second section reviews the theory of finance-growth nexus, together with some empirical evidence. Section 3 overviews the Belgrade Stock Exchange, its recent history and the current level of its development. Then we proceed with econometric analysis. The data and methodology are discussed in Section 4. Empirical findings follow in Section 5. The final section concludes.

2. Literature review on stock market and economic growth. The first research on the relationship between financial and economic development originated as early as the beginning of the twentieth century (Schumpeter, 1911). Later on, many authors established what is known nowadays as a scientific fact that financial development is an important determinant of future economic growth (Gurley and Shaw, 1967; McKinnon, 1973; King and Levine, 1993). According to the theory, economic growth depends on efficient financial sector, which mobilizes domestic savings and foreign capital and directs them towards most productive local investments. The financial system might be extremely valuable, since it not only mobilizes savings and allocates capital, but also facilitates corporate control and monitoring of managers and reduces ownership risk through hedging or diversifying (for the thorough review of arguments see Levine, 1997). Therefore, it is of no surprise that researchers frequently found a strong correlation between financial and economic growth (most recently — Cecchetti and Schoenholtz, 2011). Based on the analysis, which encompasses 47 countries, Rousseau and Wachtel (2000) agreed that a developed financial

sector has the leading role in economic development. Beck and Levine (2004) also came to a similar conclusion. Not all studies underline this way of influence. For instance, Aboudou (2009) suggests that the development of financial sector and economic growth are in a positive correlation with each other in the long run, stressing mutual dependence. The development of financial sector is accompanied by economic growth, which in turn determines the changes and development of financial institutions (Brasoveanu et al., 2008; Barna and Mura 2010).

In less developed countries, economic development relies largely on banking loans, whereas capital market is far less significant, so that no robust relationship between the development of stock exchange and economic growth is observed in ample studies (Nurudeen, 2009; Boubakari and Ognaligui, 2010). The causal relationship is weaker in the countries with small and less liquid stock exchanges (Harris, 1997; Boubakari and Jin, 2010). On the contrary, in developed countries with liquid and rather active stock exchanges, there is a positive relationship between the development of stock exchange and economic growth. For example, the study that covers China, the USA, the United Kingdom, Japan and Hong Kong confirms a strong positive correlation between the development of stock exchange and economic growth (Wong and Zhou, 2011). In addition, researching into the sample of 10 developing countries, Luintel and Khan (1999) proved the existence of a bidirectional causal relationship between the development of stock exchange and economic growth. Well functioning stock exchanges reduce the costs of mobilization of savings and facilitate investments in productive technologies (Greenwood and Smith, 1997). Thus, relying on stock exchanges, corporations quickly, cheaply and easily gain capital, which they then invest, further stimulating economic growth. Therefore, in the long run the development of stock exchange directly influences economic growth (Adamopoulos, 2010). On the other hand, economic growth stimulates the long-term development of stock exchange (Vazakidis and Adamopoulos, 2009).

The relationship between the development of stock exchanges and economic growth attracts attention of numerous researchers. The research gains its momentum since recently many developing countries took steps to establish national stock exchanges. Some studies are single-country oriented (Guryay et al., 2007; Shahbaz et al., 2008; Boubakari and Ognaligui, 2010), while some opted for broad cross-country comparisons (Levine and Zervos, 1996; Demetriades and Hussein 1996; Boubakari and Jin, 2010; Aboudou, 2010). Levine and Zervos (1998) confirm the strong relationship between initial development of stock exchange and economic growth to follow afterwards. Adamopoulos (2010) on the example of Ireland reached a similar conclusion. Some authors only proved the causal relationship between the development of stock exchange and economic growth in the long run (Atje and Jovanovic, 1993; Shahbaz et al., 2008; Boubakari and Jin, 2010), whereas others confirmed the relationship in the short run as well (Aboudou 2010; Soumya and Jaydeep, 2008).

At the early phases of development, financial intermediation predominantly conditions economic growth. Financial intermediaries are taken to be the most effective solution for informational frictions. Namely, investors avoid direct investments in a company since they cannot withdraw their cash when they need it. However, via stock exchange, they can buy and sell shares and whereby relax the liquidity constraint (Spears, 1991). Levin and Zervos (1996) used the data for 41 countries in the period

from 1976 to 1993 to study the causal relationship between the development of stock exchanges and long-term economic growth. They came to the conclusion that liquid stock exchanges had a positive strong influence on the current and future rates of economic growth, on the accumulation of capital as well as on increasing productivity. Thus, a liquid stock exchange is a reliable indicator of a future long-term growth. Stock exchange can encourage economic performance by enabling the outgoing mechanism for venture capital, offering investors required liquidity, enabling firms to always be able to obtain capital they need for large-scale projects and providing them with information about quality of potential investments. Therefore, it is not surprising that in a large number of cases a strong positive correlation between the development of capital market and economic growth is determined.

3. An overview of Belgrade Stock Exchange. Belgrade Stock Exchange was established back in late 19 century, precisely 1894, albeit it has not reached a high level of development yet. It is by no means low-liquidity market. Many agree that a weak regulatory framework, together with the lack of local corporate culture, prevent its further development. Belgrade Stock Exchange stayed shut down for almost 4 decades. The stock exchange was officially abolished in 1953, only to be reopened in 1989, under the name of Yugoslav Capital Market. Under the name of Belgrade Stock Exchange, it has been continuously operating since 1992.

Until 2002, Belgrade Stock Exchange had been a market exclusively for short-term securities. The largest share of trade volume in the years 2000, 2001 and 2002 has been reported in commercial and treasury bills. In the following years, the exchange did get a trait of a real capital market. Shares overcame governmental bonds in terms of trading volume, currently accounting for over 85% of the total turnover.

In the period from 2002 to 2011, the market capitalization of shares reached its maximum in the third quarter of 2007, which was more than 25 times its minimum reported in the third quarter of 2003. Unfortunately, in the archive of Belgrade Stock Exchange there are no separately recorded data on market capitalization of shares prior to the third quarter of 2003, which makes it impossible for us to view its relations from that time. However, those data would not be of major significance having in view the fact that active trading of shares on Belgrade Stock Exchange began not earlier than 2003, which is apparent in the data on share turnover. The development of share turnover followed suit. The turnover reached its high the same year as market capitalization did. The record level is remarkable in comparison to the bottom that is recorded in the first quarter of 2002 (nearly 800 times increase).

Since it was reestablished, Belgrade Stock Exchange has been characterized by low liquidity. The total annual turnover of shares reached the maximum amount of 7.2% of GDP (2007). Prima facie, considering solely the share market capitalization, Belgrade Stock Exchange appears the one of a solid size, but we should bear in mind the fact that the Law on Privatization of the Republic of Serbia made obligatory for all open joint-stock companies to be listed at stock exchange. That resulted in the emergence of a large number of companies at Belgrade Stock Exchange (in early 2012 there were around 1300), i.e. in a large number of illiquid shares. The Law on Capital Market of the Republic of Serbia, which came in effect 21 November 2011, contributes to the significant reduction in the number of companies listed at Belgrade Stock Exchange.

Belgrade Stock Exchange represents a contemporary designed electronic trading venue. It is an order-driven market with some hybrid elements in place. Namely, since recently the market introduced designated market makers, which are expected to supply additional liquidity on a competitive basis. The stock exchange's trading system currently in use, BELEXFIX, satisfies the conditions which the EU recommends to its member countries and classifies Serbian stock exchange amongst the most advanced ones.

4. Data and methodology. The development of stock exchange will be analyzed on the basis of the indicators of its size and liquidity. In a large number of empirical studies, the size of a stock market is represented by the ratio of market capitalization of shares to GDP, whereas the ratio of share turnover to GDP is used as the indicator of average share liquidity (Boubakari and Ognaligui, 2010; Levine and Zervos, 1996). Since the liquidity of stock exchange presumably has exceptional significance, another indicator of liquidity enters to join the previous one. It is the ratio of share turnover to share market capitalization, also known as the turnover ratio. Belgrade Stock Exchange kindly supplied the data on market capitalization and stock turnover, whereas the GDP data are from the official database of the Statistical Office of the Republic of Serbia. On Figure 1(a-d) the time series are presented graphically.

In the covered time span economic activity passed through clear cut boom phase which ended up early in 2009, in the wake of the recent global financial crisis. With 2010, the economy starts recovering slow but steady. Negative growth rates are firstly reported in the first quarter 2009, lasted one year, and then reversed. Market capitalization reached its peak several quarters earlier, at the end of the second quarter of 2007 (2.6 times GDP). It follows a several quarters lasting period of rather stagnant values, which ended up in a steep decrease. The reversal in turnover data took place at the same time, and it is even more clear. Moreover, both indicators seem to have announced growth deceleration.

The strike of foreign capital outflow rapidly decreased the demand for local capital assets, what together with diminishing business perspectives of local economy drove down share prices and consequently both stock market capitalization and its turnover. However, it happened that the sudden stop hit a bit harder trading activity than share prices. It was the main reason why turnover ratio has been decreasing since beginning of 2010. Steady decrease of the turnover ratio in the period that precedes the financial turmoil was mainly driven by previously mentioned overinflated market capitalization.

4.1 Descriptive statistics of the dataset. In this sub-section, we present the summary statistics on the dataset. All series except market capitalization show similar volatility (when comparing standard deviation with mean data). The data indicate that all series but real GDP growth rates (close to normal) are skewed to the left, while kurtosis data are tolerable, except for the turnover ratio. None of the series is normally distributed (Jarque-Bera test statistics not enclosed), with real GDP growth a bit better performing then other variables. Nevertheless, the assumption of normality is not necessary a precondition.

At first glance, time series (Figures 1(a-d)) all look like non-stationary processes. Thus, we applied the augmented Dickey-Fuller to test for presence of unit root (non-stationarity) as a statistical property, which is crucial for further testing. Augmented Dickey-Fuller tests the null hypothesis that each individual time series has a unit root.
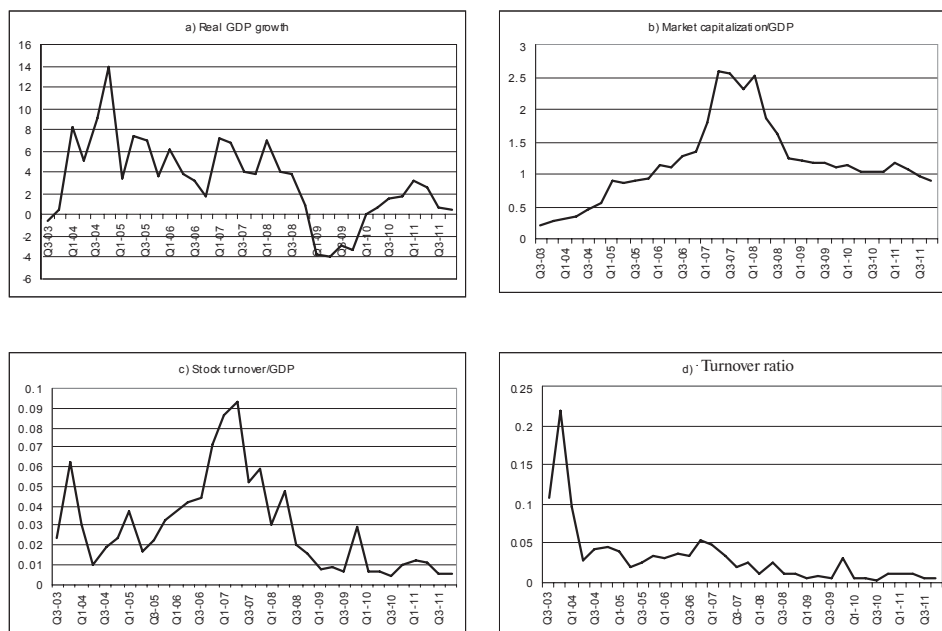
Figure 1(a-d). **Plots of variables' time series**

Table 1. **Summary statistics of dataset**

Variables	Mean	St. dev	Max	Min	Skewness	Kurtosis
Dependent						
Real GDP growth (in %)	3.164	3.961	14.000	−4.000	0.297	3.261
Explanatory						
Stock turnover/GDP	0.029	0.023	0.093	0.003	1.092	3.444
Market Cap/GDP	1.185	0.625	2.600	0.215	0.800	3.313
Turnover ratio	0.032	0.041	0.220	0.003	3.171	14.360

The turnover ratio and the real GDP growth, when expressed in levels, appear slightly more stationary than other 2 variables. MacKinnon one-sided p-value is 0.054 and 0.084, respectively, so that they satisfy only 90% confidence level. All series become clearly stationary when they were transformed into first differences. According to the results (Table 2), we can be more than 99% confident that first differences of all the tested series contains no unit root. Provided values for Dickey-Fuller t-statistics (DF) stay far below the tabulated critical values, and correspond to extremely low p-values, so that null hypotheses that series have a unit root are rejected.

4.2 Methodology. Granger causality test is a statistical procedure that has been proposed by Granger (1969) to test statistical causality between a pair of stationary variables resampled as time series. According to the test, if previous values of variable *y* significantly contribute to forecasts of current values of variable *x*, then it follows that *y* Granger causes *x*. Contrary to that, if previous values of *x* statistically improve the forecasts of variable *y*, then *x* Granger causes *y*.

Table 2. **Augmented Dickey-Fuller test**

Variables	Levels		First differences	
	DF	*p*-value	*DF*	*p*-value
Real GDP growth	−2.703	0.084	−7.590	0.000*
Stock turnover/GDP	−2.031	0.272	−7.893	0.000*
Market Cap/GDP	−1.834	0.357	−4.119	0.003*
Turnover ratio	−2.913	0.054	−8.933	0.000*

Notes: Test critical values are: −3.646 (1%); −2.954 (5%), and −2.615 (10%); * Null hypothesis is rejected at the 1% level of significance.

Granger tests null hypothesis (H0) that there is no causal relationship. If H0 is rejected with the statistical significance, we conclude that there is a causality in the tested direction. Then, the test is repeated in the opposite order to see is there any clue that causality exist between the 2 variables in the opposite direction. Therefore, for each pair of variables there are 2 null hypotheses to test. Results are crucially sensitive to tested time leg, so that a researcher has to repeat procedure as many times as needed to find most appropriate (best-fitted) length of leg. The next section presents the results for as many as 3 quarters length of leg, since longer legs are insignificant.

5. Empirical findings. In Table 3 lag lengths, computed F-values and their assigned p-values, are reported. The numbers with asterisks indicate the cases of Granger causality.

Table 3. **Linear Granger causality test results**

Variables	lag	Obs.	H0: x does not cause y		H0: y does not cause x	
			F–value	*p*–value	*F*–value	*p*–value
Stock turnover/GDP	1	32	4.906	0.034*	0.438	0.513
	2	31	1.348	0.277	0.719	0.496
	3	30	2.459	0.088	0.792	0.510
Market Cap/GDP	1	32	0.061	0.805	0.675	0.417
	2	31	0.366	0.696	0.333	0.719
	3	30	0.131	0.940	0.391	0.760
Turnover ratio	1	32	3.508	0.071	1.303	0.262
	2	31	1.997	0.156	1.439	0.255
	3	30	5.009	0.008**	1.877	0.161

Notes: * Null hypothesis is rejected at the 5% level of significance; ** Null hypothesis is rejected at the 1% level of significance.

Granger linear causality test confirmed the statistically robust case of causality between 2 of the 3 tested pairs. Turnover ratio as well as stock turnover to GDP Granger cause real GDP growth, albeit the latter one in lesser extent. On the contrary, market capitalization to GDP appears non-significant to economic growth. Moreover, there is no evidence of either opposite direction of causality or bidirectional causal relationship between economic growth (in real terms) and chosen set of stock market development indicators (Table 4).

Where one variable appears to cause the other, it happens to be with a leg no longer than 3 quarters. For stock turnover to GDP ratio, it is one period (quarter) while for turnover ratio the best fitted leg is 3 quarters.

In addition to previous tests, we also undergo some tests of causality between chosen indicators of stock market development. The results are presented in the matrix form (Table 4). Causal variables are listed by rows, while effects are listed by

columns. Not surprisingly, stock turnover to GDP ratio Granger causes both market capitalization to GDP and turnover ratio. The former causality might come as a consequence of using the common denominator (GDP). Moreover, both capitalization and trade volume are dependent on share prices, so there must be some correlation between them. The test evidence is conclusive that exactly turnover drives the market capitalization, not opposite. If liquidity is what makes share more attractive, it might be that an increase in share turnover itself push up demand and consequently the share price, built into both capitalization and turnover. It is a plausible economic rationale for the given direction of causality.

Table 4. **Matrix of Granger causality between explanatory variables**

	Stock turnover/GDP		Market Cap/GDP		Turnover ratio	
	F(p)	Best lag	*F(p)*	Best lag	*F(p)*	Best lag
Stock turnover/GDP	—	—	9.240 (0.005)*	1	8.034 (0.002)*	2
Market Cap/GDP	0.206 (0.653)	1	—	—	0.643 (0.533)	2
Turnover ratio	2.877 (0.074)	2	0.874 (0.468)	3	—	—

Notes: Numbers in parenthesis are *p*–values; * Statistical significant at the level of 1%.

6. Conclusion. The causality test confirms that some tested variables do indeed Granger causes economic growth. The indicators of the liquidity of stock exchange have influenced the real GDP growth rate. On the contrary, no causal relationship has been observed between the movement of size of stock exchange and the real GDP growth rate. A plausible explanation for the absence of such causal relationship is the excessive market capitalization of shares conditioned by inadequate legal solutions. In the observed period, all open joint-stock companies in the Republic of Serbia were obliged to apply for listing at stock exchange, which caused the emergence of a large but poorly liquid market. The shares that were completely inactive in long-term sequences account for inbetween one-half and two-thirds of the total number of listed companies. For the development of stock exchange, as well as for overall economic growth, market liquidity is much more significant than size. The results of our research clearly lead to this conclusion.

Moreover, the empirical findings reject any mutual causal relationship (bidirectional causality) the between the indicators of development of Belgrade Stock Exchange and the economic growth of the Republic of Serbia. The stock market thus far played, and probably will continue in near future to play a subordinate role in financing Serbian economy. This economy relies on banking loans to a much greater extent. So far, not a single initial public offer has been realized. The reported trading volume largely excludes minority purchases. It depends mainly on privatization and equity exchanges within industrial groups. As Shleifer and Wishny (1997, p. 766) pointed out, speculative bubbles and investor overoptimism are playing an important role in equity financing in rapidly growing economies with virtually no protection of minority shareholders. If those driving forces are draining, a slump becomes inevitable.

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