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ECONOMIC GROWTH AND STOCK PRICES: EVIDENCE FROM CENTRAL AND EASTERN EUROPEAN COUNTRIES¹

(Summary)

The paper discusses the problem of relations between a capital market and real economy measured by the cross-country correlation between long-term stock rate of return and real GDP growth. According to some research results, the correlation is negative for most developed countries in the long run. Other studies indicate rather the lack of correlation, both for highly developed and emerging market countries. The aim of the paper is to present these somewhat controversial results and review plausible reasons for the observed tendencies. The second aim is to present the results of our research obtained with a sample of Central and Eastern European countries, in which capital market began to develop only after the fall of communism, so quite recently. They allow the conclusion that in the CEE economies the correlation between economic growth and equity returns is either positive or unclear. It is difficult to find all reasons why it is so, however, generally these results show that it is difficult to find clear relationship between stock market and economic growth in the world economies.

Keywords: economic growth; stock returns; Central and Eastern European countries

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¹ Artykuł opublikowany w ramach projektu „Popularyzacja najnowszej wiedzy ekonomicznej wśród ludzi młodych” realizowanego z Narodowym Bankiem Polskim w ramach programu edukacji ekonomicznej.

1. Introduction

The literature on financial markets describes many relationships implying that the situation on the capital market, particularly on the stock market, and the real sphere of the economy are closely related to each other. There is no agreement, however, on the specific mechanisms underlying these relationships or on their direction, i.e. whether it is the real economy that influences the capital market or whether it is the other way round. Conventional wisdom holds there is a positive relation between real economy and capital market which means that in the long run it is worth investing in the stock markets of countries which economies are solid and have good prospects and in stocks of companies which have a strong fundamental position. However, at the beginning of present century there appeared views which are totally controversial to such opinion. According to Sigel², in the long run there has been a negative correlation between economic growth and stock market return in developed markets and according to Ritter³, the negative correlation exists both for developed and emerging markets. Estrada⁴, on the other hand, found the lack of significant relation between economic growth and stock returns and also the lack of correlation between fundamental condition of a company and rate of return on its stocks. There are several explanations for such phenomena, however that issue has not been searched in the case of Central and Eastern European (CEE) countries yet. The main goal of this paper is to present arguments justifying negative correlation or lack of correlation between economic growth and stock returns and present the results of research concerning relation between stock returns and GDP growth in relatively newly established equity markets of CEE countries. We use the same methodology of estimating cross-country correlation between average annual rate of economic growth and the rate of return on stocks as was used by other authors in their studies regarding developed and emerging market countries. That enables to compare results between both groups of markets. Discussion of the obtained results ends the paper.

² **J. Siegel**, *Stocks for the Long Run*, fourth edition, McGraw-Hill, New York 2002.

³ **J. Ritter**, *Is Economic Growth Good for Investors*, *Journal of Applied Corporate Finance* 2012/24/3, pp. 8–18.

⁴ **J. Estrada**, *Blinded by Growth*, *Journal of Applied Corporate Finance* 2012/24/3, pp. 19–25.

2. Theoretical views on the relationship between the stock market situation and the state of the economy

In the economic and finance theory there exist different views concerning connection between real economy and capital market. The relations between these categories have been considered by many economists as: Shumpeter⁵, Goldsmith⁶, Mc Kinnon⁷, Tobin and Brainard⁸, Malkiel⁹, Gurley and Shaw¹⁰, Rioja and Valev¹¹, Miller¹² and Modigliani¹³ among others. The discussion about the role of stock market is an important issue of these considerations.

According to the first set of views on the direction of the relationship between the stock market situation and the condition of the economy has a positive sign. Several mechanisms explain why it should be so¹⁴.

One line of reasoning indicates that a good situation on the stock market stimulates investment activity. According to Tobin's "q" theory elaborated by Tobin and Brainard¹⁵, the rising process of companies' shares cause that their market value increasingly exceeds their replacement value, to which managers respond by making additional investments. This boosts the demand for investments across the economy and ultimately improves the economic situation.

⁵ **J. Shumpeter**, *Theorie der wirtschaftlichen Entwicklung: eine Untersuchung über Unternehmerrgewinn, Kapital, Kredit, Zins und den Konjunkturzyklus*, Dunker und Humblod, München 1912.

⁶ **R. Goldsmith**, *Financial Structure and Development*, Yale University Press, New Haven 1969.

⁷ **R. McKinnon**, *Money and Capital in Economic Development*, Brookings Institution Press, Washington, D.C. 1973.

⁸ **W. Brainard, J. Tobin**, *Pitfalls in Financial Model-building*, American Economic Review 1968/58/2, pp. 99–122.

⁹ **B. Malkiel**, *A Random Walk Down Wall Street*, W.W. Norton&Company, New York, 1999.

¹⁰ **J. Gurley, E. Shaw**, *Financial Aspects of Economic Development*, American Economic Review 1955/45, pp. 515–538.

¹¹ **F. Rioja, N. Valev**, *Finance and the Sources of Growth at Various Stages of Economic Development*, Economic Enquiry 2004/42, pp. 27–40.

¹² **M. Miller**, *Financial Markets and Economic Growth*, Journal of Applied Corporate Finance 1998/11/3, pp. 8–14.

¹³ **F. Modigliani**, *Monetary Policy and Consumption: Linkages via Interest Rate and Wealth Effects in the FMP Model*, in: *Consumer Spending and Monetary Policy: The Linkages*, Conference Series, No. 5, Federal Reserve Bank of Boston, Boston 1971, pp. 9–85.

¹⁴ **J. Brzeszczyński et al.**, *Koniunktura geldowa a zmiany w realnej sferze gospodarki w Polsce*, Przegląd Organizacji 2009/7–8, pp. 3–9.

¹⁵ **W. Brainard, J. Tobin**, *Pitfalls...*

Malkiel¹⁶ attributes the stock market's influence on the economy to the "wealth effect" that accompanies rises in stock prices and directly increases consumption and to a multiplier effect of increasing national income; to the falling costs of companies' equity leading to a greater number of profitable investments, etc., and greater amounts of capital raised; or to the so-called "effect of expectations" that makes firms and consumers more optimistic about the future.

Other mechanisms involved in the positive interaction between the stock market and the economy include improving creditworthiness, and therefore falling borrowing costs, of companies as the prices of their shares are rising, or the belief that stock market indices are rising as a promise of the expected rate of growth, which gives an impulse for more real investments to be undertaken.

Another group of views focuses on the mechanisms through which the economy affects the stock market, such as investors' reactions to results published by listed companies, the released macroeconomic data, or information about economic policy pursued by the state.

The key theoretical case for a positive relationship between economic growth and equity returns can be inferred from neoclassical growth theory, pioneered by Solow¹⁷. One of the key assumptions in this theory is that capital is subject to diminishing returns, i.e. for a given level of labour input, additional capital input will raise output by less than previous units. Largely because of this assumption, the theory predicts that poorer countries (in terms of GDP per capita), with lower capital/labour ratios, should exhibit both higher rates of return on capital and higher GDP growth, that makes them converge towards the living standards of wealthier economies. These results will apply regardless of differences in savings rates between countries, providing that capital is internationally mobile. Under this assumption, capital should flow to the countries with the highest rates of return (in the model world, the poorest economies) and stimulate their GDP growth until returns on capital, capital/labour ratios and GDPs per capita are equalised globally. Problems with this line of reasoning are such that it does not take into account such important factors as expropriation risk or differences in human capital embodied in workers in different countries, affecting the productivity of physical capital¹⁸. What is more, the implicit assumption that returns on physical capital in a country simply translate into returns on stocks of the companies listed on its

¹⁶ B. Malkiel, *A Random...*

¹⁷ R. Solow, *A Contribution to the Theory of Economic Growth*, Quarterly Journal of Economics 1956/70/1, pp. 65–94.

¹⁸ R. Lucas, Jr., *Why Doesn't Capital Flow from Rich to Poor Countries?*, American Economic Review 1990/80/2, pp. 92–96.

stock exchange is also questionable. Hence, the positive relationship between growth rates and returns on capital that can be drawn from the theory does not automatically imply positive correlation between growth rates and stock returns.

It has been also long noticed, that the capital market does not always have a positive influence on the economy. According to one opinion, the ease with which shares can be sold on the stock market weakens corporate governance and so it may decelerate economic growth¹⁹. On the other hand, a rate of return on investment increasing because of the income and substitution effects may reduce the rate of savings, which also has a negative effect on the rate of economic growth.

Even so, a common belief is that the state of the economy and the situation on capital markets, particularly on stock markets, are positively correlated. This sometimes prompts a conclusion that investors seeking for attractive countries to invest in stocks should consider their economic prospects and choose countries where the forecasts are optimistic. While there is some disagreement on which indicators are best in measuring the economic situation of a country, one of those that are mentioned most frequently is the rate of growth of national income. Hence, if the above factors were to be used to decide which countries are worth long-term investments, investors should prefer those where the rate of GDP growth was high in the long-run. In other words, investing in the capital market of, let us say, China, where the long-run rate of GDP growth was high, seems more promising than investing in stocks in Argentina that permanently experiences economic shocks. Some studies show, however, that this rule is not always confirmed in practice.

3. Economic growth and the stock market situation in the long term according to previous empirical research

The relationship between stock market performance and the real sphere of the economy was the subject of interest to many researchers²⁰. However, they have not

¹⁹ **A. Demirguc-Kunt, R. Levine**, *Stock Markets, Corporate Finance and Economic Growth. An Overview*, The World Bank Economic Review 1996/10/2, p. 230.

²⁰ See ex.: *ibidem*; **B. Malkiel**, *A Random...*; **M. Binswanger**, *Stock Market Booms and Real Economic Activity: Is this Time Different?*, International Review of Economics & Finance 2000/9/4, pp. 387–415; *idem*, *Stock Returns and Economic Activity in the G-7 Countries: Did the Relationship Change during the 1980s?*, Quarterly Review of Economics and Finance 2004/44/2, pp. 237–252; **Ch. Hassapis, S. Kalyvitis**, *Investigating the Links between Growth and Stock Price Changes with Empirical Evidence from the G-7 Economies*, *Quarterly Review*

come to agree views on this issue. There are differences of opinion as to whether it is the situation in stock exchange that affects the economic activity or the opposite is true, or these spheres affect each other, or finally, there is no statistically significant correlation between the indicators characterizing the situation in the stock market and the “real” economy. Moreover, there is no consensus about the direction of this relationship, so as to whether good economic situation is accompanied with high rates of return in equity markets or the opposite happens. Most of these studies concerned statistical relationships between time series of GDP growth and stock returns in particular countries. This line of research is not the subject of interest in this paper. What we would like to concentrate on are long-run relationships between these two categories across countries, as measured by cross-country correlation coefficient between average annual rates of economic growth and rates of return on stocks.

As ex. Ritter claims, intuitively it seems reasonable to assume that it should be profitable to invest in equities in the markets of these countries that record high economic growth rates²¹. Not only do the findings of empirical studies not confirm this intuitive rule, but they also suggest that the opposite is true. Namely, the long-run correlation between the growth rates of GDP per capita and the rate of return on the stock market seems to be negative. This fact has been noticed relatively recently, at the beginning of this century, by Siegel who presented it in his book “Stocks for the long run”²². The research that made him reach this conclusion was based on time series ending in the 1970s. Ritter analysed relationships between the growth rates of GDP per capita (real rates, i.e. allowing for inflation) and the rates of return on the stock market (real) for 19 highly developed countries in the years 1900–2011 and arrived at similar conclusions²³. Namely, the correlation coefficient between this two variables is -0.39 with (p -value = 0.10). The data used in his research is shown in Figure 1.

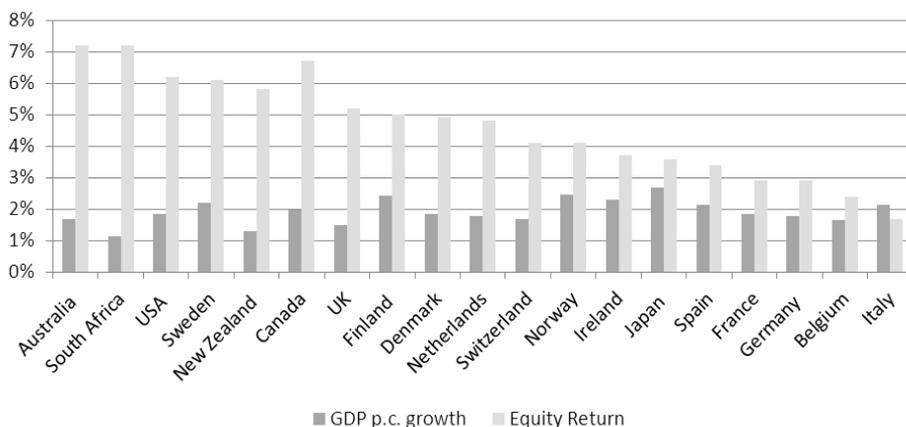
of Economics and Finance 2002/42/3, pp. 543–575; **B. Sawhney** et al., *Long-run Relationship Between Economic Growth and Stock Returns: An Empirical Investigation on Canada and the United States*, *Journal of Economics* 2006/54/6, pp. 584–596; **B. Wyżnikiewicz** et al., *Silna giełda silą gospodarki*, Instytut Badań nad Gospodarką Rynkową, Warszawa 2005; **J. Brzeszczyński** et al., *Koniunktura...*; **B. Cornell**, *Economic Growth and Equity Investing*, *Financial Analyst Journal* 2010/66/1, pp. 54–64.

²¹ **J. Ritter**, *Is Economic...*

²² **J. Siegel**, *Stocks...*

²³ **J. Ritter**, *Is Economic...*

FIGURE 1: *The real growth rate of GDP per capita and the rates of return on stocks in 19 highly developed countries between 1900 and 2011*



Source: based on **J. Ritter**, *Is Economic...*, p. 9.

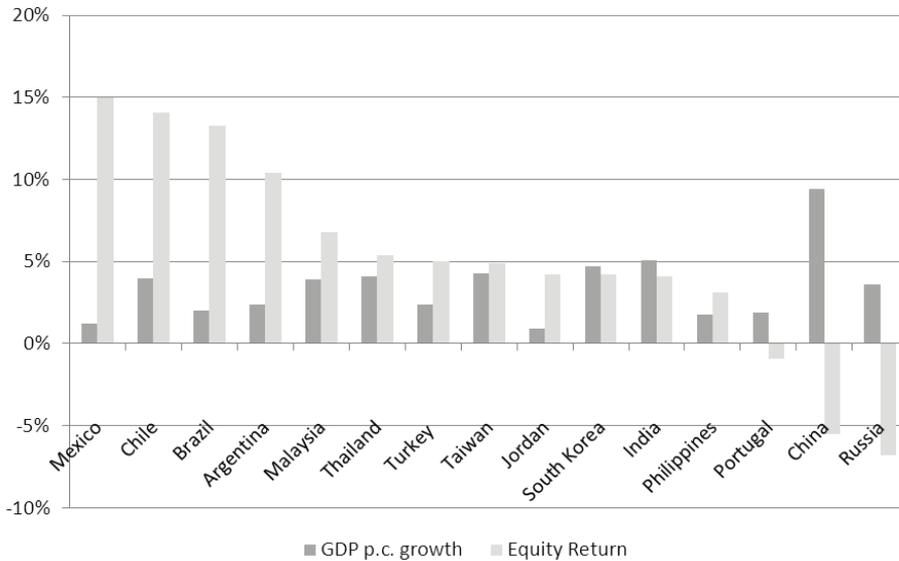
According to Ritter, there are several conclusions that can be drawn from the data in Figure 1. Firstly, the real average annual rate of growth on stocks is higher than the growth rate of GDP per capita. While the highest average annual growth rate of GDP was 2.69% (Japan) and the lowest 1.16% (RSA), the average annual rate of return on stocks ranged from 7.2% (Australia) to 1.7% (Italy).

The highest rates of return on stocks were recorded for Australia, Republic of South Africa (RSA), USA, Sweden, New Zealand, and Canada. One thing that the countries have in common is that no wars that could have caused material losses were fought on their territories over the analysed period of 111 years. The second common feature is that almost all of them (the only exception is Sweden) are English-speaking countries and so they are characterised by the Anglo-Saxon culture of doing business. So it turns out that this attitude to business offers relatively higher rates of return on stocks in the long term. Thirdly, Ritter argues, natural resources play a major role in the economies of the countries.

As mentioned, Figure 1 presents highly-developed countries that in the early XXth century accounted for around 90% of the global stock market capitalisation. Similar results were obtained by Ritter for the group of 15 countries that in the early 1990s were called the emerging markets. The correlation coefficient between GDP per capita growth rate and the return rate on stocks is also negative

(−0.41) but not statistically significant at the 10 percent level (p -value = 0.14). The data is shown in Figure 2.

FIGURE 2: *The real growth rate of GDP per capita and the rates of return on stocks in 15 countries classified as emerging markets in the early 1990s in the period 1988–2011*²⁴



Source: based on **J. Ritter**, *Is Economic...*, p. 12.

Similar results were obtained by Estrada²⁵. He examined cross-country correlation between annualized economic growth, as measured by both real GDP and real GDP per capita, and annualized real equity returns, as measured in both local currency and in dollars. Return data is based on MSCI indices for 24 developed countries and 21 emerging countries (as well as 45 countries combined), which account for both capital gains/losses and dividends. The sample period varies by country, starting in 1987 or later, and in all cases through the end of 2010. Correlation coefficients and p -values (in parentheses) are presented in Table 1.

²⁴ The data for Brazil, China and India starts in 1993 and for Russia – in 1996.

²⁵ **J. Estrada**, *Blinded...*

TABLE 1: *Correlation coefficients between economic growth and equity returns based on MSCI indices for developed and emerging countries in the period 1987–2010*

	Developed		Emerging		All countries	
	R-L	R-\$	R-L	R-\$	R-L	R-\$
GDP	0.01 (0.96)	-0.06 (0.77)	-0.12 (0.60)	-0.13 (0.59)	0.25 (0.09)	0.20 (0.18)
GDP per capita	-0.09 (0.69)	-0.13 (0.54)	-0.19 (0.41)	-0.14 (0.54)	0.20 (0.20)	0.17 (0.25)

Markings: R-L – returns in local currency, R-\$ – returns in USD, p -values (in parentheses)

Source: **J. Estrada**, *Blinded...*, p. 21.

Although correlation coefficients presented in Table 1 have different signs, they are all statistically insignificant at 5 percent level and almost all (besides one) at 10 percent level which indicates lack of correlation.

The question about why it is so has not been given a clear-cut answer yet. According to Siegel, one reason for rates of return not to follow GDP growth may be progressing globalisation and the fact that multinational corporations play an increasingly important role in the economies of particular countries²⁶. For instance, international markets account for a huge share of sales made by the Nokia Corporation, a major player in the Finnish economy, so Nokia's results depend more on the performance of these markets than of the economic situation in Finland itself. As another example, the same applies to many Spanish companies that obtain substantial profits from Latin American economies.

According to Estrada, the correlation may also not exist or even be negative when investors have high hopes for the future economic situation, which happens particularly often in periods of fast growth²⁷. When growth expectations are very high, investors are so eager to participate in the expected profits of such growth that they largely ignore the price they pay to do so. As Estrada calls this phenomenon, investors are “blinded by growth”. This attitude leads to overpriced stocks and consequently to low rates of return in the future. This explanation seems convincing as far as China is concerned. Figure 2 shows that in contrast to China's unusually high rate of GDP growth, the rate of return on the stock market was negative, one of the lowest in this grouping. One of the proofs showing that stocks were overpriced are the values of the P/E ratio (price to earnings) that in the sampled period were relatively high in China compared with the other countries in the group. For instance, in 2007 the value of P/E ratio

²⁶ **J. Siegel**, *Stocks...*

²⁷ **J. Estrada**, *Blinded...*

was 64.34, 52.06 in 2001, 49.35 in 2002, etc.²⁸. However, China alone is not enough to conclude that investors in all countries always expect more than the fundamental data obtained in the future might allow.

A different explanation of why the economic situation in the country and the stock market situation are not positively correlated has been given by Ritter²⁹. He maintains that what rates of return are earned on the stock market is determined in the first place not by the profits corporations generate in the economy, but by improving values of the selected measures of corporations' performance, e.g. a P/E ratio or ROE (rate on equity) which reflect both earnings and the amount of capital contributed by investors.

However, Ritter continues, this seeming paradox disappears when we take into account that inflation is systematically overestimated as well as two tendencies observed in US corporations, i.e. a high share of rewards and remuneration paid to employees in the form of stock options (ESO) and substantial amounts allocated to acquisitions. According to Ritter, these two tendencies occurring in US corporations explain the rest of inconsistencies. By exercising their stock options employees increased the volume of shares listed on the stock market and reduced the rate of dividend growth; this diluted earnings and dividend per share and ultimately reduced the growth rate of dividend per share to around 1% over the sampled period (before 1980 ESO was relatively rare). Cash earmarked for acquisitions has a similar effect as ESO. The difference is that it does not reduce the number of the acquiring company's shares, as in practice its only purpose is to redeem the shares of the company being acquired. Over the last 50 years, a substantial amount of cashflows generated by companies has been distributed in this way. Ritter estimates that in the analysed period of 112 years it may have amounted to an average of 0.4% of the market value of companies. Put together with the total effect of overestimated inflation, of exercised stock options and of mergers and acquisitions this provides an explanation why the amount of reinvested funds and the growth rate of dividend are at variance.

Reasons for a weak correlation between the state of the economy and the return rate on stocks can also be sought in the fact that basically in all countries and for various reasons the managers of public companies are pressed to prove that their organisation is growing, even if its market value would fall as a result. The pressure causes that managers frequently commit resources to negative

²⁸ **A. Huang, T. Wirjanto**, *Is China's P/E Ratio too Low? Examining the Role of Earnings Volatility*, Pacific-Basin Finance Journal 2012/20/1, p. 46.

²⁹ **J. Ritter**, *Is Economic...*, p. 13.

NPV projects, including acquisitions of other companies. According to Ritter, a case in point are Japanese companies that were reluctant to pay dividends even if attractive investment projects were not available. In addition to political and public pressures, behavioural factors can provide another explanation of why companies may want to grow. In this case, mergers, acquisitions and overinvestment arise from excessive self-confidence or inflated optimism of managers as to the possibility of carrying out high-performing projects. As a result, against their expectations the pursued projects fail to bring, rates of return above the cost of the invested capital.

The industries where growth was particularly strong in the last century include airlines, automotive industry, computer industry (both hardware and software), and pharmaceuticals. Interestingly, tobacco industry, metallurgic industry and railways were losing their significance. Yet, the rates of return shareholders in the car-making business or airlines made were not high, because many projects in these industries had negative NPV. On the other hand, shareholders in tobacco companies earned relatively high rates of return notwithstanding the hundreds of millions of dollars the companies had to pay in damages adjudicated by courts, partly because the companies distributed high dividends among their shareholders instead of squandering large amounts on unprofitable investments.

The last aspect that is worth looking into has to do with the fact that factors stimulating economic growth may not always improve the return rates on stocks. As already explained, the rates improve when profits are reinvested in projects with high positive NPV, and then dividend per share is high too. However, as mentioned, if continuous growth is one of political or economic objectives, it might as well be achieved through reinvestments into negative NPV projects and then economic growth can be shown in countries even if shareholders' wealth is shrinking. That argument is believed to apply to many of the so called "Asian tigers", since Krugman popularized very controversial results of research done by Young and Kim and Lau, concerning sources of economic growth in South and East Asian countries³⁰.

In addition to the capital and labour growth, technological progress also stimulates growth in the economy. However, often most benefits that come with it are reaped not by investors but by consumers who profit from the falling prices of better quality products when fewer possibilities of raising profit margins are available because of tough competition. As an illustration, let us consider the case of industries such as agriculture or airlines. Some 150 years ago agriculture

³⁰ P. Krugman, *The Myth of Asia's Miracle*, Foreign Affairs 1994/73(7), pp. 62–78.

accounted for around of 90% of employment in Europe and North America. As technological progress and increase in capital (artificial fertilizers, agricultural machinery, high-quality seeds) significantly improved agricultural output per employee over the next years, in highly developed countries agriculture accounts today only for several percent of the workforce. However, almost all of this radical improvement has benefited consumers, so farmers' incomes rose relatively little in that period and in many highly-developed states they are supported by subsidies. Airlines are another instance where technological progress failed to increase shareholders' wealth. The remarkable progress in aircraft production technology and in booking systems dramatically reduced costs per passenger, but the earnings of shareholders in these industries did not become higher because of that. Tough competition caused that lower costs could not translate into higher revenues of the competing corporations and consequently many of them had to file for bankruptcy.

4. Economic growth and the stock market situation in Central and Eastern European countries

The factors explaining correlation between the state of the economy and the stock market situation by no means change the intuitive assumption that these two categories should be always positively correlated. It justifies the investigation of the relationship between the return rates on stocks and GDP growth in the post-communist Central and Eastern European (CEE) countries. Besides common geographical location, all of these countries experienced large-scale systemic reforms after 1990, leading to the market economy. That is why capital markets in these countries are fairly new compared with those in highly-developed countries and most of emerging market countries. That is also why the scale of phenomena such as multinational companies, remunerating employees with stock options or acquisitions, potentially responsible for the lag between economic growth and stock returns, is relatively low. On the other hand, the part of the economy represented by companies listed on local stock exchange is also relatively small in these countries. The economic potential of these countries is disproportionately smaller and they attract much less attention than highly developed economies. Local capital markets are quite "tight" and possibly less effective, in the sense that prices may not reflect all relevant information. Besides, political factors relating to many of the listed companies can rise uncertainty and thus induce overreaction of investors. It is also possible that investors trading on these markets tend

to overreact to external data, not necessarily relevant for local listed companies. Foreign investors, in turn, are more liable to perceive these markets in group without regarding specific local factors determining economic performance of listed companies.

The main goal of research is to find out whether negative correlation or the lack of correlation between GDP growth and stock market observed in the long run for developed countries is present also within CEE markets.

4.1. Methodology and data set

We use the same methodology of estimating cross-country correlation between average annual rate of economic growth and average annual rate of return on stock indices that was used by Ritter and Estrada in their studies regarding developed and emerging market countries (presented in section 3) which enables to compare obtained results. Economic growth is measured both by the real growth rate of GDP and the real growth rate of GDP per capita. Data was obtained from World Bank database. Data on indices includes dividends and comes from websites of exchanges and Bloomberg database. Quite naturally, the series available for analysis is shorter in case of CEE countries than for countries considered in the previous section of the paper. We consider the longest period for each country for which the data is available³¹. These data was adjusted for inflation. As a measure of inflation the data on GDP deflator from World Bank database was used.

4.2. Research results

The research results are shown in Table 2 and Figure 3.

TABLE 2: *The real growth rate of GDP and GDP per capita versus rates of return on stocks in 11 Central and Eastern European (CEE) countries in the years 1988–2013*

Country	Years	Real annual rate of return on the index (geometric mean, %)	Annual rate of real GDP growth (geometric mean, %)	Annual rate of real GDP growth per capita (geometric mean, %)
Romania	1998–2013	–2.55	2.82	3.60
Bulgaria	2001–2013	8.55	3.37	4.30
Hungary	1992–2013	4.76	1.71	1.92

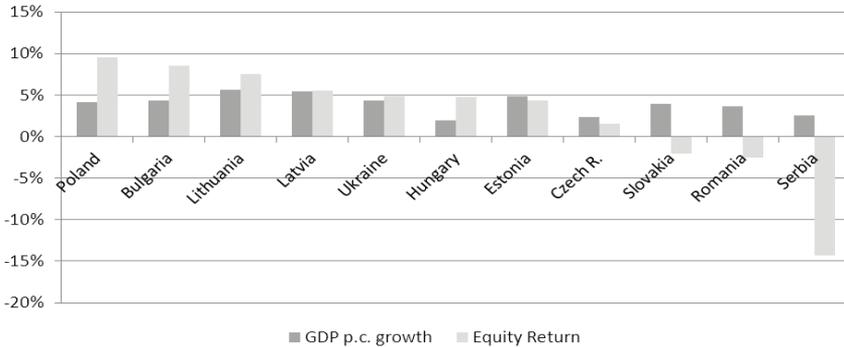
³¹ Annual averages used to estimate correlation are thus calculated with data spanning different number of years for different countries. It can be regarded as the weak side of our analysis but is in line with the procedure applied by other authors in their studies described above.

Country	Years	Real annual rate of return on the index (geometric mean, %)	Annual rate of real GDP growth (geometric mean, %)	Annual rate of real GDP growth per capita (geometric mean, %)
Czech R.	1995–2013	1.57	2.48	2.38
Slovakia	1996–2013	–2.01	3.98	3.93
Serbia	2006–2013	–14.32	2.03	2.52
Ukraine	1999–2013	4.80	3.71	4.38
Lithuania	2000–2013	7.58	4.27	5.59
Latvia	2000–2013	5.49	4.13	5.42
Estonia	2000–2013	4.39	4.44	4.84
Poland	1992–2013	9.48	4.18	4.15
Coefficient of correlation			0.53	0.51
<i>p</i> -value			(0.093)	(0.112)

Source: own calculations applying data concerning the following stock exchange indices: Sofix Index (Bulgarian Stock Exchange – Sophia), PX GLOB Index (Prague Stock Exchange), OMX Tallinn (Nasdaq OMX Tallinn), OMX Vilnius (Nasdaq OMX Vilnius), OMX Riga (Nasdaq OMX Riga), General Share Index of Belgrade (Belgrade Stock Exchange), CROBEX Index (Zagreb Stock Exchange), Slovene Blue Chip Index (Ljubljana Stock Exchange), SAX-The Slovak Share Index, (Bratislava Stock Exchange), BUX Index (Budapest Stock Exchange), PFTX index (PFTX Ukraine Stock Exchange), WIG (Warsaw Stock Exchange). The authors wish to acknowledge their gratitude to Dr Janusz Brzeszczyński for his assistance in obtaining the data.

According to Table 2, on the analysed stock markets in the CEE countries the coefficients of correlation between the average return rate on stocks on one side and the rate of GDP and GDP per capita growth on the other are positive, although they are not statistically significant at 5 percent level and, in one case, also at 10 percent level. However these results do not confirm that there is a negative correlation between stock return and GDP growth, as it was found for the 19 highly-developed countries in the years 1900–2011 by Ritter. We can conclude that in these countries factors which may weaken relationship between stock market and real sphere of economy are less influential than in the highly-developed countries. Rather our results are closer to conclusion about CEE economies positive correlation or about the lack of clear correlation between economic growth and equity returns that can be drawn from some studies for other groups of countries described above. However this is an initial research on that issue and further analysis is needed before the final conclusion can be drawn.

FIGURE 3: *The real growth rate of GDP per capita versus rates of return on stocks in 11 Central and Eastern European (CEE) countries in the years 1988–2013*³²



Source: as in Table 2.

Some may question the relevance of correlations between annual averages calculated with data spanning two essentially different periods – before and after the eruption of last global financial and economic crisis. That is why it is worth checking the results separately for the years until 2007 and after that year. Our choice on including 2008 into the second time sample is not obvious. Although in fact it is the year of a huge slump in stock markets of all countries we examine, a serious downturn in real economies reflected in negative ratios of GDP growth in most cases came one year later. Nevertheless, it occurs that leaving 2008 in the first time sample (before the crisis) and starting the second one (after the burst of the crisis) in 2009 hardly change the results. The results are shown in Table 3.

TABLE 3: *Correlation coefficients between economic growth and equity returns in 11 Central and Eastern European (CEE) countries before and after the burst of global financial crisis*

	2000–2007	2008–2013
GDP	0.10 (0.76)	–0.04 (0.90)
GDP per capita	0.18 (0.59)	–0.06 (0.85)

Source: as in Table 2.

³² Gajdka and Pietraszewski in their paper presented similar calculations but for shorter time period (**J. Gajdka, P. Pietraszewski**, *Wzrost gospodarczy a ceny akcji*, Zeszyty Naukowe Uniwersytetu Szczecińskiego 2014/804, pp. 399–408). Now, besides extending time horizon until the beginning of 2014, we use actualized historical data on inflation, GDP and GDP per capital growth obtained from World Bank database, which sometimes differs from that presented in this database a year before. These changes made our results on correlation slightly different from that obtained earlier. In that paper both correlation coefficients were also positive but statistically significant at the 5 percent level.

According to Table 3, the correlation coefficients are slightly positive in the period 2000–2007 and slightly negative after the eruption of the financial and economic crisis, however none of them is statistically significant. These results enhance previous conclusions about the lack of correlation between stock returns and economic growth in the analysed group of countries.

5. Conclusion

One may intuitively think of stock returns as a result of the underlying real economy growth. However, the results of empirical studies for highly-developed countries and for the countries that in the early 1990s were called the emerging markets suggest there is a negative correlation or no correlation between these two categories across different countries. A range of various reasons is believed to account for that fact. Disproportionate share of unlisted or new companies in nations' GDP growth, the exposure of large companies to international markets, diluting companies' earnings through emissions of new shares or remunerating employees with stock options and the pressure to grow at all cost resulting in negative-NPV investments are among them. Besides, expected growth of corporate earnings may be built into prices, making initial P/E ratios very high. Subsequent change in valuation may cancel the impact of EPS growth on stock returns.

The results of our analysis are closer to conclusion about CEE economies positive correlation or about the lack of clear correlation between economic growth and equity returns. However, these are very preliminary results of research applying very basic methodology and further research should be conducted for finding the explanation of such results. However, the first impression is that less developed stock markets with less experienced investors and with shorter life record present stronger positive correlation with real economy growth measured by GDP than well developed markets. The reasons for such results need another research. One of possible explanations for such result is that development of financial market leads rather to reducing the connection between real economy and stock market which leads to disturbances observed lately in the global economy. However, due to very basic methodology and relatively short period of time one must be very careful with drawing the final conclusion. In this paper we tried rather to find out the problem than to find an exhaustive explanation for existing phenomenon. As we mentioned earlier it needs further research.

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WZROST GOSPODARCZY A CENY AKCJI W KRAJACH EUROPY ŚRODKOWO-WSCHODNIEJ

(Streszczenie)

W artykule omówiono związek pomiędzy koniunkturą giełdową a realną sferą gospodarki, mierzony korelacją pomiędzy stopą zwrotu z rynku akcji a stopą wzrostu PKB. Z niektórych wcześniejszych badań wynika, że związek ten w krajach wysoko rozwiniętych w długim okresie ma charakter korelacji negatywnej. Inne badania wskazują raczej na brak korelacji, zarówno dla krajów wysoko rozwiniętych, jak i rynków wschodzących. Celem artykułu jest zaprezentowanie tych nieco kontrowersyjnych wyników i przegląd możliwych przyczyn zaobserwowanych tendencji. W prezentowanym artykule przedstawiono również rezultaty własnych badań omawianej relacji, przeprowadzonych na próbie państw Europy Środkowo-Wschodniej, w których rynek kapitałowy zaczął rozwijać się dopiero po upadku komunizmu, a więc od relatywnie niedługiego okresu. Jak wykazały wyniki badania, w państwach Europy Środkowo-Wschodniej można mówić raczej o korelacji pozytywnej lub też braku korelacji pomiędzy wzrostem gospodarczym a stopami zwrotu z akcji. Trudno wskazać na jednoznaczną przyczynę tego stanu, ale uzyskane rezultaty wskazują, że nie można w sposób jednoznaczny określić związku, który występuje pomiędzy wzrostem gospodarczym a rynkiem akcji w poszczególnych krajach.

Słowa kluczowe: wzrost gospodarczy; stopy zwrotu z akcji; kraje Europy Środkowo-Wschodniej