THE STOCK MARKET SITUATION AND ECONOMIC GROWTH – AN ATTEMPT TO ASSESS THE DEPENDENCE

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Abstract

The aim of the article: The main aim of the article is to analyze the relationship between the stock market situation and the real economy, measured by the strength of the correlation between the rate of return on the stock market and the rate of GDP growth in European capital markets. The next objective is to answer the question whether the stock market index changes are ahead of, and if so, by how much, GDP changes. The author's hypothesis stipulates that the stock exchange situation precedes the change in economic activity and serves as its forecast.

Methodology: The empirical research work was carried out on the basis of quarterly data value of the stock index and the GDP between 2010 and the first quarter of 2021 for 20 European countries. For indices and GDP, the quarterly dynamics of the rate of return and GDP were calculated. Data on the value of the stock exchange index was taken from the website www.stooq.pl, while data on GDP was taken from Eurostat. Subsequently, the analysis concerned the correlation relationships between the variables on the basis of the Pearson correlation coefficient. The correlation between the variables was calculated without delay, as well as with a delay of one, two or three quarters of the returns on stock indices.

Results of the research: Changes in the value of the stock exchange index is in most cases positively correlated with the change in GDP and the correlation is pronounced, but it is low and moderate. The only market for which a significant correlation was observed, was the Polish market. At the same time, it can be stated that the rates of return on the stock exchange index precede a change in GDP by one or three quarters. No changes were observed for the analyzed countries for two quarters.

Keywords: capital markets, European stock exchanges, GDP, stock index.

JEL Class: G15, G23.

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INTRODUCTION

The relationship between the financial system and economic growth is indisputable. The size of the financial system is strongly correlated with the level of economic development. However, it is debatable that there is a cause-and-effect relationship between financial development and economic growth, its direction and transmission channels between these two variables. There are four main groups of views on the relationship between financial development and economic growth. The first view, the precursor of which was J.A. Schumpeter, assigns the leading role to the supply of financial services. According to this view, financial development has a positive effect on economic growth. The second view initiated by J. Robinson inclines to the view that the development of the financial system does not lead to greater economic growth, but only comes after only it. According to the third view, financial development and economic growth are interdependent, i.e. there is a two-way cause-and-effect relationship. The fourth trend put forward by R. Lucas is the view that financial development and economic growth are not linked with a cause-and-effect relationship (Kasprzak-Czelej, 2012: 17–18).

The stock exchange market as an element of the financial system potentially influences economic growth through the channel of capital accumulation and the so-called technological change (total factor productivity). This influence takes place as part of the function of the stock exchange market, especially the capital market (Kasprzak-Czelej, 2012: 154–155). It can be concluded that the capital market transforms savings into investments more effectively, and therefore contributes to the optimal allocation of capital, which consists in shifting resources towards enterprises that manage them best, which leads to acceleration of economic growth. Investors, striving for the optimal allocation of capital, are guided by the desire for profit and count on compensation for „suffering” and risk. This compensation is a fair rate of return. This is the most important criterion on the capital market. So investors buy stocks, the price of which should rise, and the price of the stock will rise as the value of the company increases, and the latter will rise as its profits increase. Summing up, investors invest in the shares of enterprises on which they expect a profit, and sell the shares of enterprises that will not bring any (Kachniewski et al., 2008: 39). The favorable stock market situation leads to an increase in investments, because managers react to the increase in share prices by undertaking additional investments that lead to an improvement in the economic situation (Gajdka and Pietraszewski, 2014: 400).

Stock market movements are often considered an important or good barometer for measuring financial strength and economic development. Therefore, an economy that has the effective stock market can often use it as an indicator to measure changes in the economy several months in advance (Adebayo et al., 2020: 903).

F. Modigliani, in turn, draws attention to the influence of the stock exchange on consumption. The long-term increase in the prices of shares and other assets on the capital market causes a significant and constant increase in the income of individuals, and this also results in an increase in permanent income. According to the permanent income hypothesis of M. Friedman, individuals smooth their consumption throughout their lives in order to maximize utility (Goczek et al., 2014: 138–139).

The dominant trend in the related literaure is the first view. It includes the works of J. Greenwood and B. Jovanovic, V.R. Bencivengi and B.D. Smith, G. Saint-Paula, R.G. King and R. Levine, M. Pagano. The authors point out that financial development is the cause of economic growth. In other words, in the duo of financial development and economic growth, the leading one is financial development (Kasprzak-Czelej, 2012: 17–18).

The main goal of the article is to analyze the relationship between the stock market situation and the real economy, measured by the strength of the correlation between the rate of return on the stock market, and the GDP growth rate on the European capital markets. Another objective is to answer the question whether stock exchange index changes precede that growth, and if so, by how much. The article presents a hypothesis that reads as follows: the stock market situation precedes the change in the economic situation, and thus this change is forecast.

1. REVIEW OF EMPIRICAL RESEARCH

The literature often indicates that the stock market influences economic development and can be a barometer of the economic situation. It is commonly believed that changes in the stock market conditions signal changes in the economic situation. Table 1 presents studies on the relationship between the stock market and the economy.

Tabel 1. Review of empirical research: the impact of the stock exchange market on economic growth

Authors	Conclusions	Research period	Study countries
R.D.F. Harris	The increase in the liquidity of the stock exchange market has a significant impact on the GDP growth rate per capita only in the group of developed countries.	1980–1991	49 countries
P.L. Rousseau, P. Wachtel	The liquidity of the stock market has a stronger impact on economic growth than its size (capitalization). Increasing the liquidity to GDP ratio by 1% results	1980–1995	47 countries

	in an increase in real GDP per capita after five years by 0.48%.		
J.B. Durham	The positive impact of the stock exchange on economic growth in the long term depends on the country's development (GDP per capita), the country's rating and the legal level	1981–1998	26–64 countries
E. Łon	The correlation between the annual rate of return on WIG and economic growth as measured by GDP growth was 0.66	1991–1994	Poland
X. Liu, P. Sinclair	There is a one-way cause-and-effect relationship between economic growth and share prices in the long run in China, Hong Kong and Taiwan. On the other hand, in the short term, there is a cause and effect relationship between changes in the index and the value of GDP.	–2008	China, Hong Kong, Taiwan
W. Dębski, I. Bujnowicz,	Stock market capitalization is positively correlated with GDP. It has been shown that a 1% increase in capitalization leads to a GDP increase of 0.22%.	1994–2005	Poland
J. Gajdka, J. Brzeszczyński, T. Schabek	Change in the WIG index to changes in GDP are positively correlated at the level of 0.65. On the other hand, a stronger cause-and-effect relationship was observed in the opposite direction, i.e. changes in GDP had a stronger impact on changes in WIG.	1996–2008	Poland
J. Minier	The launch of the stock exchange market is positively correlated with the economic growth that follows over the next five years, which results rather from the influence of the stock exchange on more effective allocation of investments than increasing their level. In the long run, the results of the impact are not unequivocal.	1960–1998	54 countries (including Poland) that launched the stock exchange during the research period
A.A. Enisan, A.O. Olufisayo	In the case of two countries, the stock exchange market has a positive effect on economic growth in the long run (Egypt, South Africa). In Nigeria, economic growth is a determinant of stock market development, not the other way around. In other countries, the relationship between stock exchange development and economic growth is two-way.	1980–2004	Egypt, South Africa, Ivory Coast, Kenya, Morocco, Zimbabwe, Nigeria
A. Boubakari, D. Jin	There is a cause-and-effect relationship between volume and liquidity and economic growth as measured by GDP. For countries where stock exchanges are	1995–2008	Five Euronext countries (Belgium, France,

	large and liquid, this relationship is positive, while for countries where stock markets are small and less liquid, this relationship is negative.		Portugal, the Netherlands, Great Britain)
M. Adamopoulos	There is a one-way relationship between economic growth and the development of the stock exchange market. The development of the stock exchange determines economic growth. An increase in the stock exchange index by 1% leads to an acceleration of economic growth by 0.06%.	1965–2007	Germany
J. Wu, H. Hou, S. Cheng	The capitalization and liquidity of the stock market have a positive effect on long-term economic growth. In the short term, the impact of liquidity is negative.	1976–2005	13 countries from Western Europe
A. Cooray	The stock exchange market (its size and liquidity), apart from human and physical capital, is an important factor determining long-term economic growth.	1992–2003	35 developing countries
M.M. Rahman, M. Salahuddin	The stock exchange market (capitalization and turnover in relation to GDP) determine economic growth both in the short and long term. The impact of market liquidity on economic growth is greater than its size.	1971–2006	Pakistan
N.M. Odhiambo	The development of the stock exchange market contributes to the development of the banking sector both in the short and long term, therefore it has a decisive influence on the development of the entire financial sector. There is a two-way relationship between economic growth and financial development.	1980–2007	South Africa
R.T. Obiakor, A.T. Okwu,	The size of the stock exchange (capitalization in % of GDP) as opposed to the liquidity of the market (turnover in % of GDP) determines the rate of economic growth.	1981–2008	Nigeria
J. Gajdka, P. Pietraszewski	The relationship between the rate of return on equity and the rate of GDP growth is positively correlated.	1992–2002	11 countries of Central and Eastern Europe
Ł. Goczek, K. Kurowska, K. Zduniuk	The size of the stock exchange (capitalization) has a positive effect on GDP as well as the value of trading. In contrast, the liquidity of trade has a mixed economic growth, GDP is negatively correlated.	since the beginning of the stock exchange in these countries to 2012	16 countries of Central and Eastern Europe

E. Widz	There is a positive, but moderate correlation between the rates of return of the main stock indices and the economic situation in Poland, measured by GDP.	2003–2014	Poland
E. Łon	The correlation between the rate of return on the Price Index in year T and the real GDP rate in year T + 1 was 0.45	1995–2019	Poland
	The correlation between the rate of return on the Price Index in year T and the real GDP rate in year T + 1 was 0.61	2000–2019	
	The correlation between the rate of return on the Price Index in year T and the real GDP rate in year T + 1 was 0.63	2004–2019	

Source: own study based on: Liu and Sinclair, 2008; Boubakari and Jin, 2010; Kasprzak-Cze-lej, 2012; Goczek, Kurowska and Zduniuk, 2014; Gajdka and Pietraszewski, 2014; Widz, 2016; Łon, 2020.

The analysis of the research presented in Table 1, which includes research in the years 1960–2019, shows that the stock market influences economic development measured, for example, with GDP and GDP per capita.

2. RESEARCH METHODOLOGY

The empirical research work was carried out on the basis of quarterly data value of the stock index and the GDP between 2010 and the first quarter of 2021 for 20 European countries. Data on the value of the stock exchange index was taken from the website www.stooq.pl, while data on GDP was taken from Eurostat. As the stock indices and the GDP index are calculated in a different way, where the differences refer to the frequency, timing and update of the measurement as well as to the reference period. This makes empirical research much more difficult.

The dynamics of the stock market index and GDP growth between consecutive quarters was calculated in accordance with the formula (Widz, 2016: 454):

$$I = \frac{P_t}{P_{t-4}} - 1$$

where:

I – the dynamics of the variable (index, GDP),

P_t – the level of the variable (index, GDP) for a given quarter,

P_{t-4} – the same level of the variable (index, GDP) from the quarter of the previous year.

Further study based on the analysis was a correlation between the variables based on the Pearson correlation coefficient (Wiktorowicz et al., 2020: 154):

$$r = \frac{cov(x,y)}{S_x S_y}$$

where:

cov(*x*,*y*) – covariance between the *X* and *Y* variables,

$S_x S_y$ – standard deviation of the population *X* and *Y*, respectively.

After Starzyńska (2009: 167), the authors present how to roughly assess the intermediate values taken by the correlation coefficient. The relationship is:

– indistinct, if $r \le 0.2$;
– pronounced, but low, if $0.2 < r \le 0.4$;
– moderate, if $0, 4 < r \le 0.7$;
– significant, if $0, 7 < r \le 0.9$;
– very strong if $r > 0.9$.

The correlation between the variables was calculated without delay, as well as with a delay of one, two or three quarters of the returns on stock indices in the SPSS program.

3. RESEARCH RESULTS

In the period from 2010 to the first quarter of 2021, both positive and negative quarterly GDP dynamics as well as positive and negative returns on stock exchange indices were observed among the analyzed countries. The results of the research on the correlation between the stock exchange index returns and GDP dynamics without delay and with a delay of one, two, three quarters of the stock exchange index returns are presented in Table 2.

Tabel 2. Coefficients of correlation of stock exchange index returns and GDP dynamics
in 2010 – Q1 2021 (based on quarterly data, with and without a delay) (N = 45)

Index / Country	t	t–1Q	t–2Q	t–3Q	Market[1]
OMX Riga Index/ GDP Latvia	–,312*	–,034	,231	**,526****	Frontier
OMX Vilnius Index/ GDP Lithuania	–272*	–,017	,277*	**,528****	Frontier
OMX Tallinn Index/ GDP Estonia	–,125	,131	,367*	**,518****	Frontier
BET Index/ GDP Romania	,039	–,018	–,178	**–,249***	Secondary Emerging
ATHEX Composite Index/ GDP Greece	,417**	**,432****	,200	,107	Advanced Emerging
BUX Index/ GDP Hungary	,507**	**,547****	,278*	,160	Advanced Emerging
CAC 40/ GDP France	**,265***	,235	–,035	,069	Developed
Swiss Market Index/ GDP Swiss	**–,275***	–,052	,023	,138	Developed
WIG 20/ GDP Poland	,689**	**,820****	,509*	,209	Developed
PSI 20 Index/ GDP Portugal	,397**	**,467****	,295*	,260*	Developed
Index/ GDP Spain	,265*	**,341***	,185	,223	Developed
BEL-20/ GDP Belgium	,193	**,300***	,051	,118	Developed
OSE All Share Index/ GDP Norway	,405**	**,501****	,315*	,130	Developed
DAX Index/GDP Germany	,069	**,315***	,219	,275*	Developed
OMX Stokholm 30 Index/ GDP Sweeden	,365**	**,528****	,518**	,460**	Developed
OMX Helsinki Index/ GDP Finland	–,191	,179	,176	**,449****	Developed
ATX Index Cash/ GDP Austria	,107	,342*	,222	**,363****	Developed
FTSE 250 UK/ GDP UK	–,060	,294*	,0307*	**,366****	Developed
FTSE MIB/GDP Italy	,172	,209	,011	,096	Developed
AEX Index/ GDP Netherlands	–,053	,240	,121	,222	Developed

** Correlation is significant at the 0.01 level (1-tailded)
* Correlation is significant at the 0.05 level (1-tailded)

Source: own study based on www1, www2.

Comparing the correlation for all indices without delay for 20 compared countries, 14 were characterized by a correlation at the level of indistinct or pronounced, but low. However, in six cases there was a moderate correlation. None of the indices had a significant and very strong correlation. Indices of such countries as Latvia, Lithuania, Estonia, Switzerland, Finland and the United Kingdom were characterized by a negative correlation of returns on stock

[1] The division of stock markets was made on the basis of the division presented by FTSE Russell.

exchange indices in relation to GDP. For France and Switzerland, the correlation without delay was the highest in abduction with the correlation with lags, while for France it was negative. For both of these countries, it was in the range from 0.2 to 0.4, which is pronounced, but low.

In 18 of the 20 analyzed countries, the highest correlation occurs in the case of quarterly delays. For the correlation with a one-quarter lag in rates of return, the highest correlation occurred for 8 out of 20 analyzed markets. Pronounced, but low correlation was observed for the markets of Spain, Belgium and Germany. while it was moderate for the markets of Greece, Portugal and Norway, and significant for the Polish market. For the delay of the two-quarter stock exchange index, the highest correlation occurred for the Swedish market and was within the limits of the moderate correlation. On the other hand, for the 3-quarter delay, the highest correlation occurred for seven countries. The pronounced correlation, albeit low occurred for the countries of Romania, Austria and Great Britain, moderate for the markets of Latvia, Lithuania, Estonia and Finland. It can also be seen that for the Italian and Dutch markets there is no significant correlation in each of the delay ranges.

For the least developed stock markets, changes in stock exchange indices precede changes in GDP by three quarters. Similarly, to the Frontier markets on the Romanian market, which belongs to Secondary Advanced, the highest correlation was observed for the third quarter, but the correlation is negative.

For the markets included in Advanced Emerging, the highest correlation was observed for the delay by 1 quarter. For Developed markets, it is not possible to clearly define the delay with which the rate of return on indices predicts a change in GDP. In most cases, the highest dependency occurs with a lag of one or three quarters. For the French and Swiss markets, the highest dependence occurs in the absence of delay.

SUMMARY

In the field of economists' interest there is the question of the interdependence between the development of the financial system and economic growth. Numerous studies indicate the existence of links between the financial zone of the economy, especially the financial market, which includes the capital market, and the real sphere of the economy. The rates of return provide information for predicting the future pace of economic growth in both, the developed and developing countries.

The article presents the results of research aimed at detecting the relationship between the stock market situation measured by the rate of return on the stock exchange index and the economic situation measured by the dynamics of GDP for 20 European markets.

The paper presents the hypothesis that reads as follows: the stock market situation precedes the change in the economic situation and thus forecasts its change. The hypothesis was confirmed. The change in the value of the stock exchange index is in most cases positively correlated with the change in GDP and the correlation is pronounced, but low and moderate. For the Polish market as the only one, a significant correlation was observed. At the same time, it can be stated that the returns on the stock exchange index precede a change in GDP by one or three quarters. No changes were observed for the analyzed countries for two quarters. Similar conclusions in earlier studies were drawn by E. Łon, X. Liu and P. Sinclair, J. Gajdka, J. Brzeszyński and T. Schabek, M. Adamopoulos, J. Gajdka and P. Pietraszewski, and E. Widz. The obtained results allow one to conclude that the stock market influences the changes in GDP. If GDP grows, we produce more, and if we produce more, there are more jobs and we can earn more. If the demand for workers increases in the labor market, the value of labor automatically increases. Then the average wages are raised by „the invisible hand of the free labor market". In the case of a decline in GDP, the situation is the opposite. Therefore, a change in the stock exchange index may precede changes in such variables as unemployment and average wages.

When analyzing the relationship between the stock market and the economy, it should be remembered that economic growth is influenced by many factors, and the stock market situation is only one of them. When analyzing the stock market situation, it must be mentioned that the behavior of stock exchange indices is the result of not only fundamental factors, but also of behavioral ones. The capital market is a place where expectations concerning both individual companies and the entire economy are reflected. These expectations, if the market is effective, constitute a valuable signal for managers and economic decision-makers, leading them to make effective allocation decisions (Goczek et al., 2014: 149). It can also be reasoned differently. If the stock market is booming, it has an optimistic effect on economic entities that increase production capacity. Investors, encouraged by the rise in the share price, spend more and more money. After a few months, it is clear that the economy has been stimulated and is developing better and better. If there is a slump on the stock market, the opposite is true. In both of these cases, the stock exchange contributed to a change in the economic situation (Kachniewski et al., 2008: 41).

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