



MACROECONOMIC INDICATORS AND THEIR IMPACT ON STOCK MARKET PERFORMANCE IN THE SHORT AND LONG RUN: THE CASE OF THE BALTIC STATES

Donatas Pilinkus

*Vilnius University, Kaunas Faculty of Humanities, Muitinės g. 8,
LT-44280 Kaunas, Lithuania, e-mail: pilinkus@pilinkus.com*

Received 05 January 2010; accepted 27 April 2010

Abstract. The relation between macroeconomic variables and the movement of stock prices has well been documented in the literature over the last several decades. It is often argued that stock prices are determined by some fundamental macroeconomic variables. Therefore, macroeconomic variables can influence investment decisions and motivates many researchers to investigate the relation between stock market prices and macroeconomic variables. The current paper attempts to introduce the concepts of stock market and macroeconomic indicators, then to present a model of the impact of macroeconomic indicators on stock market index, and to define what macroeconomic indicators are related with stock market index in the short and long runs. The study investigates ten macroeconomic indicators and the main Baltic stock market indices. The data are monthly and extend from the January of 2000 to the December of 2008. Empirical research has been conducted with the Baltic States: Lithuania, Latvia, and Estonia. With the reference to the results of performed analysis the interpretations of the relationships between macroeconomic indicators and stock market index from the viewpoint of investors have been formed.

Keywords: macroeconomic indicators, stock market index, OMXV, OMXR, OMXT, Lithuania, Latvia, Estonia.

Reference to this paper should be made as follows: Pilinkus, D. 2010. Macroeconomic indicators and their impact on stock market performance in the short and long run: the case of the Baltic States, *Technological and Economic Development of Economy* 16(2): 291–304.

1. Introduction

The stock market is considered to be a concurrent part of economies since it allows redistribution of financial resources among separate economic entities. Having used stocks governments and companies may be provided with necessary financial means and household establishments while other economic entities are able to invest their savings into such ranges

of economy which are supposed to be reliable and are expected to be profitable. The reciprocal relation between the development of stock market and changes in the country's economy was noticed long ago: as soon as the economic situation in the country improves the stock market performs more actively. The stock market performance is supposed to illustrate the state of the country's economy: if stock prices start to fall economic depression is likely to take place and, conversely, rising stock prices show possible economic growth. Stock market indices are the statistic indicators which enable to show the state of the stock market and its dynamic tendencies. Considering the state of the world financial system which is getting more and more complicated it is important to find out what factors influence fluctuations of stock market indices in separate countries.

The impact of macroeconomic indicators on stock markets as well as on their indices has been emphasized in scientific literature recently and has become more relevant for the two recent decades. The relation between macroeconomic indicators and stock prices is confirmed in the most academic works, although there is a lack of comprehensive assessment of causality and dependence of macroeconomic indicators and stock market in regard to the time and changing macroeconomic processes. That is why the model of the impact of macroeconomic indicators on the stock market index, which enables to reveal a complex assessment of causality and dependence of the relation between macroeconomic indicators and stock prices during the long and the short runs, becomes a logical prolongation of an existent academic analysis.

There are great many works in economic literature analyzing methodological attitudes towards the conception of stocks and assessment of stock market (Russell 1985; Dallas 2004; Bodie *et al.* 2006; Kumpikaitė and Čiarnienė 2008; Melnikas 2008; Teresienė *et al.* 2008; Ginevičius and Podvezko 2009; Girdzijauskas *et al.* 2009; Girdzijauskas and Štreimikienė 2009). The analysis of the conception of macroeconomic indicators, principles of their classification and their place in the general system of economics is outlined in a number of scientific works (Bikker and Kennedy 1991; Rogers 1998; Mohr 1998; Darnay 1998; Dua 2004; Lakštutienė 2008; Tvaronavičius and Tvaronavičienė 2008, Chen 2009; Čiegis *et al.* 2009). The relevance of macroeconomic indicators and possibilities of their use in the modern economic theories are emphasized by some other authors (Blaug 1997; Backhouse 2002; Tsai and Lee 2006; Norvaišienė *et al.* 2008; Rutkauskas *et al.* 2008; Snieška 2008; Dumludag 2009). The connection of these two fields gives the shape to the problem of an assessment of the relation between macroeconomic indicators and stock market, which is researched in the works of economists all over the world. While analyzing the relation between the country's macroeconomic factors and stock market index the scientists yet mostly apply to well developed stock markets like the USA (Cheng 1995; Clare and Thomas 1994), Japan (Mukherjee and Naka 1995), Italy (Panetta 2002), Spain (Martinez and Rubio 1989) and others. More and more researches take place in developing financial markets, including the works written by Mookerjee and Yu (1997), Maysami and Koh (2000), who analyzed the dependence of changes of stock market indices quoted in Singapore stock market from macroeconomic factors, also Kwon and Shin (1999), who analyzed such connection in the stock market of South Korea, and Chong and Goh (2004), who analyzed the stock market in Malaysia. An influence of macroeconomic indicators on the country's stock market index in developing

stock markets is analyzed in the works with a focus on Athens (Dritsaki 2005) or Cyprus (Tsoukalas 2003). There is a lack of such type of researches especially in less developed stock markets in East and Central Europe, including the Baltic stock market (Snieška *et al.* 2008; Pilinkus and Boguslauskas 2009).

Therefore, the problem of this article is how to present a complex estimation of the impact of macroeconomic indicators on the country's stock market index. The object of the article is the impact of macroeconomic indicators on stock market index. The objective of the scientific work is to create the model of the impact of macroeconomic indicators on stock market index, which could enable to present a complex estimation of causality and dependence of the relation between macroeconomic indicators and stock market index during the long and the short runs. Applied research methods are the logical analysis and synthesis of scientific literature, the comparison and generalization method, the statistical grouping method. The scientific novelty of the article is outlined by the following results:

- The model of the impact of macroeconomic indicators on stock market index, which enables to present a complex estimation of causality and dependence of the relation between macroeconomic indicators and stock market index during the short and the long runs, has been created. Compared with other scientific works this model is consistent and includes methodologically reasonable principles in estimation of the relation between macroeconomic indicators and stock market index.
- The performed analysis of practical use of the model of the impact of macroeconomic indicators on stock market index in the Baltic States, supplemented the topics of the scientific researches analyzing the relation between macroeconomic indicators and stock market index, also enabled to interpret these relations from a viewpoint of an investor.

2. The concepts of stock market and macroeconomic indicators

The researches show that stock market is treated as a part of securities market where the stock trade is organized and performed. The main purpose of stock market indices is to ensure for investors possibility to estimate not only the state of separate stocks but the state of the entire market, sector or region. Stock market indices are analyzed according to such criteria as capitalization and geographical spread. It is found that stock market indices estimated in the countries of the world reflect general fluctuations of the market of those companies' stocks which are quoted in the country, and in order to find fluctuations in separate regions or all over the world international and world stock market indices are selected.

On the other hand, macroeconomic indicators are treated as statistical indicators which are used for assessment of general state of the country's economy during a certain period of time (Rogers 1998) or as regularly published governmental statistics which reflects the economic situation in the specified country (Mohr 1998). Macroeconomic indicators may be classified by their connection with the country's business cycle, the rate of declaration in different statistical editions, the character of economic process what facilitates initiative identification of certain economic processes.

The performed analysis of the concepts of macroeconomic indicators and stock prices in the context of assessment of macroeconomic processes enables to find certain prerequisites of their relation, which are confirmed by the performed researches. Having summarized the performed analysis the following prerequisites of the relation between macroeconomic indicators and stock prices are formulated:

- Use of the country's stock market index and selection of macroeconomic indicators based on coherent criteria;
- The period of research reasoned and named subject to particularity of the research;
- Valid methods of research, which would enable to assess the relation between the country's macroeconomic indicators and stocks prices comprehensively and to make an objective comparison with the results of analogical researches in other countries.

3. The model of the impact of macroeconomic indicators on stock market index

The performed analysis of scientific works showed that selection of macroeconomic indicators is quite various. The researches showed (Binswanger 2000; Laopodis 2007; Padhan 2007; Agrawalla and Tuteja 2007) that such macroeconomic indicators as GDP, inflation, interest rates, money supply, industrial production index are generally used although there is a lack of detailed reasoning for selection of aforementioned indicators. It is found that objective selection of macroeconomic indicators, searching for their relationship with stock market, is determined by such criteria as popularity and frequency of that way in researches, the state of the country's economy and its particularity, simple methods of accounting of the indicators, connection of the indicators with the most important economic processes in the country.

The researches showed that despite the fact that there is no steady opinion about the treatment of the short and the long runs searching for the relation between macroeconomic indicators and stock market index in scientific literature, specification of the conception of the long and the short runs is an objective basis to find a relevant method of research. With the reference to the analysis of scientific literature (Shim and Siegel 2000 and others) the short run is defined as a one (and less) year period of time and the long one is treated as a longer than one year period of time in the context of relationship between macroeconomic indicators and stock market index.

Scientists' critical approach to indefiniteness of the results determined the priorities of the methods used for researching the impact of macroeconomic indicators on stock market index and expediency of the analysis which became the object of scientific discussions. This problem stimulated performing the analysis of the methods of researching the impact of macroeconomic indicators on stock market index with regard to the short and the long runs. Having summarized the performed researches (Nishat and Shaheen 2004; Siliverstovs and Duong 2006; Laopodis 2007; Padhan 2007; Adam and Tweneboah 2008) it is possible to make the conclusion that independent of the methods of researching used by scientists the relationship between macroeconomic indicators and stock market index during the short run has been proved empirically by almost all authors. The analysis showed that economic literature does not present a unified opinion about the priorities of the methods used by them during the long and the short run.

The analysis of empirical researches showed that most of them proved the causality of the impact of macroeconomic indicators on stock market index using such methods as arbitrage pricing theory, impulse response function, forecast error variance decomposition, Granger causality tests, Johansen cointegration tests, etc. The performed assessment of the dependence of relationship between macroeconomic indicators and stock market index during the short and the long runs in empirical researches showed (Nishat and Shaheen 2004; Dritsaki 2005; Padhan 2007; Ahmed 2008) that the dependence is usually fixed between macroeconomic indicators and stock market index during the long runs although the type of the dependence (direct, converse) is determined by analyzed macroeconomic indicators and the extent of the country's economic development. Besides, while moving from the short run to the long one the type of dependence of the relationship between macroeconomic indicators and stock market index changes although some researches confirm the existence of reciprocal relation.

The performed academic researches enabled to create the model which permits to present a complex estimation of the dependence and causality of the relationship between macroeconomic indicators and stock market index during the long and the short run. It was found that an objective determination of this relationship should be grounded not only on relevant selection of macroeconomic indicators but also based on the methodology of the researches giving a complex assessment of the variations of the relationship between macroeconomic indicators and stock market index during the long and the short runs. Academic economic models present the methods which mostly oriented to quite narrow interpretation of this relationship whereas in economic literature there is a lack of the methods, which could unite the criteria of selection of macroeconomic indicators and the methods of estimation of causality and dependence of the relationship between macroeconomic indicators a stock market index and enable to increase reliability of the relationship between macroeconomic indicators and stock market index. That shows that scientific literature does not present a completed and general conception of the impact of macroeconomic indicators on stock market index which could enable to assess macroeconomic processes thoroughly and forecast their variations' relationships.

With the reference to scientific works of various authors (Nasseh and Strauss 2000; Nishat and Shaheen 2004; Chaudhuri and Smile 2004; Dritsaki and Adamopoulos 2005) and performed scientific researches the relationship between macroeconomic indicators and stock market index is suggested to estimate accentuating the following stages: 1) Selecting the meaning macroeconomic indicators and stock market index; 2) Preparation of the meaning macroeconomic indicators and stock market index; 3) Determination of relationships between macroeconomic indicators and stock market index; 4) Interpretation of relationships between macroeconomic indicators and stock market index from the viewpoint of investors.

The completed model of the impact of macroeconomic indicators on stock market index is presented in Fig. 1. In the presented model hierarchic relations are marked by the pointer depicted as a solid line and feedback is marked as a pointer with dotted line. The importance of the feedback emphasizes that it is necessary to observe steadily the tendencies of macroeconomic indicators' variation. Including the new meanings of macroeconomic indicators and stock market index every time enables to specify the analysis and find new tendencies of

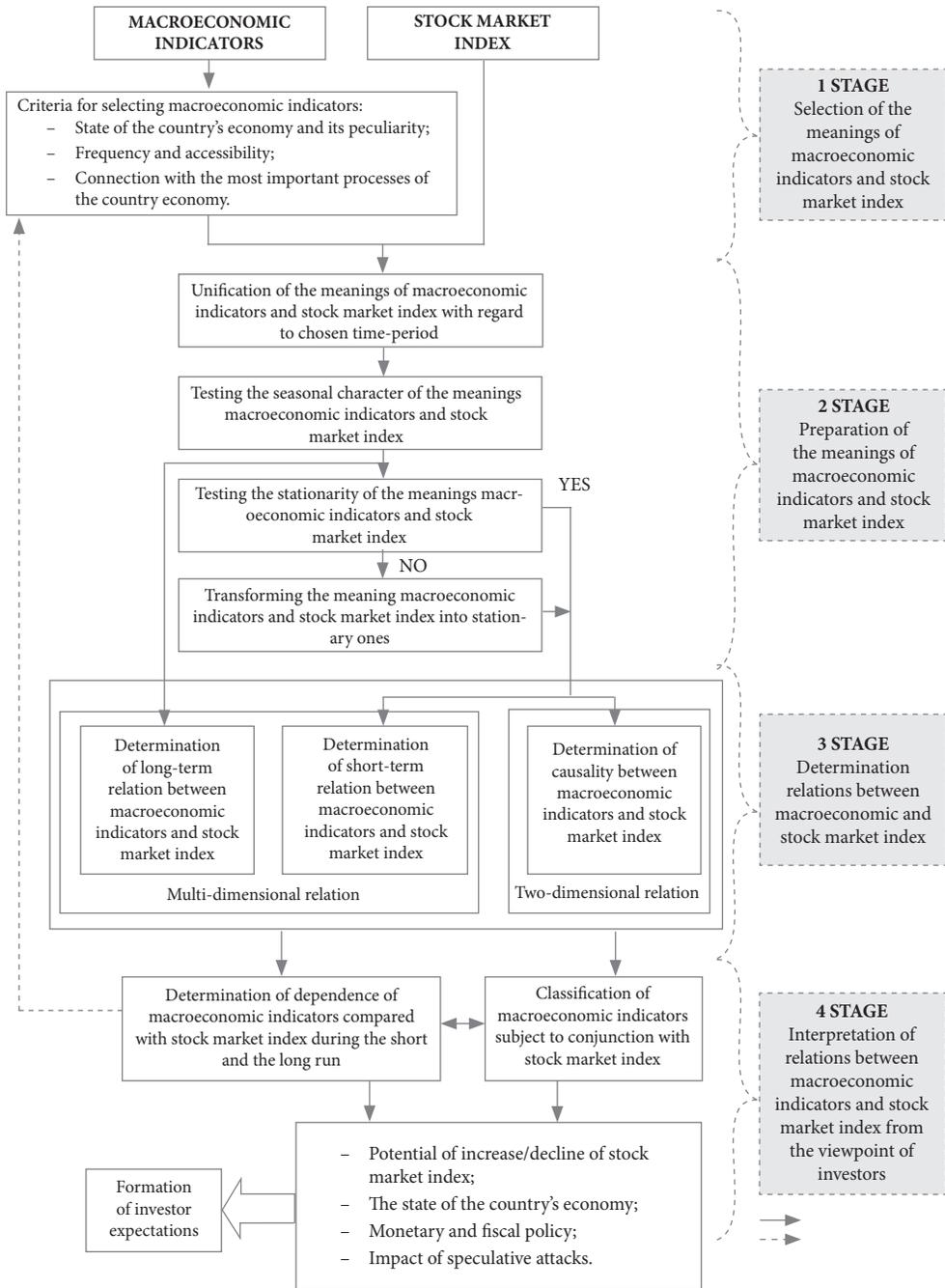


Fig. 1. The model of the impact of macroeconomic indicators on stock market index

causality and dependence. It is important for investors to ascertain the new possible tendencies and according to them to form the expectations connected with their investments.

4. Empirical research of the model of the impact of macroeconomic indicators on stock market index

While analyzing the dependence of stock market index and macroeconomic factors the statistical information of the years 2000–2008 about macroeconomic indicators in Lithuania, Latvia, Estonia and the stock market indices of Vilnius, Riga and Tallinn were used. In order to estimate the impact of macroeconomic indicators of the Baltic countries on stock prices of separate countries a group of macroeconomic indicators, which reflect the state of the countries' economy and its variation, were chosen. They are also accounted in all the countries, can be easily found in databases and are sure to be rather popular. The selected macroeconomic indicators and their abbreviations are presented in Table 1.

Aiming to analyze the causality of macroeconomic indicators and stock market indices Granger causality tests were employed. Vector autoregression was applied to determine the short-term relationship between macroeconomic indicators and stock market index. Johansen cointegration was used to determine the long-term relationship between macroeconomic indicators and stock market indices.

The preparation of the meaning macroeconomic indicators and stock market index was performed in the following stages: 1) Unification of the meaning macroeconomic indicators and stock market index considering to chosen time-period; 2) Testing the seasonal character of the meaning macroeconomic indicators and stock market index; 3) Testing the stationarity of the meaning macroeconomic indicators and stock market index.

Table 1. Macroeconomic indicators and their abbreviations

Indicator	Frequency of accounting of the indicator	Lithuania	Latvia	Estonia
Gross domestic product	Quarterly	BVP_LT	BVP_LV	BVP_EE
Unemployment		NL_LT	NL_LV	NL_EE
Foreign direct investment		TUI_LT	TUI_LV	TUI_EE
State debt		VBS_LT	VBS_LV	VBS_EE
Harmonized consumer price index	Monthly	SVKI_LT	SVKI_LV	SVKI_EE
Money supply		M1_LT	M1_LV	M1_EE
Export		EX_LT	EX_LV	EX_EE
Import		IM_LT	IM_LV	IM_EE
Trade balance		MP_LT	MP_LV	MP_EE
Short-term interest rates	Daily	VILIBOR1M	RIGIBOR1M	TALIBOR1M
Stock market index		OMXV	OMXR	OMXT

In order to unify the frequency of the presented data, i.e. to transform quarterly data into monthly and convert daily data into monthly, the methods of interpolation and the last value were proportionately used. The existence of seasonality in aforementioned time series was tested by CENSUS-12 method.

Stationarity of the data was tested using a unit root test or the ADF test, which showed that most of the macroeconomic indicators are non-stationary at the level. In order to convert available data into stationary the first level difference was performed and later on in order to avoid more errors of statistical analysis for all data the second level difference was carried out.

In order to determine the causality of macroeconomic indicators and stock market index in the Baltic countries Granger causality tests were employed. The results of the tests proved causality relations between macroeconomic indicators and stock market index in these countries by changing the lag from 2 to 12. According to the results, it was possible to classify macroeconomic indicators into three large groups (Table 2).

Table 2. Classification of macroeconomic indicators in the Baltic countries with respect to Granger causality relations and coincidence with stock market index

Groups of macroeconomic indicators	Lithuania (OMXV)	Latvia (OMXR)	Estonia (OMXT)
Leading	IM, MP, VBS	BVP, EX, MP, SVKI, TUI, RIGIBOR1M	
Coincident	TUI	IM,	
Lagging	BVP, EX, M1, VILIBOR1M, TUI	IM, M1, NL, VBS,	BVP, EX, M1, MP, VBS, TALIBOR1M

The short-term relationship between macroeconomic indicators and stock market index was determined while using vector autoregression. The multiple impact of macroeconomic indicators on stock market index of the countries during the short run was determined; the selected macroeconomic indicators in Lithuania, Latvia, Estonia explain proportionately 37%, 39.9%, and 36.4% fluctuations of stock market index (Table 3).

The only indicators that are statistically significant for all three stock market indices are lagged values of the indices themselves. Three of the ten macroeconomic indicators have no significant influence on the stock market indices, i.e. gross domestic product, import and state debt. Impact of the remaining macroeconomic indicators on stock market index varies depending on the country. Six macroeconomic indicators – namely, money supply (lagged by one period), money supply (lagged by two periods), harmonized consumer price index (lagged by one period), foreign direct investment (lagged by two periods), short-term interest rates (lagged by one period), short term interest rates (lagged by two periods) – are statistically significant only for Latvian stock market index.

For determination of long-term relationship between macroeconomic indicators and stock market index Johansen multiple cointegration was applied and cointegration equations were generated. The results revealed the statistical significance of almost all macroeconomic

indicators (Table 4). The extent of unemployment is not statistically significant in Lithuanian and Latvian cointegration equations.

In the case of Latvia harmonized consumer price index is statistically significant only with 90% reliability. In Estonian cointegration equations the indicators of trade balance and short-term interest rates are not statistically significant. It was determined that there is a relationship between the stock market indices of the Baltic States and most of the macroeconomic indicators during the long run with 99% reliability.

Table 3. Vector autoregression equations (the dependent variable – stock market index)

Indices Macro indicators	DDOMXV	DDOMXR	DDOMXT
Constant	-0.675697	-0.695174	-1.306336
DDOMX (-1)	-0.767124***	-0.677795***	-0.757777***
DDOMX (-2)	-0.424101***	-0.376567***	-0.309738**
DDBVP_SA (-1)	-0.010918	-0.000181	-0.043385
DDBVP_SA (-2)	-0.00997	0.000259	-0.014432
DDEX (-1)	-0.00000101	0.144121	-0.004638
DDEX (-2)	0.00000884	0.076427	-0.014367**
DDIM (-1)	-0.00000556	0.031682	0.005946
DDIM (-2)	-0.00000291	-0.005026	0.006667
DDM1 (-1)	0.003755	0.108887**	0.002154
DDM1 (-2)	-0.001641	0.157337***	0.001439
DDMP (-1)	0.0000819**	0.493356	0.002808
DDMP (-2)	0.0000525	-1.189918	-0.006892
DDNL (-1)	0.668438	8.970224	33.42868*
DDNL (-2)	-5.634407	-10.42077	-0.777811
DDSVKI (-1)	-2.091602	-10.13272**	-3.701941
DDSVKI (-2)	-3.311993	0.173839	-2.416015
DDTUI (-1)	-0.0000202*	0.131944	0.0000053
DDTUI (-2)	-0.0000282***	0.456832**	-1.57E-07
DDVBS (-1)	-0.018564	-0.047924	0.030789
DDVBS (-2)	0.017897	0.089127	0.001389
DD_BOR1M (-1)	-6.462568	6.855219***	13.94879
DD_BOR1M (-2)	-1.121748	7.445271***	16.19516
Adj_R_sq	0.370	0.399	0.364

Remark: Statistical significance reflected by *, **, *** represents respectively 90%, 95%, and 99%.

With the reference to the results of performed analysis the following interpretations of the relationships between macroeconomic indicators and stock market index from the viewpoint of investors have been formed:

1. The impact of macroeconomic indicators on stock market index during the long and the short run is different even in the countries with analogous level of economic development.
2. During the short run in the stock markets of small open economy speculative attacks are expected that restricts the possibilities to determine the relationship between macroeconomic indicators and stock market index of the countries.

Table 4. Johansen cointegration equations (the dependent variable – stock market index)

Country Macro indicators	Lithuania	Latvia	Estonia
DOMX	1	1	1
DBVP_SA	0.100213***	0.000708***	-0.332212***
DEX	-0.000213***	-5.687758***	-1.238204***
DIM	0.000313***	-1.711195**	1.272282***
DM1	-0.056196***	-0.589886***	-0.09314***
DMP	-0.000534***	23.02969***	-0.186313
DNL	-5.471307	-4.812104	-144.692***
DSVKI	10.15506***	-10.5103*	118.879***
DTUI	-0.0000091***	3.244314***	29.13173***
DVBS	0.058878***	0.337284**	-0.264429***
D_BOR1M	10.68806***	-22.76964***	21.12663
Konstanta	-2129.278***		

Remark: Statistical significance reflected by *, **, *** represents respectively 90%, 95%, and 99%.

3. During the long run the found significance of the dependence of the relationship between macroeconomic indicators and stock market index increases to 99%.
4. Suggested classification of macroeconomic indicators, grouping them into leading, coincident, lagging subject to the relationship with stock market index, enables to improve the probability of stock market forecasting.
5. Determined direction of macroeconomic indicators compared with stock market index enables to forecast the tendencies of variation of the macroeconomic environment of the country and their impact on stock market also contributes to formation of the investors' decisions.

5. Conclusions

The analysis carried out in this paper reveals that there are many works in economic literature analyzing methodological viewpoints towards the conception of stocks and assessment of stock market. While analyzing the relation between the country's macroeconomic factors and stock market index the scientists mostly focus on well developed stock markets.

As a result of this article, the model of the impact of macroeconomic indicators on stock market index has been created. It enables to present a complex estimation of causality and

dependence of the relation between macroeconomic indicators and stock market index during both short and long runs. Compared with other scientific works this model is consistent and includes methodologically reasonable principles in estimation of the relation between macroeconomic indicators and stock market index.

Application of the model to the Baltic countries reveals the following:

- Granger causality exists between some macroeconomic indicators and stock market indices in the Baltic States. The causality relations seem to be different what can be explained by different monetary and fiscal policies of the countries.
- The short-term relationship was proved by vector autoregression however the multiple impact of macroeconomic indicators on stock market index of the countries is explained only by 37% (Lithuania), 39.9% (Latvia), and 36.4% (Estonia).
- The long-term relationship was disclosed by Johansen multiple cointegration and the relationship between the stock market indices and nearly all macroeconomic indicators exhibit a reliability of 99%.
- The investor should pay attention to the different impact of macroeconomic indicators on stock market index in the Baltic States what clearly proves the existence of speculative attacks in the aforementioned economies. The relation of macroeconomic indicators and stock market indices is much more reliable in the long run.

References

- Adam, A. M.; Tweneboah, G. 2008. *Macroeconomic Factors and Stock Market Movement: Evidence From Ghana*. Social Science Research Network [online]. Available from Internet: <<http://ssrn.com/abstract=1289842>>.
- Agrawalla, R. K.; Tuteja, S. K. 2007. Causality between stock market development and economic growth: a case study of India, *Journal of Management Research* 7(3): 158–168.
- Ahmed, S. 2008. Aggregate economic variables and stock markets in India, *International Research Journal of Finance and Economics* 14: 141–163.
- Backhouse, R. 2002. *Interpreting Macroeconomics Explorations in the History of Macroeconomic Thought*. London: Routledge.
- Bikker, J. A.; Kennedy, N. O. 1991. Composite leading indicators of underlying inflation of seven EU countries, *Journal of Forecasting* 18: 225–258. doi:10.1002/(SICI)1099-131X(199907)18:4<225::AID-FOR722>3.0.CO;2-P
- Binswanger, M. 2000. Stock market booms and real economic activity: is this time different? *International Review of Economics & Finance* 9(4): 387–415. doi:10.1016/S1059-0560(99)00056-8
- Blaug, M. 1997. *Economic Theory in Retrospect*. Cambridge: Cambridge University Press.
- Bodie, Z.; Kane, A.; Marcus, A. J. 2006. *Investments*. London: McGraw-Hill/Irwin.
- Chaudhuri, K.; Smile, S. 2004. Stock market and aggregate economic activity: evidence from Australia, *Applied Financial Economics* 14: 121–129. doi:10.1080/0960310042000176399
- Chen, S. S. 2009. Predicting the bear stock market: macroeconomic variables as leading indicators, *Journal of Banking & Finance* 33(2): 211–223. doi:10.1016/j.jbankfin.2008.07.013
- Cheng, A. C. S. 1995. The UK stock market and economic factors: a new approach, *Journal of Business Finance and Accounting* 22(1): 129–142. doi:10.1111/j.1468-5957.1995.tb00675.x

- Chong, C. S.; Goh, K. L. 2004. Linkages of economic activity, stock prices and monetary policy: the case of Malaysia, in *Proceedings of the Malaysian Finance Association Sixth Annual Symposium*, Universiti Utara Malaysia, Sintok, 754–767.
- Čiegis, R.; Ramanauskienė, J.; Startienė, G. 2009. Theoretical reasoning of the use of indicators and indices for sustainable development assessment, *Inžinerine Ekonomika – Engineering Economics* (3): 33–40.
- Clare, A. D.; Thomas, S. H. 1994. Macroeconomic factors, the APT and the UK stock market, *Journal of Business Finance and Accounting* 2: 309–330. doi:10.1111/j.1468-5957.1994.tb00322.x
- Dallas, G. S. 2004. *Governance and Risk – an Analytical Handbook for Investors, Managers, Directors, and Stakeholders*. McGraw-Hill Professional.
- Darnay, A. J. 1998. *Economic Indicators Handbook: Time Series, Conversions, Documentation*. Detroit: Gale.
- Dritsaki, C.; Adamopoulos, A. A. 2005. Causal relationship and macroeconomic activity: empirical results from European Union, *American Journal of Applied Science* 2(2): 504–507. doi:10.3844/ajassp.2005.504.507
- Dritsaki, M. 2005. Linkage between stock market and macroeconomic fundamentals: case study of Athens stock exchange, *Journal of Financial Management and Analysis* 18(1): 38–47.
- Dua, P. 2004. *Business Cycles and Economic Growth: an Analysis Using Leading Indicators*. Oxford University Press.
- Dumludag, D. 2009. An analysis of the determinants of foreign direct investment in Turkey: The role of the institutional context, *Journal of Business Economics and Management* 10(1): 15–30. doi:10.3846/1611-1699.2009.10.15-30
- Ginevičius, R.; Podvezko, V. 2009. Evaluating the changes in economic and social development of Lithuanian countries by multiple criteria methods, *Technological and Economic Development of Economy* 15(3): 418–436. doi:10.3846/1392-8619.2009.15.418-436
- Girdzijauskas, S.; Štreimikienė, D.; Čepinskis, J.; Moskaliova, V., et al. 2009. Formation of economic bubbles: causes and possible preventions, *Technological and Economic Development of Economy* 15(2): 267–280. doi:10.3846/1392-8619.2009.15.267-280
- Girdzijauskas, S.; Štreimikienė, D. 2009. Application of logistic models for stock market bubbles analysis, *Journal of Business Economics and Management* 10(1): 45–51. doi:10.3846/1611-1699.2009.10.45-51
- Kumpikaitė, V.; Čiarnienė, R. 2008. New training technologies and their use in training and development activities: Survey evidence from Lithuania, *Journal of Business Economics and Management* 9(2): 155–159. doi:10.3846/1611-1699.2008.9.155-159
- Kwon, C. S.; Shin, T. S. 1999. Cointegration and causality between macroeconomic variables and stock market returns, *Global Finance Journal* 10(1): 71–81. doi:10.1016/S1044-0283(99)00006-X
- Lakštutienė, A. 2008. Correlation of the indicators of the financial system and gross domestic product in European Union countries, *Inžinerine Ekonomika – Engineering Economics* (3): 7–18.
- Laopodis, N. T. 2007. Fiscal policy, monetary policy, and the stock market, *Annual International Conference on Macroeconomic Analysis and International Finance* [online]. Available from Internet: <[http://www.fma.org/Barcelona/Papers/ StocknFiscalPolicy.pdf](http://www.fma.org/Barcelona/Papers/StocknFiscalPolicy.pdf)>.
- Martinez, M. A.; Rubio, G. 1989. *Arbitrage Pricing with Macroeconomic Variables: An Empirical Investigation using Spanish Data*. Working Paper, Universidad del Pais Vasco.
- Maysami, R. C.; Koh, T. S. 2000. A vector error correction model of the Singapore stock market, *International Review of Economics and Finance* 9: 79–96. doi:10.1016/S1059-0560(99)00042-8

- Melnikas, B. 2008. Integral spaces in the European Union: possible trends of the social, economic and technological integration in the Baltic region, *Journal of Business Economics and Management* 9(1): 65–77. doi:10.3846/1611-1699.2008.9.65-77
- Mohr, P. 1998. *Economic Indicators*. Pretoria: Unisa Press.
- Mookerjee, R.; Yu, Q. 1997. Macroeconomic variables and stock prices in a small open economy: The case of Singapore, *Pacific-Basin Finance Journal* 5: 377–388. doi:10.1016/S0927-538X(96)00029-7
- Mukherjee, T. K.; Naka, A. 1995. Dynamic relations between macroeconomic variables and the Japanese stock market: an application of a vector error correction model, *Journal of Financial Research* 18(2): 223–237.
- Nasseh, A.; Strauss, J. 2000. Stock prices and domestic and international macroeconomic activity: a cointegration approach, *Quarterly Review of Economics and Finance* 40(2): 229–245. doi:10.1016/S1062-9769(99)00054-X
- Nishat, M.; Shaheen, R. 2004. Macroeconomic factors and Pakistani equity market, *The Pakistan Development Review* 43(4): 619–637.
- Norvaišienė, R.; Stankevičienė, J.; Krušinskas, R. 2008. The impact of loan capital on the Baltic listed companies' investment and growth, *Inžinerine Ekonomika – Engineering Economics* (2): 40–48.
- Padhan, P. C. 2007. The nexus between stock market and economic activity: an empirical analysis for India, *International Journal of Social Economics* 34(10): 741–753. doi:10.1108/03068290710816874
- Panetta, F. 2002. The stability of the relation between the stock market and macroeconomic forces, *Economic Notes* 31(3): 417–450. doi:10.1111/1468-0300.00093
- Pilinkus, D.; Boguslauskas, V. 2009. The short-run relationship between stock market prices and macroeconomic variables in Lithuania: An application of the impulse response function, *Inžinerine Ekonomika – Engineering Economics* (5): 26–34.
- Rogers, R. M. 1998. *Handbook of Key Economic Indicators*. New York: McGraw-Hill.
- Russell, R. 1985. *Sharing Ownership in the Workplace*. New York: State University of New York Press.
- Rutkauskas, A. V.; Miečinskienė, A.; Stasytytė, V. 2008. Investment decisions modelling along sustainable development concept on financial markets, *Technological and Economic Development of Economy* 14(3): 417–427. doi:10.3846/1392-8619.2008.14.417-427
- Shim, J. K.; Siegel, J. G. 2000. *Financial Management*. Barron's Educational Series.
- Silverstovs, B.; Duong, M. H. 2006. *On the Role of Stock Market for Real Economic Activity: Evidence for Europe*. DIW Berlin Discussion Paper 559, German Institute for Economic Research [online]. Available from Internet: <<http://opus.zbw-kiel.de/volltexte/2007/6273/pdf/dp599.pdf>>.
- Snieška, V. 2008. Research into international competitiveness in 2000–2008, *Inžinerine Ekonomika – Engineering Economics* (4): 29–41.
- Snieška, V.; Laskienė, D.; Pekarskienė, I. 2008. Stock returns and the macroeconomic environment: The case of the Vilnius stock exchange, *Transformations in Business & Economics* 7(2): 115–129.
- Teresienė, D.; Aarma, A.; Dubauskas, G. 2008. Relationship between stock market and macroeconomic volatility, *Transformations in Business & Economics* 7(2) Supplement B: 102–114.
- Tsai, M. T.; Lee, K. W. A. 2006. Study of knowledge internalization: from the perspective of learning cycle theory, *Journal of Knowledge Management* 10(3): 57–71. doi:10.1108/13673270610670858
- Tsoukalas, D. 2003. Macroeconomic factors and stock prices in the emerging Cypriot equity market, *Managerial Finance* 29(4): 87–92. doi:10.1108/03074350310768300
- Tvaronavičius, V.; Tvaronavičienė, M. 2008. Role of fixed investments in economic growth of country: Lithuania in European context, *Journal of Business Economics and Management* 9(1): 57–64. doi:10.3846/1611-1699.2008.9.57-64

MAKROEKONOMINIAI RODIKLIAI IR JŲ ĮTAKA AKCIJŲ RINKOS INDEKSUI TRUMPUOJU IR ILGUOJU LAIKOTARPIU: BALTIJOS ŠALIŲ ATVEJIS**D. Pilinkus**

Santrauka

Straipsnyje nagrinėjama, kaip kompleksiskai įvertinti makroekonominių rodiklių įtaką akcijų rinkos indeksui. Atlikti teoriniai tyrimai leido sukurti modelį, kuris kompleksiskai įvertintų makroekonominių rodiklių ir akcijų rinkos indekso sąryšio priežastingumą bei priklausomybę trumpuoju ir ilguoju laikotarpiu. Nustatyta, kad objektyvus šio sąryšio nustatymas turi remtis ne tik tinkamų makroekonominių rodiklių parinkimu, bet ir pagrįsta tyrimo metodologija, kompleksiskai įvertinančia makroekonominių rodiklių ir akcijų rinkos indekso sąryšio pokyčius trumpuoju bei ilguoju laikotarpiais. Tiriant priklausomybę tarp akcijų kainų ir makroekonominių veiksnių buvo naudojami statistiniai 2000–2008 m. Lietuvos, Latvijos ir Estijos makroekonominių rodiklių bei Vilniaus, Rygos ir Talino vertybinių popierių biržos indekso duomenys. Siekiant įvertinti Baltijos šalių makroekonominių rodiklių įtaką atskirų šalių akcijų kainoms, pasirinkti tokie makroekonominiai rodikliai, kurie perteikia šalių ekonomikos būklę ir jos kitimą, skaičiuojami visose šalyse, lengvai prieinami statistinių duomenų šaltiniuose ir yra gana populiariūs. Remiantis atlikto tyrimo rezultatais, suformuotos makroekonominių rodiklių ir akcijų rinkos indekso sąryšių interpretacijos investuotojo požiūriu.

Reikšminiai žodžiai: makroekonominiai rodikliai, akcijų rinkos indeksas, OMXV, OMXR, OMXT, Lietuva, Latvija, Estija.

Donatas PILINKUS. Lecturer, Doctor of Social Sciences (Economics) at the Vilnius University, Kaunas Faculty of Humanities (Lithuania). The major areas of interest are stock market analysis, investment strategies, risk management. Other interests are concerned with economic forecasting, investment portfolio management, international trade.