Estimation of Investment Perspectives in the Baltic Stock Market

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Abstract. Short analysis of stock market and stock indices of Baltic countries is presented in the article. Theoretical aspects of importance of fundamental economic analysis, presented by Lithuanian and foreign authors for investigation of investment market is analysed and presented in the research. Research of correlation analysis and stochastic dependence test between chosen stock indices and macroeconomic indicators of Baltic countries is fulfilled. After analysis of the 2004–2013 year period statistics, the relationship between macroeconomic indicators and stock indices in the long term is established. After evaluating the results of the research, macroeconomic indicators, mostly influencing the changes in Baltic stock markets are picked out and their influence on stock indices is described. Investment perspectives in the Baltic stock market are estimated in the near future using macroeconomic forecastings of every country.

Keywords: Baltic stock market, stock indices, macroeconomic indicator, correlation analysis, gross domestic product, unemployment.

JEL Classification: G10, G11, G15.

Conference topic: Financial Risk Management of Business Development.

Introduction

People with free financial resources can choose between many possibilities to invest them. One of such possibility is to invest into stocks. Stocks usually generate bigger profitability than average in comparison with other types of investments. But from the other side the bigger risk should be taken, because the revenues are not clearly described (as in the case of deposits and bonds) and stock prices can fall in the secondary market. In order to reduce the uncertainty it is possible to analyze factors that are related with changes of stock market. Understanding how various economic measurements influence investment returns is vital for investors. One of such possibilities is fundamental analysis. Usually fundamental analysis consists of three steps that is economic or macroeconomic indicators analysis, industry sector analysis and enterprise analysis. According to these steps first of all country attractive for investments should be chosen. In the second step the investor has to choose industry sector that should be perspective during the coming years and only then the enterprise should be chosen whose stocks are valuable to invest and whose mission corresponds with investment purposes of the investor.

Economic analysis indicates if the time is suitable for investing of money. According to Kancerevičius (2009) general effects of the market cause about 30–50 percent of changes of separate stock prices. The research made in the year 2014 by two German professors and named "Capital Markets and Economic Growth – Long-Term Trends and Policy Challenges" showed that growing stock market directly influences the growth of economy. The influence is measured as 1 to 1 (Kaserer, Rapp 2014). Such fact confirm that the relationship between country economics and stock market exists.

It is presented in literature that relationship between economic indicators and stock market exist, but this relationship is poorly analyzed in practice. Authors analyze little the direction of relationship that is how the meaning of stock index would change in the case of meaning change of separate economic indicators. Frequently in various literature sources analysis of developing and developed countries stock markets are presented. But development level of economy and macroeconomic changes going in Lithuania and other Baltic countries in some cases differ though from developed countries, though from developing countries. Dependence between macroeconomic indicators of Baltic countries and stock indices is investigated in the article.

Object of the article is Baltic stock market indices and macroeconomic indicators.

Purpose of the article is to estimate investment perspectives in Baltic stock market using correlation between macroeconomic indicators of Baltic countries and stock indices.

Tasks of the research are:

− to analyze Baltic stock market;
− to make the research on dependency between macroeconomic indicators of Baltic countries and stock indices;
− to describe the impact of macroeconomic indicators on stock market;
− to evaluate investment perspectives in Baltic stock market.

Methods used for the research are systemic analysis of scientific literature, correlation analysis and stochastic dependency between separate indicators, comparison of data and generalization.

Stock market analysis of Baltic countries

NASDAQ Baltic market is composed of three exchanges that is NASDAQ OMX Tallinn, NASDAQ OMX Riga and NASDAQ OMX Vilnius. All three exchanges use the same trading system, coordinated trading rules and trading practice (NASDAQ Baltic 2015a).

According to numbers of companies included in the trading lists of Baltic countries exchanges. Lithuanian stock market makes about 43 percent of all Baltic stock market, Latvian makes about 37 percent and Estonian market makes about 20 percent of all Baltic stock market (see Table 1). In 2014 the biggest number of realized contracts and distributed stocks was reached in Lithuania stock market and the smallest one was in Latvia stock market. 57420 contracts were realized and about 136 MM stocks were distributed in Lithuania.

Table 1. Capitalization and other statsitics in the Baltic stock market in 2014 (Source: prepared by the authors, using trading lists and capitalization of NASDAQ Baltic 2015a)

Market	Equity list		Number of contracts	Number of distributed stocks	Turnover, million. EUR	Market capitalization, million. EUR		
	Main	Secondary				2013.12.30	2014.12.30	Change
Nasdaq Vilnius	16	19	57420	135801117	79.07	2906.71	3330.43	14.58%
Nasdaq Ryga	5	25	14177	5308327	17.26	947.97	860.32	−9.25%
Nasdaq Talinas	13	3	43227	79110487	127.35	1876.59	1663.00	−11.38%
Nasdaq Baltic	34	47	114824	220219931	223.68	5731.27	5853.75	2.14%

During analyzed period in Estonian market 43227 contracts were realized and more than 79 MM stocks were distributed. Turnover of realized contracts was the biggest in Estonia (127 MM EUR), in Lithuania it was about 79 MM EUR and in Latvia it was just about 17 MM EUR.

Value of Lithuanian stock market is the biggest. If to compare the results of 2014 and 2013, capitalization of Lithuanian stock market increased about 15 percent and reached 3330 MM EUR. Capitalization of Estonian and Latvian stock markets decreased during analysed period. Capitalization of Estonian market decreased more than 11 percent and was 1663 MM EUR, and capitalization of Latvian market decreased about 9 percent and was 860 MM EUR.

81 company is quoted in NASDAQ Baltic stock exchange, 34 companies are included in the main list and the rest of them are included in the secondary list. In comparison of the results in 2014 and 2013 the market capitalization of all companies increased about 2.14 percent and was equal to 5854 MM EUR.

NASDAQ Baltic index consists of few other indexes that is OMX Baltic Benchmark, OMX Baltic 10, OMX Baltic, OMX Tallinn, OMX Riga, OMX Vilnius and Industry Classification Benchmark. It was chosen to analyse three stock indices of Baltic market: OMX Vilnius (OMXV), OMX Riga (OMXR) and OMX Tallinn (OMXT). These indices reflect the present situation in every Baltic country's stock market and its changes, because they include all companies involved in main and secondary lists (NASDAQ Baltic 2015b).

It can be seen from Figure 1 that Lithuanian stock index OMXV was growing faster than other stock indexes (see Fig. 1) during analyzed period. OMXV increased about 7.31 percent during the period of one year and at the end of the year 2014 was equal to 452.42. Estonian stock index decreased about 7.66 percent during one year but still was the highest one and at the end of 2014 it reached the level of 755.05. Latvian stock index decreased about 11.32 percent during one year and was equal to 408.03. General Baltic stock market index OMXBBGI decreased to 7.65 percent and was equal to 566.56.
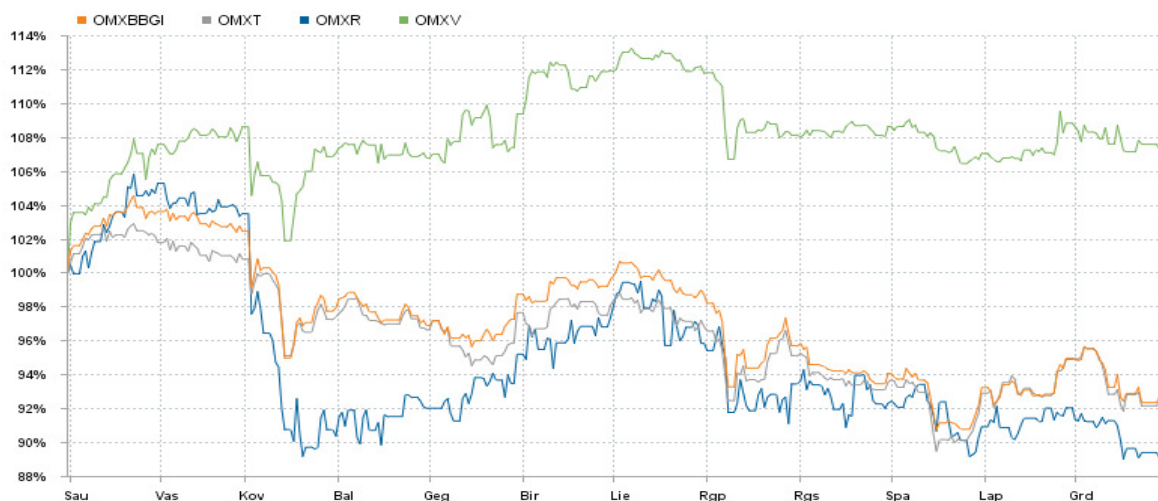
Fig. 1. Baltic stock market indices, 2014 (Source: NASDAQ Baltic 2015c)

Seeking to evaluate investment perspectives in Baltic stock market it will be researched how and in what direction stock indices change in comparing with changes of macroeconomic indicators.

Theoretical aspects of fundamental macroeconomic indicators

Cibulskiene and Butkus (2009) state that fundamental analysis is used seeking to determine the changes of stock prices or indices. According to the authors fundamental analysis investigates everything that is out of the limits of stock market. The essence of the analysis is to research the factors, influencing value. Fundamental analysis consists of analysis of macroeconomic indicators of investment market, analysis of industry sector and analysis of separate companies. In the article fundamental economic analysis will be used in order to investigate the movement of stock indexes taking into account macroeconomic indicators. According to Valentinavičius (2010) possibility to forecast in the macroeconomic level can help to invest successfully.

Evaluation of investment perspectives in stock markets, using fundamental analysis, requires detailed analysis of many indicators. Different authors separate different indicators of fundamental analysis in their scientific publications, dissertations or books that are suggested to analyze estimating investment process (see Table 2). Rutkauskas and Martinkutė (2007) in their book don't distinquish any macroeconomic indicators while speaking about fundamental analysis.

In their works authors (Brazauskas 2014; Cibulskienė, Butkus 2009; Jurevičienė 2008; Kancerevičius 2009; Rasimavičius 2000; Rutkauskas, Martinkutė 2007; Rutkauskas, Stankevičius 2006; Valentinavičius 2010; Žilinskij, Rutkauskas 2012) state that it is necessary to make fundamental economic analysis while investigating investment market, they point at economic indicators that are purposeful to analyze and what these indicators mean and how they affect share prices. But many authors present just theoretical aspects of analysis and don't ground them by using market research (Cibulskienė, Butkus 2009; Jurevičienė 2008; Rutkauskas, Martinkutė 2007; Rutkauskas, Stankevičius 2006; Valentinavičius 2010). Analysis of USA or other developed and developing countries marekts are mostly presented in the books or internet sources (Anokye, Tweneboah 2008; Khan 2011; Kriščiulaitytė 2008; MC Wealth Management 2014; Nishat, Shaheen 2004; Talla 2013; Vejzagic, Zarafat 2013). During the last years analysis of Eurozone become quite popular.

Baranauskas (2010) and Danilenko (2009) investigated correlation between various macroeconomic indicators and stock indices. Koncevičienė and Janickaitė (2011) researched the influence of macroeconomic indicators on earnings per share of separate sectors enterprises quoted in NASDAQ OMX Vilnius. The authors established that GDP, industry production, interest rates are the most important indicators of undiversified risk that significantly decide changes of earnings per share. Inflation, money supply, currency rates, prices of oil usually are important for establishment of expected earnings per share.

It was chosen to analyze these macroeconomic ratios of Baltic market: GDP, inflation, unemployment rate, public debt, foreign direct investments and consumer trust. Ratios were chosen because of their recurrence frequency in scientific works and because of the possibility to find historical data in historical sources.

Macroeconomic indicators are related with activity of country's economy, its development and direction. GDP is one of the main economic indicators that influences enterprises and households. This indicator reflects the growth of country's economy and shows how much the economy made of production and provided services during the exact period of time.

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Table 2. Fundamental indicators of investment attractiveness into the stock market (Source: prepared by the authors)

Source	Suggested indicators for the analysis
Brazauskas (2014)	Growth of sales, growth of profit, net profitability, return on equity, debt and equity ratio, share price and book value ratio, share price and current assets ratio, share price and earnings per share ratio, dividend yield.
Cibulskienė and Butkus (2009)	Macroeconomic indicators: growth of inflation, volume of foreign direct investments, gross domestic product, unemployment rate, consumer price index, budget deficit, changes of interest rates, foreign trade balance. Sector indicators: sales volume, share price and earning per share ratio, level of competition, profitability level, solvency level. Companies' activity indicators: sales volume, profitability level of sales, level of profitability of assets and capital, financial structure and turnover ratios, level of liquidity (solvency), share price and profitability ratio, share face value, level of dividends.
Jurevičienė (2008)	Macroeconomic indicators such as general domestic product, unemployment, inflation, interest rate, expectations of consumers.
Kancerevičius (2009)	Economic situation and economic politics of the country: GDP and its dynamics, monetary politics, foreign trade balance and its changes, inflation, level of unemployment, competiveness, fiscal politics, sensitiveness of economics for the price of energetic resources, currency prices and interest rates. Political situation in the country: political changes in the country, possibility of manifestation, appearance time and strength of non-constitutional and brutal powers, preparation of government to control changes, relationships of the country with other states. Social situation in the country: changes in the volume of inhabitants, dislocation of assets and revenues, country's climate and possibility of catastrophes. Ratios of the company: earnings per share, return on equity, return on assets, financial leverage, net margin, asset turnover, efficiency of activities, windfall profits.
Žilinskij and Rutkauskas (2012)	Change of stock price, growth of enterprise turnover, profitability, net profit, change of rate between activity expenses and turnover, changes in assets, change of assets turnover, changes of returns on equity, debt and equity ratio, general liquidity, share price and book value ratio, share price and earning per share ratio, standard deviation of share price change, change of share turnover, dividend yield, difference between share price changes and turnover change.
Khan (2011) and Quadir (2012)	Macroeconomic indicators: exchange rate, interest rate, inflation rate and GDP.
Talla (2013)	Macroeconomic indicators: cnsumer price index, inflation rate, exchange rate, money supply, interest rate.
Geetha *et al.* (2011)	Macroeconomic indicators: expected inflation rate, unexpected inflation rate, exchange rate, interest rate and GDP.

GDP is closely connected with inflation that reflects general level of growth of prices. High inflation usually is equated with the economics when demand of goods and services exceeds production produced. In many countries inflation is one of the main economic problems.

Valentinavičius (2010) and Kancerevičius (2009) state that inflation and unemployment are economic problems that contradict each other and all countries have to solve them. In order to reduce the unemployment, economic power should be increased but this action courses bigger inflation.

Foreign direct investments have positive impact on the growth of economy. Foreign direct investments promote creation of new working places, instilment of progressive management models and modern technologies into enterprises and development of country's export at the same time.

Public debt is connected with government budget. The main purpose of borrowing is to finance budget deficit. When the government seeks to finance big difference between revenues and expenses and don't want to enlarge taxes, it borrows faster.

It could be concluded that macroeconomic indicators are important to analyze because they show economic situation of the country. Good economic indicators create favorable conditions for development of business and stock market.

Theoretical substantiation of correlation analysis

It is analyzed in the article how stock indices of separate Baltic countries (OMXV, OMXR, OMXT) depend on macroeconomic indicators of corresponding country that is to what direction they move in comparing with changes of separate macroeconomic indicators. Stochastic data of the year 2004–2013 was used for the research though direction of changes of stock indices was set in the long period.

To set the dependency quantitative decision making method such as correlation analysis is used. It is estimated during correlation analysis what macroeconomic indicators (Y) have stochastic relation with stock indices (X). Correlation coefficients *r* between stock indices and chosen macroeconomic indicators of separate countries are calculated using paired correlation analysis.

Correlation coefficient values range from –1 to 1, and the sign near the value indicated the direction of the correlation. Thus, when the value of correlation coefficient is positive we can assume that the greater X variable value is, the greater will be the Y value as well. Accordingly, when the value of correlation coefficient is negative as the independent variable value increases, the dependent variable, vice versa, decreases. When correlation coefficient is equal to 0, two variables are called not correlated variables. Thus if there exists two variables, and ne of them does not depends on other, their correlation coeficinet value will be equal 0 and they will be not correlated. If correlation coeficinet value is equal to 1, that does not simply mean that two variables are correlation according to Pabedinskaitė (2005), it means that very strong relationship between two variables exists, it could be even functional.

Correlation coefficient *r* is calculated using formula (Pabedinskaitė 2005):

$$r = \frac{\frac{1}{n-1}\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{S_x S_y}} ,\qquad(1)$$

where: $\bar{x}, \bar{y}$ are sample means, S_x, S_y, are standart deviations. CORREL function of the Excel was used for calculation of correlation coeficient.

Stochastic dependency is determined by estimating significance of correlation coefficient. If the value of the correlation coefficient is significant, one can assume that there exists stochastic relationship between the variables. Significance could be tested using *t* – statistics, which could be found using this formula:

$$t = \left| r\sqrt{\frac{n-2}{1-r^2}} \right|,\qquad(2)$$

where: *t* – is the value of the statistics, *r* – correlation coefficient, *n* – number of the observations.

Calculated *t-value* is compared to the critical *t-value* $t_{\alpha,k}^{cr}$. If the calculated value of *t* is greater than the critical value, then we can assume that correlation coefficient is significant. Critical value could be found in the Student *t*-statistics value table using the chosen level of significance α (in this regression level of the significance chose will be $\alpha = 0.05$) and the number of the degrees of freedom *k* ($k = n - 2$). If calculated t-value is lower than the critical one, we cannot assume that there is relationship between the variables. For the calculation of critical values TINV ($\alpha = 0,05$) function of EXCEL program was used and for calculation of value of the statistics 2 formula was used.

The results of the research

The results of the research of correlation analysis and stochastic dependency between Baltic stock market indices and macroeconomic indicators is presented in Table 3.

It was established during the research that the strongest relationship in Lithuanian market exists between stock index OMXV and intensity of foreign direct investments and stock index OMXV and real annual change in GDP. Correlation coefficients between these indicators were equal to 0.655 and 0.650 correspondingly. It means that OMXV and intensity of foreign direct investments and annual change in GDP have average direct dependence. Weaker inverse relationship exists between OMXV and unemployment rate. Correlation coefficient is equal to –0.59. Weak direct relationship is between stock index OMXV and consumer trust ratio (*r* = 0.483). It was found that OMXV and average annual inflation and public debt don't correlate, their correlation coefficients are equal correspondingly to –0.116 and 0.194. Research of stochastic relationship showed that relationship exists between OMXV, foreign direct investments and GDP annual changes in Lithuania. Changes of independent variables such as intensity of foreign direct investments and annual GDP, changes dependable variable stock index OMXV to the same direction.

Correlation analysis of Latvian market showed that the strongest relationship is between stock index OMXR and foreign direct investments and between OMXR and unemployment rate. Strong direct relatioship is between OMXR and foreign direct investments. OMXR and unemployment rate have strong inverse relationship. OMXR and GDP, OMXR and consumer trust ratio have average direct relationship, their correlation coefficients are 0.717 and 0.631

correspondingly. Average inverse relationship exists between OMXR and public debt, correlation coefficient is equal to –0.642. The weakest direct relationship was found between OMXR and average annual inflation rate. It can be concluded that stochastic relationship exist between OMXR and such indicators as foreign direct investment, unemployment rate, annual changes of GDP and public debt. Changes of these macroeconomic indicators influence changes of stock index OMXR.

Table 3. Correlation analysis and stochastic relationship between Baltic stock market indices and macroeconomic indicators 2004–2013 (Source: prepared by the authors using NASDAQ Baltic 2015d, 2015e and Eurostat 2014)

Indicators	Lithuanian OMXV		Latvian OMXR		Estonian OMXT		t_{cr}
	r	t	r	t	r	t	
Real GDP, annual change, %	0.650	2.418*	0.717	2.910*	0.564	1.933	2.306
Average annual inflation, %	0.194	0.559	0.445	1.405	0.302	0.897	
Unemployment rate, %	−0.590	2.066	−0.832	4.234*	−0.497	1.622	
Public debt, MM Eur	−0.116	0.331	−0.642	2.371*	0.277	0.814	
Intensity of foreign direct investments (ratio with GDP), %	0.655	2.455*	0.879	5.205*	−0.032	0.090	
Consumer trust index, %	0.483	1.561	0.631	2.302	0.481	1.550	

Note: stochastic dependence between compared indicators exists, because $t > t_{cr}$.

Correlation analysis of Estonian indicators showed that the strongest relationship is between OMXT and annual change of GDP. Average direct relationship between these indicators exist. Their correlation coefficient r is equal to 0.564. Weak direct relationship exists between OMXT and such ratios as consumer trust index, average annual inflation rate, and public debt. Correlation coefficient is equal to less than 0.5. Relation between OMXT and unemployment level has weak inverse relationship. Index OMXT is not correlated with intensity of foreign direct investments. Research made on stochastic dependency showed that there is no dependency between analyzed macroeconomic indicators and stock index OMXT.

The research of correlation and stochastic dependency of Baltic stock indices and macroeconomic indicators confirmed the statements of other authors that relationship between stock indices and macroeconomic indicators exists. But it was indicated during the research that relationship of different strength level between stock indices of separate countries and their macroeconomic indicators exists. The relationship can even be of different directions. It was ascertained that OMXV and OMXR have inverse relationship, and OMXT has direct relationship with public debt.

Concluding the results of the research macroeconomic indicators, influencing the changes of Baltic stock market can be distinquished: annual change of real GDP, unemployment level, public debt and foreign direct investments. Interpretations how changes of these macroeconomic indicators could influence stock market are presented in the next section.

Influence of macroeconomic indicators on stock market

It was indicated during the research that stock indices and GDP have direct dependency that is their changes have the same direction. GDP reflects the growth of country's economy, it shows how much the economy made of production and delivered services during some period of time. Growing economy have positive effect on households' revenues and their possibility to invest in stock market. Because of this reason stock demand and prices increase. Growing GDP also improve financial results of enterprises and this improvement increase investment attractiveness of stocks though for locals though for foreign investors that expect bigger dividends.

The research showed that stock indices and unemployment rate have indirect dependency between each other that is they change in different directions. Increasing unemployment rate decreases revenues of households and possibilities to invest free means into the stocks. Because of this reason stock demand decrease, turnover decline and stock prices fall.

During the research it was found that stock indices and public debt can have bouth direct and inverse dependency. Direct dependency is when the government doesn't increase taxes in order to conform incomes to expenditures but it lends money and compensates stable taxes.

If lower taxes are paid incomes of households are increasing and possibility to invest into the stocks is bigger. This fact influences growing demand and prices of stocks and other securities. Lower taxes also influence financial results and value of stocks.

Inverse dependency can be explained through bigger taxes. Growing public debt and difference between budget incomes and expenditures induce government to enlarge taxes. As households have to pay more for the taxes, their

possibilities to invest become smaller. Bigger taxes have negative impact on financial results of companies and their stocks become less attractive for the investors.

After the research it was established that stock indices and foreign direct investments are directly dependent and change to the same direction. Growing foreign direct investments decide creation of new working places, decrease unemployment and increase GDP. Thou growth of foreign direct investments have positive influence on investment perspectives in stock market.

Further investment possibilities in the Baltic stock market are estimated using macroeconomic forecasts.

Estimation of investment perspectives in Baltic stock market

In 2014 annual change of Lithuanian and Latvian real GDP was equal to 2.9 percent, in Estonia it was about 1.2 percent. It is forecasted that during three coming years Lithuanian economy is going to grow faster and faster. In 2015 it should be 3.4 percent, in 2016 it should be 3.8 percent and in 2017 it should be 4.3 percent (Ministry of Finance Republic of Lithuania 2014). Forecasting of Estonian economy are: in 2015 economy growth is going to be 1.3 percent, in 2016 it will reach even 2.8 percent (Ministry of Finance Republic of Estonia 2014). In 2015 Latvian economy is going to grow about 0.1 percent, in 2016 and in 2017 it can reach 3.3 percent and 3.6 percent (Ministry of Finance Republic of Latvia 2014).

In 2014 unemployment level in Lithuania was 11.2 percent, in Latvia it was 10.8 percent and in Estonia it was 7.5 percent. It is forecasted that unemployment level is going to decrease in Baltic countries. In 2015 it should be equal to 10.4 in Lithuania, 10.1 in Latvia and 6.8 in Estonia. In 2016 percents correspondingly are 9.6, 9.5 and 6.4, in 2017 they are 8.6, 8.8 and 6.1 (Ministry of Finance Republic of Lithuania 2014; Ministry of Finance Republic of Latvia 2014; Ministry of Finance Republic of Estonia 2014).

Generally economy of Baltic countries is going to grow in the nearest future. Unemployment is going to decrease. The research showed that growing economy and decreasing unemployment have positive influence on Baltic stock market. Because of the mentioned factors incomes of households will increase as the possibility to invest. This has to increase the demand and better investment perspectives in Baltic stock market.

Conclusions

Importance of macroeconomic indicators in the investment process is distinquished in scientific works but poor analysis is made on dependency between stock indices and macroeconomic indicators that is how stock indices are going to change in the case of change of separate macroeconomic indicator. Correlation analysis and stochastic dependency of Baltic stock market indices and macroeconomic indicators confirmed statements of various authors that there is relationship between stock indices and macroeconomic indicators. The research showed that the relationship has different strength. It was also found that relationship can have different direction, for example OMXV and OMXR have indirect relationship with public debt and OMXT has direct relationship with public debt.

It can be concluded that the biggest dependency is between Baltic stock market indices and annual change of GDP, unemployment level, public debt and foreign direct investments. Direct dependency exists between stock indices and foreign direct investments and GDP. Stock indices and unemployment level have indirect dependency. Stock indices and public debt can have bouth direct and inverse dependency.

Rapidly growing economy of Baltic countries is forecasted. This growth and decreasing unemployment level shows that Baltic stock market indices should increase too and it should be attractive to invest into Baltic stock market at lest for a few coming years.

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