
-----TRANSFORMATIONS IN-----
BUSINESS & ECONOMICS

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STOCK RETURNS AND THE MACROECONOMIC ENVIRONMENT: THE CASE OF THE VILNIUS STOCK EXCHANGE

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Received: November, 2006

1st Revision: May, 2007

2nd Revision: October, 2007

Accepted: February, 2008

ABSTRACT. *This paper investigates the relationship between domestic macroeconomic variables and surplus returns of stocks in Lithuanian stock market. How macroeconomic factors influence dynamics of stock index, were studied by using correlation - regressive analysis method. Dependence between share rates and macroeconomic indexes is analyzed globally both by academics and practitioners. When investigating this dependence, up to now the biggest securities markets - USA, Great Britain, Japan, and Italy and so on, received the greatest attention. In growing stock markets, like Lithuanian one, such researches are insufficient. Lack of research determines that it is not only important to estimate existing relation between separate macroeconomic indexes and stock prices in definite period, but also the stability of the relation relatively to time and changing economic indicators.*

The aim of this article is – to determine and to evaluate the relation between Lithuanian enterprises' stock rates and economic indicators, and herewith to develop already existing researches about securities prices dependence on macroeconomic factors.

The research findings disclosed, that during the considered period most of Lithuania's macroeconomic factors were correlating with shares' prices fairly strong, and it is possible to forecast the direction of these effects.

KEYWORDS: stock market, stock returns, shares indexes, macroeconomic factors, Lithuania.

JEL classification: C35, E2, E4, G13.

Introduction

Securities are inseparable part of market economy, because they create conditions to effectively distribute financial resources between separate economic subjects. By the means of securities governments and enterprises can supply themselves with required financial resources, whereas households and other economic subjects have an opportunity to invest their savings into such economic spheres, which are likely to be reliable, and to expect income from these investments

One of the most attractive forms of investments is obtaining shares from enterprises. These shares are attractive to those who are not afraid to risk. High risk means not only huge profits, but sometimes great losses. Additionally, from all investment types, only shares are protected against inflation. In addition to the list of shares' advantages, we can add their price, which, in comparison with other securities, is lower, and costs of ordinary shares' transactions are quite low.

Monetary flows, which are obtained from ordinary shares, are twofold: dividends, and capital increase, which is a result of increased shares rate during its selling moment. Capital increase is usually the main profit source for investors, so we can clearly see an increased demand to monitor dynamics of shares rate and to forecast possible changes. To this, factors that influence changes of shares rates are analyzed.

Long ago, a mutual relation between securities and country's economic changes were noticed: while country's economic situation is improving, securities market becomes more active too. In turn, expansion of securities market stimulates country's economic growth. Moreover, from the behaviour of financial market we can judge about country's economic situation: we can expect economic stagnation as a result of dropping shares prices, and vice versa, increasing prices indicates possible economic growth.

Relation between securities prices and country's economic situation, which is characterized by various economic factors, has received high researchers attention. This relation is globally analyzed both by academic staff and practitioners.

Research results of inflation's influence over shares profitability were the first topics to appear in the scientific literature (Lintner, 1976; Modigliani and Cohn, 1979; Fama, 1981; Feldstein, 1982; Stulz, 1986), later on, researches on other economic factors were included (Keim and Stambaugh, 1986; Friedman, 1988; Giovannini and Jorion, 1989 *etc.*). Clare and Thomas (1994), while analyzing influence of macroeconomic factors over shares market in Great Britain, employed even twenty macroeconomic factors like: risk award, interest rate of three-month treasury bonds, gold price, volume of industrial production, balance of checking accounts, oil price, unemployment rate, exchange rate of Great Britain pound and US dollar, *etc.*

While analyzing the dependence between country's macroeconomic factors and shares prices, only the most developed securities markets received the greatest attention: USA (Shanken and Weinstein, 1987), Great Britain (Poon and Taylor, 1991; Clare and Thomas, 1994; Morelli, 2002), Japan (Hamao, 1988; Mukherjee and Naka, 1995), Italy (Panetta, 2002; Bagliano and Beltratti, 1997), Spain (Martinez and Rubio, 1989), France (Lev and Thiagarajan, 1993; Riahi-Belkaoui, 1997; Martinez, 1999), *etc.*

An increasing number of such studies can be seen in growing financial markets too, including researches made by such famous authors as Mookerjee and Yu (1997), and Maysami and Koh (2000), who analyzed the quoting shares prices alterations' dependence on macroeconomic factors in Singapore's securities market; and Kwon and Shin (1999), who were analyzing the Malaysian shares market. Chancharoenchai *et al.* (2005), were studying the relation between macroeconomic factors and shares rate in Thai, Philippine, Indonesian, Malaysian, South Korean and Taiwan securities markets until the Asian crisis in 1997. But it is certain, that such researches are insufficient. Moreover, it is not enough of such researches in growing European securities markets. Diacogiannis and Tsiritakis (2001) were analyzing such relation in Athenian stock exchange, whereas Tsoukalas (2003) was analyzing Cyprian one. Such researches are especially insufficient in poorly developed eastern and middle European countries securities markets, where Lithuanian stock market is classified too.

Only a few researches on how macroeconomic factors influence Lithuanian companies' shares prices were conducted (Pekarskiene, 2001; Bagdonas and Klimasauskas, 2005). Such lack of studies is the result of difficult determination of the relation between the separate macroeconomic factors and shares prices during the definitive period, but also the determination of connection stability in respect of the time and alternating economic conditions.

The aim of this article is the relation between shares price and macroeconomic factors.

The aim of the research is to determine and estimate the relation between Lithuanian enterprises' shares rates and country's economic factors and herewith to supplement the already existing researches on securities prices dependence on those factors.

Research methods applied in the study are systematic and scientific analysis and synthesis of literature; single dimensional and multidimensional analysis of data regression.

1. Factors Influencing Share Prices

Share prices are tuned between sellers and buyers. During the given moment, each security has its own market price, which will alter, when its supply and demand is varying. Factors of supply and demand are affected by fluctuating expectations and suspensions of those, who invest (capital procurer) and those, who are in a need of capital (capital

consumers). For example, investor may be willing to buy a security on specified price, because he is expecting to reach some specific goal: i.e. to supply himself with income, liquidity or capital gain. On the other hand, another investor may be willing to sell security for the same price, because he needs cash or is not expecting any acceptable results. Consequently, both investors have a possibility to have benefits from the deal. Unambiguously, it can be stated, that shares prices are conditioned by hopes of securities market's members. This motivated the emergence of various theories, that are analyzing behaviour of the securities market's members. These theories are known in wider scope:

- efficient market hypothesis;
- random walk theory;
- rational expectations hypothesis.

Hypothesis of efficient market is based on presumption, that market has numerous rational and eager about profit investors, who are quickly reacting to new information. When new information is present, investors estimate their changed situation and with their own actions can influence fluctuations of shares prices. Therefore, in any moment, shares price is a fair image of all available information, and moreover it is the best evaluation of a real share's value.

Random walk theory posits that new information about share is randomly spread in time. So price changes are random and not connected with previous changes. If to follow this theory, it can be stated, that previous price changes does not posses any valuable information about future changes, because any evolution, influencing enterprise, is already shown in current price.

Rational expectations hypothesis is based on presumption, that people are rational and are making clever economic solutions, after they evaluate all available information. Theory is guessing that everyone has access to such information and will use it wisely for his own benefit. Previous mistakes can be dodged, by using past experience to help forecasting the future.

Even majority of evidences are supporting these theories, but really there are many ineffectiveness manifestations:

- new information is not available to everyone at the same moment;
- not all investors will react immediately and the same;
- not everyone has the ability to properly forecast and make the right decisions.

It can be stated, that investors are not always acting rationally. During the moments of uncertainty, massive psychology of investors can be the reason of market's unbalanced acting. Greediness can raise the prices to such a high level, which will be higher than the guaranteed level of expected income. On the other hand, investors' carefulness may cause too strong reaction to information and they will start selling, which will result to quick dropping of the price.

Wills of investors are influenced by many factors, which partially are influencing shares rate. They can be classified in such groups:

- economic factors;
- market factors;
- specific enterprises' factors;
- external events.

Alongside with the economic factors, country's macro-environment can be classified too. It covers the overall economic situation, monetary and government fiscal policy, the status of specific industry branch. Economic factors are influencing the condition of all market's members – companies profit, citizenry income and so on, and over these, economic factors influence shares rates too.

Market factors cover such factors like investors' speculative goals and „January effect”. Otherwise, sometimes there are such periods, when securities price are just marginally reflecting the economic conditions and future dividends. In such case, the activity of market's „players” are especially conditioning shares rate. January effect is showing, that during the beginning of the year, investors are trying to acquire shares of more risky companies, and till the end of the year, they transmit to larger and more stable companies. Because of this, during January, small companies' shares come in demand and together with this, their market price. After noticing such tendency, investors are buying shares even earlier, so „January effect” starts even on December.

Specific enterprises factors are conditioning shares rates too. Such factors are: company's financial status, which is determining the risk degree (the better financial condition is, the lower investing risk is), company's size, current profit, over which size of dividends depend, branches in which company is specializing, perspective. Besides previously mentioned microscale factors, a very specific factors depending upon each company, for example, the policy of dividends and investment, may be active.

One more, very important factor, possessing great influence on price variations, is – external events. Rapid and unexpected external events can notably influence positively or negatively country's economics and securities prices. Such events cover: international crisis, like wars, revolutions, exchange devaluations, crop failure, famine, unexpected election results, debt defaults, radical achievements in technology, trade contracts and tariff barriers. The fluctuation of goods price is a result of global supply insufficiency or surplus, and sometimes can be foreseen. Otherwise, it is much more difficult to forecast some other factors, like OPEC oil price changes.

Another cause, which is determining the crisis expansion to other shares markets, is globalization. Therefore, shares rates are not only influenced by country's economic factors, but also by global events, so it is useful to know consequences of such processes.

While studying shares price changes, it is analyzed, who is making market prices to fluctuate and what processes describe price variation. Two main ways for analyzing financial markets exist: *technical analysis* and *fundamental analysis*. *Technical analysis* studies the market dynamics: study charts, which indicate price variations, volume of separate shares and the whole market. This analysis can aid to determine the right moment to perform operations with securities. By using this method, it is being tried not just to forecast possible variation of shares price, but also to determine the reason of this variation. Shares market analysts are prognosticating the enterprise's results, by referencing to market's opportunities, enterprise's role in market, competency of managers, demand of company's products, financial data and so on. *Fundamental analysis* is an interpretation of the most important economic indicators and evaluation of country's development factors.

In the scientific literature, Lithuanian securities market was studied by various points of view. Cibulskiene and Grigaliuniene (2006) were analyzing fundamental and technical factors, which influence the market value of shares Aleknevičienė *et al.* (2003) were researching the influence of dividends policy on Lithuanian companies shares price and found out, that in Lithuanian shares market signaling effect on dividend policy is not very eminent, so this means, that shares prices are much more influenced by other micro and macroeconomic factors. Levisauskaitė and Juras (2003) were analyzing the effectiveness of Baltic countries shares markets, in other words, whether investors can expect to gain over profit from these markets by making decisions, which are referred to technical analysis. Although authors determined, that these markets do not have weak market effectiveness, but they noted that when investing to Baltic countries shares markets, it is recommended to refer to fundamental analysis. One of the fundamental analysis constituents is the analysis of

macroeconomic environment's influence over shares price. To this we performed this research in Lithuania's market.

2. Substantiation of Research Data

While studying the dependence between shares prices and macroeconomic factors, statistical Lithuanian macroeconomic indicators and Vilnius securities market's index data were used.

Vilnius securities market (VVPB) is the only operator in Lithuania, which is regulating the stock exchange. VVPB is providing the services of securities trading, listing and informational ones. VVPB belongs to the largest North European operator of stock exchange OMX, which has under its command Copenhagen, Stockholm, Helsinki, Tallinn and Riga stock exchanges and is offering an accessibility to approximate 80% of all securities market in Northern and Baltic regions.

Short history. Lithuanian National stock exchange (NVPB) started its activity in 1993. In 1996 first shares indexes LITIN G and LITIN A were began to calculate. Former index reflected the variation of all shares prices, which are quoting in exchange, while latter index reflected the current dynamics of shares rates list. Later on, two more indexes were begun to calculate: LITIN and LITIN 10. First index was dedicated for the shares from the official list, while second index reflected the price variation of ten most popular shares being traded in exchange. In May of 2004 NVPB was privatized – OMX obtained 44% of their shares. During the same year, NVPB was renamed to Vilnius stock exchange (VVPB) and the calculation of mentioned indexes was suspended. A new index called VILSE, which reflect the variation of all listed shares prices, was started to calculate.

On the 27th of October 2004, VILSE index was changed into OMX Vilnius index, which is abbreviated as OMXV. This index is calculated every day according to newest shares, which are incorporated into the official and current lists of VVPB, prices by comparing the overall market's capitalization together with the previous day's data. The weight of the shares, that are composing the index is not limited, therefore the influence of each shares emission depends upon its weight in the total market's capitalization. Index is being calculated by using shares price, expressed in Lithuanian currency.

As it is seen, from the beginning of the exchange, several different indexes were used, while nowadays only one index exists – OMXV, which initial value, set in 1st of January 2000, is 10000 points. Different indexes are not comparable, so for this study, a period of 2000-2006 was chosen. Moreover, when choosing this period, a new opportunity to compare the obtained results with the analogical study's results (Pekarskiene, 2001), covering 1996-2000 period, appeared.

From the year 2000, both quantitative, and qualitative variations were typical for VVPB. Exchange turnover was increasing signally, capitalization and ratio of capitalization and GDP increased from 12% in 2000 to 36.8% in 2006, shares index increase manifested (Lithuanian Securities Commission, 2007). In 1998, Lithuanian securities market was influenced by negative external factors: instability in global financial markets and crisis situation in Russia made shares prices to drop and slowed down the exchange's revenue circulation. Consequently, during the 2000-2001 periods, Lithuanian securities market was passive. In addition, during this period, change of the way of investment showed up – more and more contracts were made with the government's securities.

From 2001 last quarter, Lithuanian securities market began to improve. We assume that this rise could have been influenced by both economic and political circumstances. We will highlight the most principal ones:

1. In 2002–2006 growth of Lithuanian economy was one of the fastest in the Europe, and such situation positively influenced the securities market. Firstly, this reflected in primary market, where, when comparing with 2001, joint stock companies attracted financial capital even one third more.
2. During the preparation for EU membership, Lithuania had to control the monetary and fiscal policy much more strictly and to change the legitimate basis. These changes were reducing the investment risk and increased the attractiveness of Lithuanian issuer shares. This preparation was like a sign for foreign investors to be more courageous to invest into the Lithuanian capital market.
3. Privatization of strategic energetic and alcohol producers provided with opportunities for investors to benefit from speculative deals.
4. Rising economy, and increasing quantity of free money in financial markets were reducing the interest rate, hereof this motivated the investors to look for more profitable alternatives, like shares market.
5. Privatization of NVPB had positive influence over Lithuanian securities market.

In pursuance of estimating country's economic factors influence over enterprises shares prices, there is a necessity to choose such macroeconomic indicators, which best reflect country's economic situation's variation. Macroeconomic factors affect the decisions of all shares market's members – both by issuers and investors. Majority of our studied authors (Friedman, 1988; Clare and Thomas, 1994; Panetta 2002, Dibooglu and Mathur, 2005) in their researches analyzed shares rate independence from economic activity, inflation, unemployment rate, interest rate, national exchange rate, money amount and other factors. In VVPB and central securities depository's annual reports, exchange's situation is also often associated with GDP, inflation and unemployment rate. For our study we selected the macroeconomic factors, which best reflect the variation of Lithuanian economic situation and influence shares market, such as:

- Real Gross Domestic Product (RGDP);
- Consumers price index (CPI);
- Producers price index (PPI);
- Building price index (BPI);
- Unemployment rate (Ur);
- 6 month period VILIBOR interest rate;
- Average time-span Government securities yield;
- Money quantity M2;
- Litas exchange rate dollar-wise (USD/LTL).

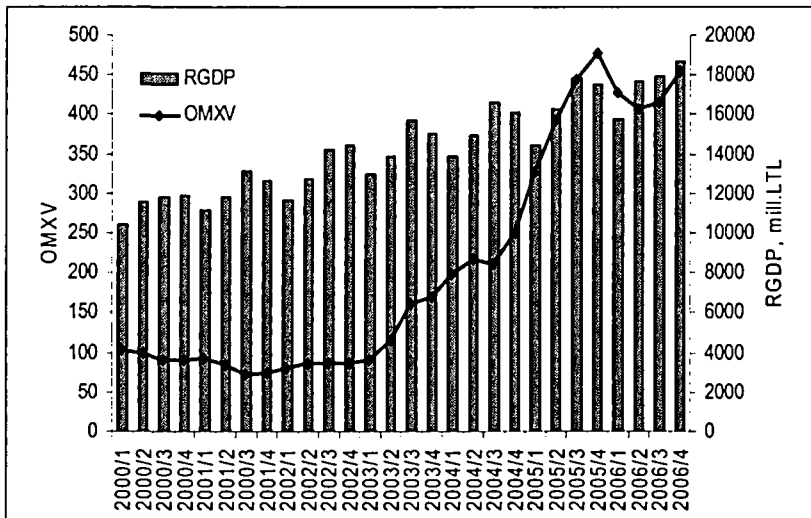
While studying larger statistical data sequence, much more accurate results are acquired. In our case, the composition of data sequence was limited by selected period, so, trying to acquire more accurate results, we used data from quarters. Quarterly indexes from OMX were calculated according to the information provided by Vilnius securities exchange (2007), while meanings of macroeconomic indicators were collected from Department of statistics (2007) and data provided by Lithuanian bank (2007).

3. Research Hypothesis

It was noticed, that variations of enterprises' shares are bond with the country's economic activity. Usually shares prices increase before and during the periods of business growth, because profit hopes are boosting, which lead to the bigger dividends, or bigger suspended and/or reinvested income, or both. Moreover, while economy is growing, citizenry potential to invest is boosting too, and in turn this is increasing shares demand and their price. Investors, who are expecting for income or capital increment, during this period of growth,

gain benefits from ordinary shares. And conversely, prices of ordinary shares tend to drop during the periods of deterioration. In such case it is possible to forecast the peak, in other words, when economic conditions are fairly good. Cause of price dropping is a will to earn lower profits. During such period, dividends and growth of corporate active value may decrease. Concerned investors sell ordinary shares in order to obtain securities of capital fixed income (straight bonds and preferred shares) for reinvestment, in order to maintain or even improve the asset change. Investors, willing to shut capital increment, are selling ordinary shares regarding to realize paper profits.

During our analyzed period, a swift growth of Real GDP was present in Lithuania. Dynamics of RGDP and OMXV index during 2000 – 2006 are shown in *Figure 1*. In this figure it is possible to notice the direct relation between these two indicators.



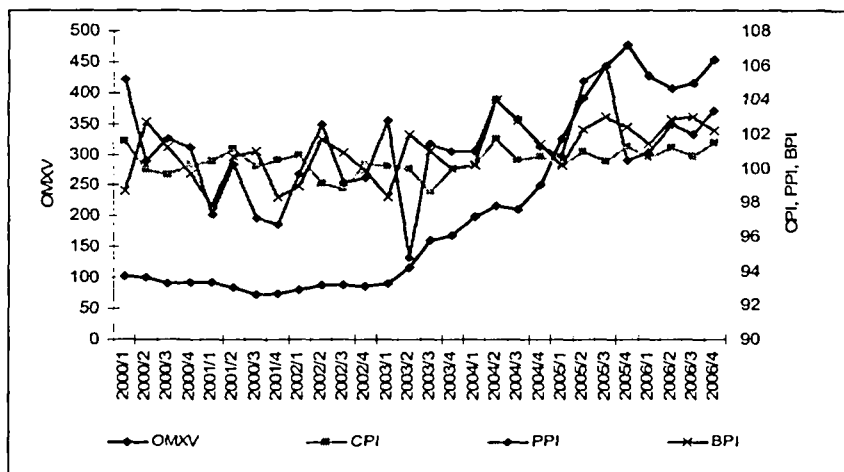
Source: compiled by authors from Vilnius Stock Exchange (2007). Referred on 10/03/2007, <http://www.lt.omxgroup.com/>.

Figure 1. Dynamics of RGDP and OMXV in Lithuania, 2000 - 2006

While assuming the factor of inflation, it is possible to classify its twofold influence on shares prices. Inflation pressure on prices produces a defect of spread uncertainty and self-distrust of future. These factors are tend to reduce the enterprises profitability and are reducing their shares prices. Moreover, inflation causes increased production costs, which can be eliminated by selling the production on higher prices, if it expected to maintain the profitability. However, not always this could be accomplished, because the buyer's resistance is being developed at the same time. Moreover, if company's products prices are increasing faster than production costs, then profit can increase and boost its shares attractiveness.

Another negative effect of inflation on shares prices can manifest because of a specific system of dues, when the maintenance of factory's and its equipment's devaluation is being related with the primary purchase costs. While inflation level is high, such costs quickly become outdated and much lower costs, than current payoff costs are present. Such reserves in dues system mean that specific business costs, during periods of inflation, are deemphasized. During such periods, unpaid profits are being increased, and the burden of dues becomes barely bearable. Lower corporate profitability, as a result of inflation, can make ordinary shares less attractive for possible investors.

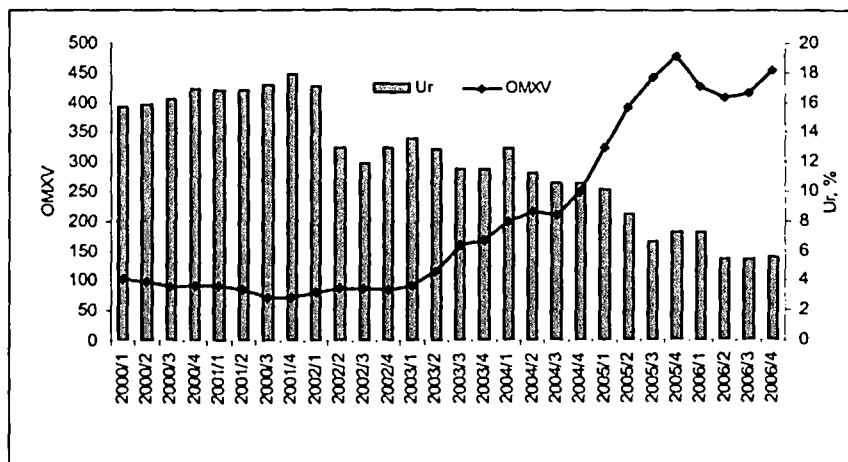
Dynamics of OMXV index and general Lithuanian price level, measured by various price indexes, are shown in Figure 2.



Source: compiled by authors from Vilnius Stock Exchange (2007). Referred on 10/03/2007, <http://www.lt.omxgroup.com/>.

Figure 2. Dynamics of CPI, PPI, BPI and OMXV in Lithuania, 2000 - 2006

It is possible to see a inverse relation between unemployment rate and shares prices. While unemployment rate is increasing, residents' income and possibility to save is reducing. Together, potential opportunities to invest available finances into the shares are reducing, and this causes a reduction in demand, decrease of shares circulation and dropping of shares prices. And conversely, reduction of unemployment may increase the shares demand, and in turn their price. Dynamics of Lithuanian unemployment rate and OMXV index, during the period of 2000 - 2006 is shown in Figure 3. This inverted relation between these indexes can be seen in Figure 3.



Source: compiled by authors from Vilnius Stock Exchange (2007). Referred on 10/03/2007, <http://www.lt.omxgroup.com/>.

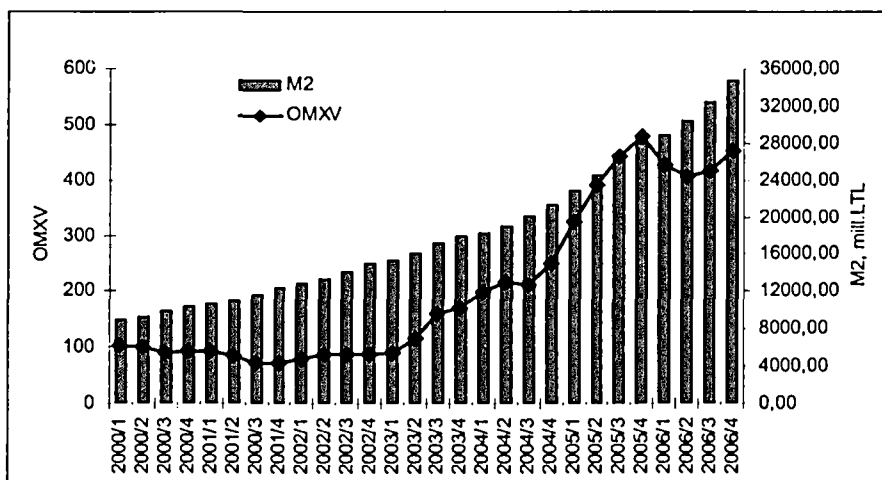
Figure 3. Dynamics of unemployment rate and OMXV in Lithuania, 2000 - 2006

It is possible to notice the inverse relation between enterprises shares rates and government securities yield, which reflects the credit price. While government securities yield is increasing, enterprises' crediting costs are growing also and their profitability is decreasing, whereas this negatively influences shares rates. Shares and government securities are competitive measures. While government securities yield is increasing, attractiveness of government's securities is increasing too, and this negatively influence over investments in property securities. Dynamics of government securities yield, market interest rate (VILIBOR) and OMXV, from period 2000-2006, are displayed in Figure 4.



Source: compiled by authors from Vilnius Stock Exchange (2007). Referred on 10/03/2007, <http://www.lt.omxgroup.com/>.

Figure 4. Dynamics of government securities yield, VILIBOR and OMXV in Lithuania, 2000 - 2006

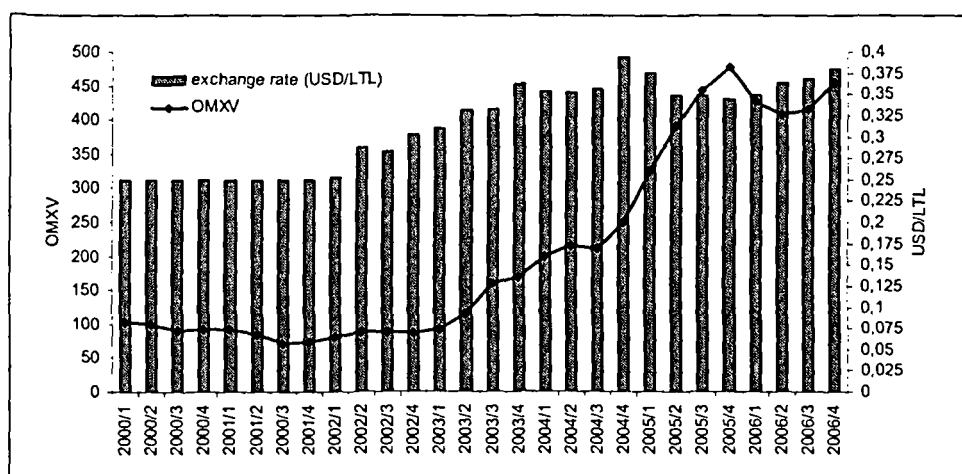


Source: compiled by authors from Vilnius Stock Exchange (2007). Referred on 10/03/2007, <http://www.lt.omxgroup.com/>.

Figure 5. Dynamics of money amount M2 and OMXV in Lithuania, 2000 - 2006

Alterations of monetary policy are influencing business and hopes, which in turn affects securities prices. While M2 amount is increasing, a greater need to invest in this money establishes and increased demand on shares boost their prices. On the other hand, increase in M2 amount can stimulate inflation, which is a negative contributor on shares markets. And conversely, reduction of M2 amount may cause reverse reaction. Dynamics of M2 and OMXV indexes, during the analyzed period, are shown in Figure 5.

National currency rate's variations influence on shares rates can be assessed twofold. Depreciated national currency is favourable for exporters. Financial results of such companies are improving and this positively affects their shares demand. In such case, imported goods become more expensive, consequently reducing citizenry income and possibilities to invest. Therefore, such effect often depends on condition of foreign trade. Because the rate of national Lithuanian currency is fixed in respect of euro since the 1st of January 2002, this is why we selected LTL/USD exchange rate for our study. Dynamics of this exchange rate and OMXV index is showed in Figure 6.



Source: compiled by authors from Vilnius Stock Exchange (2007). Referred on 10/03/2007, <http://www.lt.omxgroup.com/>.

Figure 6. Dynamics of dollar exchange and OMXV 2000 - 2006

From Figure 6 we can see, that a direct relation between these indexes exist.

We checked the posed hypothesis, about the macroeconomic indicators influence on OMXV index, in greater detail by using method of correlation - regressive analysis.

4. Research Methodology and Results

While trying to estimate statistical dependence between shares index and macroeconomic indicators, we calculated correlation relation, which's point is that variation of ingoing variable x (macroeconomic indicators) affects the average value of outgoing variable y (shares index).

In regression equation, the relation strength between variables is characterized by such cohesion indicators as: coefficient of correlation (R) and determination coefficient (R^2) (Middleton, 1997).

Our calculated twin close relational indicators – correlation and determination coefficients are show in Table 1.

Table 1. Twin close relational indicators of VVPB index and macroeconomic factors

<i>Macroeconomic factors</i>	<i>R</i>	<i>R²</i>
<i>RGDP</i>	0.8379	0.7021
<i>Consumers price index</i>	0.8379	0.1552
<i>Producers price index</i>	0.4411	0.1946
<i>Building price index</i>	0.5737	0.3291
<i>Unemployment rate, %</i>	-0.9072	0.8231
<i>VILIBOR, %</i>	-0.4604	0.2120
<i>Government's securities yield, %</i>	-0.5248	0.2755
<i>Money amount M2</i>	0.9448	0.8927
<i>USD /LTL exchange rate</i>	0.7277	0.5295

Source: compiled by authors based on *Vilnius Stock Exchange (2007)*. Referred on 10/03/2007, <http://www.lt.omxgroup.com/>.

For further study, only those pairs of variables were selected, which are interdependent. It means, that absolute correlation coefficient is no less than 0.5 (notional coefficients are in bold). From the data from *Table 1* we can see, that from the nine selected macroeconomic indicators, even six have influence over Lithuanian shares market. OMXV index directly depends on real GDP, money amount M2, USD/LTL exchange rate and variation of building price index (BPI).

Money amount has the greatest influence. In our opinion, it can be explained by the fact, that when there is an increased amount of free money in the market, the larger part of them is directed to shares market, and increased shares demand is increasing their prices. Increase of money amount M2, during the analyzed period, depended on growth of export volume and incoming direct and portfolio investments from abroad.

RGDP has great influence on shares prices too. It can be explained, that when economy is growing, issuers economic – financial results are improving too, consequently shares attractiveness is boosting for both local and foreign investors. Otherwise, while national production volume is increasing, citizenry income, standard of life, and potential possibilities to invest are improving too.

Positive relation between USD/LTL exchange rate and OMXV index can be explained, that during the analyzed period, a deficit of checking account in Lithuania was constantly increasing. Strengthening national exchange (during analyzed period, such tendency was noticed more and more often) makes imported goods cheaper. Analyzing the structure of imported goods, it is seen, that the majority of imported goods in Lithuania are raw and mediate materials. The reduction of those products prices are reducing costs and boosting profits of local producers. This positively affects shares attractiveness.

Building price index, from all of the used price indexes, is the most crucial. An average direct relation between this index and shares index is present. In our opinion, there can be two explanations. *First*, in respect of investing, new constructions and capital market are alternative investment spheres, wherefore, while construction prices are increasing, a possible increase of investments in alternative spheres may appear. *Second*, construction prices growth is boosting profits of enterprises and income of workers, who specialize in this sphere. These changes stimulate investments in shares.

Unemployment rate and average time-span Government securities yield are making negative influences on shares index.

Strong negative dependence between unemployment and OMXV could be explained in two ways: first, decreasing unemployment is improving citizenry income. Growing income is increasing savings and opportunities to invest. Second, decreasing unemployment is directly tied to boosting of enterprises activity, and this positively impacts shares demand and price.

An existing average strength negative relation between VVP interest rate and shares index allows making conclusion, that these investment measures, during the analyzed period, were competitive.

Completed single-dimensional regression analysis showed what influence on VVPB index, various economic indicators possess. Willing to explain the general influence of these factors on shares market's activity, we formed a polynomial regression model. Calculated polynomial correlation coefficient ($R=0.9727$) indicates market's index strong dependence on analyzed macroeconomic factors. Considering the obtained determination coefficient ($R^2=0.9462$), we can state, that variation of VVPB index can 94% explain the variation of Lithuanian macroeconomic situation. After determining correlation relation, we recorded the polynomial regression *Equation (1)*, which expresses the statistical dependence between pending variables.

$$Y = -5759671 + 0.0099 X_1 - 0.7371 X_2 + 6.9408 X_3 + 0.0239 X_4 + 2260996 X_5 + 1828500 X_6 \quad (1)$$

where:

- Y – VVPB shares index OMXV;
- X_1 – Real Gross Domestic Product;
- X_2 – Building price index;
- X_3 – Unemployment rate;
- X_4 – Money amount M2;
- X_5 – Government securities yield;
- X_6 – USD/LTL exchange rate.

Having such equation, and considering the forecasts of macroeconomic factors, which are computed in equation, we can foresee the variation of shares index.

Studies, from the period of 1996 – 2000, about macroeconomic environment influencing shares market, made by Pekarskiene (2001), provided different results. Variation of RGDP did not possess any influence over the shares index *LITIN G*, while only two macroeconomic indicators had significant influence: unemployment rate and average time-span government securities yield. Such different results can be explained that Lithuanian securities market, during our analyzed period, became more stable and reached a certain degree of maturity – institutional investors are much more active, speculative layer is forming. Moreover, stable growth is typical for the whole country's economy. In our opinion, because of the changes in macroeconomic environment, variations of shares rate became more supposed. Although, a dependence between country's economic situation and activity of shares market exists, but it can be always violated by global processes and other factors.

Conclusions

1. Research results indicate that during the analyzed period a close relation between Lithuanian enterprises shares prices and the majority of economic factors exists. It was designated:
 - Strong direct bond between VVPB shares index OMXV and Real Gross Domestic Product and money amount M2;
 - Average strength direct dependence between OMXV and building price index;
 - Strong inverse connection between OMXV and unemployment rate and Litas/US Dollar exchange rate;
 - Average strength negative relation between OMXV and average time-span government securities yield.
2. Accomplished research showed that during the analyzed period it was possible to forecast the macroeconomic factors influence over shares prices. Such influence was determined

by the stability of the analyzed period: both growth of Lithuanian economics and securities market were fluent and without any big shocks.

3. Comparison of our study with the results from previous researches shows, that the relation between shares prices and macroeconomic factors is dynamic; therefore any repetitive future studies are useful.

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AKCIJŲ GRAŽA IR MAKROEKONOMINĖ APLINKA: VILNIAUS VERTYBINIŲ POPIERIŲ BIRŽOS ATVEJIS

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SANTRAUKA

Vertybinių popierių rinkos išsivystymo ryšys su šalies ekonominiu vystymusi yra abipusis: kartu su gerėjančia ekonomine padėtimi, vertybinių popierių rinka tampa aktyvesnė. Be to, tuo metu, kai vertybinių popierių rinka vystosi, šalies ekonominis vystymasis greitėja. Be to, nuo finansų rinkos mes galime teisti šalies ekonominę sąlygą. Priešingai, akcijų kursų didėjimas yra galimas ekonominio vystymosi įrodymas. Kadangi akcijų kursų pakitimai atspindi kintamą ekonominę padėtį, svarbu nustatyti ir įvertinti sąsają tarp saugumo kainos ir šalies pirminių makroekonominių faktorių. Tirdama šią priklausomybę, iki šiol didžiausia vertybinių popierių rinka gavo didžiausią dėmesį: JAV, Didžioji Britanija, Japonija, Italija ir taip toliau. Augančiose vertybinių popierių biržose, kaip lietuvių kalba vienas, tokie tyrinėjimai yra nepakankami. Tyrinėjimo trūkumas nusprendžia, kad nėra tikrai svarbu įvertinti egzistuojantį ryšį tarp atskirų makroekonominių indeksų ir akcijų kursų per kažkokį periodą, bet taip pat ir stabilumo ryšio dėl laiko ir keičiantis ekonomikos rodiklius. Šio straipsnio tikslas yra – kad nustatytų ir įvertintų ryšį tarp Lietuvos įmonių akcijos normų ir ekonomikos rodiklių, ir tuo pačiu papildytų jau egzistuojančius tyrinėjimus apie saugumo kainų priklausomybę nuo makroekonominių faktorių. Tai buvo pažymėta, kad yra stiprios tiesioginės priklausomybės tarp OMXV ir tikro bendrojo vidaus produkto, M2 pinigų kiekio ir litas valiutos kurso išmintinga doleriu, vidutinė priklausomybė nuo kainų indekso statybos; stiprus atvirkštinis ryšys tarp bedarbstybės lygio ir, vidutinė jėga neigiamas ryšys su vidutinės trukmės vyriausybės vertybinių popierių derliumi. Paskutinė išvada yra tokia, kad, per apgalvotą periodą, dauguma Lietuvos makroekonominiai faktoriai siejo tarpusavyje su akcijų gana stipriomis kainomis, ir galima nuspėti to padarinio kryptį.

REIKŠMINIAI ŽODŽIAI: vertybinių popierių birža, akcijos graža, akcijų indeksai, makroekonominius faktorius, Lietuva.