University of Salford
A Greater Manchester University
University of Essex
ESSEX BUSINESS SCHOOL
international Centre for Entrepreneurship Research
The General Jonas Žemaitis Military Academy of Lithuania
Ministry of National Defence Republic of Lithuania
Vilnius Gediminas Technical University
RISEBA
Estonian Business School
NATO Energy Security Centre of Excellence
ENTREPRENEURSHIP AND SUSTAINABILITY CENTER
AVADA

JOURNAL OF SECURITY AND SUSTAINABILITY ISSUES
ISSN 2029-7017 print/ISSN 2029-7025 online
2015 September Volume 5 Number 1
http://dx.doi.org/10.9770/jssi.2015.5.1(6)

STOCK EVALUATION METHODS AND THEIR APPLICABILITY IN LITHUANIA ENSURING SUSTAINABLE CAPITAL MARKET DEVELOPMENT

Dovydas Kulišauskas[1], Birutė Galinienė[2]

Vilnius University, Faculty of Economics, Saulėtekio av. 9, LT-10223 Vilnius, Lithuania

E-mails:[1]dovydas.kulisauskas@gmail.com, [2]birute.galiniene@ef.vu.lt

Received 20 March 2015; accepted 15 August, 2015

Abstract. The article discusses the situation in Lithuania`s stock market, stock valuation methods and their applicability in the capital market. Stock market data reveals that it is still under the development phase and that determines that a few stock valuation methods can be applied for this Baltic country. Statistical data shows that the most suitable valuation methods according to current market conditions are discounted cash flow to equity and equity economic value added methods. These two methods and their variables were analyzed deeply in order to ensure correct, objective and precise valuation and contribute to sustainable development of valuation practice in Lithuania.

Keywords: stock valuation, capital market, discounted cash flow to equity, economic value added, sensitivity analysis

Reference to this paper should be made as follows Kulišauskas, D.; Galinienė, B. Stock evaluation methods and their applicability in Lithuania ensuring sustainable capital market development, *Journal of Security and Sustainability Issues* 5(1): 73–86.
DOI: http://dx.doi.org/10.9770/jssi.2015.5.1(6)

JEL Classifications: G15, G17

1. Introduction

Share valuation methodology and methods practical application is widely analyzed topic in western countries scientific literature. Meanwhile there is a lack of academic literature covering this subject and its practical application in Lithuania`s capital market. As a capital market in Lithuania is still under the conditions of development, it is important to define the most appropriate stock evaluation methods for this Baltic country in order to contribute and ensure sustainable growth of capital market. The main purpose of this article is to analyze stock valuation methods and their applicability in Lithuania`s stock market. There are used alternative valuation, structural, dynamic, regression and coefficients analysis methods. Based on the above mentioned research methods logical conclusions were made about stock valuation methods applicability in Lithuania`s capital market.

2. Stock valuation methods

Business valuation literature offers lots of ways to determine the value of company. Most of them can be applied for stock valuation. It is important to state that company`s share valuation can be also called as business valuation because shares of the company give an ability to control the business (Galinienė 2005). This means that stock valuation can be considered as the business valuation. The main stock valuation methods are listed in the Figure 1:

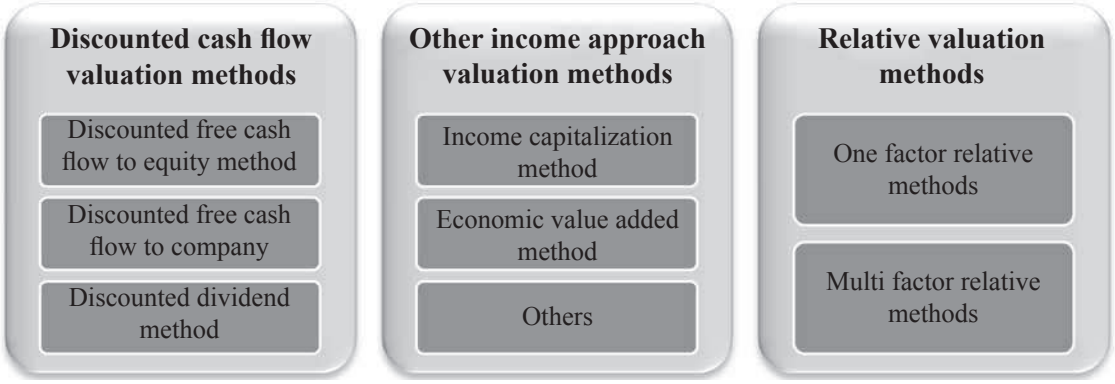


Fig.1. Classification of stock valuation methods.

(Prepared by authors according to Damodaran 2012; Fernandez 2007; Larrabee *et al.*2013)

One of the most popular approaches used in stock valuation is income approach and its discounted cash flow methods. The main idea of this valuation methodology is to convert projected future cash flows into the present value of the stock. There are three main variations of this approach and the result of each of the variation depends on the chosen cash flow type. The scientific literature states that the discounted cash flow methods are used widely in developed economies for large and medium-sized enterprises assessment and is applied in 80 – 90 percent valuation cases (Galinienė 2015). As an alternative for discounted cash flow methods there is suggested recently invented method named as an economic value added method. This valuation type suggest a calculation of a benefit for the shareholders where shareholders` investment costs are deducted from the company`s net revenue. This benefit is treated like projected future cash flow and is converted to present value of the share (Valez – Pareja *et al.* 2007). There are also other types of income approach valuation methods but their application is more complicated because of special conditions needed (for example income capitalization method where company is expected to generate constant free cash flow forever and etc.).

Another widely discussed and broadly used valuation approach is a relative valuation. The main principle of this technique is to find the same or very similar assets whose prices are known for the analyst (International Valuation Standards 2013). In order to use this method, the market must be active in shares trades with a reasonable amount of comparable assets and it must contain sufficient information about transactions conducted with these assets (Peterson 2013). International Valuation Council and Lithuanian legislation states that the minimum number of comparable companies has to be three in order to use this technique. As the stock market usually provides the historical information about the transactions in securities it is expected that this method can be easily applicable by a business evaluator.

The short review of the evaluation methods and their main principles shows that the stock valuation quality is highly dependent on capital market development level. The number of listed companies in stock market, the abundance of transactions, volumes, amount of information available for the analyst is the main basis for successful and accurate valuation. In order to examine the basis for stock valuation in Lithuania`s capital market there will be presented the main characteristics of it. It will help to decide which valuation methods have to be analyzed in detail according to the market conditions.

3. Characteristics of Lithuania`s Capital Market

The first thing which is noticed when analyzing the main features of Lithuania`s capital market is short period of existence of stock market. This market changed significantly in 20 years but still can be described as underdeveloped market. The findings about the underdeveloped capital market were made by Kuodis and Garbaravičius, 2001, but the situation from that year till nowadays has not changed substantially. The main indicators defining Lithuania`s stock market development are presented in a Table 1.

Table 1. Nasdaq OMX Vilnius main indicators, 2014

(Estimated and created by the authors)

Indicators	Values
Market Capitalisation	5.718.639.579 EUR
Equity Market Capitalisation	3.330.429.916 EUR
Number of listed companies	33
Number of contracts in market	57420
Average number of contract per company	1740
Market Capitalisation to GDP	15,76%
Constant dividend payers	3

The data presented in the table confirms that Lithuania`s stock market is still in the development phase. Small number of publicly traded companies, modest number of contracts shows that there is still small activity in the stock market. What is more, market capitalization to GDP ratio is just about 16 % and is far away from numbers in developed capital markets. According to World Bank data, stock market penetration in western countries such as Germany, Great Britain and United States amounted to 43,4 %, 122,2 %, 114,9 % respectively. Even the neighbor country Poland has significantly higher level reached the stock market (35,8 % in 2012) despite the fact that both Lithuania and Poland are almost at the same economic development stage (according to World Economic Forum data). These number leads to the conclusion that just a part of previously mentioned stock valuation methods can be used in Lithuania`s capital market. Firstly, it is clearly visible that relative valuation methods cannot be applied when making valuation of shares in Lithuania`s stock market because there is missing needed number of the same or very similar companies (see Table 2):

Table 2. Companies listed in Nasdaq OMX Vilnius by sector, 2014

(Prepared by the authors based on Nasdaq OMX Baltic data)

Sector	Number of companies	Sector	Number of companies
Personal & Household Goods	4	Oil & Gas	1
Banks	1	Basic Resources	1
Financial services	1	Industrial Goods & Services	3
Utilities	5	Construction & Materials	2
Food & Beverage	10	Telecommunications	1
Retail	1	Technology	1
Real Estate	2		

The information about a distribution of listed companies by sectors are presented in the table above. The data shows that there are only a few sectors with number of three or more operating companies. It is hard to find a comparative company even in food and beverage sector where operates 10 companies. As the main idea of relative method is to find very similar business in the same sector with the similar in risk level, growth potential and similar cash flows (Damodoran 2012; International Valuation Standards 2013) it is obvious that three needed companies in Lithuania`s stock market cannot be find. This leads to the conclusion that relative valuation methods applicability is complicated in Lithuania`s stock market.

Another important feature of the market, directly linked with the valuation is dividend payments. In the academic literature it is emphasized that the dividend payments have to be constant with a clear trend of such payments (Fernandez 2002; Damodaran 2005; Maness 1988). Information about paid dividends has been started to be published since 2005. Starting from that year only 3 of 33 (“Lietuvos dujos”, “Pieno Žvaigždės”, “TEO LT”) currently listed companies in stock market paid dividends every year.

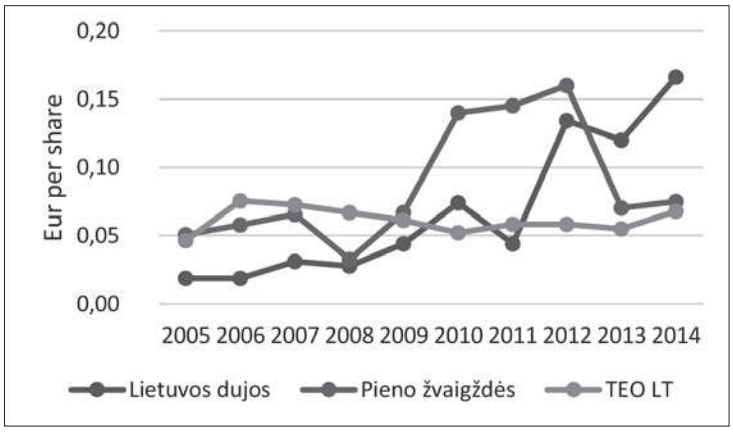


Fig. 2. Dividend companies and the amount of payout 2005 – 2014 years

(Prepared by the authors based on Nasdaq OMX Baltic data)

The statistics above show (Fig. 2) that there are no possibilities to use discounted dividends method although it is very popular way to determine the share values in developed financial markets. Taking into account all above mentioned information about the stock market development stage in Lithuania, it is clear that the most suitable way to determine the value of shares is to use discounted cash flow methods. As an alternative the analyst can use equity economic value added method. These two methods and their application in Lithuania stock market will be analyzed in details later in this article.

4. Methodological part

It takes very important role in valuation process as there are many assumptions and variables which have to be chosen by the valuator. They have to be described clearly, reasonably and objectively because the selection of these variables has a huge impact on increasing or decreasing the final results. In order to ensure the objectivity, accuracy and practical application of the research there will be described all calculation techniques and the models` variables.

Calculation models. The authors have chosen to analyze two methods for share value calculation. The first one is traditional two stage discounted cash flow to equity method because this calculation method is more flexible compared with one stage discounted cash flow method as it takes the fast growth period cash flows and stable long term growth cash flow. The method description is presented below by formula (1) (Damodoran 2012):

(1) $Stock\ value = \sum_{t=1}^{t=n} \frac{(CF\ to\ equity_t}{(1+k_e)^t} + \frac{(CF\ to\ equity)_{t+1}}{(k_e-g)*(1+k_e)^{t+1}}$, where CF – cash flow, k_e – cost of equity, o g – stable growth rate.

As the alternative for the above mentioned calculation economic value added to equity method will be used. It has two differences compared to the discounted cash flow to equity method. The first one is that instead of cash flow to equity there is used economic value added to equity and the second one is that the value consists of nominal share price and the present value of future calculated economic value added. (Fernandez 2007; Valez – Pareja *et al.* 2003). The method description is presented below by formula (2):

(2) $Stock\ value = \sum_{t=1}^{t=n} N + \frac{(EVA\ to\ equity_t}{(1+k_e)^t} + \frac{(EVA\ to\ equity)_{t+1}}{(k_e-g)*(1+k_e)^{t+1}}$, where N – nominal share price, EVA – economic value added, k_e – cost of equity, o g – stable growth rate.

All the variables, their values or calculations will be described in detail in the later chapters.

Research period. It was mentioned that capital market is functioning for a fairly short period of time. Because of that it is hard to find companies operating for the longer period of time and its statistical information. What is more, companies started to prepare their financial reports according to International Accounting Standards only from 2003 or later. Considering the short period and quality of available and comparable financial data it was chosen to analyse 2003 – 2014 period in stock market. Another important issue related to research period is the period of forecasted cash flows. In the academic literature it is debated what length of cash flows forecast should be. For example, some authors (Galinienė 2015) believes that for developing market it is acceptable to calculate 3 years cash flows and to transform to present value of the company shares. The others (Damodaran 2012) believes that the valuator have to calculate forecasted cash flows from five to ten years and just then to calculate the value of share capital. Considering suggestions from both of the authors there will be chosen five years length of cash flow prognosis. It is inappropriate to choose the longer period because of short history of statistical. What is more, it is believed that five years cash flow will give accurate results. The authors also want to point out that five years cash flow calculation means that company will be growing at the fast pace for four years and starting from year fifth it will be growing at the stable pace; see formulas (1) and (2).

Discount rate. Discount rate or k_e (in different sources discount rate also can be called as a cost of capital) is one of the most important variables which has a big impact for the valuation results. There are two significant things which have to be taken into account when calculating the discount rate. Firstly, the cost of capital should represent the risk of company`s cash flow and secondly, it has to be matched with the cash flow. As this research is oriented to calculation of stock value, there will be used traditional Capital Asset Pricing Model (hereinafter – CAPM). Researches who are interested in valuation methodology discusses if CAPM is still the most suitable way to calculate the cost of capital (Fama *et al.* 1996). There are two strong arguments why it will be used CAPM for discount rate calculations. The survey which was conducted among the finance specialist and analyst showed that 75 % of them are using the CAPM for cost of capital calculation (Welsh 2008). Such a high level of usage proves that discount rate calculated using CAPM is appropriate. Another reason for such a choice is another researches whose results show that CAPM is the most suitable discount rate calculation method for developing markets (Butvilas *et al.* 2012; Begovic *et al.* 2013).

As the suitability of CAPM is proved, the description of this cost of capital calculation method is presented below (3):

(3) $k_e = R_f + \beta * (R_m - R_f)$, where R_f – return on risk – free assets, R_m – market return, β – systemic risk coefficient.

All the variables mentioned in the formula (3) can be found or calculated from the official statistical sources. Return on risk – free assets can be taken as government long term bond yields (Damodoran 2012; Gilbert 1990; Galinienė 2015). This is a reasonable measure of the risk-free rate return of the country because country risk premium is already included in it. Another significant part of cost of capital calculation is β coefficient. It is company`s systemic risk coefficient which shows the risk level of company compared to the market (Damodoran 2012; Galinienė 2015). The coefficient is calculated dividing the standard deviation of particular stock price changes by the standard deviation of the stock market index value changes and multiplying this ratio by the correlation coefficient between company`s stock and stock market: $\beta = \rho * \frac{\sigma_{vp}}{\sigma_m}$. Systemic risk coefficient also can be calculated in different ways and these ways depends on the length of statistical data and data periodicity. For example, Odabasi analyses 2 and 4 years data for β calculation while Damodaran suggests using at least 5 years data (Odabasi 2003; Damodaran 2012). Another issue which needs clarification is the periodicity of changes. It is usual to analyze weekly and monthly stock price and market index changes. For instance, in developed financial markets it is suggested to use changes from 1 to 5 weeks in order to calculate β values (Ryu 2011). Taking into account that activity in Baltic stock market is low, it is reasonable to investigate quarterly data changes in order to calculate reliable β values. The third part of cost of capital (R_m) can be calculated as a yearly change of stock market index. It is up to the analyst what index will be used when calculating market returns but it would be appropriate to use the index which reflects moves in company share prices the best.

Cash flow. Another part of chosen evaluation methods are cash flow calculation. In this article there is analyzed stock valuation techniques so cash flow to equity and economic value added to equity will be calculated. Cash flow to equity assesses company`s net income, depreciation and amortization, capital expenditure, net working capital change and debt change (Damodaran 2012; Reilly *et al.* 2006; Bodie *et al*. 2013) (4):

(4) FCFE = NI + DA – CAPEX – Δ NWC + Δ D, where FCFE – free cash flow to equity, NI – net income, DA – depreciation and amortization, CAPEX – capital expenditure, NWC – net working capital, D – company`s debt.

There are no big discussions how to calculate net income, depreciation and amortization and change in debt but capital expenditure and net working capital are more complicated rates. For example, CAPEX can be calculated in several ways. The easies one is to calculate the change in fixed assets during one year period (Graham *et al.* 2010). Another way to compute the CAPEX is to analyze company`s cash flow sheet and find out the amount of investments to fixed assets (Brealy *et al.* 2009). But this calculation method is not suitable for all cases, and especially in comparison of a few valuations as the investments to fixed assets in different companies` financial statements can be treated in the different way (for instance some companies include investments into intangible assets in fixed assets and others not and etc.). In order to avoid different accounting policies in the companies there the first one alternative will be used. Net working capital calculation also has one aspect, which is under discussions. Scientists do not agree if cash and cash equivalents have to be included into or eliminated from net working capital. Damodaran explains that increase in cash or its equivalents cannot be treated as the investment, so cash has to be excluded from net working capital (Damodaran 2012).

Economic value added (some authors call this method as residual income method (Valez – Pareja *et al.* 2013) calculation is simple compared to FCFE calculation (5):

(5) $EVA = (ROE - k_e) * IC = NI - k_e * IC$, where ROE – return on equity, k_e – cost of equity, IC – shareholders` invested capital.

This type of cash flow looks like more conservative as it takes into account only net income and excludes the cost of shareholders` invested capital. The further research will show the results and accuracy of both calculation techniques.

Stable growth rate. The last one variable which takes important role in stock value calculation technique is stable growth rate g. It is usually calculated as a long term nominal GDP growth rate (Damodaran 2012; Bodie *et al.* 2013). But this stable growth calculation method might not represent objectively the long term period as Lithuania`s economy and capital market is developing for a short period of time during which they grew at a very fast pace (it is calculated that the average annual growth rate in nominal GDP were 7,6 % in 2000 – 2013 years). But it is not likely that such a fast growth rate will be for a very long time. On the other hand, stable growth rate can be divided in two different parts: one of them corresponding to long term real country growth (measured as a real GDP growth) and the other corresponding to a long term price level changes. The first one part can be taken from OECD long term real GDP perspectives (OECD, 2012). Despite the fact that Lithuania is not a member of this organization, it calculates the long term real GDP growth perspectives to similar countries according to the level of economic development. For example, it is expected that average yearly growth rate for Estonia will be 2,4 %, for Czech Republic 2,1 %, Poland 1,6 %, Slovakia 2,0 %, Slovenia 1,8 % and etc. According to the given data, the authors decide to make an assumption that real GDP in Lithuania in long term perspective will be growing in 2,0 % yearly. The second part of stable growth rate is the price change level which makes the stable growth rate a nominal variable. After the joining the European Union, Lithuania became a member of European Central Bank System which has an aim to keep the price level at 2,0 % in a middle term (ECB 2011). Combined these two parts there will be used 4.0 % stable growth rate variable in calculation.

Analyzed companies. In order to evaluate stock valuation techniques is Lithuania`s capital market there was chosen two companies which are listed in Nasdaq OMX Baltic capital market – “Apranga” and “Pieno

žvaigždės". The main criteria why these companies were chosen are their business volumes, market share, performance results and data availability. What is more, these companies operate in different economic sectors. "Apranga" is the biggest retail seller of clothes and shoes in Lithuania (also operating in Latvia and Estonia with significant part of the market share) while "Pieno žvaigždės" is the biggest producer of dairy products. The first one company is operating in economic sector which is very sensitive to business cycles (Morningstar Global Equity Classification Structure 2011). It is expected that such company will face bigger fluctuations in its cash compared to the second company which is operating in less sensitive economic sector. Evaluating the different type of companies will allow to make objective conclusions about the most suitable valuation technique in Lithuania capital market.

5. Analysis of valuation technique results

In this chapter there will be performed valuation of the above mentioned companies according to the criteria described in the previous chapter. In the beginning, there is presented the statistical information which was used when calculating stock values. After that, the shares value for both companies are calculated using two different techniques. Finally, the results are analyzed and sensitivity analysis is performed in order to make objective and precise conclusion about the most suitable valuation technique in Lithuania`s stock market.

It was mentioned that cost of capital parts can be calculated from the public statistical sources. Firstly, it is presented the long term government bond yields which represent risk – free rate R_f:

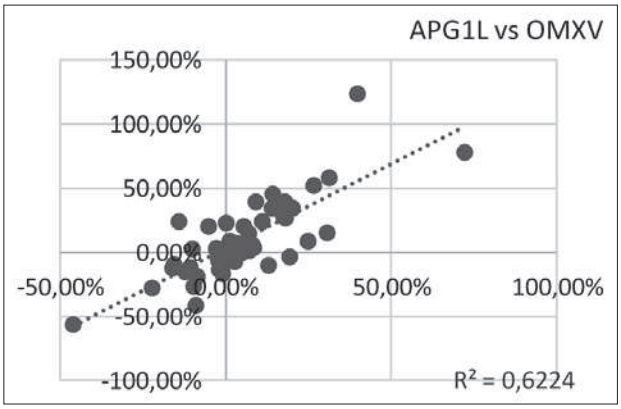
Table 3. Long term Lithuania`s government bond yields, %.

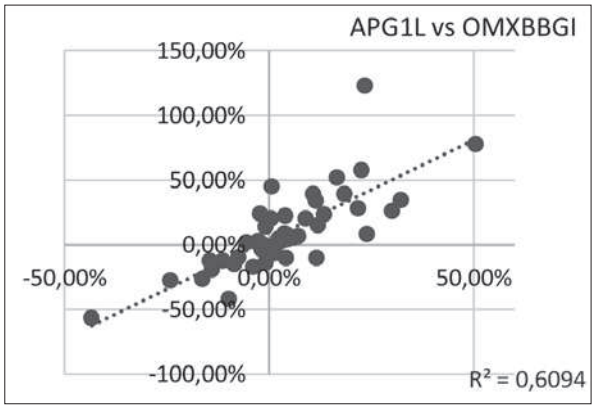
(Prepared by authors according to Eurostat data)

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
5,3%	4,5%	3,7%	4,1%	4,5%	5,6%	14,0%	5,6%	5,2%	4,8%	3,8%	2,8%

According to the data presented in the Table 3, Lithuania`s government bond yields fluctuated in the interval 2,8 % - 5,6 % in 2003 – 2014 period except 2009 year when the country faced the deep impact of economic crisis and government bond yields increase to 14,0 %. But it is clear that this number is just the statistical exception so it will be excluded from the calculations. Calculating the average of data (except 2009 year) gives the average of 4,2 % of government bond yields which will be used instead of exception.

Systemic risk coefficient β was also calculated using 2003 – 2014 years data which is available on nasdaqomxbaltic.com. Two indexes were used in order to calculate β value (OMX Vilnius index, representing only Lithuania`s capital market and OMX Baltic Benchmark index, representing the Baltic capital market as a whole). That would allow comparing the results using different data inputs. As it was expected earlier, "Apranga" β coefficient exceeded the number 1 (which means that company is riskier and more sensitive to changes in the market) while "Pieno žvaigždės" β was below number 1 (β results are presented in the Table 5)





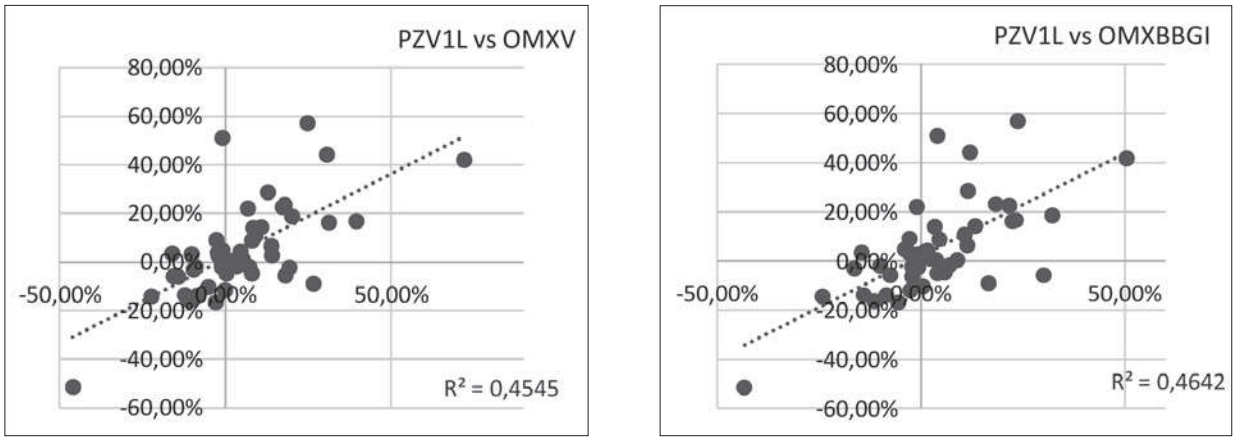


Fig. 3. Correlation between share prices and indexes.

(Prepared by the authors based on Nasdaq OMX Baltic data)

The results show that different indexes reflect companies` stock prices changes the best (see figure no. 3). In this particular case, "Apranga" price changes has to be compared with OMXV index changes ($R^2 = 0.62$) while "Pieno žvaigždės" has to be compared with OMXBBGI index changes ($R^2 = 0.46$).

The third part of the cost of capital is return on stock market R_m. It was also calculated using OMXV and OMBBGI indexes. Analysis period for market return was 2003 – 2014. Because of big fluctuations during this period, it was decided to choose compound annual growth rate formula to calculate the average yearly return on stock market. Results are presented in the Table 4:

Table 4. Return on stock market, %.

(Prepared by authors according to Nasdaq OMX Baltic data)

	OMXBBGI index return (Baltic market)	OMXV index return (Lithuania`s market)
Average yearly return	11,67%	10,52%

Given data in the table no. 4 reveals that two markets were developing at a little bit different pace. The average annual growth rate in Baltic capital market (which is a sum of Vilnius, Riga and Tallinn markets) was faster compared to Lithuania`s capital market growth which was about 10.5%. Once again it is important to state that when calculating the cost of capital it is necessary to use the index which explains the company price changes the best in order to get the accurate results. By inserting risk – free rate return, β coefficient and return in market into the formula (3) it is calculated discount rate which will be used calculating stock values:

Table 5. Discount rate, %.

(Calculated and prepared by authors according to Nasdaq OMX Baltic, Eurostat data)

		Apranga		Pieno žvaigždės	
	Government bond yield	**β**	**k_e**	**β**	**k_e**
2007	4,55%	1,24	11,94%	0,40	7,30%
2008	5,61%	1,37	12,33%	0,72	9,01%
2009	4,20%*	1,23	11,97%*	0,76	9,89%*
2010	5,57%	1,25	11,73%	0,74	8,83%
2011	5,17%	1,25	11,83%	0,72	8,60%
2012	4,83%	1,24	11,91%	0,71	8,48%
2013	3,83%	1,25	12,18%	0,72	8,16%
2014	2,80%	1,25	12,43%	0,74	7,85%

The other part of the valuation model is cash flow which is calculated according to the formula (4) and its detailed description. The forecast of cash flow parts is the most difficult stage in calculation technique as there is just a short period of available data in Lithuania`s capital market (the data can be found from 2003 year). What is more, during this period of time, the companies faced different situations in the market (economic expansion in 2003 – 2008 years, recession in 2009 – 2010 years and recovery starting from 2011). That is one of the main reasons why the cash flows of the companies were very unstable, fluctuating in a wide range. Because of such conditions, the analyst is put to inconvenience when making the forecast of the cash flow. In order to use such data, there is the need to make data "alignment". The types of the "alignment" were discussed by Damodaran (Damodaran 2009). The authors chose to align company sales according to average yearly growth rate (calculated by CAGR formula). Taking into account the above mentioned facts, it is logical to calculate cash flow parts as a percentage of the company sales (the bigger turnover means that company can make the bigger amount of net income, but also it will need more capital and working capital in order to maintain the increase in sales and etc.). Adding all the calculated/forecasted variables in the calculation methods, the results of the companies` stock prices can be calculated:

Table 6. "Apranga" stock value, €.

(Calculated and prepared by authors)

	2007	2008	2009	2010	2011	2012	2013	2014
Value_CF	2,14	2,42	2,78	2,21	2,39	2,59	2,72	2,84
Value_EVA	1,35	1,56	1,84	1,57	1,71	1,86	1,97	2,07
Actual price	5,01	2,21	0,62	3,98	1,70	1,83	2,49	2,71

Table 7. "Pieno žvaigždės" stock value, €.

(Calculated and prepared by authors)

	2007	2008	2009	2010	2011	2012	2013	2014
Value_CF	7,69	4,64	3,58	5,32	5,94	7,17	8,03	8,90
Value_EVA	2,28	1,51	1,26	1,79	2,15	2,37	2,66	2,94
Actual price	1,55	1,33	0,71	1,15	1,58	1,77	2,02	1,78

The main idea of this article is not just to calculate the values of stock and compare them with actual stock prices in the market, so only short comment on the results provided above will be given. Both evaluated enterprises have two similarities:

1. The actual prices in the market were lower than calculated values (using cash flow to equity technique) and that means that analyzed companies are undervalued. The reasons of such situation are:
   - low activity (and liquidity) in the market;
   - fluctuating cash flows and companies results which makes forecasting complicated;
   - uncertain dividend payment policy.
2. Values calculated by EVA to equity were lower compared to calculated values using FCFE technique. The difference can be explained by comparing the benefits which are addressed to shareholders in FCFE technique and EVA to equity technique as the first one option has the wider range of these benefits.

As the main purpose of this article is to evaluate valuation methods techniques and their applicability in Lithuania`s capital market, the sensitivity analysis will be provided which will allow to make a final decision about the most suitable calculation method.

6. Sensitivity analysis

As it can be seen from the previous chapters, the analyst or valuator has to make some assumptions in order to perform stock valuation. There are 3 key variables whose changes due to the inaccuracy of assumptions/calcu-

lation results can determine deviations from calculated stock values increasing them or decreasing:

- Cash flow and the assumptions associated with the forecast of it;
- Discount rate assumptions;
- Stable growth rate assumptions;

In order to assess the impact of the changes in the stock evaluation techniques, the sensitivity analysis will be performed. It will also allow to underline the most essential parts when choosing valuation variables and their values.

There will be tested all three variables in the sensitivity analysis. All of them will be checked under the conditions of increase and decrease by 1 % compared with calculated/chosen value:

- Cash flow change by +/-1 %;
- Discount rate change by +/-1 %;
- Stable growth rate change by +/-1%.

The results are presented in the Figures 4 and 5:

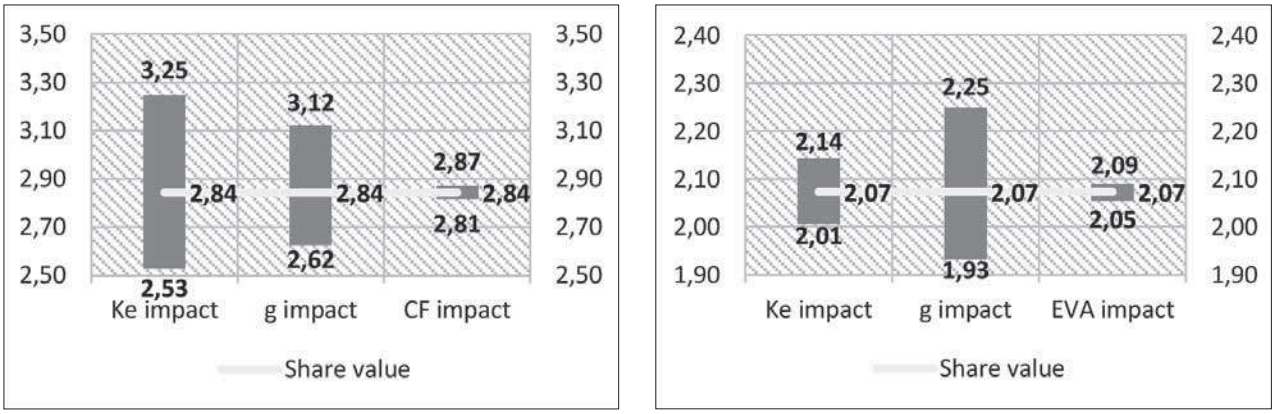


Fig. 4. "Apranga" value change because of variables changes, €

(Calculated and prepared by the authors)

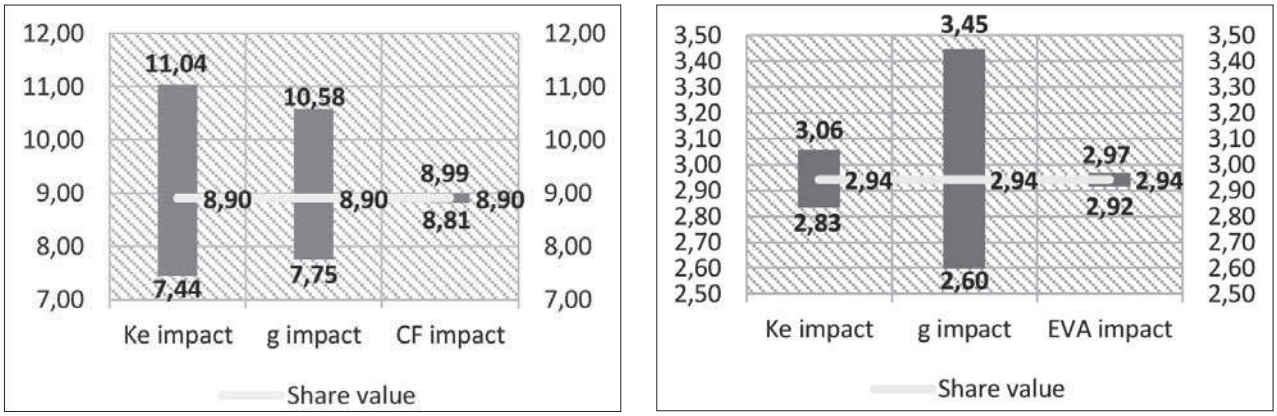


Fig. 5. "Pieno žvaigždės" value change because of variables changes, €

(Calculated and prepared by the authors)

Sensitivity analysis shows that discount rate changes in cash flow to equity technique have the most significant effect on calculated values. The cost of capital change by 1 % determined changes in "Apranga" stock value by -11,1 % when the discount rate increased and +14,2 % when the discount rate decreased by 1 %. The effect of cost of capital changes for "Pieno žvaigždės" company was even bigger as the increase of discount rate reduced the value by -16.4 % while the decrease in discount rate made value bigger by 24,1 %. The

changes in stable growth rate were also significant but the effect for the results were lower compared with discount rate changes (see Figure 4 and 5). When analyzing "Apranga" case, the change in stable growth rate by 1 % affected the value -7,7 % and +9,8 % while in "Pieno žvaigždės" case the values were -12,9 % and 18,9 % respectively. The lowest impact for the value was made by cash flow changes. The change of 1 % had almost the same effect in value change. Although the cash flow changes were least significant, the fluctuations of cash flow parts in analyzed companies were reasonable. Furthermore, the cost of capital and stable growth rates are more predictable and do not have a tendency to change significantly over the long period of time (for example standard deviation for "Apranga" cost of capital was 0,25 % and for "Pieno žvaigždės" 0,86 %).

A little bit different situation was with economic added value valuation technique. The most significant variable was stable growth rate according to sensitivity analysis. 1 % change in stable growth rate affected value -6,7 %/+8,5 % and -11,7 %/+17,1 % for retailer and dairy producer respectively. The effect of cost of capital were reasonable lower and resulted from -3,7 % to 3,8%. The change of calculated EVA to equity increase or decrease by 1 % had very low impact resulting in less than 1% for both companies.

The sensitivity analysis leads to the conclusion that cost of capital and stable growth rate changes has significant effect on final result. That means that analyst should pay a lot of attention when making assumptions and calculating these variables. But the concluded analysis also reveals that the discount rate is not fluctuating in a wide range (see Table 5) – the standard deviation of cost of capital for "Apranga" is 0,25 % and 0,86 % for "Pieno žvaigždės". The long term stable growth rate should also remain also at the same level as projected because its calculation is based on the long term statistical data. Although the cash flow or EVA variables have low impact for the final result compared to discount rate or stable growth rate, it is expected to have more significant fluctuations in these variables. The historical data reveals that variations in cash flow or EVA can be very high so and it is hard to predict them precisely. What is more, it was mentioned that using various calculation techniques is complicated because of the level of market development. Taking into account the all above mentioned facts, it is suggested to calculate the range of share value considering basic scenario (standard forecast of cash flows or EVA), optimistic scenario (using more optimistic than basic forecast when calculating cash flows or EVA) and pessimistic scenario (using more optimistic than basic forecast when calculating cash flows or EVA). Authors have chosen -10 % and +10 % change of basic scenario cash flow as statistical data proves huge fluctuations in analyzed period. Final results are presented in Table 8:

Table 8. Calculated stock values according to different scenarios, €

(Calculated and prepared by authors)

		Pessimistic scenario	Basic scenario	Optimistic scenario
"Apranga"	Value_CF	2,56	2,84	3,13
	Value_EVA	1,89	2,07	2,25
"Pieno žvaigždės"	Value_CF	8,01	8,90	9,79
	Value_EVA	2,68	2,94	3,21

The calculated values according to pessimistic and optimistic scenarios do not defer significantly from the basic scenario (the calculated values fluctuated from -10,0 % to 10,2 %). Depending on the calculated value, the basic scenario value and optimistic/pessimistic scenario value deferred up to 0,89 € but such a difference is acceptable. Because of the situation in Lithuania`s stock market authors believe that included value range in valuation reports/analysis can be practically implemented. This would contribute to sustainable development of valuation system in this Baltic country.

Conclusions

Stock valuations techniques are sophisticated processes which include different variables from internal and external environment. Statistical data from the internal and external environments determines the availability of methods usage. Because of low development level of stock market in Lithuania it was found that only two calculation techniques can be applied: cash flow to equity method and economic value added to equity method. The attention was paid to three valuation techniques` variables as they play the main role when calculating the final results. Large fluctuations of companies` cash flows led to the assessment of long term cash flow parts` trend and its application in cash flow calculation. Taking into account the current situation in the capital market it was decided and suggested for readers to use CAPM method when calculating the discount rate. Because of low activity in the market, it was suggested to use quarterly changes when calculating β coefficient and to calculate β and market return according to the market index which represents chosen equity the best. When determining the value of long term growth rate it was considered Lithuania`s current economic conditions and according to them was chosen to use a combination of real GDP and inflation rate.

By adding these three variables stock values in two different methods were calculated. The results show that values calculated using economic value added to equity technique were lower than values calculated using cash flow to equity method. The main reason of such difference was the wider range of benefits included for shareholders in cash flow to equity method. As economic value added to equity method is more conservative compared to cash flow to equity it was advised to use the liberal one option as the main calculation technique and the conservative one as the alternative calculation.

In order to prove the objectivity and preciseness of the results the sensitivity analysis were conducted. It revealed that discount rate and stable growth rate changes had reasonable effect on final result while cash flow changes were not so significant. Although the cost of capital and stable growth rate had the bigger impact compared to cash flow changes, the further analysis showed that cash flow fluctuations were more likely to happen and the range of these changes were significant. As the valuation techniques are based on cash flow forecasts and these forecasts can be with an error it was decided to suggest calculating three forecast scenarios. It is believed that such the range of calculated stock value will add additional objectivity, preciseness and trustworthiness for valuation results.

Considered the above mentioned things, authors believes that proper and applicable calculation technique can be created for Lithuania`s stock market. The methods which were described in details can contribute sustainable development of Lithuania`s valuation system.

References

Baltic market indexes. 2015. NASDAQ OMX Baltic stock market. Available on the Internet: <http://www.nasdaqomxbaltic.com/market/?pg=charts&lang=lt>

Bodie, Z.; Kane, A.; Marcus A. J. 2013. Essentials of Investments. Ninth Edition. The McGraw Hill Companies. p. 193 – 233, p. 405 – 445.

Brealy, R. A.; Myers, S. C.; Marcus, A. J. 2009. Fundamentals of Corporate Finance. Boston, MA: McGraw – Hill. 680 p.

Damodaran, A. 2005. An Introduction to Valuation. Available on the Internet: <http://people.stern.nyu.edu/adamodar/pdfiles/eqnotes/approach.pdf>

Damodaran, A. 2009. Ups and Downs: Valuing Cyclical and Commodity Companies. Stern School of Business. Available on the Internet: <http://people.stern.nyu.edu/adamodar/pdfiles/papers/commodity.pdf>

Damodaran, A. 2012. Investment Valuation: Tools and Techniques for Determining the Value of Any Asset. John Wiley & Sons, Inc. 656 p.

Dividends, NASDAQ OMX Baltic stock market. Available on the Internet: <http://www.nasdaqomxbaltic.com/map?id=3792210&highlight=dividendai>

Fernandez, P. 2002. Valuation Methods and Shareholder Value Creation. Academic Press.

Fernandez, P. 2007. Valuing Companies by Cash Flow Discounting: Ten Methods and Nine Theories, *Journal of Management Science* 1(1)

Galinienė, B. 2015. Turto ir verslo vertinimo sistemos transformacijos. Monografija. Vilniaus universiteto leidykla, p.181-221; p.258-270. [Transformations of real estate and business evaluation system. Monograph.]

Galinienė, B., Butvilas, A. 2010. Analysis of the Capital Cost Impact on Share Value, *Baltic Journal on Sustainability* 16 (1): 126 – 142.

Galinienė, B., Kulišauskas, D. 2014. Vertybinių popierių vertinimo metodų teoriniai aspektai ir metodų pritaikymo Lietuvos kapitalo rinkoje galimybės. Lietuvos turto vertintojai – 20 metų veiklos patirtis nacionalinės ir Europos ekonominės erdvės kontekste.[Thoretical aspects of securities' evaluation and possibilities of methods' application in Lithuanian capital market]

Garbaravičius, T., Kuodis, R. 2002. Lietuvos finansų sektoriaus struktūra ir funkcionavimas. Pinigų studijos, p.27 – 31. [Stucture and functioning of Lithuanian financial sector]

GDP and Main Components. 2014. Eurostat. Available on the Internet: <http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_gdp_c&lang=en>

Gilbert, G. A. 1990. Discounted Cash Flow Approach to Valuation. IFCA Continuing Education Series. Valuation of Closely Held Companies and Inactively Traded Securities.

Graham, J.; Smart, S. B., Megginson, W. L. 2010.Corporate finance: Linking theory to what companies do. Mason, OH. South Western.1008 p.

ICB classification, NASDAQ OMX Baltic stock market. Available on the Internet: <http://www.nasdaqomxbaltic.com/market/?pg=industry&lang=lt>

Įmonių finansinė analizė. Rodiklių skaičiavimo metodika. 2010. Vertybinių popierių rinka NASDAQ OMX Vilnius. [Financial analysis of enterprises. Methodic of indicators' calculation]

Capitalisation, NASDAQ OMX Baltic stock market. Available on Internet: <http://www.nasdaqomxbaltic.com/market/?pg=capital&lang=lt>

Larrabee, D. T.; Voss, J. A. 2013. Valuation Techniques. Discounted Cash Flow, Earnings Quality, Measures of Value Added, and Real Options. CFA Institute. 608 p.

Lietuvos Respublikos finansų ministro 2012-04-27 įsakymas Nr. 1K-159 „Dėl turto ir verslo vertinimo metodikos patvirtinimo". (Žin., 2012, Nr. 50-2502). [Requisition of minister of Financial Ministry of Lithuania, Official Gazette. 2012, No. 50-2502]

Lietuvos Respublikos turto ir verslo vertinimo pagrindų įstatymo pakeitimo įstatymas .2011. Available on the Internet: <http://www.atvi.lt/index.php/teisine_informacija/teises_aktai/lietuvos_respublikos_turto_ir_verslo_vertinimo_pagrindu_istatymas_galiojanbsp-nuo_2012_05_01/480 > [The Government of the Republic of Lithuania. Resolution of May the1st, 2011 No. 480]

Long term government bond yields. 2014. Eurostat. Available on the Internet: <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&plugin=1&language=en&pcode=teimf050>.

Maness, T. S. 1988. Introduction to Corporate finance. McGraw Hill Series in Finance.

Market capitalization of listed companies (% of GDP). The World Bank. Available on the Internet: <http://data.worldbank.org/indicator/CM.MKT.LCAP.GD.ZS>

Morningstar Global Equity Classification structure. 2011. Available on the Internet: <http://corporate.morningstar.com/us/documents/methodologydocuments/methodologypapers/equityclassmethodology.pdf>

Odabasi, A. 2003. Some Estimation Issues on Betas: A Preliminary Investigation on the Istanbul Stock Exchange. Available on the Internet: <http://odabasi.boun.edu.tr/research/BetaStability-JBU.pdf>

Peterson, D. 2013. Three Approaches to Valuing a Privately Held Company. Financial Executives International.

Trading statistics, NASDAQ OMX Baltic stock market. Available on the Internet: <http://www.nasdaqomxbaltic.com/market/?pg=stats&lang=lt>

Reilly, F. K., Brown, K. C. 2006. Investment Analysis and Portfolio Management. Eight Edition. Thomson South – Western™. 513 – 582.

Market capitalization .2014. NASDAQ OMX Baltic stock market. Available on the Internet: <http://www.nasdaqomxbaltic.com/market/?pg=capital&list[]=BAMT&list[]=BAIT&list[]=BAFN&period=other&start_d=30&start_m=12&start_y=2013&end_d=31&end_m=12&end_y=2013>

Ryu, A. 2011. Beta Estimation Using High Frequency Data. Available on the Internet: <https://econ.duke.edu/uploads/assets/Ryu.pdf>
International Valuation Standards. 2013. International Valuation Standards Council. Available on the Internet: <http://www.atvi.lt/uploads/files/dir33/dir1/7_0.php>

Velez – Pareja, I., Tham, J. 2003. Do the RIM (Residual Income Model), EVA and DCF (Discounted Cash Flow) Really Match? Working paper No. 25.

Welch, I. 2008. The Consensus Estimate for the Equity Premium by Academic Financial Economists in December 2007. Unpublished Working Paper. Brown University.

World Economic Forum. 2014. The Global Competitiveness Report 2014 – 2015. Available on the Internet: <http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2014-15.pdf>

Pieno žvaigždės 2003 – 2014 years financial reports. Available on the Internet: <http://www.nasdaqomxbaltic.com/market/?pg=details&instrument=LT0000111676&list=2&tab=reports>

Apranga 2003 – 2014 years financial reports. Available on the Internet: <http://www.nasdaqomxbaltic.com/market/?instrument=LT0000102337&list=2&pg=details&tab=reports>

Begovic, S.V., Momčilovic, M., Jovin, S. 2013. Advantages and limitations of the discounted cash flow to firm valuation. Available on the Internet: <http://www.vps.ns.ac.rs/SB/2013/1.4.pdf>

Looking to 2060: Long term global growth prospects. OECD. 2012. Available on the Internet: <http://www.oecd.org/eco/outlook/2060%20policy%20paper%20FINAL.pdf>