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Companies' growth vs. growth opportunity: Evidence from the regular and alternative stock markets in Poland

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ABSTRACT

The article discusses the ability of potential growth measures calculated basing on market share prices to predict the future growth of the companies listed on the primary and alternative exchange markets in Poland. Analysing the Polish exchange market and dividing the sample of companies due to the markets they are listed – the Warsaw Stock Exchange Main Market or the NewConnect Alternative Market – brought conclusive results. Company growth measured as the growth of total assets, equity, sales and, what is the most important, earnings per share, is related to the growth opportunity measures and other factors taken into account in the tested models. The differences between the results for the two separate markets are evident and the relationship between growth opportunity measures and the future growth seems to be stronger for larger companies listed on the main market, while the NewConnect smaller companies' growth is less predictable. We add to the theory of the growth prediction a modified approach by sampling companies according to the exchange they are listed that helps to solve the companies' "growth puzzle" and supplement the growth theory in the field of factors affecting this process in different growth stages. The originality of the paper is reflected in the modified approach to the problem and distinguishing the stages of development of the company taking into account the Polish stock market.

KEYWORDS

company growth, growth opportunity, earnings, value, Poland

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G10, M20

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1. INTRODUCTION

A company's growth forecast is one of the most inscrutable issues in finance that is related to investing on a capital market. Growth is a subject of development that can be measured by financial indicators and other quantifiable and non-quantifiable factors related to this process. Financial measures of growth include assets, equity, sales and earnings per share, while other measures reflect the increase of employment (Shreyer 2000) or quality (Cho – Pucik 2005) in a company.

Growth opportunity is related to the value of a company and according to Miller – Modigliani (1961) value can be split into the part related to the assets a business entity possesses and the growth opportunity represented by the present value of future investment projects cash flows. Growth opportunity can be also measured by the investors' assessment of a company's future performance and such an evaluation is included in the prices of shares traded on the exchange.

This paper's goal is related to the growth opportunity measures and future company growth on the Polish stock market. Until now, growth opportunity surveys have been done on the developed markets, i.e., the USA and the UK. The paper follows Danbolt et al. (2011) methodology, taking into account two separate markets existing on Warsaw Stock Exchange (WSE), the main and the alternative NewConnect (NC). It can be expected that in separate groups of companies taken into account the growth opportunity measures will reflect future growth in a more efficient way.

The WSE and NC are two markets with different regulations for companies listed there. WSE Main Market (WSE-MM) is the exchange for large companies with a good reputation and long history, while NC is a market for small- and medium-sized companies interested in financing development through public offering. It is expected that some successful companies listed on the NC will be listed on the WSE-MM in the future. The capitalization on NC varies from several hundred thousand to several dozen million zlotys, while on the WSE-MM capitalization related to IPO (Initial Public Offering) starts from this amount. Therefore, taking into account the information requirements on both markets and the degree of investor protection, the NC market is a risky market for companies, while the WSE-MM is dedicated for the developed and stabilized enterprises with a lower investment risk level.

The paper is composed of following Sections: Problem overview in the literature, Methodology and data, Results of the empirical study and Conclusions.

2. LITERATURE REVIEW

Company growth theory can help to understand the limitations of the surveys in the field of financial growth and support the concluding remarks, especially that not all companies grow in the same way and the theory related to this problem is developing according to Davidsson et al. (2006).

Most models of company growth assume an existence of distinct stages through which businesses pass and it is formulated in the growth theory proposed first time by McGuire (1963), Christiansen – Scott (1964), Steinmetz (1969), and later by Lewis – Churchill (1983), Greiner (1972), Scott – Bruce (1987) or Hanks et al. (1994). Moreover, the presented models distinguish

different number of stages: three stages are presented by Sahlmanet al. (1999), four by Timmons – Spinelli (2003), five by Kuratko – Hodgetts (2007) or six by Baron – Shane (2005). The 'growth stages' were the most popular theories formulated in the 20th century but according to Levie – Lichtenstein (2010) there is no proof that such stages exist and the models are describing rather a theoretical process of growth, not an empirical process. There are tools, as for example the check-list, that through covering the most important issues of specific phases, can help in identifying the stage of a company development (Kozien 2017).

From the other hand attempting to define stochastic models led researchers to the conclusion that so many factors affect the growth of an enterprise that it should be perceived more as a random event and cannot be predicted (Farouk – Saleh 2007). Different patterns of growth, especially non-linear, may influence the possibility of growth forecasting with the growth opportunity measures accompanying the modelling of the growth. One of the first concepts describing the process of enterprise growth is the theory of proportional growth that was proposed by Gibrat (1931), according to which the size of the enterprise in the next period will be equal to the present size enlarged by a stochastic variable, meaning that the rate of a company growth is independent of the company size (the law of proportionate effect) and uncorrelated in time. This law has been tested by many researchers and, for example, Lotti et al. (2003) found that start-up organizations must grow quickly to achieve a size that would allow them to survive. Therefore, in the initial period of development the law of proportional growth does not work, but in subsequent years, after the intensive development phase, the surveyed enterprises grew in accordance with the Gibrat rule. Taking into account all companies together in one sample may affect the statistical methods bringing insignificant results while separating the developed, smaller and younger companies enables to find proper parameters of the tested models.

The growth of a company is related to the various sources of capital used in different stages of development based on the growth opportunity taken into consideration by investors. Moreover, investment in small and young companies is accompanied by higher risk, and therefore, higher expected rate of return in comparison to the developed companies. In this context, the small companies should be characterised by higher growth indices and growth opportunity than the mature entities to bring investors a higher rate of return.

Growth opportunity plays a key role in the investment process in which investors evaluate companies and their securities. A survey of the relationship between growth opportunity measures and future growth was first presented by Kallapur – Trombley (1999), who tested the growth opportunity proxies with book value of equity, assets, sales and earnings growth and found a relationship between the opportunity measures and the growth of sales and assets, however they concluded that it is rather weak for the future earnings growth forecast. They argued that the weakness of the results is related to the fact that the earnings can be the subject of manipulation and very often its value can be negative.

On the other hand, Danbolt et al. (2002) tested the validity of the Kester (1984) and Brealey – Myers (1981) model (KBM) on a sample of the UK companies. They found that the value of growth opportunities accounts for a larger proportion of market values than assets-in-place. They also mentioned that the KBM model is highly sensitive to the inclusion of inflation in the risk-free interest rate. The model also fails to provide results consistent with the expectations derived from option pricing theory regarding the relationship between the value of growth potential and the value of assets-in-place. Jones et al. (2004) found the level of abnormal returns that varies according to the type of capital investment being announced. In particular, they

found that the market reacts more favourably to the investments that 'create' future investment opportunities than to the investments which can be categorized as 'exercising' investment opportunities. Market reaction also varies by the firm size, with large companies tending to experience weaker responses to announcements than smaller firms. The findings of Jones et al. (2004) supported the role for investment opportunities in market valuations. Moreover, Hirst et al. (2008) found that the traditional methods of estimating required rates of return overstate hurdle rates in the presence of growth opportunities. They found that growth opportunities for the UK companies average 33% of the equity value, and while incorporating the effect of growth opportunities, the average cost of capital for investment purposes falls.

Finally, Danbolt et al. (2011) mentioned that although numerous empirical studies include proxies for growth opportunities in their analyses, there is limited evidence as to the validity of the various growth proxies used. Based on a sample of the UK companies, they assessed the performance of eight growth opportunity measures. Their results show that while all the growth measures show some ability to predict growth in a company's sales, total assets or equity, there are substantial differences between various models. In particular, Tobin's Q performs poorly while dividend-based measures generally perform better. However, none of the measures has any success in predicting earnings per share growth, even when controlling for mean reversion and other time-series patterns in earnings. Growth companies do grow, but they do not grow in the key dimension (earnings) as the theory predicts. They called this phenomenon a "growth puzzle".

Growth opportunity, as a proxy, was taken into account in studies provided by Rayan – Zingales (1995), Michaelas et al. (1999), Ozkan (2001), Billett et al. (2007) and Chen (2002) in the light of the optimal capital structure that influences the value of the company and its growth. It was found by Land et al. (1996) that there was a negative relation between leverage and future growth for the companies they surveyed. This negative relation between leverage and growth hold for firms with low Tobin's q ratio, but not for high-q firms or firms in high-q industries. They stated that leverage did not reduce growth for firms known to have good investment opportunities but was negatively related to the growth for firms whose growth opportunities were either not recognized by the capital markets or were not sufficiently valuable to overcome the effects of their debt overhang.

Martinez – Sola et al. (2018) found that SMEs with greater growth opportunities adjust more quickly to their target cash holding level to preserve their financial flexibility and to be able to take advantage of the profitable investment opportunities when they arise. From the other hand, supply chain management improvement influenced positively the company development (Wahyuni – Sumarmi 2018). Moreover, firms with high growth potential face high risk and adopt a more progressive strategy for earnings (Huang et al. 2018). Growth opportunity is, moreover, created by the institutional environment which supports the development of enterprises, and as Aparicio et al. (2017) stated, it could be possible to obtain economic growth by encouraging the appropriate institutions in order to increase entrepreneurship by opportunity.

Growth patterns may be different in separate stages of company development especially on a capital market where exchanges provide specific requirements toward the companies planning to issue shares. A new approach is proposed in this paper based on the sampling companies due to the market they are listed that can help to solve the companies' growth puzzle described by Danbolt et al. (2011).

3. DATA AND METHODS

All measures of growth potential are based on the idea that market prices of shares reflect prospects of future company growth. Tobin (1969) presented an index which is the ratio of the market value of assets and replacement costs, which can be considered as the growth opportunity measure.

$$TQ = \frac{MVC}{ARC}, \tag{1}$$

where TQ – Tobin's Q, MVC – market value of capital invested in the company, and ARC – cost of asset replacement.

Due to the problems associated with determining the level of replacement costs, it is possible to modify the Tobin's Q ratio, which was proposed by Danbolt et al. (2011):

$$TQ = \frac{TA + MVE - BVE}{TA}, \tag{2}$$

where TA – total assets, MVE – market value of equity, and BVE – book value of equity.

The higher the value of this indicator, the greater the growth opportunity of the examined enterprise, and therefore, the difference between the market value of equity and its book value determines the growth potential, which is included in the market price of the shares.

Another indicator that can be used to assess the growth opportunity of an enterprise is the inverse of the price/earnings (P/E) ratio, namely earnings to market price ratio (E/P). For profitable companies the lower the E/P value, the greater the growth potential of the company. A particular situation may apply to enterprises in the phase of preparing for intensive growth, when revenues do not cover costs incurred and the company shows losses. In this phase investors allocate capital to finance development and investment projects based on the company's growth opportunity.

The model of Kester (1984) and Brealey – Myers (1981) was built on the basis of the decomposition of the stock price into the value of assets in place and the value of growth opportunities.

$$P_gKBM = \frac{P_S - EPS/k_E}{P_S}, \tag{3}$$

where Pg – value of growth potential, Ps – share price, EPS – earnings per share, and k_E – cost of equity. The cost of equity is estimated using the Capital Asset Pricing Model.

The higher the value of this indicator, the higher the growth opportunity. This model should not be used when the company's profits are negative.

The proposals for measuring growth opportunity presented by Ottoo (2000) are related to the concept of value added, and the higher the value of indicators, the greater the growth potential of the examined enterprise. The first presented model refers to the value that exceeds the company value (EVF – Exceeding Value to Firm):

$$P_gEVF = \frac{(MVE + BVD) - (BVE + BVD)}{MVE + BVD}. \tag{4}$$

The second model represents the value that exceeds the shareholders' value (EVE – Exceeding Value to Equity):

$$P_gEVE = \frac{MVE - BVE}{MVE}, \tag{5}$$

where *MVE* – market value of equity, *BVE* – book value of equity, and *BVD* – book value of debt.

If the NPV of the investment projects implemented by a company is positive, the market value of the assets will be higher than the book value of the present value of profits that will appear in the future. The concept of additional value is similar to the idea of Economic Value Added with the added value being related to the past, while the models proposed by Otto are related to the future and the company growth opportunity, which is included in the market price of the shares.

In the presented paper, data for the non-financial companies listed on the WSE-MM and NC from the years 2004–2014 were used (including the years of the global financial crisis). The decision of not excluding this period from the analysis was made based on the assumption that both stock markets taken into consideration were impacted by the same circumstances that influenced the fundamental value and the growth opportunity. The growth may have either a positive or a negative sign during the crisis that can be related to the investors' expectations.

The balance sheets and exchange quotations of 461 enterprises from the WSE-MM and 440 from the NC were collected and, on their basis, the ratios used in the study were calculated. It has to be added that in some cases there were no data available resulting in non-equal number of observations. In such situations the number of correlation or regression input data was reduced and differentiated depending on the examined case.

A database containing the original 5,071 observations company/year, for the main market of the WSE, and 4,840 records company/year for the NC alternative market was created. However, these data sets did not allow to calculate the growth opportunity indicators for all company/year observations. The lack of data was caused by two factors. The first is the lack of relevant data on the balance sheets or the other: the value of the balance sheet items is not allowing a proper calculation of the examined indicators. Diversity growth rates resulted in the need to use different data from the balance sheets, and this meant that the number of observations in the sample undergo large variations, so as to cover from 1,749 observations for averaged Earnings Growth (3), 3,387 observations for Earnings Growth (1) on the Warsaw Stock Exchange, and the 494 observations for Earnings Growth (3) follow-up to 1,999 observations the company/year Equity Growth (1) on the NC. The diverse number of observations in the sample was also performed in the source texts, those referred to by the authors. Growth rates are calculated on a basis of balance sheet items. The occurrence of loss in a company, no dividend payment, suspension of listening, the withdrawal of the company from the stock exchange which prevented the calculation of market indicators such as I beta, or capitalization affected the number of calculated growth rates indicators. In addition, some of the indicators were calculated based on three-year observations, giving only one record in the database. This also limited the number of records in the database.

Danbolt et al. (2011) draw attention to the falsification of accounting data. It is supposed that in Poland this practice has a similar scale as in other developed economies. For example, Ernst & Young in Poland presents such an opinion in their reports, but there is a lack of scientific studies in this field. It is difficult to recognize how widespread this problem is, so accounting data were treated as reliable.

Table 1. Statistical characteristics of growth opportunity measures for the WSE-MM companies

	N	Mean	Median	SD	Min	Max	Q1	Q3
TQ	1,955	1.48	1.18	0.96	0.44	6.30	0.89	1.72
E/P	835	0.08	0.06	0.08	0.00	0.58	0.03	0.10
MV/BV	1,955	1.82	1.28	1.63	0.15	9.81	0.76	2.23
KBM	660	0.15	0.28	0.77	–4.03	0.98	–0.11	0.69
EVF	1,955	0.15	0.17	0.37	–0.82	0.85	–0.09	0.43
EVE	1,944	0.34	0.56	0.73	–3.94	0.99	0.14	0.82

Note: E/P and KBM are calculated only for positive earnings.

Each time the cost of equity is used in the research, for instance in the KBM model, it has been calculated using the Capital Asset Pricing Model (Sharpe 1964; Litner 1965; Mossin 1966). The beta coefficients for each year were calculated using the daily data on listings of the companies during a particular year. The listings included both splits and possible pre-emption rights or dividends. In the calculations, the 'market' is represented by the WIG broad-market index. The expected risk premium was calculated on the basis of the risk premium for the developed countries, including rating for Poland (Damodaran 2015). The risk-free rate was estimated on the basis of the average annual rate of return on wholesale treasury bills and if they were not available, bonds with the longest term to maturity available at a given time were taken into consideration. In the whole period 52-weeks treasury bills were used and if they were unavailable, ten-years bond yields were taken instead.

The following hypothesis will be tested in the next sections:

H1: Smaller companies are characterised by higher growth and growth opportunity than mature entities.

H2: Companies' growth measured as the growth of total assets, equity, sales and earnings per share growth are related to the growth opportunity measures.

H3: There is a difference between two markets and the relationship between growth opportunity measures and future growth is stronger for the companies listed at the WSE-MM than at the alternative NC exchange.

Tables 1 and 2 provide descriptive statistics of growth opportunity measures separately in the groups of mature and small companies listed, respectively, on the WSE-MM and its alternative subsidiary NC. Earnings to price (E/P) and KBM ratios were calculated only for those years for which earnings were positive. The lowest and highest 2.5% were trimmed to exclude outliers.

Statistical analysis of the data shows that Tobin's Q mean and median as well as market-to-book value (MV/BV) are higher for the small companies listed on NC, with a higher variation between years (measured by standard deviation). The distribution of E/P ratios is similar in both groups, but it should be remembered that only positive earnings were taken into account.[1] Both

[1]If negative earnings are included, the E/P mean is negative for the young companies, indicating loses, and the ratios are much more varied within the sample than for the mature entities.

Table 2. Statistical characteristics of growth opportunities measures for the NC companies

	N	Mean	Median	SD	Min	Max	Q1	Q3
TQ	991	2.74	1.47	3.63	–0.01	25.97	0.92	3.03
E/P	529	0.08	0.05	0.08	0.00	0.48	0.02	0.11
MV/BV	991	4.30	2.05	7.12	–7.10	55.78	0.99	4.32
KBM	439	–9.66	–0.79	28.52	–227.86	1.00	–3.94	0.38
EVF	991	0.33	0.40	0.47	–1.56	0.96	0.06	0.71
EVE	991	0.40	0.75	0.84	–4.24	1.00	0.26	0.92

Note: As for Table 1.

models based on value added indicate that the small companies are characterized by a higher growth opportunity. The results are in line with the theory and expectations that the small companies should be characterised by higher growth opportunity than the mature entities to bring investors higher rate of returns. On the other hand, the average KBM ratio is higher and less varied for the mature companies. In the group of smaller companies, the KBM mean and median are negative, which means that the growth opportunity measures are negative and shares are priced on the market below the value of assets in place based on current earnings. These results may be biased by the fact that companies with negative current earnings were excluded from the sample to calculate this measure.

The growth of companies is represented by the growth of assets, equity, sales and earnings per share. The one-year, two-year and three-year growth rates of assets are calculated according to the following formulas:

$$\Delta TAS_{+1} = \frac{TAS_{+1} - TAS_0}{TAS_0}, \quad \Delta TAS_{+2} = \frac{TAS_{+2} - TAS_0}{TAS_0}, \quad \Delta TAS_{+3} = \frac{TAS_{+3} - TAS_0}{TAS_0}, \tag{6}$$

where TAS_{+1}, TAS_{+2}, TAS_{+3} denote total assets at the end of one, two and three years after year 0, in which total earnings equals TAS_0.

Similarly, the growth rates of equity and sales are calculated. The growth rates of earning per share are determined in the following way:

$$\Delta EPS_{+1} = \frac{EPS_1 - EPS_0}{TAS_0}, \quad \Delta EPS_{+2} = \frac{EPS_2 - EPS_0}{TAS_0}, \quad \Delta EPS_{+3} = \frac{EPS_3 - EPS_0}{TAS_0}, \tag{7}$$

where EPS_{+1}, EPS_{+2}, EPS_{+3} are earnings per share in one, two and three years ahead from year 0. The growth of earnings is calculated in relation to the assets size due to the fact that earnings can be negative and the change of a ratio from the negative and positive value of earnings is not symmetric and could affect the results.

As it was mentioned earlier in this paper that earnings can be the subject of manipulation and one-off events in a company may affect them. Trying to overcome these problems, the average EPS three-year growth rates are calculated, where both the initial and final levels of EPS are determined as the averages over three consecutive years, according to the formula:

$$\Delta EPS_{+3(averaged)} = \frac{\frac{EPS_{+2}+EPS_{+3}+EPS_{+4}}{3} - \frac{EPS_{-1}+EPS_{0}+EPS_{+1}}{3}}{TAS_0}, \tag{8}$$

where EPS_{-1} denotes earnings per share one year before year 0 and EPS_{+1}, EPS_{+2}, EPS_{+3}, EPS_{+4} are earnings per share one, two, three and four years after year 0, respectively.

In the next section the coefficients of correlation between the levels of various growth opportunity measures and future company growth over one, two and three years, measured by assets, equity, sales and earnings per share growth rates are analysed. The relationship between future earnings growth and growth opportunity measures will also be studied more deeply with the use of the multivariate regression model proposed by Danbolt et al. (2011). Besides growth potential measures the model takes into account other factors identified in the literature associated with earnings growth. In each estimated linear regression, the chosen growth opportunity measure is only one of several explanatory variables. These estimations allow, therefore, to explore whether the level of growth opportunities have any incremental impact on earnings growth once a control for other factors potentially related to that growth is taken into account. The regression models estimated here can be presented with the following general formula:

$$\Delta EPS_i = \alpha + \beta_1 GO_{0i} + \beta_2 ROE_{-1i} + \beta_3 \Delta EPS_{0i} + \beta_4 \Delta TA_{0i} + \beta_5 \ln MV_{0i} + \varepsilon_i. \tag{9}$$

In the above equation, ΔEPS refers to the one-year, two-year or three-year growth of a company's earnings per share, given by the formulas (8) and (9).

$ROE_{-1} = EPS_{-1}/EQ_{-1}$ denotes a one-year-lagged return on equity, $\Delta EPS_0 = \frac{EPS_0 - EPS_{-1}}{TAS_{-1}}$, $\Delta TA_0 = \frac{TAS_0 - TAS_{-1}}{TAS_{-1}}$, $\ln MV_0$ is the natural logarithm of the market value and GO_0 represents one of the six considered growth opportunities measures.

According to Danbolt et al. (2011), the one-year-lagged return on equity, ROE_{-1} is included in the regression to cover the effect of mean reversion in earnings. Mean reversion is observed when the coefficient β_2 is negative and statistically significant. The recent one-year earnings growth, ΔEPS_0, is added to control for the persistence in earnings growth rates (when β_3 is positive). However, it should be admitted that, to some extent, both of these control variables embody similar information and each of them can speak for either the mean reversion or the persistence in earnings, depending on whether the sign of the respective regression coefficient is positive or negative. The presence of recent annual growth of total assets, ΔTA_0 is slightly more arbitrary and based on their strong predictive power for future abnormal returns observed in the literature. Finally, the logarithm of present market value is a proxy for company size.

4. RESULTS AND DISCUSSION

In this section the discussion of the results is provided firstly for the WSE-MM, followed by the results for the NC, while the analysis of the difference between the results for those markets is placed at the end of this Section.

Table 3. Correlation matrix for various measures of growth opportunities for the WSE-MM companies

	TQ	E/P	MV/BV	KBM	EVF
TQ					
E/P	*–0.272****				
MV/BV	*0.877****	*–0.282****			
KBM	*0.203****	*–0.715****	*0.217****		
EVF	*0.811****	*–0.296****	*0.764****	*0.244****	
EVE	*0.366****	*–0.204****	*0.296****	*0.196****	*0.413****

Note: Values that are in italic indicate that the coefficient is significant and of the predicted sign.
*, **, ***: The coefficients are significant at 10%, 5% and 1% level, respectively.

4.1. WSE main market analysis

Table 3 presents the matrix of Pearson correlation coefficients between various growth opportunity measures.[2] The positive correlations between all measures except the one between E/P and the other measures are expected. The statistical significance of these correlation coefficients is assessed with the t-test.

All measures are significantly correlated with each other and of the predicted sign that is given by italic. Among them, the absolute values of correlation coefficients range from 0.196 to 0.877. Deeper analysis reveals very clear rules in these relationships. All market-to-book-based measures (MV/BV, TQ, EVF, EVE) are highly correlated with each other. Among them, EVE is the least correlated with the others. There is also a very strong relationship between two measures based on the price to earnings concept (E/P and KBM). Between the measures representing these two distinctly different groups, the correlation is weaker.

It is interesting to what extent various measures of growth opportunities are able to predict companies' future growth. Table 4 provides the Pearson correlation coefficients between various measures of growth opportunities and the subsequent growth rates of companies.

The future growth in total assets is predicted by all market-to-book-based growth opportunities measures (Tobin Q, MV/BV, EVF, EVE) – for each of the three periods considered, the coefficients of correlation are statistically significant at 1% level and have the predicted sign. Among these four measures, EVE is the least correlated with assets growth. In contrast, E/P and KBM are quite poor predictors of future growth in total assets – 4 out of the 6 correlation coefficients are not statistically significant.

Quite a similar pattern of relationships between growth opportunity measures and future growth rates exists when equity and sales growth are concerned, but there is a difference in the strength of these correlations. All estimated coefficients of the correlation between market-to-book-based measures and future equity growth rates are lower than the respective coefficients

[2]The Spearman analysis was applied as well, but it did not bring significantly different results than the Pearson.

Table 4. Growth opportunities and realised growth – Correlation coefficients for the WSE-MM companies

	Assets growth (1)	Assets growth (2)	Assets growth (3)
TQ	*0.330****	*0.257****	*0.275****
E/P	*–0.140****	–0.053	0.041
MV/BV	*0.317****	*0.268****	*0.251****
KBM	*0.123****	–0.026	–0.058
EVF	*0.290****	*0.224****	*0.247****
EVE	*0.209****	*0.165****	*0.155****
	Equity growth (1)	**Equity growth (2)**	**Equity growth (3)**
TQ	*0.201****	*0.182****	*0.208****
E/P	*–0.066**	0.034	0.076
MV/BV	*0.245****	*0.219****	*0.214****
KBM	*0.076**	–0.127**	*0.198****
EVF	*0.191****	*0.172****	*0.198****
EVE	0.030	*0.066***	*0.057**
	Sales growth (1)	**Sales growth (2)**	**Sales growth (3)**
TQ	*0.170****	*0.131****	*0.108****
E/P	*–0.099***	*–0.080**	0.091*
MV/BV	*0.179****	*0.141****	*0.105****
KBM	0.012	0.031	–0.041
EVF	*0.141****	*0.123****	*0.083****
EVE	*0.076****	*0.063***	0.037

	EPS growth (1)	EPS growth (2)	EPS growth (3)	(Averaged) EPS growth (3)
TQ	0.019	*0.077****	*0.050**	*0.129****
E/P	*–0.133****	*–0.178****	*–0.155****	*–0.176****
MV/BV	*0.055***	*0.081****	*0.058***	*0.109****
KBM	*0.101***	*0.088**	0.083	*0.149***
EVF	*0.049***	0.043	0.044	*0.112****
EVE	–0.043*	–0.003	–0.006	0.002

Notes: Values that are in italic indicate that the coefficient is significant and of the predicted sign.
For all measures, except E/P, the predicted sign is positive, for E/P it is negative.
*, **, ***: Coefficients are significant at 10%, 5% and 1% level, respectively.

for assets growth, and they are the lowest for sales growth. The correlation coefficients between EVE and equity or sales growth rates are very low or even statistically insignificant.

Summarizing this part of the analysis regarding the size growth of the WSE-MM companies, it is best predicted by two market-to-book-based growth opportunities measures (TQ and MV/BV). Excess-value measures, especially EVF, have some relevance, too. In contrast, price-to-earnings-based measures do not play a significant role in predicting future size growth.

In the case of earnings growth, the best-performing growth opportunities measure is now the E/P ratio. The second price-to-earnings-based measure, KBM, also plays a role but it performs poorly. In the group of market-to-book-based growth potential measures, the best-performing is the market-to-book ratio (MV/BV), and TQ is the second best, although the respective correlation coefficients are lower. EVE plays no role in predicting the EPS growth.

The determinants of future earnings growth are presented in Table 5. Due to the volume limitations of the paper only final regressions after eliminating irrelevant explanatory variables in a sequential *a posteriori* selection method is presented.[3]

In most regression models estimated here, the effect of mean reversion in earnings per share can be stated. This is confirmed by the negative and statistically significant regression coefficients on ROE_{-1} and on ΔEPS_0. The lack of significance of these variables in the regression models explaining the three-year EPS (average) growth rate is probably due to the special technique of calculating that rate, where the beginning and the final levels of EPS are averaged over three consecutive years. The previous-year growth in total assets, represented by ΔTA_0, does not matter for the subsequent earnings growth. One- and two-year EPS growth is also not related to the firm size (measured by $\ln MV_0$), although a positive linkage was detected for the three-year growth. What is most important for the subject of this study, the incremental impact of the market level of growth opportunity has been reported in Table 5. Values that are in italic in column 8 indicate that the coefficient on the growth opportunity measure is significant and of the predicted sign. The only measure that is not significant in any regression is EVE, which corresponds to the results of the correlation analysis. Other measures representing the market-to-book-value-based group (Tobin's Q, MV/BV, EVF) perform quite well in every time horizon (except Tobin's Q for one-year growth). Earnings-based growth opportunity measures (E/P, KBP) proved to have incremental predicting power for one-year earnings growth, but surprisingly, they do not have any impact on two- or three-year growth rates. Taking into account the statistically significant correlations reported previously, these regression results must be related to the inclusion of other explanatory variables based on the level of earnings (ROE_{-1}, ΔEPS_0), embodying similar information as E/P and KBM measures.

4.2. NewConnect analysis

Table 6 presents the correlation coefficients between various growth opportunity measures on the NewConnect (NC) alternative market.

The structure of the correlation matrix is similar to that for the WSE-MM companies. As previously, all market-to-book-based measures (MV/BV, TQ, EVF, EVE) are significantly

[3]At each step of this procedure, the variable with the lowest value of the Student's t-statistic (the highest *P*-value) was removed. Complete regression models are available from the authors upon request.

Table 5. Determinants of future earnings growth for the WSE-MM companies (Models with only statistically significant regressors)

	Sample	Const.	ROE_{-1}	ΔEPS_0	ΔTA_0	$lnMV_0$	GO_0	Adj. R^2 %	F-stat.
Explained variable: One-year EPS growth									
Q	2,732	0.007***	−0.033***	−0.136***				2.5	36.63***
E/P	633	0.010*	−0.113***				*−0.131***	3.4	12.21***
MV/BV	1,479	−0.001	−0.048***	−0.158***			*0.004***	3.6	19.40***
KBM	463	−0.006		−0.055			*0.016***	2.2	6.19***
EVF	1,458	0.003*	−0.029*	−0.163***			*0.012***	2.9	15.69***
EVE	2,732	0.007***	−0.033***	−0.136***				2.5	36.63***
Explained variable: Two-year EPS growth									
Q	1,257	0.000	−0.039*	−0.219***			*0.008***	3.3	15.19***
E/P	2,364	0.010***	−0.067***	−0.222***				4.8	60.02***
MV/BV	1,274	0.001	−0.054**	−0.189***			*0.007***	3.3	15.60***
KBM	2,364	0.010***	−0.067***	−0.222***				4.8	60.02***
EVF	1,302	0.010***		−0.237***			*0.013**	2.9	20.76***
EVE	2,503	0.006***		−0.264***				4.0	105.23***
Explained variable: Three-year EPS growth									
Q	1,015	−0.061**	−0.060**	−0.196***		0.006**	*0.006**	2.7	8.08***
E/P	1,134	−0.063***	−0.081***			0.006***		1.4	9.23***
MV/BV	1,026	−0.054**	−0.062**	−0.197***		0.005**	*0.004***	2.8	8.46***
KBM	1,134	−0.063***	−0.081***			0.006***		1.4	9.23***
EVF	1,013	−0.056**	−0.056**	−0.193***		0.006**	*0.017**	2.7	7.99***
EVE	1,046	−0.061**	−0.047*	−0.189***		0.006***		2.3	9.34***

(continued)

Table 5. Continued

	Sample	Const.	ROE_{-1}	ΔEPS_0	ΔTA_0	$lnMV_0$	GO_0	Adj. R^2 %	F-stat.
Explained variable: Three-year (averaged) EPS growth									
Q	856	−0.096***				0.007***	*0.010***	2.5	12.39***
E/P	1,616	−0.001	−0.050***	0.092**				0.6	6.15***
MV/BV	857	−0.096***				0.007***	*0.004***	2.1	10.45***
KBM	888	−0.102***				0.009***		1.6	15.32***
EVF	856	−0.082***				0.007***	*0.025***	2.1	10.37***
EVE	888	−0.102***				0.009***		1.6	15.32***

Notes: Values that are in italic indicate that the coefficient is significant and of the predicted sign.
*, **, ***: Coefficients or F-statistic are significant at 10%, 5% and 1% level, respectively.

Table 6. Correlation matrix for various measures of growth opportunities for the NC companies

	TQ	E/P	MV/BV	KBM	EVF
TQ					
E/P	*–0.260****				
MV/BV	*0.751****	*–0.270****			
KBM	0.011	*–0.574****	0.060		
EVF	*0.568****	*–0.319****	*0.500****	*0.197****	
EVE	*0.296****	*–0.239****	*0.265****	*0.110***	*0.436****

Notes: Values that are in italic indicate that the coefficient is significant and of the predicted sign.
*, **, ***: Coefficients or F-statistic are significant at 10%, 5% and 1% level, respectively.

correlated with each other and with the predicted sign. Once more, EVE is the least correlated with the others. There is also a significant correlation between E/P and KBM. What is different is the strength of these correlations, which seems to be weaker for the NC companies than for the WSE-MM companies (the absolute values of all estimated coefficients are lower, with only one exception, for EVE/EVF, which is slightly higher). The correlation coefficients between market-to-book-based measures and earnings-to-price-based measures (E/P, KBM) are either much lower or even statistically insignificant.

In Table 7, the correlation coefficients between growth opportunity measures and the future growth rates for the NC companies are presented.

Compared with the results for the WSE-MM companies, the number of correlation coefficients that are statistically significant and of the predicted sign is much lower for the NC companies. The difference is most striking for total assets and equity growth. The only measure that performs quite well in terms of statistical significance is EVE, although the correlation coefficients are very low. The difference is also apparent for sales growth: TQ is now completely invalid, MV/BV is not significant for three-year growth, and the remaining significant correlation coefficients are lower than for the WSE-MM companies. The growth opportunity measures perform relatively well in predicting one and two-year growth of earnings per share (8 out of 12 measures have statistical significance at least at the 10% level and the predicted sign). The performance of E/P is comparable with that for the WSE-MM companies, although it is not significantly correlated with the three-year (average) EPS growth. KBM behaves unexpectedly because the sign of the correlation is opposite to what was predicted.

The determinants of future earnings growth are presented in Table 8. Once more, due to the volume limitations of the paper only final regressions after eliminating irrelevant explanatory variables in a sequential *a posteriori* selection method is presented.

The results of the regression analysis presented in Table 8 bring evidence that there are important differences between stock companies listed on the WSE-MM and on the NC in the ability of growth opportunity measures based on the market prices to predict future company growth. With only a few exceptions, growth opportunity measures proved to be statistically insignificant in explaining future EPS growth when other factors affecting that growth are controlled for. This is in contrast to the results for the WSE-MM companies. The most

Table 7. Growth opportunities and realised future growth – Correlation coefficients for the NC companies

	Assets growth (1)	Assets growth (2)	Assets growth (3)
TQ	0.029	–0.037	–0.009
E/P	0.149***	0.018	0.038
MV/BV	*0.063**	0.005	0.004
KBM	0.027	–0.065	0.025
EVF	*0.077***	–0.024	–0.019
EVE	*0.066***	0.017	*0.081***
	Equity growth (1)	**Equity growth (2)**	**Equity growth (3)**
TQ	–0.026	–0.059*	–0.040
E/P	0.081*	–0.019	0.029
MV/BV	–0.047	–0.051	–0.026
KBM	*0.085**	0.045	–0.035
EVF	0.045	–0.024	–0.035
EVE	*0.099****	*0.092****	*0.097***
	Sales growth (1)	**Sales growth (2)**	**Sales growth (3)**
TQ	0.010	0.049	0.054
E/P	0.097**	–0.062	–0.033
MV/BV	*0.076***	*0.066**	0.002
KBM	–0.104**	0.028	0.042
EVF	*0.077***	*0.107****	*0.107****
EVE	*0.073***	*0.098****	0.046

	EPS growth (1)	EPS growth (2)	EPS growth (3)	(Averaged) EPS growth (3)
TQ	*0.167****	*0.149****	0.034	*0.226****
E/P	*–0.127***	*–0.124***	*–0.238****	–0.175
MV/BV	*0.074**	*0.086**	–0.004	0.217
KBM	–0.303***	–0.388***	0.009	–0.348*
EVF	*0.125****	*0.132****	0.039	0.105
EVE	0.008	–0.007	–0.021	–0.071

Notes: Values that are in italic indicate that the coefficient is significant and of the predicted sign.
For all measures, except E/P, the predicted sign is positive, for E/P it is negative.
*, **, ***: Coefficients are significant at 10%, 5% and 1% level, respectively.

Table 8. Determinants of future earnings growth for the NC companies (Models with only statistically significant regressors)

	Sample	Const.	ROE_{-1}	ΔEPS_0	ΔTA_0	$lnMV_0$	GO_0	Adj. R^2 %	F-stat.
Explained variable: One-year EPS growth									
Q	1,400	−0.002	−0.142***	−0.055**				5.7	43.26***
E/P	382	−0.019					*−0.267***	1.3	6.20***
MV/BV	1,400	−0.002	−0.142***	−0.055**				5.7	43.26***
KBM	1,784	0.006	−0.134***					3.7	69.21***
EVF	1,400	−0.002	−0.142***	−0.055**				5.7	43.26***
EVE	1,400	−0.002	−0.142***	−0.055**				5.7	43.26***
Explained variable: Two-year EPS growth									
Q	1,034	0.013	−0.278***		−0.021***			10.7	62.92***
E/P	253	−0.039**					*−0.373***	1.1	3.92**
MV/BV	1,034	0.013	−0.278***		−0.021***			10.7	62.92***
KBM	1,034	0.013	−0.278***		−0.021***			10.7	62.92***
EVF	410	−0.024	−0.346***		−0.025***		*0.045**	17.9	30.78***
EVE	1,034	0.013	−0.278***		−0.021***			10.7	62.92***
Explained variable: Three-year EPS growth									
Q	721	−0.020	−0.197***	−0.123**				3.9	15.61***
E/P	148	−0.021					*−0.937****	5.0	8.74***
MV/BV	721	−0.020	−0.197***	−0.123**				3.9	15.61***
KBM	777	−0.008		−0.233***				2.2	18.62***
EVF	721	−0.020	−0.197***	−0.123**				3.9	15.61***
EVE	721	−0.020	−0.197***	−0.123**				3.9	15.61***

(continued)

Table 8. Continued

	Sample	Const.	ROE_{-1}	ΔEPS_0	ΔTA_0	$lnMV_0$	GO_0	Adj. R^2 %	F-stat.
Explained variable: Three-year (averaged) EPS growth									
Q	116	−0.084**	−0.156*				*0.022****	10.2	7.55***
E/P	59	0.030		0.362**			*−2.052****	14.1	5.78***
MV/BV	105	−0.711**	−0.362***	0.302**		0.070*		11.6	5.56***
KBM	105	−0.711**	−0.362***	0.302**		0.070*		11.6	5.56***
EVF	105	−0.711**	−0.362***	0.302**		0.070*		11.6	5.56***
EVE	105	−0.711**	−0.362***	0.302**		0.070*		11.6	5.56***

Notes: Values that are in italic indicate that the coefficient is significant and of the predicted sign.
*, **, ***: Coefficients or F-statistic are significant at 10%, 5% and 1% level, respectively.

important exception is the E/P ratio, which now, after eliminating statistically unimportant regressors, has proved to be a good predictor of future earnings growth in each of the time horizons that was considered.

On the other hand, similarly to what has been proved for the WSE-MM companies, the effect of mean reversion in earnings (the negative and statistically significant coefficient on ROE_{-1}) is also evident for the NC companies. The results for the remaining factors are mixed between different panels of the table and cannot lead to reliable conclusions.

4.3. Significance of the differences between the samples

The survey of the two groups of companies seems to bring results proving important differences in the correlation and regression coefficients but to be able to come to much clearer conclusions, statistical tests for the differences between the two samples will be run.

First, the inequality of the correlation coefficients between future growth measures and growth opportunity measures in the two groups of companies are tested. To verify the significance of the difference between two Pearson correlation coefficients coming from two independent populations, the t-test based on the Fisher transformation is used. The null states that these correlation coefficients are equal. The t-statistic is given by the formula:

$$t = \frac{z_{GPW} - z_{NC}}{\sqrt{\frac{1}{n_{GPW}-3} + \frac{1}{n_{NC}-3}}}\,, \tag{10}$$

where $z_{GPW} = \frac{1}{2}\ln\left(\frac{1+r_{GPW}}{1-r_{GPW}}\right)$, $z_{NC} = \frac{1}{2}\ln\left(\frac{1+r_{NC}}{1-r_{NC}}\right)$, r_{GPW}, r_{NC} denote the estimated correlation coefficients in the two samples of companies and n_{GPW}, $n_{NC}>3$ are the numbers of companies in each sample. If r_{GPW} is greater than r_{NC}, the resulting value of t will have a positive sign, if r_{GPW} is smaller than, the sign of t will be negative. The test statistic has a t-Student distribution with $n_{GPW} + n_{NC} - 4$ degrees of freedom. The results are presented in Table 9.

According to Table 9, almost half of the correlation coefficients (37 out of 78) in the two groups of companies are different at (at least) 10% level of statistical significance. Additionally, in 32 cases out of the 37, there are differences that are statistically significant, the relationship between the future growth measure and the growth opportunity measure has proved to be stronger in the group of companies listed on the WSE-MM than in the group of the NC firms.

In the next step we test the statement that the regression models explaining realized future growth rates of EPS can differ between the group of companies listed on the WSE-MM and the group of companies listed on the NC. Two tests for a structural break in the regression coefficients have been applied. The first one, called the Chow test, is based on the F statistic and compares the residual sums of squares in two regressions: one estimated for the joint group of companies listed on the WSE Main Market and NC:

$$EPSGrowth_i = \alpha + \beta_1 GO_{0i} + \beta_2 ROE_{-1i} + \beta_3 \Delta EPS_{0i} + \beta_4 \Delta TA_{0i} + \beta_5 \ln MV_{0i} + \varepsilon_i\,, \tag{11}$$

and auxiliary regression:

Table 9. Testing the equality of corr. coefficients in the 2 groups of companies Results of the t-test

	Assets growth (1)	Assets growth (2)	Assets growth (3)
TQ	*7.619****	*6.919****	*6.044****
E/P	*–4.884****	–1.097	0.036
MV/BV	*6.447****	*6.198****	*5.208****
KBM	1.466	0.528	–0.995
EVF	*5.381****	5.813	*5.606****
EVE	*3.554****	*3.428****	1.543
	Equity growth (1)	**Equity growth (2)**	**Equity growth (3)**
TQ	*5.596****	*5.594****	*5.216****
E/P	*–2.461***	0.809	0.631
MV/BV	*7.235****	*6.296****	*5.027****
KBM	–0.134	–2.394**	*2.832****
EVF	*3.628****	*4.529****	*4.872****
EVE	–1.678*	–0.593	–0.849
	Sales growth (1)	**Sales growth (2)**	**Sales growth (3)**
TQ	*3.831****	*1.849**	1.092
E/P	*–3.257****	–0.286	1.632
MV/BV	*2.455***	*1.682**	*2.063***
KBM	*1.712**	0.048	–0.985
EVF	1.537	0.360	–0.501
EVE	0.064	–0.762	–0.181

	EPS growth (1)	EPS growth (2)	EPS growth (3)	EPS growth (3) (averaged)
TQ	–3.330***	–1.383	0.249	–1.056
E/P	––0.091	–0.713	0.861	–0.009
MV/BV	–0.408	–0.093	0.948	–1.149
KBM	*5.524****	*5.177****	0.533	*2.561***
EVF	–1.697*	–1.714*	0.074	0.082
EVE	–1.120	0.088	0.221	0.777

Notes: The table contains the values of the t-statistic. The null hypothesis states that the correlation coefficient between growth opportunity measure and the realized future growth measure is the same in two groups of companies. The alternative says these correlation coefficients are different.

*, **, ***: The null hypothesis can be rejected at the 10%, 5% and 1% level of statistical significance.

Values that are in italic indicate that the difference between the corr. coefficients is statistically significant and the correlation is stronger in the group of the WSE-MM companies than in the group of the NC companies.

$$EPSGrowth_i = \alpha + \beta_1 GO_{0i} + \beta_2 ROE_{-1i} + \beta_3 \Delta EPS_{0i} + \beta_4 \Delta TA_{0i} + \beta_5 \ln MV_{0i} + \gamma_0 Z_i + \gamma_1 Z_i GO_{0i} + \gamma_2 Z_i ROE_{-1i} + \gamma_3 Z_i \Delta EPS_{0i} + \gamma_4 Z_i \Delta TA_{0i} + \gamma_5 Z_i \ln MV_{0i} + \varepsilon_i, \quad (12)$$

where Z_t is a dummy variable equal to 1 for the WSE-MM companies and 0 for the NC companies (or *vice versa*).

In this pair of equations, (12) can be seen as the restricted version of the unrestricted (13), with $q = 6$ linear restrictions imposed on the parameters. The joint null hypothesis $H_o : \gamma_i = 0$ for $i = 0, \ldots, 5$ is tested against the alternative that one or more of the restrictions under H_o does not hold. The F statistic, given by the formula:

$$F = \frac{(RSS_R - RSS_{UR})/q}{RSS_{UR}/(N-k-1)} = \frac{(RSS_R - RSS_{UR})/6}{RSS_{UR}/(N-12)}, \quad (13)$$

where RSS_R and RSS_{UR} denote residual sums of squares in the restricted and unrestricted model, N is the number of observations and k is the number of regression coefficients (intercept not included) in the unrestricted model, has the $F_{6,\ N-12}$ distribution.

In the likelihood ratio test, the values of likelihood functions of both equations (12) and (13), L_R, L_U, respectively, are compared. The null and alternative hypotheses are the same as in the previous test. The probability distribution of the log-likelihood ratio statistic, given by the formula $-2\ln(L_R/L_U)$, is approximately a chi-squared distribution with degrees of freedom equal to the number of restrictions, $q = 6$. The results of both tests are presented in the last two columns of Table 10.

The results of both tests are similar. In most regressions (19 out of 24) the coefficients are not stable, at least at 10% level of statistical significance (in 18 regressions at least at 1%) when moving from the WSE-MM companies to the NC companies. These results indicate that the structural relationships between future EPS growth and different factors predicting that growth (growth opportunity measures among them) are significantly different in both groups of companies, and separate regression models should be estimated.

4.4. Robustness checks

Similar methods can be used to test for the robustness of the achieved results over time. For that aim the full data sample is divided in two subsamples: the data coming from years 2004–2008, before the burst of the financial crisis, and the data coming from the succeeding years, 2009–2014. It is done separately both for the sample of the WSE-MM companies and the NC companies. Limited by the paper volume we present only the results of study for the stability of parameters in the regressions where future growth of earnings is regressed on different factors, with growth opportunity measures among them. The auxiliary regression is similar to (13) where now Z_t is a dummy variable equal to 1 for the records coming from years 2004–2008 and 0 for that coming from years 2009–2014. The results of the Chow test and the likelihood ratio test are presented in Tables 11 and 12.

According to Table 11, the linkages between future EPS growth and the regressors in the group of companies listed on the WSE-MM are in most cases not stable over time when we move from the pre-crises period of 2004–2008 to the succeeding years of 2009–2014. And

Table 10. Determinants of future earnings growth in the joint group of companies listed on the WSE and NewConnect and the results of the Chow-test for structural change

	Sample	Const.	ROE_{-1}	ΔEPS_0	ΔTA_0	$lnMV_0$	GO_0	Adj. R^2 (%)	Chow-test F-stat	LR-test chi^2-stat
Explained variable: One-year EPS growth										
Q	1,955	−0.039**	−0.124***	−0.117***	−0.002	0.004***	−0.001	6.4	5.45***	32.62***
E/P	896	−0.061**	−0.065	−0.040	0.004	0.005**	−0.113*	1.9	0.72	4.39
M/B	1,978	−0.052***	−0.121***	−0.102***	−0.002	0.005***	0.000	5.8	4.61***	27.64***
KBM	683	−0.070**	−0.163***	0.012	−0.010	0.007**	−0.001	4.5	1.41	10.14
EVF	1,946	−0.050***	−0.115***	−0.116***	−0.002	0.005***	0.019***	5.9	5.51***	32.97***
EVE	1,943	−0.052***	−0.111***	−0.094***	−0.001	0.005***	0.001	4.7	3.99***	23.94***
Explained variable: Two-year EPS growth										
Q	1,573	−0.080***	−0.203***	−0.058*	−0.008	0.008***	−0.001	7.0	10.00***	65.12***
E/P	630	−0.095**	−0.203***	−0.009	−0.018*	0.008**	−0.025**	2.3	1.41	8.58
M/B	1,594	−0.085***	−0.210***	−0.056*	−0.009	0.009***	0.000	7.6	11.00***	65.16***
KBM	446	−0.039	−0.223***	0.030	−0.002	0.004	0.000	3.0	0.66	4.08
EVF	1,565	−0.083***	−0.211***	−0.067**	−0.010*	0.008***	0.021**	7.9	11.00***	65.16***
EVE	1,562	−0.084***	−0.221***	−0.043	−0.009	0.009***	0.003	7.6	10.12***	60.04***
Explained variable: Three-year EPS growth										
Q	1,203	−0.124***	−0.136***	−0.210***	0.007	0.012***	0.001	4.9	3.43***	20.64***
E/P	395	−0.068	−0.196*	−0.049	0.024	0.005	−0.267*	3.3	1.87*	11.44*
M/B	1,213	−0.121***	−0.137***	−0.208***	0.007	0.011***	−0.000	4.8	3.79***	22.77***
KBM	250	−0.002	−0.071	−0.275***	−0.019	−0.004	0.009***	11.8	3.03***	18.40***
EVF	1,201	−0.121***	−0.136***	−0.218***	0.006	0.011***	0.009	5.0	3.57***	21.47***
EVE	1,197	−0.128***	−0.170***	−0.255***	0.007	0.012***	−0.001	7.1	3.51***	21.06***

(continued)

Table 10. Continued

	Sample	Const.	ROE_{-1}	ΔEPS_0	ΔTA_0	$lnMV_0$	GO_0	Adj. R^2 (%)	Chow-test F-stat	LR-test chi^2-stat
Explained variable: Three-year EPS growth (averaged)										
Q	891	−0.189***	−0.136***	0.098*	−0.000	0.015***	0.014***	6.4	6.17***	36.75***
E/P	281	−0.127**	−0.299***	0.281***	0.011	0.011**	−0.248*	9.3	3.91***	23.53***
M/B	896	−0.182***	−0.138***	0.106**	0.001	0.015***	0.005***	5.1	7.24***	43.01***
KBM	190	−0.104*	−0.255***	0.122**	−0.010	0.008*	0.003	4.7	0.64	4.06
EVF	889	−0.174***	−0.158***	0.118**	0.001	0.015***	0.019	4.4	8.23***	48.72***
EVE	890	−0.170***	−0.152***	0.123**	0.002	0.015***	−0.001	3.9	8.89***	52.49***

Notes: The table contains the results of estimating the regression models in the joint group of companies listed on the WSE Main Market and NewConnect. The results of two tests for a structural break in the regression coefficients when the companies are divided into those listed on the WSE and on the NewConnect are presented in the last two columns. The null hypothesis in both tests states that the regression coefficients are stable in the whole group of companies. *, **, ***: The null hypothesis can be rejected at the 10%, 5% and 1% level of statistical significance.

Table 11. Determinants of future earnings growth for the WSE-MM companies – Testing the stability of parameters over two subperiods: 2004–2008 and 2009–2014

Explanatory variable (GO)	Explained variable:							
	EPS Growth (1)		EPS Growth (2)		EPS Growth (3)		(averaged) EPS Growth (3)	
	Chow-test F-stat	LR-test chi^2-stat	Chow-test F-stat	LR-test chi^2-stat	Chow-test F-stat	LR-test chi^2-stat	Chow-test F-stat	LR-test chi^2-stat
TQ	7.40***	44.06***	21.22***	122.11***	14.42***	83.89***	6.94***	41.17***
E/P	3.51***	21.09***	5.52***	32.77***	2.08*	12.74**	1.10	6.84
MV/BV	8.63***	51.29***	19.81***	114.44***	14.47***	84.18***	6.17***	36.75***
KBM	3.52***	21.19***	5.07***	30.12***	1.17	7.35	1.58***	9.94***
EVF	8.08***	48.03***	19.52***	112.71***	14.58***	84.80***	5.34	31.85
EVE	6.96***	41.47***	15.77***	91.92***	12.75***	74.54***	4.65***	27.84***

Notes: The table contains the results of two tests for a structural break in the regression coefficients when the data are divided into those coming from the years of 2004–2008 and 2009–2014. The null hypothesis in both tests states that the regression coefficients are stable over two subperiods.
*, **, ***: The null hypothesis can be rejected at the 10%, 5% and 1% level of statistical significance.

Table 12. Determinants of future earnings growth for the NC companies – Testing the stability of parameters over two subperiods: 2004–2008 and 2009–2014

Explanatory variable (GO)	Explained variable:							
	EPS Growth (1)		EPS Growth (2)		EPS Growth (3)		(averaged) EPS Growth (3)	
	Chow-test F-stat	LR-test chi^2-stat	Chow-test F-stat	LR-test chi^2-stat	Chow-test F-stat	LR-test chi^2-stat	Chow-test F-stat	LR-test chi^2-stat
TQ	0.14	0.87	2.75**	16.67**	2.50**	15.29**	3.26***	20.10***
E/P	0.73	4.49	2.14**	13.19**	2.18**	13.69**	0.56	4.16
MV/BV	0.29	1.78	1.38	8.43	1.69	10.45	1.49	9.68
KBM	1.36	8.44	1.98*	12.46*	7.10**	38.05***	4.77***	28.84***
EVF	0.12	0.73	1.64	10.03	1.67	10.32	2.57**	16.17**
EVE	0.21	1.32	1.63	9.95	2.13*	13.11**	1.49	9.69

Notes: The table contains the results of two tests for a structural break in the regression coefficients when the data are divided into those coming from the years of 2004–2008 and 2009–2014. The null hypothesis in both tests states that the regression coefficients are stable over two subperiods.
*, **, ***: The null hypothesis can be rejected at the 10%, 5% and 1% level of statistical significance.

this result is most evident when the short time-horizon (one-year or two-year) future earnings growth is taken into consideration. For three-year EPS growth, in almost half of the estimated regressions (5 out of 12), the null hypothesis about the stability of parameters cannot be rejected at, at least, 10% level of statistical significance. One might suppose that both these reflect the disturbing effect of the Lehman Brothers collapse and the burst of the crisis on financial markets which later began to fade with time. The issue of the presumed structural changes in the relations over the pre-crises and post-crises eras is undoubtedly very interesting itself and wishes for more deepened studies with longer time-horizon data sets. Table 12 brings much more evidence about the stability of parameters over time in the group of companies listed on the NC.

5. CONCLUSIONS

The paper investigates and discusses the ability of growth potential measures based on market prices of shares to predict the future growth of the companies traded on the Warsaw Stock Exchange Main and Alternative NewConnect (WSE-MM and NC) markets. Previous research in this field were provided only for the highly developed economies without the division of enterprises based on the market they are listed. The results presented in the previous papers had led to the conclusion that while growth opportunity measures show some ability to predict growth in company sales, total assets or equity, they fail in predicting growth in the future earnings.

Our survey brings results proving the theoretical relationship between opportunity measures and growth indicators comparing to the findings presented by Kallapur – Trombley (1999), who found a relationship between the opportunity measures and the growth of sales and assets, but the relationship with the future earnings growth was very weak. Similarly, Danbolt et al. (2011) presented findings proving that while different measures show some ability to predict growth in company sales, total assets or equity, none of the measures has any success in predicting earnings per share growth. Growth companies do grow, but they do not grow in the key dimension (earnings) that the theory predicts. In contrast to the previous research, it is shown that the growth opportunity measures seem to be related to the future growth of earnings, at least for relatively mature companies. This difference in findings might be due to the fact that companies in different stages of growth are characterized by different growth patterns, and dividing the sample brings significant statistical results.

Based on the findings presented in the existing literature it was concluded that even though it can be difficult to distinguish homogenous stages of growth applicable to all companies on the market, there might be a difference between companies listed on separate markets that differ in size and maturity. The analysis of the growth process presented in the literature shows that the young and small companies grow in a non-linear way, while those that are mature should grow linearly.

In recognition of this fact, the research in this paper was based on two groups of companies representing the mature entities that are listed on the WSE-MM and less mature, smaller firms listed on the NC alternative market. It was assumed that smaller companies are characterised by higher growth and growth opportunity than mature entities. The results of the research do not support this statement because they are ambiguous. The statement that there is a correlation

between growth and growth potential measures in every group of tested companies was positively verified showing that the growth opportunity measures based on the market pricing are bringing the same information. The growth of the companies is homogenous on both markets in the dimension of assets, equity and sales. Earnings per share growth is the least correlated with other growth factors.

Surprisingly, in the context of the previous research cited in the paper, the growth opportunity measures have a predictive power for future earnings growth. The results have shown the incremental impact of the level of growth opportunities on the future earnings growth in the group of the WSE-MM companies. In the group of companies listed on the NC, with only a few exceptions, the growth potential measures are insignificant in explaining the future EPS growth.

The differences between the results obtained for the two samples of stock companies have also been confirmed. Additionally, in most cases, the relationship between future growth and growth opportunities is stronger in the group of companies listed on the WSE-MM than in the group of the NC firms. The results indicated that structural relationships between the future EPS growth and different factors predicting that growth, with growth opportunity measures among them, were significantly different in both groups of companies, and separate regression models should be estimated therefore. In the light of these findings, the research strategy to divide companies into two samples according to the stage of their development, proxied here by the type of the stock market – main or alternative – on which they are traded, has proven to be sensible and effective. It allowed to show, among other things, that the "growth companies puzzle" does not hold on the Polish stock market, at least in the group of the so-called mature companies listed on the main stock market operated by the WSE.

The limitations of the analysis are related to the scope of data used in the study, due to the fact that Polish market is young, and the time span of data is short. This was the reason why companies' growth in time horizons longer than three years were not considered in the survey.

We add to the theory of the growth prediction a modified approach by sampling companies according to the exchange they are listed that helps to solve the companies' "growth puzzle" and supplement the growth theory in the field of factors affecting this process in different growth stages. Mature companies listed on the WSE-MM are more predictable, and therefore, the future research should consider the risk analysis and the required rate of return, that should be higher for the NC companies due to the fact that they are less predictable and riskier. Moreover, the effect of financialization, becoming more and more important on the developed markets and may negatively affect the assessment of the growth opportunity should be taken into consideration in the future study. Financialization, by the way, refers to the increase in size and importance of financial sector in relation to the overall economy. The research strategy proposed in the paper with the division for smaller and larger companies can be repeated in the surveys for more developed economies and their stock markets.

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