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## Relationships Between Investment Effectiveness Controlling and Business Performance

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### ABSTRACT

We focused on business performance in companies and in scope of investment measurement and management we analyse using of investment effectiveness evaluation methods. Goal of our research at first was to detect what investment valuation methods apply companies in Slovakia in their management and what determinants cause it. Consequently, the aim was to find out if using of certain investment valuation method or some valuation approach consisted from several methods, has the positive impact into business performance. Analysed data were collected trough questionnaire. We defined several hypotheses and decided to apply two kinds of statistical methods appropriate for tested variables. Results of the research confirmed some assumptions and we state that use of investment valuation methods is limited by foreign ownership of company and certain methods caused better business performance.

## 1. INTRODUCTION

For qualified and correct answer how to achieve the higher efficiency and economic effectiveness of business, it is firstly necessary to determine what is the current and real business performance, and which appropriate and objective indicators use to measure this performance. The collected information, obtained values of the indicators are important factors for decision making about future investment in companies. Insufficient domestic capital has been shown in the process of transformation in post-communist countries and a possible solution of this problem appeared the foreign direct investment. Therefore it is necessary to additionally increase efficiency of the investment activity in order to achieve set economic goals, especially reducing of unemployment (Piplica and Speranda, 2015).

FDI brings for the country and its businesses more significant effects. Innovation activities play an important role in economic growth and can be considered as the engine of economies. It is argued that a dependency between innovation activities and economy performance exists and the relationship of these two indicators is considered (Juřickova and Novak, 2015). Based on the scientific conclusions and previous research results, in which we have shown the positive effects of the FDI at the level of macro environment, we then hypothesized certain influence of foreign firms in microeconomics. We tested if companies with foreign capital are performing better and what is typical for them against local firms. We interested in investment effectiveness controlling and investment valuation methods used in companies. Aim was to analyze determinants what cause the use of the investment effectiveness valuation methods and to find out certain methods with positive effect in better business performance. Significant results of our research we publish in this paper.

## 2. LITERATURE REVIEW

In scope of measuring the businesses performance it can be concluded that the economic experience quite often realizes the financial management based on the accounting profit and common indicators such as profitability or activity ratios. These indicators are presently considered as insufficient, which is also one of the reasons for the significantly poor competitiveness of enterprises. Traditional methods of measuring business performance (for example in Kislingerova, 2010 and others) are based primarily to maximize profits (which is also in line with the objectives of business activity). To measuring the performance are used absolute and relative indicators (Brealey and Myers, 2002; Kislingerova, 2010 or others). However, in recent years can be seen objections to the traditional performance measurement indicators such as profitability. INFA performance indicator diagnostic system (Neumaier and Neumaierová, 2002), used at the Ministry of Industry and Trade of the Czech Republic, works with the managerial face of economic profit, which compares the ROE and the alternative cost of equity (Neumaier and Neumaierova, 2014). Recent research at the microeconomic level aimed at businesses in various industries in Slovakia (Rajnoha et al., 2013) was focused on both - traditional key indicators such as accounting profit, value added, wages and labor productivity as well as non-traditional way of performance measuring. Business performance in mentioned research was expressed by the ROE indicator. Company managers utilize a number of concepts for the management of performance including Balanced Scorecard (BSC), Economic Value Added, benchmarking and many others (Knapkova, Pavelkova and Jircikova, 2010). Petera, Wagner and Mensík (2012) deal with performance measurement and management systems with focus on BSC and they found statistically significant difference between BSC adopters and BSC non-adopters as for utilization of Activity Based Management. One of the conditions to maintain the competitiveness and performance of the company is the ability to work properly and timely with information not only about past and present but also especially about the future (Rajnoha et al., 2014). Business activities are significantly determined by the environment of the company, which forces firm to use a particular method of behavior, as well as to use the choice of particular business goals and ways of achieving them. In this context, a very important role is played by social environment and political and legal environment that is created by the state authorities. It is assumable that a positive perception of these companies by their environment could stimulate their financial performance and accelerate the positive influences of these companies on the whole society (Belás, Bilan, Demjan and Sipko, 2015). Other similar research based on a questionnaire survey obtained from the 91 companies from Czech Republic. This is one of the few studies which investigate the relationship between management tools and techniques and organizational performance. The study indicates that there is a positive significant relationship between management tools and techniques utilization and organizational performance (Afonina, 2015). On the other hand, some studies analyse using of tools without positive impact

into business performance. Research in Romania, where sample consisted of 73 multinational companies, investigated linkage between corporate social performance and financial performance. Authors according statistical analysis results state, that improving of CSR does not necessarily lead to better financial performance (Miron and Petrache, 2012). Next research in Germany interprets, that due to some significant correlations between innovations and financial and quality performance it is not possible to provide a clear statement about the impact of innovations on the performance (Heurich and Vignali, 2015). The importance of these problems has significantly increased during the economic crisis, because many enterprises in the world reduced their performance. According to Belás et al. (2014) average performance of small and medium enterprises decreased by 15.80% in the Czech Republic and 18.78% in Slovakia at this time.

Several studies and analyses dealing with FDI issues worldwide generally finds a significantly positive relation between FDI and economic growth. FDI by multinational corporations plays an important role in the transformation of former centrally planned economies into vibrant market systems, since it provides an inflow of capital, management skills, and jobs, alongside increasing exports and transfer of technology (Chidlow, Salciuviene and Young, 2009). Considering given localization of our research and existing literature from this region, authors Pavlínek and Smith (1998) in their research deal with FDI in the Czech and Slovak Republics. Pavlínek (2008) discussed about advantages of foreign ownership for Czech enterprises, such as access to investment capital, access to sale and distribution networks of parent companies and technology transfer. Positive impact of FDI in Slovakia demonstrated authors Merkova, Draábek and Jelacic, (2012). Another research realized in Slovakia has statistically confirmed that better business performance is significantly dependent on financing from foreign capital (Merkova, Rajnoha and Dobrovic, 2015). Rugraff (2007) focused on the efficiency of the Central European countries' FDI policies by evaluating the spillover effects of FDI. His comparison demonstrated that for the creation of competitive indigenous firms has been more efficient the model built on strong state intervention in the industrial structure and in industrial guidance of FDI than the model totally banned policies constraining FDI. Companies with higher level of implementation of corporate governance principles have higher net profit margin and earnings per share (Todorovic, 2013).

There are several approaches how to value economic effectiveness of investment and which methods or indicators are used in companies. The most frequently mentioned methods in theory are Net Present Value and Internal Rate of Return (e.g. Levy & Sarnat, 1986; Khan, 1993; Brealey and Myers, 2002; Drabek and Polach, 2008 etc.) considering the discount rate. Discounted cash flow valuation is based on expected future cash flows and discount rates. While discounted cash flow valuation is only one of the three ways of approaching valuation, it is the foundation on which all other valuation approaches are built (Damodaran, 2012). Brealey and Myers (2002) also deal with often used indicators Return on Investment or Return on Equity, but these methods do not take into account the time factor. Cost criteria (discounted cost method) commonly used in manufacture industries (Popesko, 2010) compare different technical and production alternatives of investments, and their goal is not maximizing the benefits, but estimating the parameters, which the investment has to fulfill (Tucek, Tuckova and Zamecník, 2009). Cost management is one of the most important issue of company performance and company financial management. Also the issue of the costing systems, methods and techniques is one of the important features of cost management and management accounting (Novak and Popesko, 2014). Knowing how costs change as activity output changes is an essential part of planning, controlling, and decision making (Hansen, 2009). How underline Banker and Chen (2006) understanding cost behaviour is one of the most important aspects of profit analysis for managers. The experience of a corporate practice, analysis of variable and fixed costs and their solution is dealt with in most companies by the controlling department. Some of companies notices the causes of the cost remanence but it is not them able to predict. In the context of the emergence of cost behavior and cost remanence are growing much faster, these

costs are not analyzed and are allocated without a difference to individual groups performances (Novak and Popesko, 2014). Each company usually sets its own methods, criteria, which are the most acceptable and which enable right investment decision making, according to their own point of view considering investment effectiveness and suitability.

### 3. OBJECTIVES AND METHODOLOGY

#### 3.1 Research objective and hypotheses

The aim of the research in the first step was to analyze relevant determinants for using of the investment effectiveness valuation methods. We think that in different companies, whether domestic or foreign, different sizes, operating in different business and so on there are significant differences in the management and evaluation of investment effectiveness. Used methods of investment valuation can then affect the actual effectiveness of investments and thus also the overall performance of the company. Our primary research goal is therefore to analyze in statistically significant sample of businesses using of certain investment evaluation methods and also identify the key methods that have a positive impact on the overall business performance. Subsequently, based on statistical analysis, we tried to find out a method or group of methods for evaluation of investments, the use of which significantly affects better business performance based on the Return on Equity indicator (ROE). The essence of the research was to analyze the performance categories that companies achieved with using of certain methods.

In relation to the research objective we set the following hypotheses:

- H 1: Annual indicators for investment effectiveness valuation, due to the expected highest frequencies of use of these methods, statistically influence the business performance. However, we expect to be typical for the moderate level of performance.
- H 2: Use of discounted cash-flow indicators has a significant impact on business performance and we expressed the assumption that these methods are applied in companies that achieve a moderate or higher ROE.
- H 3: Methods based on investment controlling evaluation significantly influence business performance and they are typical in companies achieving the highest performance with ROE of over 7%.
- H 4: Additional method of break-even analysis is used in companies with better business performance.

In order to test the statistical hypotheses, the basic (null) hypothesis  $H_0$ , an alternative hypothesis  $H_1$  with a significance level  $\alpha$  we formulated. The aim was to challenge the validity of the hypothesis  $H_0$ . The alternative hypothesis  $H_1$  represented the opposite to the basic hypothesis.

- Null hypothesis: There is no relationship between tested method and business performance.
- Alternative hypothesis: There is a contingency between tested method and business performance.

The decision to accept or eventually to reject the  $H_0$  was carried out as follows:

- $\alpha < p$ ,  $H_0$  cannot be rejected,
- $\alpha \geq p$ ,  $H_0$  is rejected in favour of  $H_1$ .

The level of significance was set as  $\alpha = 0.05$ .

### 3.2 Research questionnaire and sample

There was created on-line questionnaire through internet application to build data collection of companies in Slovakia. In total 1.457 chosen businesses were asked to participate in the survey, representing selected industry segments in Slovakia.

Data about the primary database of 1.457 enterprises from selected industries of the Slovak Republic we received from information of various industrial associations and those we have subsequently supplemented by other companies on the basis of extensive online survey. The questionnaire was distributed in two consecutive rounds. First via e-mail (time for completion was two months, low latency – there were completed only 45 research questionnaires), subsequently we are therefore used in the second round the form of telephone and the most common form of face-to-face interview (time for completion was next two months, there were filled other 119 research questionnaires). After these two consecutive rounds the questionnaires were correctly completed by 164 enterprises in the end. Relatively low return stemmed mainly from the reluctance of businesses, their negative mood and scepticism from economic development, lack of time, lack of interest and so on. Nevertheless, we consider the size of the research sample – 164 enterprises as being sufficiently representative and this is 11.26% share of the total number of companies surveyed.

The initial data set consisted of all the surveyed firms (164 enterprises), out of which we created sets specifically aimed at firms from the industries of wood processing, engineering and automotive industry. A separate set containing all the enterprises from the three industries was also studied. The final two sets are defined by their core business (focus) – manufacturing, the last set also includes enterprises of trade and services. *Table 1* presents the data from the research sets.

In terms of size of company across the whole survey sample, the medium-sized (51-250 employees) and large enterprises (over 250 employees) formed 40.3% share. Small businesses (11-50 employees) accounted for 29.8% share. Micro sized to 10 employees accounted for 29.9% share of the survey sample. From that perspective the research sample was balanced and contained uniform representation of all size categories.

Regarding the parameter origin of foreign capital in companies in Slovakia, whole research sample consisted from 17 various answers. We used optimal binning of classes in this variable and we created 4 classes. Countries were sorted according most counts: 120 firms of domestic origin, 27 firms in group of other foreign origin (21 firms of 15 concrete foreign countries and 6 firms from unnamed foreign country), 10 firms from Germany and 7 from Czech Republic.

**Table 1.** Basic data on the data sets analysed

Set	<i>The industry focus</i>	<i>Totals</i>
Set 1	All industries	164 firms
Set 2	Wood Processing Industry	34 firms
Set 3	Mechanical engineering	30 firms
Set 4	Automotive industry	16 firms
Set 5	Selected industries (Wood processing industry, Engineering, Automotive)	80 firms
Set 6	Production companies	106 firms
Set 7	Trade and Services	58 firms

Data source: own

### 3.3 Statistical methods used in the research

We have used mathematical and statistical methods focusing on two-dimensional inductive statistics in the research of interdependencies and impacts of individual factors on achieved performance of companies.

The research consisted from qualitative – nominal variables the association between variables we examined with contingency. We applied chi-squared test, which is commonly used for testing the independence between two categorical variables (Pearson, 1904; Everitt, 1977; Pánik, 2005 and others). Results of chi-squared tests describe selected statistics: Pearson's chi-square and significance p-value „p“, Pearson's contingency coefficient (CC) and Adjusted contingency coefficient (Adj. CC).

**Pearson's Chi-square:** 
$$\chi^2 = \sum_{i=1}^k [(f_{oi} - f_{ei})^2 / f_{ei}]; \text{ while } \sum(f_o - f_e) = 0 \quad (1)$$

Pearson's contingency coefficient CC: 
$$CC = \sqrt{\chi^2 / (\chi^2 + N)} \quad (2)$$

Maximum contingency coefficient CC<sub>max</sub>: 
$$CC_{max} = \sqrt{(q - 1) / q} \quad (3)$$

Adjusted contingency coefficient Adj. CC: 
$$\text{Adj. CC} = CC / CC_{max}; \text{ while } CC \leq CC_{max} \quad (4)$$

Where:

$f_{oi}$  – observed frequency in an field of the table,

$f_{ei}$  – expected (theoretical) frequency in an field of the table,

k – number of cells in the table

N – sample size

q – number of rows or columns (in square tables)

**Table 2.** Maximum values of contingency coefficient for square tables

Number of rows or columns	2	3	4	5	6	7	8
CC <sub>max</sub>	0.707	0.816	0.866	0.894	0.913	0.926	0.935

Data source: Clauss and Ebner, 1988.

Pearson's contingency coefficient may occur in different maximum values depending on the number of categories for the studied variables. Clauss & Ebner (1988) report the maximum values for square tables, CC<sub>max</sub> for rectangular tables can be roughly estimated by averaging the maximum values for square tables. In our paper we publish only the results of tables 2x2 and 3x2. From *Table 2* we use CC<sub>max</sub> for 2x2 tables, which is 0.707, CC<sub>max</sub> for combination of 3 columns and 2 rows we calculated (see *Formula 3*) value CC<sub>max</sub> 0.762.

For clear interpretation and relevant comparisons of the contingency coefficients of several analyzes we calculated adjusted contingency coefficient (Adj. CC), which takes into account the calculated CC and the corresponding CC<sub>max</sub> (see *Formula 4*). That ranges from 0 to 1, values close to 1 mean a stronger dependence of two variables.

The only assumption underlying the use of the *Chi-square* (other than random selection of the sample) is that the expected frequencies are not very small. The 2x2 tables would be the value of the expected frequency for each cell being in a table greater than 5. When the expected cell frequencies fall below 5, those probabilities cannot be estimated with sufficient precision. For larger tables, compliance of this condition is often problematic. The result is inaccurate approximation of the test characteristics of the chi-square probability distribution. However, according to Finkelstein and Levin (2001), for tables larger than 2x2 it is recommended to

have at least 80% of the expected frequency of greater than 5 or not the expected frequency of less than 1 in more than 10 % of cases.

We also applied analysis of variance (ANOVA) in the research. The purpose of ANOVA (Shapiro & Wilk, 1965; Iversen & Norpoth, 1976 and others) is to test differences in means (for groups or variables) for statistical significance. Assumptions of ANOVA are:

- Normality - the normal probability distribution with mean equal to zero.
- Homogeneity of variances - the variances are equal for all values.
- The individuals are independent - observations in groups are different objects.

For testing of homogeneity of variances we used Levene's test. Levene's test (Levene et al., 1960) is an inferential statistic used to assess the equality of variances for a variable calculated for two or more groups. If the resulting p-value of Levene's test is less than significance level (0.05), the null hypothesis of equal variances is rejected and it is concluded that there is a difference between the variances in the sample.

For statistical analysis, numeric and graphical presentation of the research results, we used the program MS Office Excel and Statistic software from StatSoft, Inc.

## 4. RESULTS

### 4.1 Determinants of use of investment effectiveness valuation methods

Research of determinants whose influence using of investment valuation methods analyzed following factors (basic selecting questions no. 1-10 in the questionnaire): Industry, Region of country, Legal form, Age of company, Ownership (domestic or foreign), Origin of foreign capital, Size of company (number of employees), Type of activity, Type of production (if), Value of turnover.

Finally, from all tested factors only foreign ownership as a determinant of use of investment valuation methods proved several statistically significant dependences. Relationship between variables foreign ownership and use of concrete method or group of indicators we present in *Table 3*.

**Table 3.** Contingency: Foreign ownership vs. Use of investment valuation methods – Statistics

Foreign ownership x Use of investment valuation methods	Counts	Pearson's chi- square	df	p	Contingency coefficient (CC)	Adjusted CC (Adj. CC)
Use of annual indicators	164	2.524	1	0.112	0.12	0.17
- <b>profit comparison (profit maximization)</b>	<b>164</b>	<b>4.186</b>	<b>1</b>	<b>0.041</b>	<b>0.16</b>	<b>0.22</b>
- cost comparison (cost minimization)	164	1.264	1	0.261	0.09	0.12
- earnings	164	0.010	1	0.919	0.01	0.01
- payback period	164	2.060	1	0.151	0.11	0.16
- <b>return on investment (ROI)</b>	<b>164</b>	<b>5.823</b>	<b>1</b>	<b>0.016</b>	<b>0.19</b>	<b>0.26</b>
- approximation of earnings	164	1.523	1	0.217	0.10	0.14
<b>Use of discounted cash flow valuation</b>	<b>164</b>	<b>9.508</b>	<b>1</b>	<b>0.002</b>	<b>0.23</b>	<b>0.33</b>
- Net present value (NPV)	164	1.051	1	0.305	0.08	0.11
- Profitability index (PI)	164	3.186	1	0.074	0.14	0.20
- Internal rate of return (IRR)	164	1.459	1	0.227	0.09	0.13

Foreign ownership x Use of investment valuation methods	Counts	Pearson's chi- square	df	p	Contingency coefficient (CC)	Adjusted CC (Adj. CC)
- Payback period (PP)	164	4.141	1	0.420	0.16	0.22
<b>Use of investment controlling methods</b>	<b>164</b>	<b>7.698</b>	<b>1</b>	<b>0.006</b>	<b>0.21</b>	<b>0.30</b>
Use of additional methods:	164	1.607	1	0.205	0.10	0.14
- break-even analysis	164	0.486	1	0.486	0.05	0.08
- project commercial life cycle	164	1.198	1	0.274	0.09	0.12

Data Source: authors

We asked about four types of methods in questionnaire section aimed in investment valuation indicators and we can say main results in four groups of methods. Annual indicators without time value of money (profit, cash flow, cost, earnings, payback period and return on investment) was the first group. The research demonstrated the statistically significant relationship between foreign firms and use of the ROI indicator. In the second group were long-term indicators considering time value and cost of capital, it means methods based on discounted values (net present value, internal rate of return, profitability index and discounted payback period). In analysis of individual methods does not exist any association, but generally, use of discounted cash flow methods is statistically significant and typical for foreign firms. The third group covered methods used in investment controlling (modified internal rate of return and net final value) and the results are similar like in the second group, for individual method no one relationship (low counts), but use of controlling methods and foreign companies means significant contingency. The last group contained additional indicators for support decision-making (break-even point and others). There was not found out any significance.

Considering the separate types of methods we can summarize, that the research demonstrated the statistically significant relationship between foreign owned firms and:

- Use of the profit comparison (profit maximization)
- Use of the ROI indicator
- Use of discounted cash flow methods
- Use of investment controlling methods

Presented results of dependence between foreign owned firms and use of investment effectiveness valuation methods suggest comprehensive approach of foreign firms in investment measurement and management.

## 4.2 Influence of investment evaluation methods in business performance

In analysis of investment effectiveness evaluation methods companies could choose optional number of responses and identify one or more methods or group of methods for investment evaluation (defined in theoretical part of this paper). Each method were surveyed as a binary variable, but we also analyzed certain group of methods to determine if their use has an impact on business performance. Business performance in this analysis was categorized into three groups.

Obtained results are presented in

**Table 4.**

**Table 4.** Contingency: Use of investment valuation methods vs. Business Performance – Statistics

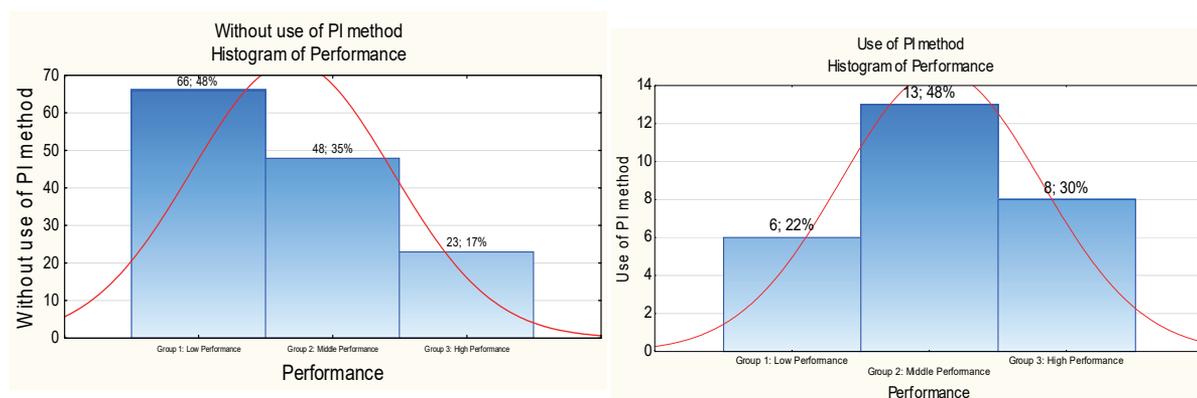
Investment valuation methods x Business Performance	Counts	Pearson's chi-square	df	p	Contingency coefficient (CC)	Adjusted CC (Adj. CC)
Use of annual indicators:	164	3.816	2	0.148	0.15	0.20
- profit	164	1.067	2	0.587	0.08	0.11
- cost	164	1.608	2	0.448	0.10	0.13
- earnings	164	1.323	2	0.516	0.09	0.12
- payback period	164	4.797	2	0.091	0.17	0.22
- return on investment (ROI)	164	0.480	2	0.786	0.05	0.07
- approximation of earnings	164	2.831	2	0.243	0.13	0.17
Use of discounted cash flow evaluation:	164	4.530	2	0.104	0.16	0.22
- Net present value (NPV)	164	1.323	2	0.516	0.09	0.12
<b>- Profitability index (PI)</b>	<b>164</b>	<b>6.470</b>	<b>2</b>	<b>0.039</b>	<b>0.19</b>	<b>0.26</b>
<b>- Internal rate of return (IRR)</b>	<b>164</b>	<b>6.349</b>	<b>2</b>	<b>0.042</b>	<b>0.19</b>	<b>0.25</b>
- Payback period (PP)	164	1.054	2	0.590	0.08	0.10
Use of investment controlling evaluation	164	4.244	2	0.120	0.16	0.21
Use of additional methods:	164	0.776	2	0.678	0.07	0.09
- break-even analysis	164	1.980	2	0.372	0.11	0.14
- project commercial life cycle	164	2.229	2	0.328	0.12	0.15

Data source: authors

In the research of the first group of methods between business performance and annual indicators (individual method or whole group of methods), the use of annual indicators has not statistically significant effect on the business performance, so we did not confirmed the general purpose of the first hypothesis  $H_1$ .

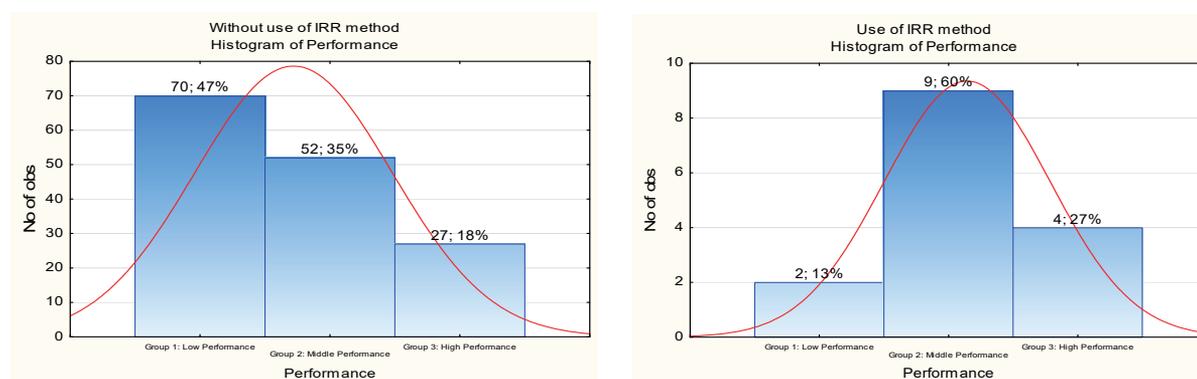
When we analysed the second group of methods, in the research of discounted cash-flow indicators, we demonstrated statistically significant relationships between performance and two indicators: Profitability Index and Internal Rate of Return. Both pursued relationships show moderate dependence with similar Adj. CC at 0.26 (and 0.25 respectively). The analysis of observed frequencies presented in histograms (*Figure 1* and *Figure 2*), but especially residuals show that if companies do not use specified evaluation method, they obtain poor performance with negative or very low positive ROE to 2%. When they use the mentioned methods, the differences between observed and expected frequencies are significant for the second and third group of performance (positive ROE above 2%), residuals are slightly higher for the second performance group (ROE 2-7%). So, we cannot say, that with application of these methods companies have extremely high performance; probability to result with the ROE indicator at the level of 2% or 10% is the same. But it is sure that without analyzed methods companies are very weak with the ROE under 2%.

**Figure 1.** Use of PI method vs. Business Performance



Data source: authors

**Figure 2.** Use of IRR method vs. Business Performance



Data source: authors

Use of discounted cash flow methods thus resulted in higher performance than without the use of methods, but does not guarantee placement in the highest categories of ROE, on which are likely to have significant impact controlling methods. However, it is possible to confirm the hypothesis  $H_2$ .

In the third group of investment effectiveness valuation indicators we focused on methods based on investment controlling approach. We specified two controlling methods in questionnaire and it would be suitable to analyse each one separately, but there were very low observed frequencies insufficient for statistical testing by using any statistical method. We decided to analyse not each method, but two controlling methods together as variable “use of investment controlling”, while it was not important which method the company uses. In this variable we selected two categories: without use and use of investment controlling approach.

In variable business performance according the ROE indicator we started with 6 groups (categories). However, the statistical analysis did not record p-value  $p < 0.05$  for this distribution. We were forced to join the groups of performance, that of the original six groups were created two, with limit ROE was 4%. Analysis of dependence between investment controlling methods and performance of businesses recorded in this case p-value of  $p < 0.05$ . Detailed statistical results of chi-square test presents *Table 5*.

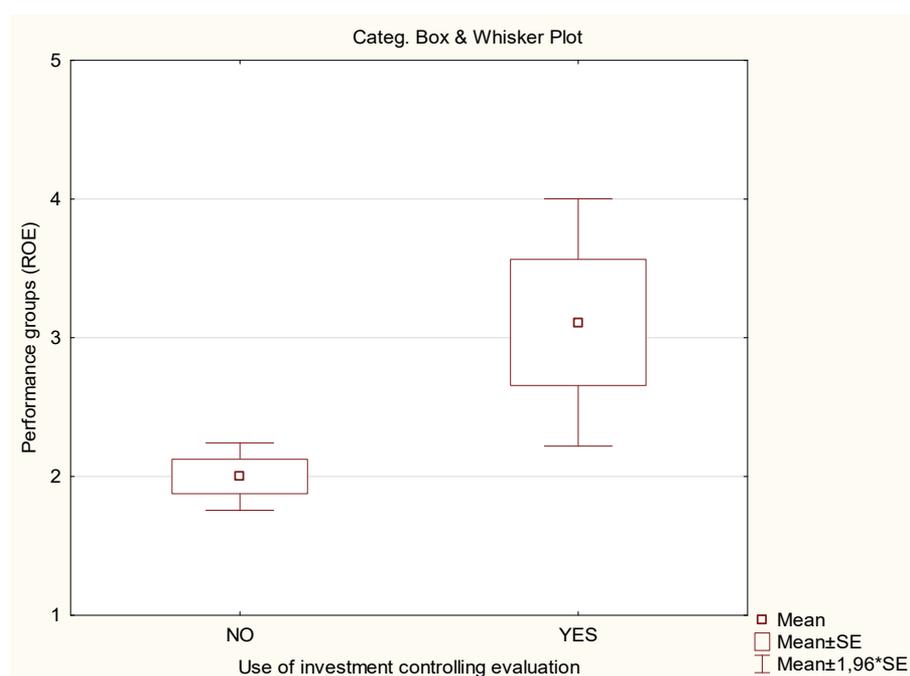
**Table 5.** Contingency: Use of investment controlling evaluation vs. Business Performance – Statistics

Investment controlling valuation x Business Performance	Counts	Pearson's chi-square	df	p	Contingency coefficient (CC)	Adjusted CC (Adj. CC)
Use of investment controlling evaluation	<b>164</b>	<b>4.276149</b>	<b>1</b>	<b>0.038</b>	<b>0.159</b>	<b>0.22</b>

Data source: authors

Due to the unfulfilled assumptions of expected frequencies was not appropriate to interpret the values of contingency coefficients or residual frequencies in contingency tables. However, the results of the p-value have led us to the decision to examine further the use of investment controlling evaluation methods and performance by statistical analysis, which would offer sufficient evidence of a statistically significant dependence of variables. We used analysis of variance. Statistical characteristics of the use of investment controlling evaluation presents *Table 6*, demonstrated impact on performance we display in *Figure 3*.

**Figure 3.** Use of investment controlling evaluation vs. Business Performance



Data source: authors

**Table 6.** Analysis of variance: Use of investment controlling evaluation vs. Business Performance

<b>Levene's test of homogeneity of variances</b>								
Use of investment controlling evaluation	SS - Effect	df - Effect	MS- Effect	SS - Error	df - Error	MS- Error	F	p
Performance (ROE)	0.345959	1	0.345959	133.3776	162	0.823319	0.4202	0.5177
<b>Analysis of variance (ANOVA)</b>								
Use of investment controlling evaluation	SS - Effect	df - Effect	MS- Effect	SS - Error	df - Error	MS- Error	F	p
Performance (ROE)	<b>10.50136</b>	<b>1</b>	<b>10.50136</b>	<b>380.8889</b>	<b>162</b>	<b>2.351166</b>	<b>4.4664</b>	<b>0.0360</b>
<b>Statistics: Performance (ROE)</b>								
Use of investment controlling evaluation	Performance (ROE) - Means	Confidence -95.000%	Confidence +95.000%	Performance (ROE) - N	Performance (ROE) - Std.Dev.			
No	2.000000	1.755382	2.244618	155	1.541630			
Yes	3.111111	2.062475	4.159748	9	1.364225			
All categories	2.060976	1.822044	2.299907	164	1.549570			

Data Source: authors

The analysis of the use of investment controlling methods reveals that Levene's test determined the p-value  $p > 0.05$ , whereby we did not reject the null hypothesis of equal variances; assumption for ANOVA test was fulfilled. In the ANOVA test, p-value was  $p < 0.05$  (0.036), we can reject null hypothesis  $H_0$  in favour of alternative hypothesis and thus demonstrate the statistically significant dependence of performance in relation to analysed methodology. Use of investment controlling evaluation methods as a tool of investment measurement we consider as significant factor with the impact into better business performance.

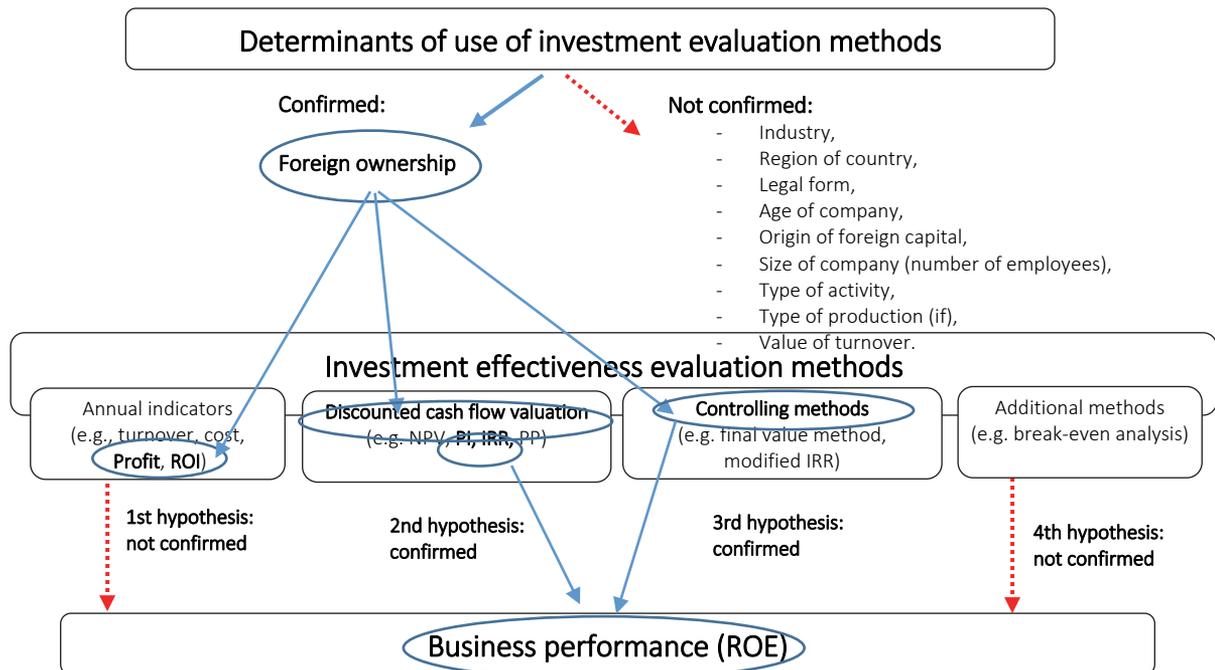
### 4.3 Relations in tested research areas

Based on the results of statistical analysis we had constructed a model of relations between the research parameters, we visualized our statement to the results of testing hypotheses. This model, shown in three general steps, presents impact of foreign owned firms in use of investment valuation methods together with influence to better performance (see Figure 4).

Based on statistical results we have made the decision on the hypothesis formulated at the beginning of the study:

- H 1:** We do not reject null hypothesis  $H_0$ . We did not confirmed the statistically significant relationship between the use of annual indicators for investment effectiveness valuation and business performance.
- H 2:** We reject null hypothesis  $H_0$  in favour of alternative  $H_1$ . Use of discounted cash-flow indicators has statistically significant impact on business performance. We proved that these methods are applied in companies that achieve moderate or higher performance.
- H 3:** We reject null hypothesis  $H_0$  in favour of alternative  $H_1$ . Dependence of business performance on using of investment controlling valuation was statistically proven. However, companies applying this tool of investment measurement and management reach the ROE indicator more than 4%, not more than 7% as we expected.
- H 4:** We do not reject null hypothesis  $H_0$ . We did not confirmed that use of additional method of break-even analysis has a significant effect into better business performance.

Figure 4. Confirmation of research hypotheses



Data source: authors

## 5. DISCUSSION

Almost a third of businesses do not use any method of evaluating the efficiency of investment (Rajnoha et al., 2013). It is possible to assume, that if a company which still does not use any method for assessing the effectiveness of investment, chooses some concept of evaluation of investment plans, it will be more applying annual indicators, only very limited use of discounted cash flow methods, certainly not once more difficult approach based on investment controlling.

Results of our research can improve businesses in Slovakia and increase their performance, regarding the application of investment effectiveness controlling. Recommendations are primarily directed to domestic firms that use concepts and tools of investment management and measurement in minimum level. Just companies with using of some basic and simple investment valuation approach would be interested in useful findings in this article. Most businesses apply annual indicator Return on investments (ROI) or methods based on discounted cash-flow. According to research results (Rajnoha et al., 2013), 38% of companies in our research sample use methods based on discounted cash-flow, but using of these methods only leads to a moderate business performance and . Precisely for this reason it is necessary to look for something that will bring greater efficiency and therefore enterprises should to their investment measurement and management also implement investment controlling. Furthermore, it was proven (Merkova, Rajnoha and Dobrovic, 2015), the investment controlling apply entities with partial or full foreign ownership. The research also confirmed that companies with foreign ownership obtain better performance, according ROE indicator more than 4%. We can therefore assume that the use of investment controlling approach is still associated with the entry of foreign investors to the company in Slovakia and with bringing of certain elements of knowledge base. Domestic firms do not use the method of investment controlling for several reasons. At first, they have no interest to implement new conceptions in management, because they do not

see the sure effects. Second, they do not understand and trust the methods of investment controlling. Third, they have lack of capital; if they invest, it is tangible investments - technology, machinery - investment in direct connection in production, not in management.

The hypothesis set at the beginning of the research assumed that the use of investment controlling cause business performance, more than 7% in ROE indicator. ANOVA test showed that companies achieved 4<sup>th</sup> and higher performance group, which means border of performance over 4% ROE. It is questionable whether such performance for businesses is enough. Rather, we purpose that if a company incurs finances to implementation of an investment controlling, they expect more.

We realise that our results have limitations and future research requires some guidelines and recommendations. The first, valuation of the overall business performance according the ROE indicator can be distorting; and also due to the results achieved, we will in our further research consider using the indicator Earnings before interests, taxes and depreciation and amortization (EBITDA). Second, it would be more appropriate to realize the study in the longer term, since it is generally known that investments bringing higher profitability after certain time. So, in our research, they did not have yet to fully reflect in business performance measured by ROE indicator. Eventually, it would be suitable to extend the research sample, primarily of the other companies with foreign capital and MNEs, to conclude the statistically more relevant research findings.

## 6. CONCLUSIONS

Presented research results based on statistical testing as well as from discussion show that some tools of investment measurement and management and applying of certain investment effectiveness valuation methods is typical for foreign owned firms. Furthermore, some of these methods has positive impact into business performance.

Comprehensive approach of investment effectiveness valuation in foreign firms, influencing better business performance, covers the ROI indicator, long-term indicators based on discounted cash flows and methods used in investment controlling.

Findings from our research based on the statistical testing can benefit businesses in the Slovak economy, in terms of the investment controlling application. Inadequate concepts in investment management and controlling may be the reason of insufficient performance of domestic companies.

We can therefore assume that the use of investment controlling approach is still associated with the entry of foreign investors to the company in Slovakia and with bringing of certain elements of knowledge base.

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