

The Economic Development Evaluation of Czech Enterprises Financed by Venture Capital

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Abstract: This paper presents results of an empirical study focused on the economic development of enterprises financed by venture capital. Each enterprise was analyzed with the help of several indicators including the volume of assets, sales, employee performance, ROE and ROA. Conclusions about the economic development are based on the thorough analysis of the changing observed indicators in each business. The overall economic development of selected enterprises in the observed time period was found to be positive.

Key-Words: venture capital, economic development, sales, employee performance, return on equity, return on assets, netto fixed assets

1 Introduction

The subject of our long-term interest has been the study of Czech enterprises financed by venture capital. Following initial investigation on decision-making made by venture capitalists in the Czech Republic and subsequent research on non-financial value added invested by investors in enterprises along with the perception of such support shared by representatives of enterprises, we have focused on the research concentrating on the economic development of these enterprises.

In 2012 we conducted research on the number of employees and on our newly defined performance characteristics of employees in the Czech enterprises with the participation of venture capital. After extensive background research and study of foreign professional resources describing development of financial indicators in enterprises with venture capital involvement, we noted the ambiguity in the

answer to the question whether enterprises, financed by such alternative sources, showed a positive economic development in the period of venture capital involvement and period immediately after its exit.

2 Theoretical Framework

Studies demonstrating the positive impact of venture capital include, among others, the following: Jain, Kini [7] reported, comparing 136 enterprises development of which was funded by venture capital that the support, given by venture capital, had positive impact on higher level of employment and turnover rise compared with enterprises funded with another than venture capital (a control group). Analysis of data collected from various enterprises established the base for said research.

Lerner [8] employed the identical methodology to compare enterprises, financed by venture capital, with so-called “control group”. The control group was formed in such a way so as reached turnover, sector of enterprise activity and region were similar to enterprises included in the first group. The result of a.m. comparison was the information that enterprises, benefiting from the support of venture capital investors, showed three to four times higher rate of growth in selected indicators - employment and sales - compared to the control group. The difference in growth rate was identified to be even higher in case of enterprises funded with venture capital in the early stage.

AVCO [1] in collaboration with the authors Penedel and Jud [10] published a study, also comparing aforementioned enterprises with the control group, based on the results revealed by questionnaire survey carried-out among owners and CEOs of surveyed enterprises. Their results can be summarized as follows:

- even though both groups were active in industries, anticipating potential growth, development of enterprises financed by venture capital showed better results compared with the control group.
- cash flow growth rate, indicated in the control group, was for about 29 % higher, but the employment rate increase in the control group was for 46 % lower than in the enterprises funded with venture capital; enterprises with venture capital financing recorded for about 10 % higher turnover.
- enterprises financed by their own internal resources generally reported dramatically lower growth rates in monitored characteristics than enterprises financed by venture capital.
- technological innovation and innovative provision of services by investors were the real engines of growth for the enterprises financed by venture capital as well as enterprises included in the control group.
- compared with the control group, enterprises funded with venture capital suffered with financial problems (such as negative CF, inability to get a bank credit, etc.) prior to the entry of investor
- three quarters of enterprises financed by venture capital perceived this particular form of financing as the value added.

Britischen Venture Capital Association - BVCA came to partially similar conclusions in its investigation of enterprises, organized in 2002 [2]. Totally 176 companies responded to distributed 1,198 questionnaires; representatives of addressed enterprises confirmed that their businesses developed more quickly in the fields of turnover and employment through venture capital financing

than for example the average of enterprises listed in the stock exchange.

Engel and Keilbach [3] studied the effect of venture capital financing on the number of filed patent applications, using internal data of individual enterprises. In the first place, the authors confirmed so-called effect of selection. Innovative enterprises had higher probability of participation of venture capital investors; development of enterprises financed by venture capital was faster than so-called “enterprise - twin” in the control group. Relationship to innovations of the enterprise, successfully funded with venture capital, did not significantly differ from another enterprise if the level of patent applications was controlled at the time of enterprise foundation. The authors concluded that venture capital investors funded rather more innovative enterprises, but, subsequently, intensified their activity in the form of product placing on the market, thus accelerating enterprise growth.

To the contrary, studies, denying such positive effect of venture capital involvement on enterprise economy, include e.g. Frederiksen et al. [4]. Frederiksen, in contrast to the conclusions of his own research from 1990, indicated that the results of research on the development of financial indicators did not show such positive imprint of venture capital investors on the enterprise development. Monitored indicators included: liquidity, turnover, number of employees, equity ratio. A.m. research used a questionnaire survey, made among respondents occupying the posts of CEOs.

Frederiksen [5] examined both financial and non-financial contribution of venture capital investors to the enterprise. He confirmed the positive impact of investors on enterprise development in “non-financial areas”; i.e., such as human resource development, marketing, establishment of contacts. Mentioned research applied both questionnaire survey and structured interviews involving totally 34 enterprises. However, the positive impact on the economic development was not demonstrated.

Cherin and Hergert [6], based on the development of exchange rates and data in the period of two years (group of enterprises financed by venture capital and control group), arrived at conclusion that the development of enterprises financed by venture capital was not better than the development of enterprises financed by other capital resources. The authors monitored development of employment and turnover growth in the short period of two years; therefore, the effects of this specific form of financing might have not been demonstrated. With these findings, we approached the research project to assess the overall

economic development of Czech enterprises financed by venture capital.

On the contrary, Manigart and Hyfte [9] proved that enterprises, financed by venture capital and receiving support from their investors, did not show significantly higher employment growth, but manifested a higher rate of growth in assets and cash flow. Again, their research analyzed so-called control group of enterprises. In total, 187 Belgian enterprises with the participation of venture capital were compared.

As regards different conclusions reached by foreign studies the fact should be highlighted that these studies answered questions about the impact of venture capital on the enterprise economy. Our task was formulated as follows: assessment of economic development of enterprises with venture capital involvement based on the analysis of input data.

Sedláček [12] published a study, among others dealing with the analysis of financial performance of enterprises in the Czech Republic; nevertheless, results of his research have not been presented yet. Therefore, presented text can be considered as unique in the Czech Republic.

3 Research

3.1 Research Objectives

The authors of the paper has set a target to assess economic development of enterprises with venture capital involvement in the Czech Republic on the basis of the analysis of selected financial indicators. Efforts to depict systematic context of enterprise development resulted in the selection of following characteristics:

- fixed assets in netto value (hereinafter also referred to as "FA"). This characteristic was employed because of its undeniable prerequisite for revenue capacities of the enterprise. Development trend of current assets was not noticed because of their closer link with sales and out of it resulting problematic assessment of their development.
- sales connected with the line of business. In individual enterprises we counted up sales achieved by sale of its own products, sales achieved by sale of services and goods. Authors consider sales as the basis of good economic results (profit) of the enterprise. Expansion of the market, complemented by cost-saving policy is reflected in the positive economic results. Development of absolute value of economic results was not followed; authors considered

ratios, constructed with values of the economic results (profit), as more appropriate.

- employee performance - we find as more important employees' contribution to the results of enterprise, i.e., performance of enterprise. We did not apply frequently used indicator of productivity of labour, constructed by value added related to one employee, to assess the employee performance. The reason was that value added depicted only evaluation of material and other supply inputs to the enterprise. Other cost items, such as wages, did not affect the amount of value added, but influenced employee performance.
- Return on Assets - ROA - expresses how any enterprise efficiently uses its existing assets conditions; the extent of available property generating profit. In order to ensure future development of the enterprise, it is important that this indicator shows when (in what time horizon) re-financing of assets from the profit would be possible.
- Return on Equity - ROE - conveys the view of owners, because ROE expresses degree of utilization of resources that such owners invested into the business.

3.2 Research Materials and Methods

The research material has been based on data collected from all enterprise entities in the Czech Republic financed by venture capital in the period from 1998 until 2011. A base sample, used in all phases of research, contained totally 93 companies with their registered seats situated in the Czech Republic. Česká asociace private equity a venture kapitálu (Czech Association of Private Equity and Venture Capital) provided the information about enterprises funded by venture capital. Data about number of employees working in individual enterprises were acquired from publicly available financial statements. Although venture capital participated in financing of 93 Czech enterprises during the years 1998-2011, data were gathered from 87 companies. I.e., the research sample has consisted of 94 % of enterprises included in the sample.

Qualitative data have been analyzed by means of methods of descriptive statistics.

As regards each surveyed characteristics, we have worked with:

- calculated average in monitored years,
- calculated annual absolute change in each indicator,
- calculated average change in indicator,

- rate of average change and average of indicator converted to a percentage number.

Resulting number indicates the percentage of average annual change in the monitored indicator for each enterprise for the period of its co-operation with venture capital investor maximally three years after the exit of such investor from the business. Established value of change has been used to analyze economic development. Functions of MS Excel has been used for these calculations.

To illustrate collected data, calculations and conclusions, four diagrams have been drawn.

Scatter diagram has been prepared to visualize relations among selected quantities for selected subjects. Mentioned diagram illustrates maximal, minimal and typical values of monitored subjects. Furthermore, said diagram also presents distribution of captured data, indicating the level of similarity of individual subjects. Conclusions resulting from data analysis have been formulated using statistical methods and cluster analysis.

Monitored indicators have been calculated using the following formulas:

$$ROE = \frac{\text{profit after taxation}}{\text{equity}} \quad (3.1)$$

$$ROA = \frac{\text{profit after taxation}}{\text{assets}} \quad (3.2)$$

$$\text{Netto fixed assets} = \text{fixed assets} - \text{accumulated depreciation} \quad (3.3)$$

$$\begin{aligned} &\text{sales} \\ &= \text{sales from selling of goods} \\ &+ \text{sales from selling of own products and services} \end{aligned} \quad (3.4)$$

To evaluate employee performance (EP), we have applied our formulated definition of employee performance, e.g. [11]:

$$EP = \frac{OPAA}{PPZ} = \frac{OP - RSFAM + BPFAM}{ARNE} \quad (3.5)$$

Legend:

EP represents employee performance, OPAA stands for operating profit, adjusted from the result (sales) from selling of assets, OP stands for operating profit, RSFAM stands for sales from selling of long-term (fixed) assets and material, BPFAM represents balance price of long-term (fixed) assets

and material and ARNE represents average recalculated number of employees.

3.2 Research Results

Given the extensiveness of calculations, complete range cannot be published; therefore, summary results (further developed) are presented. The summary results see Table 1.

The calculations in the Table 1 show the assessment of development in following quantities (indicators):

- employee performance indicator showed the fastest growth of average values. Its average annual growth amounted to 53.7 %. Applied scatter chart shows that the employee performance usually ranges from 20 to 50 %. The increase of employee performance was reported in 48 companies, representing 56 % of the entire file.
- another high annual growth - 10.4 % - was identified in fixed assets. In the graph the growth of fixed assets ranges from 5 to 10%. Fixed assets increased in 57 companies, representing 66 % of the entire file.
- sales represent another growing indicator, namely 7.2 % of average annual growth. The graph demonstrates the most common growth from 5 % to 8 %. The growth in sales was reported in 46 enterprises, i.e. 53 % of the entire file.
- average annual growth of ratio indicator ROA was achieved in the amount of 5.1 % by growth of ROA in 31 companies (36 % of the entire file).
- average annual growth of ROE indicator declined; its value grew only in 28 companies, i.e., 33 % of the total number of monitored enterprises.
- to specify the results in more detail, the indicators marked ROA 2 and ROE 2 were included in the table. Calculated results were adjusted from zero values. Zero values indicated a negative economic result (loss). Therefore, in this case we found justification to make such step. Adjusted ROE 2 reported that the average annual value was 24 %, median 13.5 %. This figure expresses a large variance values. The annual percentage change indicated annual average decline by 3 %, median 0.8 %. ROA 2 indicator showed the average annual rate of 14.3 %, median 3.9 %. Once again, we identified a group of data with high variance. For quantification of the annual percentage change we could identify decrease of 8.2 % with the average of -9.2 %.

Table 1: Summary results

Indicator \ Type of value	Netto fixed assets	Sales	Employee performance	ROE	ROA	ROE 2	ROA 2
Average annual value (AAV)	1,669,822 thousands CZK (1,086,713 thousands CZK)	1,522,596 thousands CZK (930,598 thousands CZK)	143,773 CZK/employee	19 %	11.8 %	24 %	14.3 %
Median AAV	183,202 thousands CZK (171,430 thousands CZK)	350,448 thousands CZK (313 679 thousands CZK)	49,333 CZK/employee	8.61 %	3.3 %	13.5 %	3.9 %
Percentage average annual change (PAAC)	10.4 %	7.2 %	53.7 %	-1.9 %	5.1 %	-3 %	-8.2 %
Median PAAC	8.3 %	1.9 %	7.8 %	0 %	0 %	-0.8 %	-9.2 %

Source: own

Average annual percentage changes have been used for graphical illustration in Figures 1, 2 and 4.

Only in case of Figure 3 the average annual values of indicators have been applied because of the significance of this indicator as an expression of the profitability of the indicators in the enterprise.

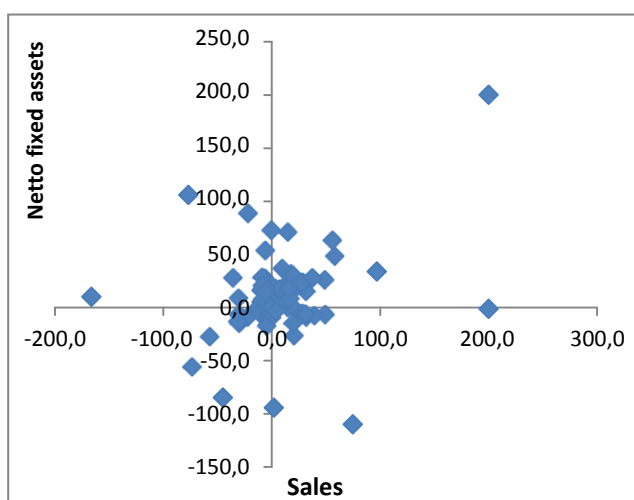


Fig. 1: Percentage of annual average change in sales and netto fixed assets

Source: own based on own calculations

The annual average percentage change in the netto fixed assets, see Figure 1, is predominantly positive and varies in the range from 0 % to about 20 % per year; however, sales range mostly from -5 % to +15 % of the annual percentage change. Enterprises reporting the annual percentage growth, both in sales and fixed assets, see the right upper quadrant. These enterprises are a total of 40 % (34 enterprises), i.e., that 40 % of enterprises

notice the growth both in sales and netto fixed assets. The scatter chart shows, in interval from 0 % to 20 %, the increase in the netto fixed assets and, at the same time, in the interval from 0 % to 20 % the increase in total sales for 20 enterprises, representing 23 % of the entire file.

Enterprises, reporting percentage annual growth in sales with simultaneous decrease in netto fixed assets see the left upper quadrant. This is a total of 11 enterprises; values of monitored change in netto fixed assets range between the decline of sales to -10 % per year and the increase of sales to 20 % per year.

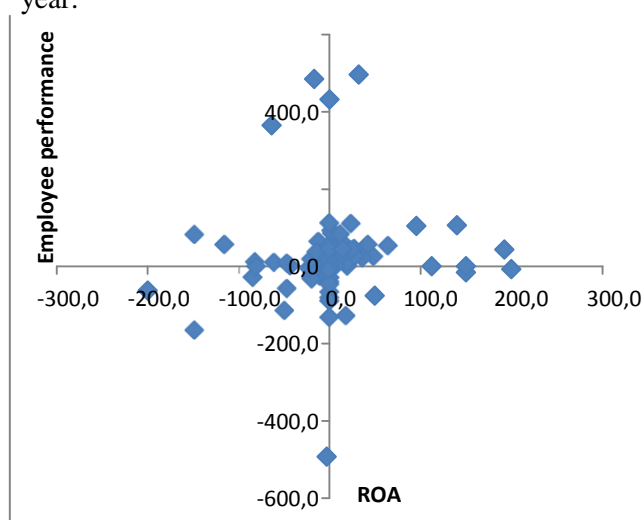


Fig. 2: Average annual percentage change in ROA and employee performance

Source: own based on own calculations

In the right upper quadrant of Figure 2 see a group of 26 enterprises with a positive annual

change in ROA and employee performance. ROA of the most of enterprises classified in this group amounted to 100 %. Two maximal results oscillated in the interval of 400 – 500 %, i.e., representing about 30 % of the enterprises. In most cases in the interval up to 50 % of the annual change in employee performance and about 20 % of the annual change in ROA. In contrast, at the same time 17 enterprises noticed decrease in ROA and employee performance per year (approximately 20% of the enterprises).

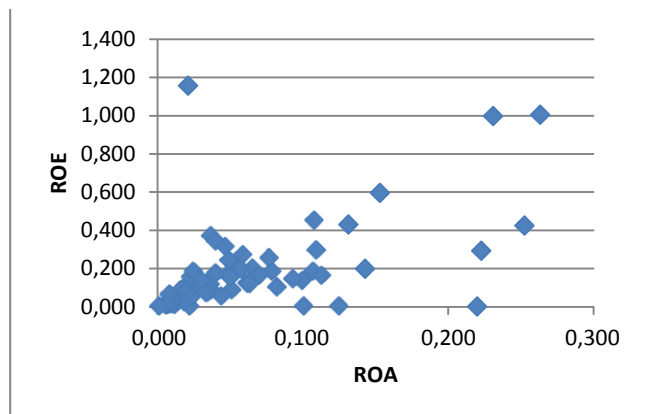


Fig. 3: Average values of ROA and ROE in the period 1998 - 2011 in the enterprises financed by venture capital in the Czech Republic

Source: own based on own calculations

Figure 3, scatter chart, shows average values of ROA and ROE for the monitored period in the individual enterprises. A total of 48 enterprises out of 87 monitored (i.e., 55 % of the entire file) reported ROE value in the interval between 0 % and 20 % and ROA value in the interval between 0 % and 10 %. The total of 28 enterprises (32 % of the entire file), out of 48 enterprises mentioned above, reported ROE value in the interval 0 % - 10 %, and 20 enterprises (23 % of the entire file) reported ROE value in the interval 10 – 20 %. The total of 32 enterprises reported ROA value in the interval 0 % - 5 %.

Furthermore, mentioned diagram demonstrates following fact: as long as ROE values are in the interval up to 10 %, then ROA values are founded in the interval up to 5%. The variance is higher by ROE range from 10 % to 20 %. The condition stating that ROE values should be higher than ROA values has been fulfilled.

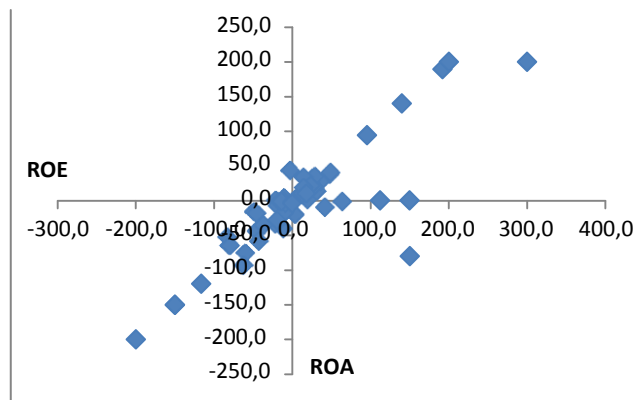


Figure 4: Average annual percentage change in ROE and ROA

Source: own based on own calculations

Figure 4 shows the average annual percentage change in ROA and ROE. Changes in the values show a consistent development. In case of 26 enterprises (30% of the entire file) the decrease in ROE and ROA values was noticed. In case of 28 enterprises (32 % of the entire file) ROE and ROA values were growing per year. Development of both indicators was bidirectional in case of 9 enterprises. In case of 28 enterprises (32% of the entire file) ROA and ROE values were not quantified because those enterprises reported a negative economic result (loss).

4 Discussion

We have formulated following findings based on relationships and links among mentioned indicators:

- massive increase in employee performance should be reflected in the growth of other characteristics of the enterprises, certainly should correspond to sales growth. Significantly faster growth in employee performance (53.7 %) compared to 7.2 % annual growth in sales indicate that increasing employee performance has been reflected in the results of business activities only partially. The data in the enterprise file shows that only 23 enterprises, i.e., less than 27 % contained in the file, noted increasing employee performance accompanied by increase in sales; 17 companies (20 %) achieved sales growth during the decline in employee performance and even 8 companies (9%) increased employee performance without any sales growth.
- Comparison between average annual growth rate of fixed assets (10.4 %), sales (7.2 %) and ROA (5.1 %) indicates a decrease in profit (sales and ROA additions) and deteriorating asset utilization in

the category of fixed assets (fixed assets and ROA additions). Details about the structure of file discloses that only 18 companies, i.e., 21 %, reported fixed asset and ROA growth; in 39 companies (45 %) grew fixed assets during the decline in ROA and in 23 companies (23 %) grew fixed assets without any sales growth.

- level of achieved values of ROA and ROE in the file can be considered as above standard. The average value of ROA is 11.8 %, modus reaches 3.25 %. The average value of ROE is 19.0 %, modus reaches 8.61 %. The average annual additions to ROA (5.1 %), compared to additions to other indicators, demonstrate - as already mentioned - decrease in economic result (profit). In this context the average annual decline in ROE by less than 2 % can be interpreted as the consequence of enterprise equity capital growth in other components than in the economic result (profit) of the current period. Paradoxically, decline in ROE confirms increasing financial independence and financial stability of monitored enterprises.
- overall economic image of group of enterprises with the venture capital involvement in the Czech Republic shows an evident positive development of baseline characteristics of successful development of enterprises, i.e., indicators of employee performance, development of sales and increase in the volume of fixed assets. However, these favourable conditions were not reflected in corresponding growth in overall enterprise performance, measured by ROA and ROE characteristics. Established annual change in ROE shows declining trend. However, the fact should be taken into account that the average annual values of ROA and ROE can be considered as high, and their further growth at a fast pace is rather improbable. Moreover, problems connected with the formation of economic result (profit), influencing the calculation of both indicators, should be considered as well. The economic result (profit) is affected by policy adopted by the enterprise, such as asset depreciation, reserve formation, adjusting items, etc.
- We also consider important the fact that the characteristics and additions to the monitored indicators at the individual enterprises are significantly differentiated within the file. This idea was shown during more detail monitoring of relationships among indicators in the enterprise file; see above. The complex of enterprises with venture capital involvement in the Czech environment is a very incoherent group,

requiring the utmost caution in assessing the status and development of the entire file. Moreover, we consider problematic the fact of a large range of business industries in which venture capital in the Czech Republic is involved.

In connection with the above mentioned findings arising from the results of our research, we can formulate the opinion that the economic development of the Czech enterprises financed by venture capital is positive.

4 Conclusion

The idea of our research project, i.e., to assess the economic development of enterprises with venture capital involvement in the Czech Republic, has been derived from the inconsistency in the results of foreign studies.

Characteristics studied within the framework of this research have been formulated as fixed assets in the netto form, sales associated with the line business, employee performance, return on assets (ROA) and return on equity (ROE). The sample has consisted of 94 % of the file and descriptive statistics has been used for its analysis.

Based on the findings of percentage of average annual change in the characteristics of particular indicator for individual enterprises conclusions have been reached, based on which we can consider the economic development of enterprises and its venture capital involvement as positive.

As part of this research the general condition of economic development of enterprises has been assessed, regardless of the context such as enterprise size, impact of investors resp. managerial companies operating in the enterprise, etc. In the future we expect to focus on these aspects.

References:

- [1] AVCO, *Der Einfluss von Private Equity (PE) und Venture Capital (VC) auf Wachstum und Innovationsleistung österreichischer Unternehmen*, [online], 2006, [quot.2011-01-11].
<http://www.avco.at/upload/medialibrary/Impact_von_PE_VC_Endbericht_Okt_2006.pdf>.
- [2] BVCA, *The Economic Impact of Private Equity in the UK*. [online], 2002, [quot. 2011-01-15].<<http://www.bvca.co.uk/assets/features/show/TheEconomicImpactofPrivateEquityintheUK2002.pdf>>.
- [3] Engel, D., Keilbach, M., *Firm level Implications of Early stage Venture Capital Investments - An Empirical Investigation. Discussion Paper*, No. 02-82, 2002, Mannheim: ZEW.

- [4] Frederiksen, O., Olofsson, C., Wahlbin, C., The role of venture capitalist add value? Do They? In: Churchill N. C. – Bygrave W. D. – Muzyka D. F. – Vesper K. H. – Weztler W. E., Jr. (Hrsg.) *Frontiers Of Enterpreunership Research Proceeding of the Eleventh Annual Babson College Enterpreunership Research Conference*, *Babson Park Verlag*, MA, 1991, pp. 435-444.
- [5] Frederiksen, O., *Venture Capital Firms Relationship and Cooperation with Entrepreneurial Companies. Thesis Nr. 625*, Linköping: Linköping University, 1997.
- [6] Cherin, A., Hergert, M., Do venture capitalist create value? A Test from the computer industry. In: Kirchoff B. A. – Long W. A. – McMullan W. Ed. – Vesper K. H. – Weztler W. E., Jr. (Hrsg.) *Frontiers Of Enterpreunership Research Proceeding of the eight Annual Babson College Enterpreunership Research Conference Babson*, *Babson Park Verlag*, MA, 1988, pp. 341-342.
- [7] Jain, B. A., Kini, O., *Venture Capitalist Participation and the Post-issue Operating Performance of IPO firms. Managerial and Decision Economics*, 16, 1995, pp. 593-606.
- [8] Lerner, J., *The Government as Venture Capitalist. Journal of Business Venturing*, 72, No. 3, 1999, pp. 285-318.
- [9] Manigart, S., Van Hyfte, W., *Post Investment Evolution of Venture Backed Companies. Frontiers of Entrepreneurship Research*. Wellesley, MA: Babson College, 1999.
- [10] Peneder, M., Jud, T., *Empirische Untersuchungen und Ergebnisse zur Wirkung von Private Equity und Venture Capital auf die Unternehmensentwicklung*. [online], 2004, [quot. 2010-04-01] <
<http://www.avco.at/AVCO.aspx?target=21865>>.
- [11] Rajchlová, J., Fedorová, A., *Financování českých podniků rizikovým kapitálem a vývoj výkonnosti jejich zaměstnanců. Trendy ekonomiky a managementu*, VII, No. 14, 2013, pp. 55-62.
- [12] Sedláček, J., *Analýza vývoje finanční výkonnosti podniků v České republice. Ekonomický časopis/Journal of Economics*, 55, No. 1, 2007, pp. 3 – 18.