

University doctoral (PhD) dissertation abstract

LIFE BEYOND THE MARKET –

**The conceptual framework and empirical analysis of government backed
venture capital agendas based on Hungarian evidence**

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1. GOALS AND HYPHOTESSES OF THE RESEARCH

Venture Capital (VC) is a funding form focusing on young and innovative firms with huge growth potential. For various reasons such companies face difficulties in obtaining the necessary resources for their growth due to market failures, like information asymmetries and externalities combined with the problems of high uncertainty and the lack of collaterals. (BECSKY-NAGY, 2016; CRESSY, 2002; GOMPERS, 1995; HALL, 2002; MASON – HARRISON, 1998; PHILPOTT, 1997). Through evolutionary development VC evolved as a market institution that is supposed to provide a solution for the funding problems of these companies. In well-developed entrepreneurial ecosystems VC plays a major role in the funding of young and innovative enterprises, therefore it is an important element of innovation systems (KENNEY, 2011). The highly cited article of KORTUM and LERNER (2000) stated the positive effect of VC on innovation.

In Europe, especially in the Central and Eastern European regions, the development of the VC industry belatedly followed the US market. If the pivotal role of VC in innovation processes and economic growth is taken into consideration, it is not surprising that governments make continuous attempts to support and promote this industry (BECSKY-NAGY – FAZEKAS, 2015; DA RIN et al., 2006; LELEUX – SURLEMONT, 2003; LERNER, 2009; MURRAY et al., 2012). Agendas aiming at the development of VC markets were created with the presumption that the inefficiencies of the supply side lag behind the relative underdevelopment of the market. Therefore the public sector tried to support private investors through direct interventions and fill in for them in their absence by providing VC type funding. There are many examples supporting the notion that well-designed government agendas greatly contribute to the most vivid entrepreneurial ecosystems (LERNER – TAG, 2013). On the other hand, there are numerous examples of failed attempts to use government intervention in the VC market to spur entrepreneurship (LERNER, 2009). It is obvious based on theoretical and empirical evidence that on the long run government backed venture capital cannot replace its private backed peer, but at the same time in case of infant VC markets the government is able

to contribute to the development of the market as a catalyst (FAZEKAS, 2014).

The main purpose of my dissertation is to examine the effects of government backed VC based on Hungarian evidence. My dissertation adds new scientific results to the body of existing research studies by meeting the following two goals:

- The creation of the comprehensive models of purely government backed venture capital (GVC) and hybrid venture capital (HGVC).
- The comparison of GVC and HGVC backed firms' performance based on Hungarian evidence.

One of the major objectives of my dissertation is to create the theoretical model of government backed venture capital by synthesizing the literature and international evidences. The systematic approach of the PVC model is in the focus of many international studies (DA RIN et al. 2011; GOMPERS – LERNER, 1998; LERNER, 2003; METRICK, 2007). In the field of Hungarian research KARSAI (2012) gives a comprehensive discussion of VC's model, while BECSKY-NAGY (2016) described the dynamic model of VC's value creation. As the role of government backed VC is increasing especially in developing industries, the model of government backed VC is becoming increasingly important.

In face of the theoretical models my research compares the effects and performance of GVC and HGVC. I carry out my research by examining the performance of invested firms. The empirical research covers the population of VC backed firms that have obtained capital since 2010 within the framework of the hybrid JEREMIE VC agenda and the Szécheny Capital Fund (SCF). I carry out the comparison of the different schemes by comparing the performance of the invested firms based on their business potential and innovative capabilities. The effects of the different types of government agendas will be investigated based on the following aspects:

- Hybrid or purely government backed firms are able to generate higher growth?
- Hybrid or purely government backed firms are able to show a more active innovative performance?

Furthermore, besides the above mentioned research questions I investigate specific factors influencing the growth and innovative capabilities of invested firms. The research points out the relationship of firm's quality and its capital structure. The question regarding this relationship is the following:

- What information is provided by the ownership obtained by venture capitalists/ offered by founders about the quality of invested firm?

The following section introduces the hypotheses of my dissertation.

1.1. Growth hypotheses

Based on international evidence VC primarily seeks and spurs high growth potential. The dissertation's hypotheses regarding firms' growth investigate the question if there is a difference between the performance of HGVC and GVC backed firms. The growth of firms is measured on the basis of their revenues and number of employees. At the same time I investigate the performance of firms in terms of how successfully they are able to appear in the market and their contribution to employment. The following hypotheses are connected to the above mentioned research questions:

Hypothesis 1: Based on Hungarian evidence HGVC backed firms appear more successfully on the market (measured by sales activity) than their GVC backed peers.

Hypothesis 2: Based on Hungarian evidence HGVC backed firms have higher employment than their GVC backed peers.

Hypothesis 3: Based on Hungarian evidence HGVC backed firms generate higher growth in revenues than their GVC backed peers.

Hypothesis 4: Based on Hungarian evidence HGVC backed firms generate higher growth in employment than their GVC backed peers.

The phrasing of the hypotheses implies the primacy of HGVC. The motive behind shaping HGVC was that the efficiency of investments might be increased by the appearance of private participants. The fundamental of HGVC is that private interests and market selection brought by private investors into HGVC leads to

the more efficient allocation of resources. There is a limited number of research studies comparing the effects of HGVC and GVC on firms in a reliable way. The existing studies presented the slight superiority of HGVC over GVC. The theoretical framework of HGVC model shows that by crowding in private participants, this scheme creates a complex two goal system where private profit maximizing interests are in conflict with the economic policy goals targeting the funding of young and innovative firms. This inconsistency might lead to increased information asymmetry and to the inefficient use of funds. The success of HGVC does not rely solely on the positive effects of private participants lead by their private interests. Proper regulation, adequately designed incentive scheme and a certain level of transparency are also inevitable in a successful agenda. Rejection of the above mentioned four hypotheses would support the conclusions of the HGVC model.

The analysis does not separate the effects of selection and post investment activities' added value¹. The conclusions about the performance of HGVC and GVC incorporate the effects of these factors. The regulation of the use of funds was different in case of the Hungarian HGVC and GVC agendas; therefore I put special emphasis on controlling for this difference in the models. This includes controls for industry, geographical region, age and investment size.

Besides the effects of HGVC and GVC on growth I investigated the relationship of growth with capital structure and innovation. Regarding the effect of capital structure and innovation on firm growth the following hypotheses were phrased:

Hypothesis 5: Based on Hungarian evidence the higher ownership is gained by venture capitalists the lesser the firm's growth is in terms of

- a. revenues.
- b. number of employees.

¹ The separation of these effects would have required the analysis of invested firms before the investments were made, but as the majority of the firms did not have a relevant track record that enabled this.

Hypothesis 6: VC backed firms that introduce radical innovations are able to generate higher growth in

- a. revenues
- b. number of employees

than their non-VC backed peers based on Hungarian evidence.

Based on international evidence the chances of successful exits are lower if the government supported VC funds obtain higher ownership stakes. The capital structure of firms provides information for market participants; the more efforts the firms' founders make in order to retain the ownership of their firms, the more valuable the firm is. If the founders are willing to give up the majority share of their firms then they send a negative signal for market participants about the quality of their firm that narrows exit opportunities. Besides, the lower ownership of the founders decreases their incentives for supporting the growth of their firm that might lead to lower performance. This hypothesis is relevant regarding the research in the field of information asymmetries and capital structure.

Hypothesis 6 states that firms with patents have higher growth. In my dissertation patenting activity is the measure of firms' innovation performance therefore the hypothesis says that firms with radical innovations are able to generate higher growth. Although at first this statement seems sound, international evidence suggests that the active innovation is not an indispensable requirement for firms' growth, especially in less developed regions.

1.2. Innovation hypotheses

Spurring innovation is a fundamental reason why governments support VC. That is the reason why the innovative performance of invested firms is under scrutiny in my dissertation. Hypothesis 7 refers to the firms' innovation performance:

Hypothesis 7: Based on Hungarian evidence amongst HGVC backed firms there is a higher proportion of firms that implement radical innovations than amongst their GVC backed peers.

The hypothesis refers to radical innovation that is measured by patenting activity. By its definition patenting activity focuses primarily on radical innovations (KATILA, 2000) therefore this method neglects other types of innovation activity. There are many research papers using patents as a measure of innovation performance (BASBERG, 1987; GRILICHES, 1990; PAVITT, 1988; SVENSSON, 2015). The economic impact of young and innovative firms is in the radical innovations that they bring to the market therefore this method is also dominant in the field of VC research (BERTONI – TYKOVA, 2012; CUMMING – JOHAN, 2016; ENGEL – KEILBACH, 2007; KORTUM – LERNER 2000; PENEDER, 2010). On this basis I applied patents as a measure of innovation performance in my dissertation similarly to the mainstream of international research papers.

Data regarding patenting activity was gathered via the online database of Hungarian Intellectual Property Office. Regarding the registration time of patent applications the patents were distinguished; firms with patent application prior to investment were separated from those firms that registered their patents after VC investment. In the analysis a firm is considered to be innovative if it has a patent application.

Regarding the measurement of radical innovations patent application is a soft criterion. The success of the innovation and its business potential could be measured more accurately via patent citations (KATILA, 2000, SVENSSON, 2015). Unfortunately, at present the lifespan of the patents is too short for investigations using patent citations as a measure, therefore the emphasis is on patent applications in my dissertation. Regarding this method it must be noted that it is not capable to measure the wide range of innovation activities. Organizational, marketing, service innovations that could be measured via surveys cannot be expressed with this method. Results of this dissertation are only comparable to studies that focus on radical innovations.

2. DATABASE AND METHODOLOGY

2.1. Database

The basis of empirical research is a unique database. Although there are studies reporting aggregated data regarding the investments (MNB, 2015, DELOITTE, 2016; EQUINOX, 2016; SZÁZADVÉG, 2016), there is no database reporting micro level data about the invested firms. In order to solve this problem I created a database that contains the unique data of invested firms by identifying and observing them.

The empirical research includes those Hungarian based enterprises that obtained capital since 2010 within the framework of JEREMIE. The research covers 340 investments². Apart from GVC backed investments these enterprises cover almost entirely the Hungarian VC market in the given period³. Within the framework of JEREMIE 28 funds were created and approximately 132 billion HUF became available for Hungarian firms in form of VC in 2010-2016. Invested firms were identified via the data provided by the investors and gathered via the Company Registration Office. Those firms were included in the database where a JEREMIE fund was a member of the owners⁴. This way the whole population of invested firms is covered by the research.

Since 2012 Széchenyi Capital Fund (SCF) has become an important part of Hungarian VC industry. While the investment period of JEREMIE is over in the time of the publication of this dissertation, the SCF is still making new investments⁵ therefore the whole population of these investments could not be observed. Those firms are represented in the database, where the investment was made until the end of 2017 which is the last economic year closed with financial statements. The analysis covers 86 GVC backed firms. The firms were identified based on the information publicized

² Investment in this sense covers the relationship of an invested firm and a given VC investor. It is considered to be 1 investment if the firm receives funding from the same investor in multiple funding rounds. On the other hand if 1 enterprise receives funding from multiple investors than it is accounted for 2 different investments.

³ 70% of all capital contributions were provided by JEREMIE funds since 2010. The remaining part was connected to Széchenyi Capital Fund (MNB, 2015).

⁴ In the Company Registration Office the investments of JEREMIE funds were supervised yearly in every August since 2013.

⁵ The investment period is expected to be over in 2025.

by the Széchenyi Venture Capital Fund Management. The financial data of enterprises were gathered based on the financial reports of invested firms; the database covers the economic years from 2010 to 2017. The database has cross sectional and time dimensions as well therefore a panel database was created.

2.2. Methodology and the models

The research questions of the dissertation were tested via random effect panel regression models. The business potential of firms is measured based on their revenues; revenues indicate how successful the company is in its market entry. Meagre revenues might indicate the lack of demand for the firms' activity. In case of government backed agendas VC's effect on employment also plays an important role. The effects of GVC and HGVC will be tested with the following regression models.

$$\begin{aligned}
 & \ln Sale_{i,t} / Growth \ln Sale_{i,t} \\
 & = \beta_0 + \beta_1 HGVC_i + \beta_2 haspatent_i + \beta_3 \ln Assets_{i,t} \\
 & + \beta_4 \ln Age_{i,t} + \beta_5 FinAssIntensity_{i,t} \\
 & + \beta_6 IntangibleIntensity_{i,t} + \beta_7 \ln VCapital_{i,t} \\
 & + \beta_8 ownership_{i,t} + \beta_9 experience_t \\
 & + \beta_{10} \ln Sale_{i,t-1} + Industry_i + Time_i + u_{i,t} + \varepsilon_{i,t}
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 & \ln Employ_{i,t} / Growth \ln Employ_{i,t} \\
 & = \beta_0 + \beta_1 HGVC_i + \beta_2 haspatent_i + \beta_3 \ln Assets_{i,t} \\
 & + \beta_4 \ln Age_{i,t} + \beta_5 FinAssIntensity_{i,t} \\
 & + \beta_6 IntangibleIntensity_{i,t} + \beta_7 \ln VCapital_{i,t} \\
 & + \beta_8 ownership_{i,t} + \beta_9 experience_t \\
 & + \beta_{10} \ln Employ_{i,t-1} + Industry_i + Time_i + u_{i,t} + \varepsilon_{i,t}
 \end{aligned} \tag{2}$$

The models are specified based on EVANS (1987) who created his model in order to measure firms' growth. This form is widely used in the field of VC research (GRILLI – MURTINU, 2014). The original model of EVANS (1987) was modified in order to fit the specifics of the database and research questions of this dissertation.

The business potential is measured with the revenues (*'Sale'*) and the effect on employment is measured with the number of employees (*'Employment'*). The dependent variable is the logarithm of these variables. The growth is measured with the differences of the logarithms of revenues and employees between *'t'* and *'t-1'* time periods.

Regarding the research questions the most important independent variable is *'HGVC'* which is a dummy that takes value 1 if the firm is funded by a hybrid fund and 0 if it is financed by SCF. If the variable is significant than the different forms of government backed VC have different effects on invested firms. If the coefficient is positive than HGVC backed firms outperformed their GVC backed peers while a negative coefficient indicates the better performance of GVC.

In hypothesis 5 variable *'lnownership'* plays the key role. Hypothesis 5 says that the ownership gained by investors has an inverse relationship with the firms' business potential. If this hypothesis stands than the coefficient of the variable must be negative. According to the hypothesis the ownership structure signals the quality of the firm. The higher proportion of ownership the entrepreneurs are willing to offer for investors, the less potential they see in their own firm. Hypothesis 5 can be accepted if the coefficient of *'lnownership'* is significant and negative.

Hypothesis 6 indicates that the firms pursuing radical innovation activities are able to generate higher growth. Innovation appears in the model via the *'haspatent'* variable. This is a dummy that takes value 1 if the firm has a patent and 0 if not. Hypothesis 6 can be accepted if this variable has a significant and positive coefficient.

In the models *'Industry'* dummies control for the differences caused by the different activities. Firms categorized according to their main field of activity in line with the national industry classification. The activity of firms is controlled with other variables as well. The variables are the intensity of intangible assets (*'IntangiblesIntensity'*) and financial assets (*'FinAssIntensity'*). These variables are the ratios of intangibles or financial assets and the fixed assets. The intensity of financial assets has an important role as it controls for the outsourcing of activities to subsidiary companies. If the firms follow this practice, than the ratio will have

a high value. The dominance of intangibles amongst fixed assets might indicate that the firm is prior to market entry. After market entry the high value of the variable might indicate the knowledge intensive nature of the activity.

The effect of the investment year is controlled by ‘*Time*’ dummies that express the year of investment. In the model further control variables were built in, such as the logarithm of total assets (*lnAssets*), the age of firm (*lnAge*) and the size of investment (*lnVCapital*). Controlling for the age and size of firms is important in order to handle the possible differences that derive from the regulation of government backed agendas.

In modelling the growth of revenues and employment it is reasonable to assume that these variables are dependent on their lagged values. It is especially true in case of revenues as a proportion of invested firms are prior to market entry or they have a short sales history, while other firms has more substantial record in this field. For this purpose the one period lag of the revenue’s logarithm (*lnSale_{t-1}*) is built into the model, while in the model focusing on the growth of employment the one period lag of the number of employee’s logarithm (*lnEmploy_{t-1}*) is represented.

In terms of innovation the key variable is the previously mentioned ‘*haspatent*’ dummy. As the variable is binary hypothesis 7 is tested with a binary logit model what is specified with the following equation:

(3)

$$\begin{aligned}
 & \textit{logit}(\textit{haspatent}) \\
 & = \beta_0 + \beta_1 \textit{HGVC} + \beta_2 \textit{ownership} + \beta_3 \textit{Age} + \beta_4 \textit{lnVCapital} \\
 & + \beta_5 \textit{experience} + \textit{Industry}_i + \textit{Time}_i + \varepsilon_i
 \end{aligned}$$

3. RESULTS AND CONCLUSIONS

3.1. The conceptual framework of hybrid venture capital

The increased activity in the Hungarian VC market is a new phenomenon. From a researcher's point of view this provides a chance to carry out research based on such extensive populations that would have been impossible previously because of the scarce activity. The appearance of SCF in 2012 increased further the available capital and the number of investments. The motivation for writing my dissertation with this subject is given by the new phenomenon of the vibrant Hungarian VC market that was created by government funds. This raised numerous questions that are yet unanswered because of the novelty of the phenomenon.

The research questions were partially predestined by market characteristics as the increased activity of market is the result of government intervention. Therefore the effects of the different forms of direct government interventions on the invested firms are in the centre of the dissertation. Following this line of thought I compared the performance of GVC and HGVC backed firms based on Hungarian evidence. The foundation of the research was the theoretical model that I created based on international evidence and on the synthesis of literature regarding the different forms of government backed VC. The conclusions of the conceptual models and the features of the investments were examined empirically as well based on the investments made by Hungarian HGVCs and the GVC in 2010-2016.

Based on international evidence private backed VC (PVC) proved to be a more efficient funding form than its government backed peers. The foundation of PVC is given by the special expertise of investors and the private interests of the participants that GVC cannot imitate. HGVC was created partially in order to mend these shortcomings by involving private participants and interests. The conceptual framework of HGVC showed that the appearance of private interests leads to the conflicted interests of private and public participants. The participation of private actors and their interests might lead to actions that are not consistent with economic policy goals. The assumption of the model is that if the entrepreneurial ecosystem would be able to generate viable

investment targets than private investors would be willing to participate in their funding even without government interventions. If the industry is in the need of government support than funding those firms that are targeted by government agendas is not consistent with the interests of private participants. The function of incentives built into the funding scheme of HGVC is to bridge the gap of the expected and perceived returns that private investors associate to the targeted firms.

The economic benefits of incentives give the primary motivation for private participants. In their absence they would not appear in the market of the targeted firms. The utility of investors could be maximized if they are able to enjoy the benefits of incentives by taking part in the agendas while they use the funds for making such investments that are the most beneficial for them according to their perceptions. At this point the goal of government intervention and the interest of private participants become conflicted that creates inconsistency in the model of HGVC. Captive funds - where the LPs and GPs are not independent - represent a specific case of this problem. In their case, it is possible to internalize the economic benefits of incentives and therefore to gain profits without real business successes or fulfilling the economic policy goals. As a result the appearance of private interests does not lead automatically to a more efficient funding scheme compared to GVC; it depends on the regulation, incentives and on the program level transparency.

With proper regulation the appearance of private participants might lead to a better funding solution for young and innovative firms in the form of HGVC than GVC. On the other hand HGVC is more exposed to moral hazards. If the incentive scheme, investment policy and transparency of agendas are not regulated properly, in the short run, the inconsistency of HGVCs might lead to even higher misallocation of capital than GVCs.

3.2. The effects of HGVC on the invested firms' growth

In the following sections I present the major results of my research in line with my hypotheses. Table 1 introduces the results of the model (specified in equation 1) investigating the revenues and the growth of revenues. Table 2 presents the results of the model

(specified in equation 2) investigating the number of employees and its growth.

Table 1: Random effect regression models investigating the revenues and the growth of revenues of the Hungarian investments made by JEREMIE and SCF in 2010-2016

Linear random effect regression models				
	GLS random effect estimation		Maximum Likelihood random effect estimation	
	lnSale ^{***}	Growth lnSale ^{***}	lnSales ^{***}	Growth lnSale ^{***}
HGVC	-1.235 ^{***} (0.291)	-1.078 ^{***} (0.332)	-1.134 ^{***} (0.334)	-0.945 ^{***} (0.362)
haspatent	-0.006 (0.401)	0.078 (0.400)	-0.015 (0.434)	0.036 (0.468)
lnownership	-0.684 ^{***} (0.214)	-0.524 ^{**} (0.212)	-0.659 ^{***} (0.197)	-0.529 ^{**} (0.211)
lnAssets	0.758 ^{***} (0.091)	0.780 ^{***} (0.105)	0.719 ^{***} (0.088)	0.721 ^{***} (0.096)
lnAge	-0.872 ^{***} (0.214)	-0.736 ^{***} (0.274)	-0.900 ^{***} (0.224)	-0.704 ^{***} (0.278)
FinAssIntensity	-2.396 ^{***} (0.483)	-2.807 ^{***} (0.500)	-2.407 ^{***} (0.349)	-2.712 ^{***} (0.391)
IntangibleIntensity	0.242 (0.374)	0.155 (0.377)	0.162 (0.294)	0.110 (0.327)
lnVCcapital	-0.005 (0.142)	-0.029 (0.157)	-0.009 (0.130)	-0.020 (0.142)
lnSale _{t-1}	0.518 ^{***} (0.028)	-0.487 ^{***} (0.034)	0.553 ^{***} (0.033)	-0.442 ^{***} (0.037)
cons	-2.500 [*] (1.449)	-2.578 [*] (1.600)	-2.206 (1.423)	-2.467 (1.628)
Industry dummies	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes
R ²	0.622	0.271		
sigma_u	1.248	1.420	2.907	1.192
sigma_e	2.407	2.186	2.470	2.507
rho	0.212	0.297	0.581	0.184
observations	1051	811	1051	811
groups	408	333	408	333

Note: The ^{***}, ^{**}, ^{*} notation means that the variable is significant on 99%, 95% and 90% level.

The table presents the coefficients while in the brackets there are the robust standard errors of the estimated coefficients.

The first years of the firms were eliminated if the year of foundation and investment were the same as in these cases revenues did not cover a full economic year.

Source: Own compilation

Table 2: Random effect regression models investigating employment and the employment's growth of the Hungarian investments made by JEREMIE and SCF in 2010-2016

Linear random effect regression models				
	GLS random effect estimation		Maximum Likelihood random effect estimation	
	lnEmploy^{***}	Growth-lnEmploy^{***}	lnEmploy^{***}	Growth-lnEmploy^{***}
HGVC	- 0.365 ^{***} (0.084)	-0.354 ^{***} (0.085)	-0.300 ^{***} (0.066)	-0.243 ^{***} (0.085)
haspatent	-0.020 (0.133)	-0.033 (0.134)	-0.046 (0.112)	-0.078 (0.098)
lnownership	-0.180 ^{***} (0.057)	-0.181 ^{***} (0.057)	-0.152 ^{***} (0.050)	-0.126 ^{**} (0.051)
experienced	-0.011 ^{**} (0.005)	-0.012 ^{**} (0.005)	-0.013 (0.009)	-0.014 (0.009)
lnAssets	0.095 ^{***} (0.027)	0.093 ^{***} (0.026)	0.093 ^{***} (0.019)	0.089 ^{***} (0.018)
lnAge	-0.199 ^{***} (0.053)	-0.179 ^{***} (0.053)	-0.208 ^{***} (0.050)	-0.204 ^{***} (0.052)
FinAssIntensity	-0.509 ^{***} (0.112)	-0.483 ^{***} (0.114)	-0.492 ^{***} (0.087)	-0.442 ^{***} (0.084)
IntangibleIntensity	-0.025 (0.086)	-0.013 (0.082)	-0.036 (0.068)	-0.038 (0.065)
lnVCapital	0.103 ^{***} (0.038)	0.106 ^{***} (0.038)	0.082 ^{**} (0.033)	0.065 [*] (0.034)
lnEmploy _{t-1}	0.574 ^{***} (0.033)	-0.420 ^{***} (0.034)	0.673 ^{***} (0.066)	-0.243 ^{***} (0.080)
cons	-1.198 ^{***} (0.370)	-1.270 ^{***} (0.378)	-1.034 ^{***} (0.362)	-0.910 ^{**} (0.368)
Industry dummies	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes
R ²	0.733	0.139	-	-
sigma_u	0.433	0.434	0.362	0.246
sigma_e	0.445	0.443	0.549	0.587
rho	0.486	0.489	0.303	0.150
observations	1052	1035	1052	1035
groups	409	407	409	407

Note: The ^{***}, ^{**}, ^{*} notation means that the variable is significant on 99%, 95% and 90% level. The table presents the coefficients while in the brackets there are the robust standard errors of the estimated coefficients.

Source: Own compilation

Based on Hungarian evidence the hypothesis that HGVC backed firms are able to generate higher growth must be rejected in cases of revenues and employment as well. 'HGVC' appears in all

of the models with a negative coefficient that are significant at least on 99%. The results of the models suggest that HGVC backed firms showed a poorer performance in the investigated aspects than their GVC backed peers. Therefore the conclusion is the opposite of what was stated in the hypotheses. Regarding the Hungarian HGVC's and GVC's effect on growth the following conclusions can be made in the order of hypotheses:

1: Based on Hungarian evidence HGVC backed firms are less successful in the market in terms of their revenues than their GVC backed peers.

2: Based on Hungarian evidence GVC backed firms are able to achieve higher employment than their HGVC backed peers.

3: Based on Hungarian evidence GVC backed firms are able to generate higher growth in their revenues than their HGVC backed peers.

4: Based on Hungarian evidence GVC backed firms are able to generate higher growth in their number of employees than their HGVC backed peers.

The conclusions do not express the general dominance of GVC over HGVC; they contain the results of two specific realizations of the given funding models. The results of the models on the other hand points out that from two parallel government backed programs GVC is not necessarily dominated by HGVC. The results are led not only by the effects of the different funding structures but also by the specific regulation that formulated these realizations of the funding schemes.

Firms funded by HGVCs generated lower growth than their GVC backed peers according to the regression models. The market entry measured by revenues was affected significantly and negatively by HGVC compared to GVC. Regarding the number of employees the negative effect of HGVC was also significant. Either measured by revenues or by the number of employees the firms' growth was lower in case of HGVC backed firms than in GVC financed firms.

The reason of the relatively poor performance of the HGVC model's Hungarian realization is partially that the parameters of the

agenda were not fitting to the characteristics of the market in many aspects. The capital absorption potential of Hungarian young and innovative firms fell behind the increased supply of VC. On the demand side there were not enough firms with the necessary qualities that could have enabled the efficient use of capital that was managed within the framework of the agenda. The demand side was not ready to obtain the increased capital but on the supply side VC firms were ready for managing these funds neither. There were numerous new entrants on the market who did not have a relevant history regarding VC investments. As a result the previously small circle of investors expanded and the concentration of the industry knowledge was diluted. Regarding the regulation the territorial restrictions, the limitation of investment size, the pressure of capital disbursement proved to be such criteria that were not consistent with market needs.

The efficiency of HGVC scheme was influenced greatly by the relationship of the VC firms and the limited partners. In most cases VC funds were set up in captive form rather than in the form of independent financial intermediation, which is the typical form of PVC. As a result of principal-agent relationship that evolves between general partners (GP-s) and limited partners (LP-s) PVC model uses several control mechanisms and risk management techniques in order to manage the possible problems deriving from this relationship. These features have a great contribution to the efficiency of PVCs but they cannot evolve in case of captive funds. The poor performance of HGVC is partially the result of the dominance of captive funds in the Hungarian market.

It must be emphasized that the results of the empirical research cannot be generalized to the schemes of HGVC and GVC as depending on their specific regulation they could have various actual realizations. On the other hand these results are indicative regarding the relationship of regulation and market characteristics.

3.3. Signalling of business potential by capital – The relationship of firms' growth and the ownership gained by VCs

Regarding the capital structure of invested firms it is surprising that HGVCs gained majority ownership in most of their investments. Hypothesis 5 was formulated in face of this fact.

Models describing growth, innovation, revenues and employment supported the hypothesis that the high ownership stake gained by venture capitalists is the indicator of poorer performance. In the presence of information asymmetries the actions of economic actors indirectly signals those features of firms that cannot be observed directly. In case of equity financing according to the signalling theory the higher ownership stake the entrepreneurs are willing to hand over to investors the lower business potential they see in their firms.

Information provided by the capital structure of firms has an important role in signalling business potential when information asymmetries are present. As hypothesis 5 was accepted the theory regarding the signalling of capital structure was supported; capital structure provides information regarding the quality of the invested firms in VC funding. The higher ownership is gained by venture capitalists the lower the quality of the firm is. Therefore the signalling effect of capital structure was strengthened.

3.4. The relationship of innovation performance and firms' growth

Regarding the performance of invested firms the assumption was that innovative firms have higher business potential. This assumption was stated in hypothesis 6.

In face of empirical evidence hypothesis 6 must be rejected as innovation activity measured by patents had no significant role in any of the model specifications. In the first year of the investments firms with patents had higher revenues and employment but after that their growth rate does not exceed the growth rate of those VC backed firms that do not have patents.

The results are consistent with international evidence. Innovation is not an inevitable element of growth especially in those industries that are not close to the technological frontier. In terms of the Hungarian and regional growth innovation is not a criterion.

3.5. Innovation performance

Spurring innovation is one of the major reasons behind government backed VC agendas. Although not unambiguously, but international evidence support the positive effect of PVC on innovation, while in

case of government backed initiatives such positive effect could not be observed. The spurring effect of VC on innovation might be realized in two ways; with the funding of corporate R&D and the early stage of innovation process or by supporting the delivery of an already finished innovation to the market.

Table 3: Logit models investigating the innovation performance of the Hungarian investments made by JEREMIE and SCF in 2010-2016

Logit model		
	logit(haspatent) Specification 1***	logit(haspatent) Specification 2***
HGVC	-1.273 (0.84)	-
ownership	-2.871** (1.33)	-3.313*** (1.19)
age	-0.320** (0.14)	-0.278** (0.14)
lnVCapital	0.283 (0.17)	
Y_2010	1.942* (1.00)	2.062*** (0.81)
Y_2011	2.410*** (0.76)	2.804*** (0.68)
Y_2012	1.741** (0.79)	1.971*** (0.68)
Y_2013	0.578 (1.03)	1.286* (0.75)
Y_2014	-0.989 (-0.92)	-
Y_2015	-0.711 (1.00)	-
cons	-18.655*** (2.82)	-18.224*** (1.37)
Industry dummies	yes	yes
pseudo R ²	0.326	0.281
Akaike IC	155.78	154.09
observations	418	418

Note: The ***, **, * notation means that the variable is significant on 99%, 95% and 90% level. The table presents the coefficients while in the brackets there are the robust standard errors of the estimated coefficients.

Source: Own compilation

Table 3 presents the results of the logit model describing the effects of the independent variables on the likelihood of being innovative in case of VC backed firms⁶. Specification 1 contains more independent variables that are closely connected to the research hypotheses. In specification 2 the insignificant variables of the first specification were eliminated.

Regarding the type of government intervention '*HGVC*' variable do not have a significant role in the model which indicates that there is no significant difference between the innovation spurring effect of *HGVC* and *GVC*. Both forms have an approximately equally low proportion of innovative firms.

Furthermore, the model highlights other aspects of investments. The coefficients of time dummies were presented separately as 2010, 2011 and 2012 had a significant and positive effect. In the early years of the programs there was a higher likelihood of funding innovative firms. These results were led by the low number of innovative firms in the Hungarian entrepreneurial ecosystem; in the beginning innovative firms were able to receive funding but in the latter parts of the programs the pool of innovative firms was depleted.

The low radical innovation performance of Hungarian venture capital is the symptom of the country's low innovation capabilities. It must be emphasized that VC – either private or government backed – is a part of the startup ecosystem. Therefore the performance of VC cannot be evaluated separately without taking into consideration the characteristics of the entrepreneurial ecosystem. All research papers examining the innovation performance of Hungarian enterprises agree that the Hungarian entrepreneurial ecosystem's innovative capabilities are weak in an international comparison. Developing a specific element of this ecosystem not necessarily leads to higher performance. We can witness this process in case of the Hungarian VC market as one element of the startup ecosystem enjoyed substantial support while the other elements of the ecosystem did not went through on a similar development. The support of VC and the increase of government funding might lead to the actual improvement of

⁶ The aim of the model is to determine the effect of specific variables on the likelihood of being innovative. The model cannot be used for predictive estimations.

performance if the other elements of the ecosystem are able to produce young and innovative firms in the required number and quality. In its absence, although the oversupply of capital might have a developing effect on the other elements of the startup ecosystem but it does not lead to the direct improvement of the targeted firms.

4. FINDINGS AND THESIS STATEMENTS

In my research I created the conceptual framework of hybrid venture capital funding that revealed the inconsistencies in this funding model. The conflict of economic policy goals and private interests increases moral hazards therefore the possible market distortions caused by the government interventions. *Thesis 1* describes this finding.

Thesis 1: In hybrid venture capital funding the goals of participants is in conflict that leads to inconsistency in its model. The efficiency of the scheme is not driven by the interests of private participants; it depends on the regulation, incentive scheme and the program level transparency.

In the empirical research I compared the performance of hybrid and purely government backed venture capital funds' performance based on Hungarian evidence. The results led to *thesis 2*.

Thesis 2: Based on Hungarian evidence hybrid venture capital proved to be a less efficient funding form than purely government backed venture capital in spurring the growth of firms.

In my research I studied the role of innovation in venture capital backed firms' growth. *Thesis 3* summarizes the results.

Thesis 3: Based on Hungarian evidence radical innovation (measured by patents) is not a criterion for growth amongst venture capital backed firms. Firms with patents were not able to generate higher growth than those firms that did not have patent.

Thesis 4 describes the relationship of capital structure and business potential via analysing the role of the ownership stake gained by venture capitalists.

Thesis 4: The ownership stake offered by entrepreneurs/gained by venture capitalists provides information about firms' business potential for market participants. The higher ownership stake gained by the venture capitalists the lower the firms' quality is.

In my dissertation I examined whether hybrid or purely government backed venture capital investments were able to

generate higher innovation performance. *Thesis 5* summarizes the results.

Thesis 5: Based on Hungarian evidence there is no significant difference between the innovation performance (measured by patents) of hybrid and purely government backed venture capital investments. Venture capital backed firms were bed in the Hungarian entrepreneurial system that shows meagre innovation performance.

5. PRACTICAL USE OF RESEARCH FINDINGS

Hungarian evidence of HGVC gives a less favourable picture about this funding form. On the other hand the generalization of these results would be a serious mistake. Thesis 1 describes the inconsistency of hybrid venture capital's conceptual framework. Its extent and negative effects depend on the specific regulation of agendas. The empirical research based on Hungarian data examined two specific realizations of the funding schemes therefore it highlights the shortcomings of the agendas' design and regulation rather than the general dominance of GVC over HGVC. In my opinion HGVC might have a positive contribution to the development of the industry in its early stages if the agendas are designed in line with the following points.

Designing and implementing government backed venture capital agendas is on the agenda on domestic and international level as well. In order to create successful agendas in the future it is inevitable to build on the evidence and experience gained by previous initiatives. This way the regulation might fit better to market needs. At the end I would like to summarize those recommendations that might contribute to the more efficient design of future agendas.

International and Hungarian evidence strengthen the notion that the enterprises targeted by VC have limited capital absorption capabilities. In case of VC the more is not necessarily the better. Prior to the increased level of government participation there was only scarce activity on VC market and the number of potential investment target could not be estimated properly. On the other hand as a result of oversupply of capital we have a clearer picture of the potential size of market. On the Hungarian market there were a high number of firms seeking VC, but the number of those firms that were able to use the capital efficiently fell behind the level that was required by the increased capital. Therefore in the future the implementation of agendas that are smaller in scale and more concentrated is preferable. This way the investors would have more possibilities for the selection of invested firms, which is the essential part of VC's value creation.

In the implementation of the government backed programs huge emphasize must be put into their connections and synergies. In

this sense there is a specific role of the relationship of seed, early and expansion VC funds. Funds focusing on different stages of firms lifecycles are able to improve the demand for each other. Successful seed investments could be able to obtain capital from early and expansion funds. If firms in the beginning of their life cannot obtain capital than the funds focusing on latter stages will not have adequate demand. On the other hand, if the firms cannot obtain capital in their latter stages than even those firms will be stuck in their development which are viable investment targets. In its absence seed funding cannot be efficient. In case of JEREMIE this order was not consequent but in the future special emphasize must be put into the synergies of the agendas.

The conceptual framework of hybrid venture capital funding revealed the inconsistencies in the funding model. The conflict of economic policy goals and private interests increases moral hazards therefore the possible market distortions caused by the government interventions. The regulation must focus on these issues. In my opinion the propagation of the scheme of independent private funds would be a step forward compared to the current practice where captive funds are dominant amongst HGVCs. In the selection of fund managers those VC firms should be prioritized that are able to obtain private funding from an independent third party. This way those control mechanism and risk management techniques could evolve that has a great contribution to the efficiency of PVC model.

My final recommendation refers to the incentive scheme of HGVC. In order to make targeted firms appealing it is inevitable to build in incentives into HGVCs. On the other hand the extended use of these incentives might lead to market distortions. In the past Hungarian HGVC agendas used a variety of incentives. The high level of incentives is parallel to the increased capital managed within the framework of the agenda; the high amount of capital can be secured only with an extensive incentive scheme. In my opinion – in consensus with the first recommendation – programs managing less capital suited for the demand of VC could be more fruitful. In a parallel way the level of incentives could be decreased because there would be a higher competition of VC firms for the right to manage public funds.

In the end I have to mention that the active Hungarian VC market is a new phenomenon therefore it is under constant change

and evolution. Through the eyes of a researcher it is an opportunity to examine the evolution of the market. I believe that in the future the field of the currently active investments' exits could be a fruitful area of research. Although information regarding the exits are confidential in most cases, the research of the types of exits and their determinants could expand our existing knowledge in the field of Hungarian VC.

Regarding future research I would like to reflect to the title of my dissertation. I examined the mechanism and effect of government backed VC but in a well-developed industry life does not exist only beyond the market. If the market characteristics make it possible a logical continuation of the current research could be the comparison of government backed firms with their private venture capital backed peers.

REFERENCES

- Basber, B. L. (1987): Patents and the measurement of technological change: A survey of the literature. *Research Policy*. Vol. 16. No. 2-4. pp. 131-141.
- Becsky-Nagy Patrícia (2016a): The special aspects of venture capital's value creating mechanisms in Hungary. *Journal of Entrepreneurship Management and Innovation*. Vol. 12. No. 6. pp. 31-56.
- Becsky-Nagy Patrícia – Fazekas Balázs (2015a): Befektetés vagy tanulópénz? – Az uniós és állami források hatása a magyarországi kockázati tőke-piac fejlődésére. *Pénzügyi Szemle*. Vol. 60. No. 2. pp. 243-253.
- Bertoni, F. – Tykova, T. (2012): Which Form of Venture Capital is Most Supportive of Innovation?. ZEW- Centre for European Economic Research Discussion, Paper No. 12-018
- Cressy, R. (2002): Funding Gaps: A Symposium. *The Economic Journal* 112 (477): F1 - F16
- Cumming, D.J. – Johan, S. A. (2016): Venture's Economic Impact in Australia. *Journal of Technology Transfer*. Vol. 41. No. 1. pp. 25-59.
- Da Rin, M. – Hellmann, T. F. – Puri, M. (2011): A survey of venture capital research. NBER Working Paper Series. National Bureau of Economic Research. Cambridge 2011. október
- Deloitte (2016): MFB Zrt. részére a 3-as tematikus célkitűzéshez kapcsolódó ex-ante tanulmány. Deloitte Zrt., Budapest, április 1.
- Engel, D. – Keilbach, M. (2007): Firm-Level Implications of Early Stage Venture Capital Investment: An Empirical Investigation. *Journal of Empirical Finance*. Vol. 14. No. 2. pp. 150–167.
- Evans, D. (1987): The Relationship between Firm Growth, Size, and Age: Estimates for 100 Manufacturing Industries. *Journal of Industrial Economics*. Vol. 35. No. 4. pp. 567-81.
- Equinox Consulting (2016): Kockázati tőke-programok eddigi eredményeinek értékelése. Miniszterelnökség, Budapest, november 30.

- Fazekas Balázs (2014): Government interventions in the venture capital market – How Jeremie affects the Hungarian venture capital market?. *Annals of the University of Oradea Economic Sciences*. Vol. 2. No. 2. pp. 883–892.
- Gompers, P. A. (1995): Optimal Investment, Monitoring and Staging of Venture Capital. *The Journal of Finance*. Vol. 50. No. 5. pp. 1461-1489.
- Gompers, P. A. – Lerner, J. (1998): What Drives Venture Capital Fundraising?. *Brookings Papers on Economic Activity, Microeconomics*. pp. 149-192.
- Griliches, Z. (1990): Patent Statistics as Economic Indicators: A Survey. *Journal of Economic Literature*. Vol. 28. No. 4. pp. 1661-1707.
- Grilli, L. – Murtinu, S. (2014): Government, Venture Capital and the Growth of European High-Tech Entrepreneurial Firms. *Research Policy*. Vol. 43. No. 9. pp. 1523-1543.
- Hall, B. H. (2002): The Financing of Research and Development; University of California, Berkley, Department of Economics, Working Paper No. E01-311, 2002. január, 1-24.
- Karsai Judit (2012): A kapitalizmus új királyai. Kockázati tőke Magyarországon és a közép-kelet-európai régióban. *Közgazdasági Szemle Alapítvány, Budapest*, 248. p.
- Katila, R. (2000): Measuring innovation performance. *International Journal of Business Performance Measurement*, Vol. 2. No. 1/2/3. pp. 180-193.
- Kenney, M. (2011): How venture capital became a component of the US National System of Innovation. *Industrial and Corporate Change*. Vol. 20. No. 6. pp. 1677-1723.
- Kortum, S. S. – Lerner, J. (2000): Assessing the Contribution of Venture Capital to Innovation. *Rand Journal of Economics*. Vol. 31. No. 31. pp. 674-692.
- Lerner, J. (2003): Venture Capital and Private Equity: A Course Overview. *International Journal of Entrepreneurship Education*. Vol. 1. No. 3. pp. 359–384.

- Lerner, J. (2009): Boulevard of broken dreams: Why public efforts to boost entrepreneurship and venture capital have failed and what to do about it, Princeton University Press, Princeton
- Lerner, J. - Tag, J. (2013): Institutions and venture capital. Industrial and Corporate Change. Vol. 21. No. 1. pp. 153-182.
- Magyar Nemzeti Bank (2015): Elemzés a hazai kockázati tőkealapkezelők és alapok működéséről
- Mason, M. C. – Harrison, R. T. (1998): Stimulating Investments by Business Angels in Technology-based Ventures: The Potential of an Independent Technology appraisal service; In: Oakey, R. P. - Durning, W. (szerk.): New Technology-based firms in the 1990; Vol. 5, Paul Chapman, London
- Metrick, A. (2007): Venture Capital and the Finance of Innovation, John Wiley & Sons, New York.
- Murray, G. – Cowling, M. – Liu, W. – Kalinowska-Beszczyńska, O. (2012): Government co-financed ‘Hybrid’ Venture Capital programmes: generalizing developed economy experience and its relevance to emerging nations, Kauffman International Research and Policy Roundtable, Liverpool, 11-12 March 2012
- Pavitt, K. (1988): Uses and Abuses of Patent Statistics. In.: van Raan A. F. J. (szerk.) (1988) Handbook of Quantitative Studies of Science and Technology. Amsterdam: Elsevier Science Publishers.
- Peneder, M. R. (2010): The Impact of Venture Capital on Innovation Behaviour and Firm Growth. Venture Capital: An International Journal of Entrepreneurial Finance. Vol. 12. No. 2. pp. 83-107.
- Philpott, T. (1994): Banking and New Technology Small Firms: A Study of Information Exchanges in the Financing Relationship. In: Oakey, R. P. - Durning, W. (szerk.): New Technology-based firms in the 1990; Vol. 5, Paul Chapman, London
- Svensson, R. (2015): Measuring Innovation Using Patent Data. IFN Working Paper No. 1067. Research Institute of Industrial Economics
- Századvég (2016): Pénzügyi eszközök értékelése. Századvég Gazdaságkutató Zrt., Budapest, november 30.



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Articles, studies (10)

1. Becsky-Nagy, P., **Fazekas, B.**: Résen van-e az állam? Az állami szerepvállalás hatása a kockázati tőke keresleti oldalára.
Közgazdasági Szemle. 64 (5), 507-527, 2017. ISSN: 0023-4346.
DOI: <http://dx.doi.org/10.18414/KSZ.2017.5.507>
2. Becsky-Nagy, P., **Fazekas, B.**: Mennyit ér a kockázati tőke?: Összehasonlító elemzés a kockázati tőke hozamairól.
Marketing és Menedzsment. 50 (3-4), 43-52, 2016. ISSN: 1219-0349.
3. **Fazekas, B.**: Értékteremtő bizonytalanság: A kockázati tőke reálopciók megközelítése.
Hitelintézési Szemle. 15 (4), 151-166, 2016. ISSN: 1588-6883.
4. Becsky-Nagy, P., **Fazekas, B.**: Befektetés vagy tanulópénz? Az uniós és állami források hatása a magyarországi kockázati tőke-piac fejlődésére.
Pénzügyi Szemle. 60 (2), 243-253, 2015. ISSN: 0031-496X.
5. **Fazekas, B.**, Becsky-Nagy, P.: Private equity market in recovery.
Procedia Economics and Finance. 32, 225-231, 2015. ISSN: 2212-5671.
6. Becsky-Nagy, P., **Fazekas, B.**: Speciális kockázatok és kezelésük a kockázati tőke-finanszírozásban.
Vezetéstudomány. 46 (3), 57-68, 2015. ISSN: 0133-0179.
7. **Fazekas, B.**, Becsky-Nagy, P.: The role of venture capital in the bridging of funding gaps: a real options reasoning.
Analele Universității din Oradea. Științe economice = Annals of University of Oradea. Economic science. 24 (1), 825-830, 2015. ISSN: 1222-569X.
8. **Fazekas, B.**: Government interventions in the venture capital market - How JEREMIE affects the Hungarian venture capital market?
Analele Universității din Oradea. Științe economice = Annals of University of Oradea. Economic science. 23 (1), 883-892, 2014. ISSN: 1222-569X.





9. Becsky-Nagy, P., **Fazekas, B.**: Returns of private equity: comparative analyses of the returns of venture capital and buyout funds in Europe and in the US.
Analele Universității din Oradea. Științe economice = Annals of University of Oradea. Economic science. 23 (1), 820-827, 2014. ISSN: 1222-569X.
10. Becsky-Nagy, P., **Fazekas, B.**: Állami szerepvállalás a technológia-orientált kisvállalkozások finanszírozásában.
Controller info. 2 (2), 17-20, 2014. ISSN: 2063-9309.

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