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## **Venture capital and exporting: Some evidence from Visegrad Group countries and implications for Poland**

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### **Abstract**

Venture capital funds are considered an innovative source of financing for small and medium-sized enterprises (mainly those in a seed or startup stage). The main point of these funds is to provide the firm with capital in exchange for shares. The research problem taken up in the article concerns the identification of the impact of venture capital funds on the development of businesses' exporting in the Visegrad countries. The aim of this article is to present the results of the research on the correlation between the share of venture capital funds in GDP and the export growth in the Visegrad countries. It turns out that in the case of Poland there is a strong correlation between export growth and the share of venture capital funds financing early stage ventures in GDP.

**Keywords:** export, internationalisation, Visegrad Group, venture capital, financing

**JEL codes:** L26, F23

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### **INTRODUCTION**

Venture capital (VC) funds are considered an innovative source of financing for small and medium-sized enterprises (SMEs), mainly those in the seed or the startup stage. The main point of these funds is to provide the firm with capital in exchange for shares. Additionally, the subject which invests in a given venture participates actively in the ongoing

development of the financed firm (Clercq, Manigart., 2007; Cumming, MacIntosh, 2003; Metrick, Yasuda, 2011). After a certain period of time, fund withdraws the capital committed and thus realizes a profit or loss from a given venture. There is a relatively small amount of research undertaken on the venture capital backed firms' internationalisation.

The research problem taken up in the article concerns the analysis of the impact of venture capital funds on the development of businesses' exporting in the Visegrad countries (V4 consists of the Czech Republic, Hungary, Slovakia and Poland). The aim of this article is to present the results of the research on the correlation between the share of venture capital funds in GDP and the export growth in the Visegrad countries. It must be stated that this paper is a very first step in the research advancement and it should be treated still as work in progress.

The article consists of two parts: the theoretical and empirical ones. The theoretical part discusses the aspects related to the essence of venture capital as a form of financing, as well as refers to research on the internationalisation of firms financed by these funds. The empirical part, based on the data obtained from international sources, calculates the correlation between export growth and the share of venture capital funds in GDP in each Visegrad country by using the Pearson correlation coefficient.

#### **BASIC TERMS FOR THIS STUDY: VENTURE CAPITAL AS A FORM OF FINANCING**

The demand for capital to finance innovative undertakings appeared for the first time in the 19th century. At that time, the demand for this type of financing was related to the ongoing industrial revolution in Western Europe and the United States (Węclawski, 1997). Firms had to face with numerous financial problems, therefore entrepreneurs were looking for alternative (external) sources of financing. During that time, the capital was mainly provided by rich families as well as banks (Węclawski, 1997). Currently private equity capital is more and more popular among new ventures and instant exporters (Kazlauskaitė, Autio, Šarapovas, Abramavičius, Gelbūda, 2015), and there are various types of such capital, for example (i) venture capital, (ii) various buy-outs, (iii) mezzanine capital, (iv) growth capital or (v) distressed investment (Rymarczyk, 2017, pp. 42-44).

In the selective literature review we are able to find plenty definitions of venture capital. Kowalczyk (1991) describes it as a high-risk capital. In turn Tamowicz (1995) considers venture capital funds to be medium- and long-term capital, which is invested mainly in various types of equity securities (ownership) or quasi-equity (concerns companies that are not listed on the stock exchange) in order to sell them at a higher price. Generally speaking, it can be concluded that the capital injected into a given firm has an equity share nature, but not a credit nature (debt), which results in the firm's financing subject becoming its co-owner at the same time (Tamowicz, 2004).

Two American economists, Aizenman and Kendall (2012), describe venture capital in similar way to Tamowicz (1995), but with the difference that it is mainly invested in private firms with high potential growth. Other American scientists Fenn, Layang, Pays and Johnson (Ivashko, Chulipa, 2016) identify venture capital with financing equity of small innovative enterprises, which have considerably greater potential from the very beginning of their activity (mainly in the early stage of the firm's development). This stands in line with Murray's study (1994), concluded in mid-1990s, stating that venture capital funds were particularly interested in high-growth firms (often in the seed or startup

stage) thereby it is not easy to obtain reliable information on their activities. Azarmi (2016), Wright, Lockett et al. (2002) present the same perception as Murray.

Among Polish researchers, Latusek-Jurczak (2013) defines venture capital as a high-risk capital and an important source of financing for new ventures. In turn, Bannock and Doran (1991) feel that venture capital are the main source of financing for small and medium-sized enterprises.

A very general definition of venture capital fund is proposed by EVCA<sup>1</sup>. According to its definition, venture capital is, strictly speaking, a subset of private equity and it refers to equity investments financing mainly ventures related to the startup, development or expansion of an enterprise (EVCA, 2007, 2017).

The great evolution of research on venture capital funds took place at the turn of the 20th and 21st century. Bergemann and Hege (1998) called venture capital the main source of startups funding. In many countries, mainly the United States, this capital finances activities at the frontier of science and knowledge. Due to their innovative nature, venture capital projects are inherently highly vulnerable to a high risk of failure. Several years later, empirical studies by Hellmann and Puri (2002) showed that companies financed by venture capital are more susceptible to staff changes than those which were not financed by such capital. According to these researchers, the founders of venture capital backed firms are pushed into the background, but the role of managing directors is taken over by people from outside the firm (often directly linked to the venture capital funds that have invested in a given firm). According to Wach (2005), attracting venture capital investments depends on a stable group of small and medium-sized enterprises, which generate more innovative ideas.

Landström (2007) argues that venture capital funds are an important link in promoting the growth of innovative firms, but Bygrave and Timmons (1992) identified two types of venture capital in their research: classic and merchant.

Venture capital funds invest mainly in small and medium-sized enterprises. With this support, they can develop their activities. Furthermore, they include financing at different stages of the undertaking's development such as (Rosa, 2008):

- **Seed stage** - venture capital funds are reluctant to finance projects at this stage of development, mainly due to the high level of the project's uncertainty.
- **Startup stage** - Venture capital funds are keen to invest in startups, their product development and initial marketing plans. At this development stage, the firm is experiencing difficulties in obtaining a bank loan because of its faint credit background.
- **Early stage** - the firm lacks the funds to enhance its position on the market and for further expansion. Venture capital funds investments are particularly concerned on enterprises at this stage of development, mainly due to the fact that a well-targeted investment offers great opportunities to significantly increasing value of an enterprise in a short period of time.
- **Late stage** - this is a stage in which the firm's value has already increased. At this stage of development, financial resources are usually needed for large investments. Nonetheless, these companies have rather limited access to venture capital.

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<sup>1</sup> The European Venture Capital Association (EVCA) was founded in 1983 and is located in Brussels. It represents the concerns of the European private equity sector by, among others, standard setting and researching the wider private equity sector (including venture capital). In 2015, the organisation changed its name to Invest Europe.

Investments in early-stage are considered to be a classic form of venture capital. These funds invest in young enterprises by introducing a professional system of managing a given venture, covering all management cycles (including the most basic ones). At the seed stage, the role of VC funds is limited to helping to develop a business idea before a product is introduced to the market, while at the startup stage, the role of VC funds is limited to helping to consolidate the market position of a given project. Early-stage projects are highly dependent on external resource providers due to the limited nature of their internal resource bases (Lockett, Wright, Burrows, Scholes, Paton, 2008).

### **PRIOR STUDIES LINKING VENTURE CAPITAL AND INTERNATIONALISATION**

Various empirical studies show that small and new enterprises may face problems with internationalisation mainly due to the lack of both human and financial capital resources (Bilkey, Tesar, 1977; Bonaccorsi, 1992; McDougall, Oviatt, 1996; Oviatt, McDougall, 1994; Westhead, Wright, Ucbasaran, 2001). Unfortunately, a handful of studies have been carried out on the internationalisation of venture capital backed companies. One of the first studies which concerns this issue took place in 2005, when a team of researchers George, Wiklund and Zahra (2005) analysed the importance of venture capital from a variety of perspectives. Researchers found out that equity ownership can influence the management's attitude towards the risk of internationalisation. In order to examine this relationship, they took into account the impact of internal and external equity ownership on the scale and range of internationalisation. Researchers discovered that external equity ownership is positively related to the range and scale of internationalisation measured by the number of countries in which a firm establishes export relations and the percentage of companies doing business on an international scale (George et al., 2005).

In turn, Zahra, Neubaum and Naldi (2007) examined the impact of the presence of venture capital in the firm's ownership structure on internationalisation. It turns out that with the increase of the share of venture capital in the ownership structure of the enterprise (measured by the share of venture capital in the total capital) the activity for building knowledge and improving technological assets increases. Therefore it can be concluded that the presence of export-oriented venture capital can increase the activity of enterprises in the context of generating and acquiring international knowledge.

Another study on the internationalisation of venture capital backed firms was carried out by a team of researchers from the University of Nottingham (UK). They analysed the export intensity of these companies depending on the development stage of the companies - early stage (including seed and startup stage) and late-stage (Lockett et al., 2008). They had put forward several hypotheses regarding the export activity of venture capital backed firms. In general, the researchers claim that the export intensity is the result of a strategic decision and is influenced by both the intellectual and financial capital of the firm. In their research, scientists also point out to the role of management as one of the sources that can influence the intensity of export and allocation of resources in the venture. Venture capital funds with internationalisation experience may be able to help the firm's management, in which they have invested, to select an appropriate strategy for entering foreign markets, which in turn will contribute to the growth of exports of these ventures (Lockett et al., 2008).

The team, consisted of scientists from the United States, has studied the impact of the knowledge and reputation of venture capital funds on the startups' internationalisation. Fernhaber and McDougall-Covin (2009) highlighted the importance of international knowledge, which can reduce both the cost of internationalisation and the reputation, that can benefit startups to operate worldwide.

Based on the review of prior studies in various parts of the globe, it is worth to verify the research hypothesis:

**H0:** There is a strong correlation between export growth and the share of venture capital funds financing early stage ventures in GDP of all four Visegrad countries.

In order to operationalized this statement was divided into four detailed hypotheses such as:

**H1:** There is a strong correlation between export growth and the share of venture capital funds financing early stage ventures in GDP in the Czech Republic.

**H2:** There is a strong correlation between export growth and the share of venture capital funds financing early stage ventures in GDP in Hungary.

**H3:** There is a strong correlation between export growth and the share of venture capital funds financing early stage ventures in GDP in Poland.

**H4:** There is a strong correlation between export growth and the share of venture capital funds financing early stage ventures in GDP in Slovakia.

## RESEARCH METHODOLOGY: DATA AND METHOD

### Data

Two main variables were used based on the secondary statistical data of OECD (2017) and the World Bank (2017) for the period of 5 years (2012-2016). These are:

1. **VCS** – share of value of money invested by venture capital funds in startup entrepreneurship in relation to GDP (in %),
2. **EXPG** – exports growth of a given country in relation to the previous period (in %).

**Table 1. Input Data**

Country		2012	2013	2014	2015	2016
Czech Republic	VCS	0,00008	0,00124	0,00189	0,00095	0,00241
	EXPG	4,27917	0,18694	8,65037	7,70282	4,27196
Poland	VCS	0,00138	0,00167	0,0028	0,00308	0,00394
	EXPG	4,58426	6,08237	6,67504	7,69389	9,01675
Slovakia	VCS	0,00000*	0,00000*	0,00226	0,00792	0,01232
	EXPG	9,30652	6,66477	3,65877	7,00066	4,76372
Hungary	VCS	0,05728	0,00916	0,0229	0,01997	0,02592
	EXPG	-1,79396	4,18262	9,8003	7,67055	5,78233

Legend: VCS - share of value of money invested by venture capital funds in startup entrepreneurship in relation to GDP [in %]. EXPG - exports growth of a given country in relation to the previous period [in %]. \* Due to lack of data, it was assumed that in a given year venture capital funds did not finance any projects.

Source: based on data from the OECD "Entrepreneurship at a Glance" (different years) and the World Bank (different years) reports.

## METHOD

For the purpose of this article, a correlation was calculated between the share of venture capital funds financing startups in GDP and the average growth of export levels in the Visegrad countries.

The statistical analysis of the interdependencies of the characteristics is based on the study of the properties of multidimensional distributions. Interdependencies can also be limited to the study of two features (Sobczyk, 2010), and then we are dealing with, among others, the linear correlation of Pearson.

Pearson's linear correlation coefficient can be used when measuring both the force and direction of a rectilinear compound, which includes two measurable features (Sobczyk, 2010). The distribution resulting from the analysis of two features is called two-dimensional distribution. In order to describe the aforementioned distribution numerically, we need to use measures that characterize both the total dispersion of value traits and the aggregation of individual points around a specific curve (Ostasiewicz, 2011).

A correlation coefficient shall be used to measure the concentration of points around a particular line:

$$r_{xy} = \frac{Cov(x, y)}{s_x s_y} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\left( \sum_{i=1}^n (x_i - \bar{x})^2 \right)^{\frac{1}{2}} \left( \sum_{i=1}^n (y_i - \bar{y})^2 \right)^{\frac{1}{2}}} \quad (1)$$

where:

$\bar{x}, \bar{y}$  - arithmetic averages of the variables „ $x$ ” i „ $y$ ”;

$s_x, s_y$  - standard deviations of the variables „ $x$ ” i „ $y$ ”.

The correlation coefficient shall be within the range:  $-1 \leq r_{xy} \leq 1$ . If  $r_{xy} = 1$  (or  $-1$ ), it means that there is an excellent positive (negative) correlation between the characteristics, and if  $r_{xy} = 0$ , this means that there is no correlation between the characteristics.

## EMPIRICAL FINDINGS AND DISCUSSION

Correlation between export growth rate (EXPG) and share of venture capital as part of GDP (VCS) were calculated and the results of the analysis are presented in Table 2.

The results presented in Table 2 show that in the analysed years (2012-2016) the correlation between the growth of exports and the share of venture capital funds in GDP is very strong in the case of Poland. The coefficient of determination amount is 92.51% for Poland, but for Hungary, Slovakia and the Czech Republic R-square coefficients were accordingly 52.59%, 15.83% and 1.74% in the case of other Visegrad countries.

The survey carried out in 2016 by the Polish Private Equity and Venture Capital Association in cooperation with KPMG consulting firm shows that nearly 60% of the surveyed firms financed by private equity funds (which mostly include venture capital investments) are expanding abroad (KPMG, 2016). It is worth mentioning that the main shareholders of

existing venture capital funds in Poland are mainly foreign investors (including the European Bank for Reconstruction and Development), and to a lesser extent the state budget.

**Table 2. Output Data in the correlation analysis between export growth and the share of venture capital funds in GDP in the years 2012-2016 in the Visegrad countries**

Country	EXPG_vs_VCS	
	Pearson coefficient	p-value
Czech Republic	0,1319	0,832
Poland	<b>0,9618*</b>	<b>0,009</b>
Slovakia	-0,3979	0,507
Hungary	-0,7252	0,166

Legend: VCS - share of value of money invested by venture capital funds in startup entrepreneurship in relation to GDP [in %]. EXPG - Exports growth of a given country in relation to the previous period [in %]. R-square – Coefficient of determination.

Source: own calculations based on the data presented in Table 1.

## CONCLUSIONS

### Summary of the findings

Venture capital funds are the main source of funding for innovative ventures. In Europe, the market for these funds is different from the one appearing in the United States. In the so called old continent, venture capital finances companies in early stages of development, while in the United States they finance companies that already have great experience (late stage of development) . In Poland, venture capital investors come mainly from abroad (e.g. the European Bank for Reconstruction and Development). In Poland, venture capital funds engage in international ventures - mainly by developing exports of the financed firms. Hypotheses has been verified in Table 3.

**Table 3. Hypotheses verification**

Hypotheses	Verification
<b>H0:</b> There is a strong correlation between export growth and the share of venture capital funds financing early stage ventures in GDP of all four Visegrad countries.	not confirmed
<b>H1:</b> There is a strong correlation between export growth and the share of venture capital funds financing early stage ventures in GDP in the Czech Republic.	not confirmed
<b>H2:</b> There is a strong correlation between export growth and the share of venture capital funds financing early stage ventures in GDP in Hungary.	not confirmed
<b>H3:</b> There is a strong correlation between export growth and the share of venture capital funds financing early stage ventures in GDP in Poland.	confirmed
<b>H4:</b> There is a strong correlation between export growth and the share of venture capital funds financing early stage ventures in GDP in Slovakia.	not confirmed

Source: own study.

### Research limitations

As each empirical study, also this research is not free of its limitations. First, the analysed period was limited only to 4 years (2012-2016). Second, it was used only one dependent and one independent variable, nevertheless it was due to the availability of data. It is

needed to include other variables, especially these moderating ones such as the entrepreneurship ratio or availability of external financing forms. Third, the linear correlation does not confirm the impact, but the relation only, so the next step should implement regression analyses.

### Direction for further studies

At present, there still few research studies exploring the export of firms financed by venture capital funds, and thus this topic is still uncovered. Therefore, it seems justified that the next steps for the research should be to analyze the aspects related to the international involvement of the financed firms in order to get better understanding of the phenomenon of strong dependence of exports on venture capital funds in Poland.

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