How to assess the impact of venture capital investments on the labour productivity of EU countries?

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Relevance of the research. The research focuses on a relevant and insufficiently investigated problem of venture capital investments. The global scope of this aspect is increasingly becoming more popular in the academic research because of the likely higher profitability. However, venture capital investments may encounter a higher level of risks for new business ideas or products, or for those ideas or products which are already being developed. These investments increase the own capital of companies and are used for funding the seed capital, the start of performance or later stages of a business in progress. Venture capital investments are highly significant for companies creating new, innovative products and technologies. Together with research and experimental development (R&D), they play an important role in creating innovations and technological processes of progress. Usually, innovative start-ups operating in the advanced technology sector and having a high potential for growth do not comply with the requirements offered and imposed by banks due to the involved high risks. As Matisone and Lace (2021) put it, contrary to banks, venture capital investors tend to assume higher risks. Moreover, venture capital investments accelerate the financial development of countries, especially in economically developed countries, since new business financing methods, such as venture capital investments, are needed to advance innovations. According to Pradhan et al. (2019), as well as Jurevičienė and Martinkutė (2013), from an economic point of view, the positive effect of venture capital investments may appear after a certain time because, when the company's performance becomes successful, venture capital investors leave the company and sell its shares.

The topic of venture capital investments is of interest to scholars, as evidenced by the research conducted on this topic. Some research studies have been carried out at different levels: company, sector, country (Frimpong, Akwaa-Sekyi, Saladrigues, 2022; Khan, Qu et al., 2021; Demou et al., 2019; Pradhan et al., 2019, 2018, 2017; Jansma, Gosselt, Jong, 2018; Karahan, 2016; Colombo, Murtinu, 2014; Faria, Barbosa, 2014; Popov, Roosenboom, 2013; Croce, Marti, Murtinu, 2013; Bertoni, Kolombo, Grilli et al., 2011; Smilga, Laurinavičius, 2011; Pottelsberghe, Romain, 2004). Meanwhile, other works focus on the assessment of the impact and correlations to other indicators of economic development (Pradhan et al., 2019, 2018; Demou et al., 2019; Cincera, Santos, 2015; Zhang, 2013; Snieška, Valodkienė, 2012) linking venture capital investments to a number of specific fields: innovations, technologies, and financial development. The analysis of scientific research works has shown that, when assessing the impact of venture capital investments at the country level, venture capital investments are associated with the economic growth, financial development, innovations, creation of new businesses, and productivity.

Empirical research works assessing the impact of venture capital investments on labour productivity were carried out at the levels of companies (Chemmaneur, Karthik, Debashi, 2011; Marti, Alemany, 2006) and sectors (Demou et al., 2019; Crose, Marti, Murtinu, 2013). They analysed the impact of venture capital investments on the labour productivity of a company or a sector. Yet, there is a lack of research works which would assess the impact of venture capital investments on the country's labour productivity or the links between venture capital investments and other factors determining labour productivity. Carrying out such research is relevant for both: businesses in a practical aspect (since venture capital investments are a financing tool for a dynamic, start-up, innovative company, and is used at different stages of its development characterised by high risks), and for the investors expecting higher returns. According to Ueda, Hirukawa (2011), and Marti, Alemany (2006), this is also relevant for politicians seeking economic growth who often promote the development or the creation of the venture capital sector. Ensuring the financing of innovative companies has a positive external effect on the economy; therefore, it makes sense for governments to take measures leading to an increase in the volume of venture capital investments (Lerner, Tag, 2013).

The connection and specificity of the phenomena of venture capital investments and the country's labour productivity is a relevant object of research. Venture capital investments are necessary for innovative companies for which the traditional methods of financing are not suitable. Innovations are always associated with high risks, and the traditional banks tend to refuse to finance them; therefore, venture capital investments have started to play a significant role in this business segment. In empirical research, venture capital investments are associated with financial development (Pradhan et al., 2019; Demou et al., 2019) which increases the growth of labour productivity. Venture capital investments accelerate the financial development of countries depending on the level of economic development of the country (Cournede, Denk et al., 2015). Economically strong countries need venture capital investments to promote their innovations. Venture capital investments have been proven to be an important financing tool which promotes innovation in companies (Jansma, Gosselt, Jong, 2018; Crose, Marti, Murtinu, 2013), increases productivity (Crose et al., 2013; Chemmanur, Karthik, Debarshi, 2011; Marti, Alemany, 2006), generates jobs and sales (Bertoni, Kolombo et al., 2011); in other words, venture capital investments promote the growth and development of economy.

The lack of research works on the impact of venture capital investments at the level of countries is identified as being revealed and highlighted in the studies conducted by the following scholars: Khan, Qu et al. (2021), Karahan (2016), Faria, Barbosa (2014), Popov, Roosenboom (2013), Pottelsberghe, Romain (2004). Khan, Qu et al. (2021), and Pradhan et al. (2017) put it that it is of fundamental importance to conduct research on venture capital investments at the levels of companies and countries.

The research problem deals with the ways how to assess the impact of a country's venture capital investments on the labour productivity and what is the impact of a country's venture capital investments on its labour productivity. The research object is the impact of a country's venture capital investments on its labour productivity.

The aim of the research is to design a model for the assessment of the impact of venture capital investments on the country's labour productivity and to empirically validate it in the EU countries after carrying out the analysis of the phenomena of venture capital investments and the labour productivity.

The research objectives are as follows:

1. After analysing the theoretical aspects of venture capital investments, labour productivity and the factors that determine it, to summarise the correlation between venture capital investments and labour productivity.

2. To carry out the analysis of research works on the assessment of the impact of venture capital investments on labour productivity by summarising their theoretical as well as practical benefits and limitations, and also to identify the gaps in the presently existing research.

3. To design a model and research methodology for the assessment of the impact of venture capital investments on the labour productivity of countries.

4. Based on the designed model and methodology for assessing the impact of venture capital investments on the labour productivity of countries, to empirically assess the impact of venture capital investments on the labour productivity in the EU countries.

The methods applied in the research. When conducting the theoretical analysis of the impact of venture capital investments on labour productivity, analysing the extent of the current investigation of the scientific problem of the research and designing the conceptual model and methods of the research, systematic analysis, synthesis, logical generalisation, comparison, grouping, and modelling have been employed. When assessing the impact of venture capital investments on labour productivity in the countries of the European Union, systematisation, grouping and analysis of the relevant statistical data have been used, graphic representation of data, cluster analysis, multiple correlation and regression analysis of panel data have been applied. The research results were obtained by using the GRETL software package. The selected research duration covers the period from 2007 to 2019. The research sample consists of 25 countries of the European Union because the Organization for Economic Cooperation and Development (OECD) does not provide the data on venture capital investments in Cyprus, Croatia and Malta for 2007–2019.

The following results define the scientific novelty and the practical significance of the present research: 1) after performing the theoretical analysis of the impact of venture capital investments on labour productivity and grounding it on the results of the empirical research, this study includes the designed conceptual model of the impact of venture capital investments on the country's labour productivity. Based on the designed model, the impact of venture capital investments on labour productivity in EU-25 countries is empirically assessed; 2) the research substantiated both the direct impact of venture capital investments on labour productivity and the impact of venture capital investments on labour productivity conditioned by the factors of the innovative environment and financial development.

Key words: *venture capital investments, economic growth, labour productivity, financial development, innovation.*
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