Venture Capital Investment and Labour Productivity: A Conceptual Model

Aistė Padgureckienė[1]

***Abstract*—** The role of venture capital in promoting innovation and company-level development has been extensively analysed in scientific papers. However, there is still a lack of research examining its impact at the macroeconomic level, particularly on labour productivity at the national level. This paper addresses this gap by conducting a theoretical analysis of the literature on venture capital investment and labour productivity. Moreover, it develops a conceptual model that explains how venture capital investment may influence countries' labour productivity. The proposed conceptual model identifies key transmission channels through which venture capital investment may affect labour productivity, including the quality of the innovation environment, financial development and other determinants of productivity.

***Keywords*—** Venture Capital Investment, Labour Productivity, Macroeconomic Impact, Conceptual Model.

I. Introduction

In the aspect of companies, sectors and countries, venture capital investments are an important factor in the economic development. The added value they create is manifested in the development of innovations and higher employment (Köppl-Turyna, Köppl et al., 2021). Recent research has increasingly focused on the impact of venture capital investment on artificial intelligence and the digital economy (Montanaro et al., 2024; Li et al., 2024), reflecting the growing need for such investments. 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 a particular country (Cournede, Denk et al., 2015). Economically strong countries need venture capital investments to promote their innovations. According to Pradhan et al. (2018), innovations promote the emergence of new technologies, systems and processes that improve country's productivity; they are important in creating new added-value products and services that contribute to new revenue generation channels.

The connection and specificity of the phenomena of venture capital investment and the country's labour productivity is a **relevant object of research**. Venture capital investments are necessary for innovative companies because traditional methods of financing are not suitable to them. Innovations are always associated with high risks, and traditional banks often refuse to finance them; therefore, venture capital investments have started to play a significant role. Taking into consideration the statements of the main theories on economic growth explaining labour productivity, venture capital investments are associated with labour productivity in terms of innovations, technologies and knowledge. Employing innovations that require venture capital investments, a larger volume of output is produced, which is associated with an increase in labour productivity (Heil, 2018). Empirical studies conducted at the country level assessed the impact of capital investment on economic growth, financial development, innovations, creation of new business and levels of productivity (Khan, Qu et al., 2021; Pradhan et al., 2019, 2018; Karahan, 2016; Faria, Barbosa, 2014).

The analysis of the scientific literature revealed that researchers highlight the need to examine the impact of venture capital investments not only at the company level but also at the country level, thereby extending the existing knowledge base and addressing an important research gap. **The aim of the** research is to design a conceptual model for assessment of the impact of venture capital investments. To achieve this aim, the following **objectives** have been set: 1) After conducting a theoretical analysis, to summarise the relationship between venture capital investment and labour productivity, 2) To design a model for assessment of the impact of venture capital investment on labour productivity in these countries. **The methods applied in the research:** systematic analysis, synthesis, logical generalisation, comparison, grouping and modelling.

II. Background

To clarify the relationship between labour productivity and venture capital investment, it is important to understand the main economic growth theories that explain the factors determining labour productivity. According to Kacou et al. (2022), there is a link between the factors determining labour productivity and theoretical models of economic growth. Table 1 presents the relationship between productivity and economic growth theories (Mačiulytė, 2015).

[1]Šiauliai State Higher Education Institution, Šiauliai, Lithuania

TABLE I: THE RELATIONSHIP BETWEEN ECONOMIC GROWTH THEORIES AND PRODUCTIVITY

Classical	Neoclassical	Endogenous	Schumpeterian	Institutional Environment
Smith	Harrod-Domar Model; Solow	Mankiv-Romer-Weil; Romer; Lucas	Schumpeter	Acemoglu, Johnson and Robinson

Source: compiled by the author, based on Mačiulytė-Šniukienė (2015)

An analysis of economic growth theories has revealed their connection to labour productivity and venture capital investment. Solow (1956), Romer (1986, 1990b), Schumpeter (1949) highlight aspects of knowledge, innovation, and technology in their theories of economic growth, emphasising the significance of venture capital investment. Venture capital investments are considered as a factor of economic growth and, in Solow's theory, are understood as a source of knowledge (Solow, 1956). Romer's (1986) long-run growth model is based on the assertion that knowledge is a key factor in increasing productivity. The model incorporates knowledge and other resources into the production function. According to Jones (2019), Romer developed a theory of endogenous technological change in 1990. In it, the search for new ideas is a key driver of economic growth. In Schumpeter's (1949) innovation model, the entrepreneur plays a central role. In his view, innovative activity, driven by technological changes and economic innovations, disrupts economic equilibrium and traditional industries, making way for more advanced ones. Schumpeter's entrepreneurial innovator is associated with leadership, innovation, and creativity. His activities create new products and services and are associated with a higher return on investment than usual over a shorter period of time. The model distinguishes between physical and human capital innovations. These are the result of investments in R&D. From the perspective of contemporary innovation theory, Schumpeter's model of innovation is expanded, as the diffusion of technology, human capital, dynamic efficiency and market growth form the foundation of innovation. According to the researcher, the impact of innovation depends on knowledge, competencies and learning processes, with an emphasis on the contributions of venture capital investments, public research organisations, universities and financial institutions (Sengupta, 2014). It can be argued that Schumpeter's claims are closely linked to venture capital investments. The main propositions of the model by Acemoglu, Johnson and Robinson (2005) reveal that, with production factors (labour and capital) remaining constant, the influence of endogenous growth factors (technology, human capital and innovation growth) is determined by the institutional environment.

Based on the conducted theoretical analysis, it has been established that there is a link between theories of labour productivity and economic growth. In neoclassical theory, the main factors determining labour productivity are technological change, knowledge and increases in capital, investment and the savings rate. It is noted that human capital and investment in it, innovation, research and experimental development are identified in endogenous theory as factors determining labour productivity. Schumpeter's theory highlights the aspects of innovation, technological change and the entrepreneurial innovator. The theory of the institutional environment is based on the impact of institutional environment factors on labour productivity. The impact of venture capital investments, as an additional resource, on labour productivity is reflected in the aspects of innovation, knowledge, research and development as well as technological change.

To sum up on the analysed scientific literature, it can be stated that there is a connection between economic growth theories and labour productivity as well as the factors that determine it.

III. The Context

This section provides a detailed analysis of the factors that most commonly determine labour productivity at the national level. Table 2 presents a classification of these factors and the authors who have studied them.

TABLE II: FACTORS INFLUENCING LABOUR PRODUCTIVITY

Factors	Authors
Innovation	Ciaffi (2025); Naveed, Wang (2023); Samargandi (2018); Coccia (2018)
Financial development	Le, Nguyen et al. (2024), Dua, Garg (2019); Samargandi (2018)
Foreign direct investment	Dua, Garg (2019); Mačiulytė-Šniukienė (2015)
Inflation	Dua, Garg (2019); Dritsaki (2016)
Foreign trade	Kacou, Kassouri (2022); Dua, Garg (2019); Samargandi (2018)
Human capital	Bellochi, Saraceno et. al. (2025); Samargandi (2018); Mačiulytė-Šniukienė (2015)
Development of technology and information and communication technologies	Calvino, Samek et al. (2025); Walheer (2021); Shahnazi (2021)
Quality of institutions	Bellochi, Saraceno et. al. (2025); Dua, Garg (2019)
Capital-labour ratio	Bellochi, Saraceno et. al. (2025); Shahnazi (2021); Mačiulytė-Šniukienė (2015)

Source: compiled by the author

An analysis of the factors determining a country's labour productivity showed that the factors most commonly examined in studies are financial development, foreign direct investment, inflation, foreign trade, innovation, development of information and communication technologies, artificial intelligence, human capital, institutional quality and capital-labour ratio. In the author's opinion, venture capital investments can be classified from an economic perspective as factors that indirectly determine labour productivity; their impact on labour productivity manifests through their influence on factors with a direct impact. Therefore, the assessment of this impact may involve an evaluation of the interaction among several independent variables.

In the context of this study, from a theoretical perspective, venture capital investments are linked to innovation and financial development classified as factors that directly determine labour productivity. Therefore, the direct impact of venture capital investments on a country's labour productivity can be assessed in conjunction with factors related to the innovation environment and financial development. According to Padgureckienė (2024), empirical studies have examined the impact and channels of innovation and financial development factors on a country's labour productivity. However, the impact of venture capital investment, which is determined by factors of the innovation environment and financial development, on country's labour productivity has not been studied. An analysis of the scientific literature identified the impact of venture capital investments on labour productivity at the national level through the following channels: 1) the innovation environment aspect: venture capital investments → determine and foster innovation-driven economic development of the country → a financing instrument for businesses operating in the innovative and high-tech sectors → increases labour productivity; 2) the aspect of financial development: venture capital investments → part of the financial market → an alternative source of financing → determines financial development → related to the efficiency of financial markets and financial institutions → has an effect on labour productivity.

The conceptual model is presented in the next section.

IV. Conceptual Model of Venture Capital Investment and Labour Productivity

The conducted scientific literature analysis revealed that researchers emphasise the need to examine the impact of venture capital investments not only at the company level, but also at the country level. Taking into consideration the statements of the main theories on economic growth explaining labour productivity and their interconnection, they are purposefully included in the designed conceptual model for assessment of the impact of venture capital investments on the labour productivity of countries. Venture capital investments are associated with the growth of countries' labour productivity in terms of innovation, technological changes and knowledge as well as R&D (Romer, 1990, 1956; Solow, 1986; Schumpeterian, 1949). The conceptual model is presented in Figure 1.

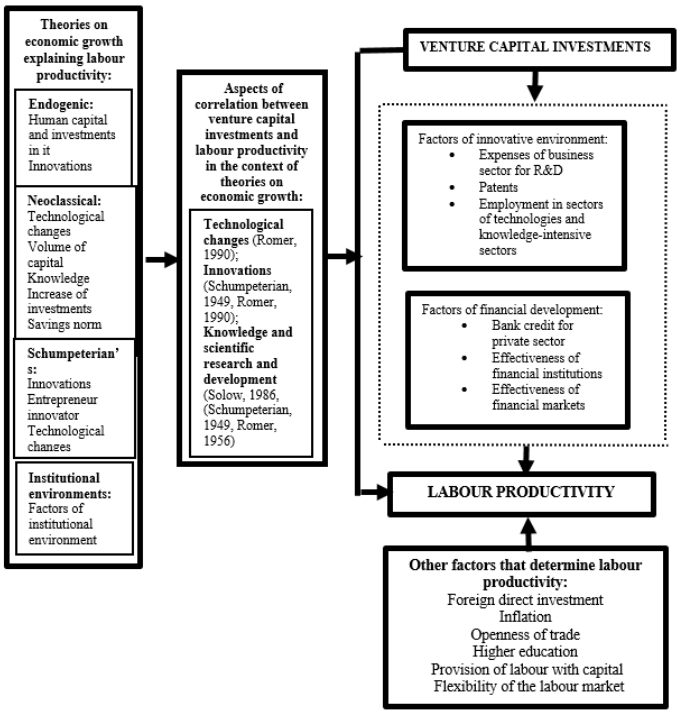

Fig. 1 Conceptual model for assessment of the impact of venture capital investments on a country's labour productivity

As can be seen in the presented model, the direct impact of venture capital investment on countries' labour productivity, is marked by a bold continuous arrow. The impact of venture capital investments on labour productivity in interaction with any of the variables of the innovative environment or financial development factors (the part of the interaction factors is indicated by a dotted line in the figure) is also marked with a bold arrow.

One of the most frequently analysed effects of innovation in research is its impact on labour productivity, which is measured by expenditure on research and experimental development. For this reason, the innovation environment is measured in the model using the business sector's R&D expenditure indicator. According to Khan, Qu et al. (2021), patents reflect the results of a company's innovation processes and serve as an appropriate measure of innovation. To develop an innovative idea and commercialise it, sufficient funds are required to finance this process. It has been demonstrated that venture capital investments drive the expansion of sectors operating on the basis of new technologies and innovations (Frimpong et al., 2022; Khan, Qu et al., 2021). In the model, the indicator of employment in technology- and knowledge-intensive sectors is included in the innovation environment. It indicates the extent to which a country's economy is oriented toward the production of value-added goods and the creation of such services.

Venture capital investments replace or supplement bank loans. Venture capital investments are an alternative source of financing. Therefore, the indicator of bank credit to the private sector was included in the study on financial development. Given the diversity of countries' financial systems, it has been

found that multiple indicators are needed to capture a country's financial development. The model incorporates two IMF Financial Development indices - financial institutions and financial markets efficiency - based on the IMF Financial Development Database (2026), originally developed by Svirydzenka (2016). These indices reflect the efficiency of the services provided by financial institutions and financial markets. The more efficiently country's financial institutions and financial markets are developed, the smaller the impact of venture capital investments on labour productivity is.

When assessing the impact of venture capital investments on labour productivity, it is important to assess the impact of other factors. Therefore, the research model includes other factors determining labour productivity: foreign direct investment, inflation, openness of trade, higher education, provision of labour with capital and flexibility of the labour market.

A conceptual model that provides a multidimensional assessment of the impact of venture capital investments on labour productivity across countries has been developed, capturing both direct and heterogeneous effects shaped by factors related to the innovation environment and financial development. Future cross-country studies could examine whether artificial intelligence readiness strengthens the impact of venture capital investments on labour productivity, as suggested by Calvino, Samek et al. (2025), since countries differ substantially in their capacity to adopt artificial intelligence technologies and convert them into productivity gains.

V. Conclusion

1. After summing up the results of the theoretical research on the factors determining labour productivity, it can be declared that the factors determining labour productivity and mostly analysed in research works are as follows: innovations, financial development, financial openness, inflation, foreign trade, development of information and communication technologies, human capital, supply of labour with capital. In the context of the theories of economic growth, the designed conceptual model reveals the connection between venture capital investments and the growth of labour productivity in the countries.

2. The analysis of scientific research on the impact of venture capital investments on labour productivity has revealed that research in this area is limited to the company or sector levels. On the basis of the analysed empirical research results, it was found that the impact of venture capital investments on labour productivity manifests in companies that were financed by venture capital investments rather than in conventionally financed companies. Moreover, this was observed in the in sectors where the need for venture capital investments and the lack of funding were the greatest. Scholars unanimously agree that it is necessary to extend the scope of this research and to conduct investigation on the impact of venture capital investments across countries, not just at the company or sector level. After identifying the factors that determine the labour productivity of the countries and revealing their connection to venture capital investments, it was found out that innovations are closely connected to venture capital investments from both theoretical and practical points of view.

Seeking to close the gap in this area, the research includes a compiled conceptual model for assessment of the impact of venture capital investments on labour productivity. The model substantiates both the direct impact of venture capital investment on labour productivity and the impact of venture capital investment on labour productivity being conditioned by factors related to the innovation environment and financial development. The model can be applied in studies analysing the impact of venture capital investments on labour productivity across countries.

References

[1] Bellocchi, A., Saraceno, F., Travaglini, G. Closing the productivity–wage gap in the European Union: The role of the labor share. *Structural Change and Economic Dynamics, Elsevier*, vol. 75(C), pages 689-702, 2025, https://doi.org/10.1016/j.strueco.2025.10.005

[2] Calvino, F., Reijerink, J., Samek, L. The effects of generative AI on productivity, innovation and entrepreneurship. *OECD Artificial Intelligence Papers, 39*, 2025. https://doi.org/10.1787/b21df222-en.

[3] Ciaffi, G. Innovation and Demand as Drivers of Labour Productivity: An Integrated Analysis for OECD Countries. *Review of Political Economy*, 37(2), 369–391, 2025, https://doi.org/10.1080/09538259.2024.2409690

[4] Cournede, B., Denk, O., Hoeller, P. Finance and Inclusive Growth. *OECD Economic Policy Paper*, No. 14. http://dx.doi.org/10.2139/ssrn.2649801, 2015.

[5] Demmou, L., Stefanescu, I., & Arquie, A. Productivity growth and finance: The role of intangible assets – a sector level analysis. *OECD Economics Department Working Papers*, p. 1547, in 2019.

[6] Dritsaki, C. Real wages, inflation, and labor productivity: Evidences from Bulgaria and Romania. Journal of Economic & Financial Studies, 04(05), 24–36. DOI: http://dx.doi.org/10.18533/jefs.v4i5.253, 2016

[7] Dua, P., Garg, N. K. Determinants of labour productivity: Comparison between developing and developed countries of Asia-Pacific. *Pasific Economic Review*, 24(5), 686–704. doi: 10.1111/1468-0106.12294, 2019.

[8] Faria, A. P., Barbosa, N. Does venture capital really foster innovation? Economics Letters, *Elsevier*,122(2), 129–131, 2014. https://doi.org/10.1016/j.econlet.2013.11.014

[9] Frimpong, F. A., Akwaa-Sekyi, E. K., Saladrigues, R. Venture capital healthcare investments and health care sector growth: A panel data analysis of Europe. *Borsa Istanbul Review*, 22(2), 388–399, 2022. https://doi.org/10.1016/j.bir.2021.06.008

[10] Heil, M. Finance and productivity: a literature review. *Economics department working papers*, 1374, 2018.

[11] International Monetary Fund. (2026). Financial Development Index Database. *IMF Data*. https://data.imf.org/en/Datasets/FDI/About-FDI

[12] Jones, C. I. Paul Romer: Ideas, Nonrivalry, and Endogenous Growth. *The Scandinavian Journal of Economics*, 121(3), 859–883, 2019 https://doi.org/10.1111/sjoe.12370

[13] Kacou,Y. T., Kassouri, Y., Ervard, T. H., Altuntas, M. Trade openness, export structure, and labor productivity in developing countries: Evidence from panel VAR approach. *Structural Change and Economic Dynamics*, 60, 194–205. https://doi.org/10.1016/j.strueco.2021.11.015, 2022.

[14] Karahan, O. The Interaction between Venture Capital and Innovation in Europe. *European financial system 2016: proceedings of the 13th international scientific conference*. P. 306–313, 2016.

[15] Khan., N., Qu, H., Qu, J., Wei, C., Wang, S. Does Venture Capital Investment Spur Innovation? A Cross-Countries Analysis. *SAGE Open*, 11(1), 1–13, 2021. https://doi.org/10.1177/21582440211003087

[16] Köppl-Turyna, M., Köppl, S., Berger, J., Strohner. Determinants and effects of Venture Capital and Private Equity: a literature analysis. *List Forum für Wirtschafts- und Finanzpolitik*, 2(4), 151–192, 2021. https://doi.org/10.1007/s41025-021-00236-1

[17] Le, N., Nguyen, H., & Schultz, E. Financial development and labour productivity growth in stagnant industries. *Applied Economics*, 57(47), 7643–7656, 2025. https://doi.org/10.1080/00036846.2024.2393459

[18] Li, Y., Zhu, Q., & Mao, F. The impact of venture capital on the digital in dustry development: evidence from China. *Asian-Pacific Economic Literature, Asia Pacific School of Economics and Government, The Australian National University*, 38(1), 93-109. doi: 10.1111/apel.12404, 2024.

[19] Mačiulytė-Šniukienė, A. Darbo produktyvumą lemiančių veiksnių poveikio vertinimas globalizacijos kontekste: daktaro disertacija. Vilnius: Technika. P. 214, in 2015. https://doi.org/10.20334/2354-M

[20] Montanaro, B., Croce, A., & Ughetto, E. Venture capital investments in artificial intelligence. *Journal of Evolutionary Economics*, 34,1–28. https://doi.org/10.1007/ s00191-024-00857-7, 2024.

[21] Naveed, A., Wang, C. Innovation and labour productivity growth moderated by structural change: Analysis in a global perspective. *Technovation*, 119, 1–16, 2023. https://doi.org/10.1016/j.technovation.2022.102554

[22] Padgureckienė, A. (2024). Rizikos kapitalo investicijų poveikio darbo produktyvumui vertinimas Europos Sąjungos šalyse: daktaro disertacija. Vilnius. P. 163. https://doi. org/10.15388/vu.thesis.575

[23] Pradhan, R. P., Arvin, M. B., Nair, M., Bennett, S. E., & Bahmani, S. Short term and long-term dynamics of venture capital and economic growth in a digital economy: A study of European countries. *Technology in Society*, 57(C), 125–134, 2019. https://doi.org/10.1016/j.techsoc.2018.11.002

[24] Pradhan, R. P., Mak B. A. Mahendhiran, N., Sara, E. B., Sahar. B., John, H. H. Endogenous dynamics between innovation, financial markets, venture capital and economic growth: Evidence from Europe. *Journal of Multinational Financial Management*, 45 (C), 15–34, 2018. https://doi.org/10.1016/j.mulfin.2018.01.002

[25] Romer, P. Endogenous Technological Change. *Journal of Political Economy*, 98, 71–102, (1990b). https://doi.org/10.1016/j.mulfin.2018.01.002

[26] Romer, P. Increasing returns and long-run growth. *The Journal of Political Economy*, 94(5), 1002–1037, (1986). https://doi.org/10.1086/261420

[27] Samargandi. Determinants of Labor Productivity in MENA Countries. *Emerging Markets Finance and Trade, Taylor & Francis Journals*. 54(5), 1063–1081, 2018. https://doi.org/10.1080/1540496X.2017.1418658

[28] Schumpeter. Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle. Harvard University Press, Cambridge, 1949.

[29] Sengupta, J. Theory of innovation. *A New Paradigm of Growth. Springer*, 2014. https://doi.org/10.1007/978-3-319-02183-6

[30] Shahnazi, R. Do information and communications technology spillovers affect labor productivity? Structural Change and Economic Dynamics, 59, 342–359, 2021. https://doi.org/10.1016/j.strueco.2021.09.003

[31] Solow, R. M. A Contribution to the Theory of Economic Growth. *The Quarterly Journal of Economics*, 70(1), 65–94, in 1956. https://doi.org/10.2307/1884513

[32] Svirydzenka, K. Introducing a New Broad-based Index of Financial Development. *IMF Working Papers*, 16(5), 2016. https://doi.org/10.5089/9781513583709.001

[33] Walheer, B. Labor productivity and technology heterogeneity. *Journal of Macroeconomics, Elsevier*, 68(C), 2021. https://doi.org/10.1016/j.jmacro.2021.103290