ELIZABETA DJAMBASKA,[1]*
ALEKSANDRA LOZANOSKA,[2]**
IRINA PIPERKOVA,[3]***

PRODUCTIVITY AS A SOURCE OF ECONOMIC GROWTH - CURRENT SITUATION AND PROSPECT IN THE REPUBLIC OF NORTH MACEDONIA

Abstract: Productivity is an indicator of the use (exploitation) of the potential of inputs for creating new value added in the economy. In the long term, productivity growth is dependent upon innovation, investment in physical capital, and investment in human capital. These immediate factors are shaped by the environment in which enterprises operate: market structures, infrastructure, the institutional framework and the quality of governance. The main objective of this paper is to study productivity growth in the Republic of North Macedonia and to analyses and propose measures that can be taken to stimulate productivity.

The analysis include: labor productivity, total factor productivity (TFP) and the level of enterprise productivity. Labour productivity in North Macedonia is low, and in the past five years even negative. The calculations of the total factor productivity using the Solow's growth model and Cobb-Douglas production function for the past twenty years, shows that GDP average growth is 4,97% and the TFP contribute by 1,69%. The level of enterprise productivity is also low. Therefore, the expectations for the increase of the GDP and reaching economic growth that can be sustainable is possible with increasing total factor productivity in the North Macedonia.

Key words: productivity, labour productivity, total factor productivity (TFP), enterprise productivity, North Macedonia
JEL Classification: O1, O12, O47

[1] * *Associate professor, Institute of Economics – Skopje, Ss. Cyril and Methodius University, beti@ek-inst.ukim.edu.mk*

[2] ** *Associate professor, Institute of Economics – Skopje, Ss. Cyril and Methodius University, sandra@ek-inst.ukim.edu.mk*

[3] *** *Associate professor, Institute of Economics – Skopje, Ss. Cyril and Methodius University, irina@ek-inst.ukim.edu.mk*

Introduction

Today's world situation challenges the economies in their functioning. Economies continue to struggle with the impacts of the COVID-19 pandemic, first to protect people's health and also to ensure the recovery of the economy. This current process has been interrupted by the war in Ukraine and all countries must find ways to ensure macroeconomic stability. So, the insurance of economic growth is paramount. Productivity growth is the one of the most important sources and a key factor for sustained economic growth.

There are two primary ways of measuring productivity: labor productivity and total factor productivity (TFP). Throughout this paper, productivity is considered as output (gross domestic product - GDP) per input of a unit of labour. This concept takes into consideration the number of economic engaged people, rather than the number of working hours as the measures of labour input in the economy. Therefore, the indicator of labour productivity in the Republic of North Macedonia that is calculated yearly and quarterly, is a weighted sum of sector-level productivity as a ration between the value added of a sector and the number of employed persons. The analysis uses the database of State Statistical Office and National Bank of Republic of North Macedonia.

The total factor productivity (TFP) is also considered in this paper. Productivity calculations use the Solow growth model of economic growth as a function of labour, capital and productivity. As such, TFP measures the effectiveness of combined factor inputs and is often used to represent technological progress. TFP may also incorporate wider factors such as organizational and institutional characteristics. TFP is widely known as a Solow' residual. The calculations of the TFP for the previous period of 2000-2020 are presented in this paper.

These two aspects cover the productivity in macroeconomic contexts. The other crucial aspect in the analysis of productivity is the level of productivity of the enterprise.

The Enterprise Survey conducted by the World Bank in 2009, 2013 and 2019 include 360 enterprises in North Macedonia. The Survey covers the question about labour productivity growth by year. This measure that explains the performance of the enterprises is essential to the conclusions about the productivity in firms.

1. LABOUR PRODUCTIVITY IN THE REPUBLIC OF NORTH MACEDONIA

As it was mention earlier, the indicator of labour productivity in the Republic of North Macedonia is a weighted sum of sector-level productivity as a ration between the value added of a sector and the number of employed persons. It is calculated yearly and quarterly. This methodology of the indicator of labour productivity has several disadvantages. First disadvantage is its comprehensiveness. Labour productivity indicator intended to capture all of those involved in the production process. The informal employment is not included. Total employment includes self-employment, which accounts for a large proportion of informal employment in developing economies. Difficulties in measurement of the informal sector create uncertainty and increase the potential for inconsistency. Nonetheless, many national statistics offices estimate the size of the informal sector and adjust their GDP estimates accordingly.[4]

Second disadvantage rests in the failure to account for the quality of labour input. The effectiveness of labor input may be influenced by the level of education, training, and health of workers. These aspects of human capital can be addressed by estimating the average years of schooling of the workforce and life expectancy to proxy workforce health. However, the quality of formal education and health, and the effects of on-the-job training provided outside of the education system, is difficult to measure consistently.

The failure to account the intensity of labour input is third disadvantage. The number of people involved in the production process does not consider different work arrangements that vary the intensity of labor input. The intensity of labor input is, for example, better captured by hours worked, but these data are not available for many countries.

---

[4]   Charmes Jacques, The Informal Economy Worldwide: Trends and Characteristics, Margin—The Journal of Applied Economic Research 6: 2 (2012): 103–132SAGE Publications Los Angeles/London/New Delhi/Singapore/Washington DCDOI: 10.1177/097380101200600202 *(12) (PDF) The Informal Economy Worldwide: Trends and Characteristics*. Available from: https://www.researchgate.net/publication/259331356_The_Informal_Economy_Worldwide_ Trends_and_Characteristics [accessed Jun 30 2022].

Figure 1 Labour productivity in North Macedonia, yearly (2012-2021)

Source: The source of the presented data for the employment is the Labour Force Survey (LFS) of the SSO. Additional information regarding the methodology of the survey can be found at the following link: http://www.stat.gov.mk/labour market

The figure 1 presents the indicator of labour productivity in the North Macedonia. The highest level in the analysed years is reach in 2014 and it is 3,2. The lowest value is evident in 2020, that is known as Pandemic year. If we exclude this 2020 and 2021 years as extraordinary, still the value of the labour productivity in all analysed years is low.
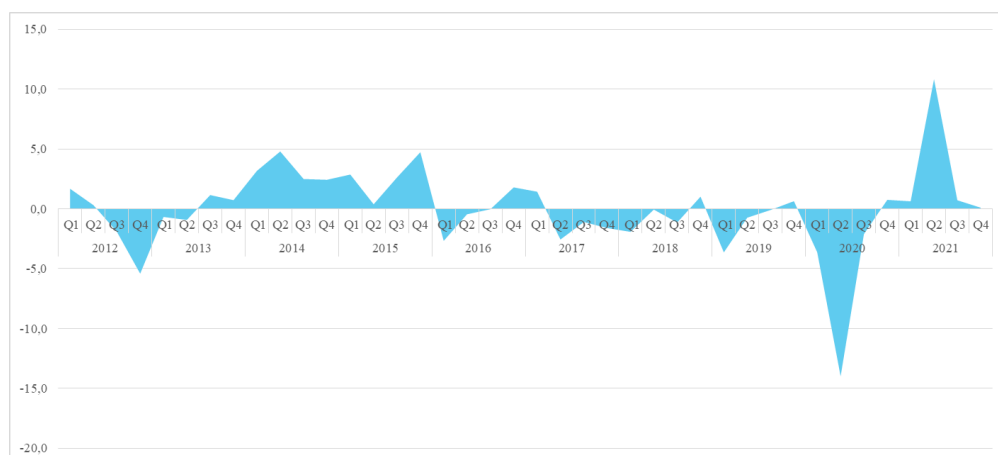
Figure 2 Labour productivity in North Macedonia, quarterly (2012-2021)

Source: The source of the presented data for the employment is the Labour Force Survey (LFS) of the SSO. Additional information regarding the methodology of the survey can be found at the following link: http://www.stat.gov.mk/labour market

The quarterly data of the labour productivity in North Macedonia are shown in figure 2. The highest negative values are evident in 2020. With 2021 the labour productivity shows positive values.

Historically, different factors impacts and increased labour productivity. Labour productivity growth has been driven by innovation, better education, and investment in physical capital. Innovation and private sector investment require a growth-friendly environment, with supportive institutions and policies, including policies that promote macroeconomic stability and the rule of law. Productivity growth also seems to benefit from expertise in producing relatively complex and sophisticated exports, which is associated with international technology diffusion. This finding complements past research and supports the argument that ″what you export matters″.[5] Important factor for the labour productivity are demographic factors. The notably changes in population age structure has huge influence on labour productivity. First of all, oldest workers have difficulties with the use of new technologies, so the digitalization working processes.

The Covid-19 pandemic imposed even more new challenges to labour productivity. Weaker investment and trade, erosion of human capital, slower labour reallocation, public and private debt burdens. Also, the widening inequality have negative impact on productivity. Yet the pandemic crates new productivity-enhancing opportunities such as lasting organizational and technological changes for business and education, diversifying global value chains, and changing social norms. These aspects are reflected in the data on labor productivity in North Macedonia.

2. TOTAL FACTOR PRODUCTIVITY – TFP CALCULATIONS IN THE REPUBLIC OF NORTH MACEDONIA

Determination of the sources of economic growth and their contribution to the achieved growth are interesting segment for researchers. There are a lot of studies that are analyzing the source of growth of the economy and every study takes in consideration the basic Cobb - Douglas production function. The peculiarities for each study arise from the different structure of the factors of production in each analyzed country. Also, there are different aspects of the analysis of the total factor productivity. One of the negative aspects of using

---

[5]   Hausmann Ricardo, Hwang Jason, Rodric Dani, "What you export matters", CID Working Papers Series 2005, Harvard University, Cambridge, MA, 2005

growth accounting is the fact that productivity residual (TFP) is unable to be decomposed.

The average growth of GDP (Y) decomposes the three basic components of the production function: labour (L), capital (K) and productivity (TFP).

The Cobb – Douglas production function used in this research is:

$$Y = AK^{1/3}L^{2/3}$$

According to this, the equitation can be written as:

$$\frac{dY}{Y} = \frac{dA}{A} + 0.33\frac{dK}{K} + 0.67\frac{dL}{L}$$

Where, $dY/Y; dA/A; dK/K; dL/L$ represent the percentage rate of change for some time (1 year), $dX/X = (X_t - X_{t-1})/X_{t-1}$ respectively. This formula measures the contribution of capital, labour and productivity residual (TFP). In this formula A represent the productivity residual according to Solow's growth model.[6]

The Solow – residual (TFP) is used as a measure of technical progress. Total factor productivity changes for various reasons. Very often the cause of the change is the growth of knowledge that leads to changes and improvements in the production methods. Many other factors, such as education and state intervention, raise the residual. For example, higher government expenditures improve the quality of education. Hence, this rises the qualifications of the labour force and their productivity, which leads to production increase.

The calculations use data from the State Statistical Office of the Republic of North Macedonia. So, the data for the real GDP (Y) are expressed in national currency, in millions denars. The labour (L) as factor of production is expressed as number of employees in the total working population old 15 years and more, using the data from the Labour Force Survey of the Republic of North Macedonia. Physical capital (K) is determined as GDP with a year of lag.

---

[6] Eftimoski, Dimitar – Petrevski Goran, Analysis of the source of economic growth in the Republic of Macedonia in transition period, Economic development, Journal of the Institute of Economics, year 5 no. 1-2-3, Skopje, 2003, p. 124

Figure 3 Total Factor Productivity calculations in Republic of North Macedonia in the period 2000-2020

Average growth rate of GDP	4,97%	Contributions of capital intensity	1,25%
Average growth rate of labour	1,86%	Contributions of labour composition	2,04%
Average growth rate of capital	6,17%	Total Factor productivity - TFP	**1,69%**
		GDP	**4,97%**

Source: own calculations

According to the analysis for the period 2000 - 2020, the average growth rate of GDP is 4,97%, the average growth of the employment rate is 1,86%, while of the physical capital is 6,17%. According the calculations, the contribution of the factors to the economic growth is the following: contributions of capital intensity is 1,25%, contributions of labour composition is 2,04% and productivity noted as TFP 1,69%.

″Low productivity points to the unsustainability of growth in the Republic of North Macedonia. Above all, the achieved economic growth rates are the result of the intensification of the labour and capital. Also, the real GDP growth are financed with the increased public debt in the last decade. Low productivity means reduced and insufficient investment in education and research and development that directly affects the quality of the human capital.″[7]

3. THE LEVEL OF ENTERPRISE PRODUCTIVITY

The other crucial aspect in the analysis of productivity is the level of enterprise productivity. This paper presents and analyses the data about the enterprise productivity that are conducted with the Enterprise Surveys by World Bank.

The Enterprise Surveys (ES)[8] focus on many aspects of the business environment. These factors can be accommodating or constraining for firms

---

[7]   E.Djambaska, A.Lozanoska, "Growth accounting in the Republic of North Macedonia", Economic Development, Journal of the Institute of Economics – Skopje, year.21, no. 3/2019, page 41

[8]   North Macedonia, Enterprise Surveys, The World Bank Group, 2020, www.enterprisesurveys.org

and play an important role in whether an economy's private sector will thrive or not. An accommodating business environment is one that encourages firms to operate efficiently. Such conditions strengthen incentives for firms to innovate and to increase productivity — key factors for sustainable development. A more productive private sector, in turn, expands employment and contributes taxes necessary for public investment in health, education, and other services. Questions contained in the ES aim at covering most of the topics mentioned above. The topics include infrastructure, trade, finance, regulations, taxes and business licensing, corruption, crime and informality, access to finance, innovation, labor, and perceptions about obstacles to doing business.

The ES are conducted by the World Bank Group and its partners across all geographic regions and cover small, medium, and large firms. The size of the firm is determined by the number of employees: 5 to 19 (small), 20 to 99 (medium), and 100 or more (large). Firms with less than five employees are ineligible for the survey. Firms that are 100% state-owned are also ineligible. Partners for the ES have included the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), and the UK's Department for International Development (DFID).

The ES are repeated approximately every four years for a particular economy (or region). By tracking changes in the business environment, policymakers and researchers can look at the effects of policy and regulatory reforms on firm performance. Repeated surveys aid in studying the evolution of the business environment and how it affects the dynamics of the private sector.

This document [9]summarizes the results of the Enterprise Survey for North Macedonia. Business owners and top managers in 360 firms were interviewed between December 2018 and October 2019.

According to this Surveys, real annual labour productivity growth, is the indicator that consider the enterprise productivity.

Annual labour productivity growth is measured by a percentage change in labour productivity between the last completed fiscal year and a previous period, where labour productivity is sales divided by the number of fulltime permanent workers. All sales values are deflated to 2009 using each country's GDP deflators.

---

[9]   North Macedonia, Enterprise Surveys, The World Bank Group, 2020, www.enterprisesurveys.org

Figure 4 The level of enterprise productivity
(The World Bank Enterprise Surveys – North Macedonia 2019)

	Real annual labor productivity growth (%)	Manufacturing (All)	Manufacturing	Services (All)	Retail	Other Services
North Macedonia	-0,4	0,4	0,4	-0,8	-1,1	-0,7
Europe & Central Asia	-0,1	0,5	...	-0,5	...	...

Source: The World Data Bank, https://www.enterprisesurveys.org/en/methodology *(access date 12.4.2022)*

The annual labor productivity growth in 2019 is negative -0,4. Also the labour productivity growth in retail companies is -1,1. In other services -0,7. Compared to the Europe and Central Asia shows lower value. (Figure 4)

The productivity growth in enterprise included in the Enterprise Surveys in North Macedonia according to the sector, for the period 2009, 2013 and 2019 are presented in the Figure 5.

Figure 5 The level of enterprise productivity in North Macedonia in 2009, 2013 and 2019 (by sector)

Year	Real annual labor productivity growth (%)	Manufacturing (All)	Services (All)	Retail	Other Services
2009	0,1	3,4	-1,9	-5,8	0,2
2013	0,8	1,5	0,5	1,7	-0,3
2019	-0,4	0,4	-0,8	-1,1	-0,7

Source: The World Data Bank, https://www.enterprisesurveys.org/en/methodology *(access date 12.4.2022)*

Productivity level in manufacturing enterprises in the analyzed years shows decline and the annual level productivity growth from the 3,4 in 2009 drop to 0,4 in 2019. The increase in productivity growth is shown in services (from -1,9 in 2009, 0,5 in 2013 and -0,8 in 2019). According to this indicator the enterprises in the retail sector in North Macedonia evident positive fluctuating (-5,8 in 2009, 1,7 in 2013 and -1,1 in 2019).

Figure 6 The level of enterprise productivity in North Macedonia in 2009, 2013 and 2019 (by size of the enterprise)

Year	Small (5-19)	Medium (20-99)	Large (100+)
2009	1,9	-2,4	-5,4
2013	3,1	-5,4	/
2019	0,6	-4,1	4,8

Source: The World Data Bank, https://www.enterprisesurveys.org/en/methodology *(access date 12.4.2022)*

The interesting fact is the increase in productivity in the large enterprises (with 100+ employee). Labour productivity in these enterprises from -5,4 in 2009 has increased to 4,8 in 2019. This is due to the foreign direct investment in the North Macedonia, especially the entrance of the British company ″Johnson Matthey″ in 2010, Belgian company ″Van Hall″ German company ″Kromberg and Schubert″ in 2013.

Figure 7 The level of enterprise productivity in North Macedonia in 2009, 2013 and 2019 (by export orientation)

Year	Direct Export	Non-exporter
2009	8,4	-2,8
2013	4,7	0,2
2019	2,1	-1,0

Source: The World Data Bank, https://www.enterprisesurveys.org/en/methodology *(access date 12.4.2022)*

Figure 7 shows the data about the level of the enterprise productivity according to the export orientation of the enterprises that was include in the survey. The productivity is higher and positive in exporting enterprises. Therefore, in the 2009 it shows 8,4%, 4,7% in 2013 and 2,1% in 2019. The non-exporter enterprises have negative values of the real annual labour productivity growth (-2,8% in 2009, 0,2% in 2013 and -1% in 2019).

CONCLUSION

Labour productivity in North Macedonia is low, and in the past five years even negative. Quarterly, the labour productivity shows the lowest values in the 2020 which is the year of the pandemic and cannot be referenced for comparison. Besides that, the labour productivity is with low level and mostly with negative values in the whole examined period (2012–2020).

The calculations of the total factor productivity using the Solow's growth model and Cobb-Douglas production function for the past twenty years, shows that GDP average growth is 4,97% and the TFP contribute by 1,69%.

The level of enterprise productivity is also low.

Therefore, the expectations for the increase of the GDP and reaching economic growth that can be sustainable is possible with increasing total factor productivity in the North Macedonia.

What is the reasonable explanation for the low productivity in North Macedonia?

Demographic trends in North Macedonia have negative impact on the productivity. First, as age structure of the labour force is unfavorable, new technologies can be faster adopted by younger labour force. Also, emigration abroad of young people has negative impact on the productivity.

The largest share in the creation of GDP in the Republic of North Macedonia has the traditional sectors that are based on the use of natural resources and are most labour-intensive activities, which have a dominant utilization of physical capital, with underrepresented new technologies and knowledge.

The largest share in GDP is created by wholesale and retail trade, together with transport and storage activities. Mining, quarrying, electricity supply, etc. is represented by shares around 17%. The contribution of industry (C) to GDP in the analyzed period ranges from 9% in 2000 to 12.9% in 2018. The industrial production comes from the most traditional industries in which new technologies and knowledge are not present. They are either predominantly capital-intensive or labor-intensive, such as mining and quarrying, electricity generation, food and beverage production, textile and clothing production. The products from these industries are in fact the main exporters of the Republic of North Macedonia.

Agriculture and forestry and fisheries have 10,9% (2000) to 7,2% (2018), while the share of construction in the analyzed period ranges from about 5% - 6%.

This traditional sector has a large share in total employment in North Macedonia. A significant proportion of them are unpaid family workers. (For example, the agriculture, forestry and fisheries sector have a large share in total employment, which is 12% in 2020. nearly 30.500 people or 32%, are unpaid family workers.)

The wholesale and retail trade sector, which employed almost 15% of the total labour force in 2020, can be seen as an important sector for maintaining current positive labour market trends. This situation with relatively low level of capital by employing, lower level of skills needed, low - paid jobs, with low value-added contribution in the GDP has minor effect on productivity in North Macedonia.

The recommendations are towards:

A comprehensive approach is needed to facilitate investment in physical and human capital. Innovations, technology transfer and research and development, investment in infrastructure can complement new technologies, and raise productivity and well-being. Also, Infrastructure needs in developing countries as North Macedonia, remain high and relate to transport, water and sanitation, power, and telecommunications.

The investment in human capital is important for the quality of labour. The productivity of an economy depends partly on the quality of its labor force, which can be improved in several ways. Other things being equal, a better-educated and healthier labor force will contribute more to economic activity.

Education can enhance not only skills but also the ability to adopt new technologies. In the long term, education may have wider positive effects, on the nature of civil society and the effectiveness of governments.

Healthy workers tend to be more efficient, faster learners, and more committed to improving their skills.

Encourage reallocation of resources toward more productive sectors and enterprises;

Foster firm capabilities to reinvigorate technology adoption and innovation, encouraging private investment in human capital, including management as well as technical training;

Strengthen institutions and government effectiveness; Productivity gains can stem from policies that limit market power and promote fair competition, simplified and transparent legal systems, governance reforms that lower political risk. Governments can also promote productivity growth by lowering transaction costs and increasing trust in institutions.

Promote an inclusive, sustainable, and growth-friendly macroeconomic and institutional environment.

The main obstacles in fulfilling these are the increased macroeconomic instability due to the Covid -19 pandemic and war conflict, less favorable demographics, demographic ageing of the population, emigration abroad of young people, gender issue, climate change and its effects on agricultural sector. Climate change is expected to continue too adversely affect productivity. The agriculture sector may be particularly affected.

REFERENCES

1   Barro, J. Robert – Sala-i-Martin X, Economic Growth, McGraw-Hill, New York, 1995

2   Charmes Jacques, The Informal Economy Worldwide: Trends and Characteristics, Margin—The Journal of Applied Economic Research 6: 2 (2012): 103–132SAGE Publications Los Angeles/London/New Delhi/ Singapore/Washington DCDOI: 10.1177/097380101200600202 , (12) (PDF) The Informal Economy Worldwide: Trends and Characteristics. Available from: https://www.researchgate.net/publication/259331356_ The_Informal_Economy_Worldwide_Trends_and_Characteristics [accessed Jun 30 2022]

3   Djambaska Elizabeta, Lozanoska Aleksandra, Theoretical approach of macroeconomic policy measures for solving economic consequences of Covid-19, Economic Development, Journal of the Institute of Economics – Skopje, year 22 No.1-2, p. 38-51, June, Skopje, 2020

4   Dieppe Alistair, editor, Global Productivity, Trends, Drivers and Policies, International Bank for Reconstruction and Development / The World Bank, 2021

5   Eftimoski, Dimitar, Economic Growth, theoretical concept and models, St. Kliment Ohridski University in Bitola, Faculty of administration and management –Bitola, 2009

6   Eftimoski, Dimitar – Petrevski Goran, Analysis of the source of economic growth in the Republic of Macedonia in transition period, Economic development, Journal of Institute of Economics, year 5 no. 1-2-3, Skopje, 2003

7   Hausmann Ricardo, Hwang Jason, Rodric Dani, "What you export matters", CID Working Papers Series 2005, Harvard University, Cambridge, MA, 2005

8   Janeska Verica, Lozanoska Aleksandra, Djambaska Elizabeta, Demographic Changes and Sustainable Demographic Development in the Western Balkans, Economics Analysis, Vol. 5, No. 1-2, pp. 1-17, Belgrade, 2018

9   Lozanoska Aleksandra, Djambaska Elizabeta, Piperkova Irina, Employment aspects related to quality of life in North Macedonia, Journal of Sustainable Development, Vol. 12, Issue 28, June 2022, page 38-55

10 UDK 330.59:331.5(497.7) https://doi.org/10.54442/JSD221228038l

11 Lozanoska Aleksandra, Djambaska Elizabeta, Economic Growth and Unemployment: An Empirical Analysis (A Case Study on the Republic of Macedonia), Economic Development, Journal of the Institute of Economics – Skopje, year 16 No. 3 December, Skopje, 2014

12 Lozanoska Aleksandra, Djambaska Elizabeta, Macroeconomic Assumptions for the Employment Policy in the Republic of Macedonia, Journal of the Institute of Economics – Skopje, year 17 No. 1-2 June 2015, p. 343-360, Skopje, 2015

13 Ministry of Finance of the Republic of North Macedonia http://www.finance.gov.mk

14 (access date 15.2.2022)

15 National Bank of Republic of North Macedonia http://www.nbrm.mk (access date 9.2.2022)

16 Piperkova Irina, Djambaska Elizabeta, Lozanoska Aleksandra, Quality of education – the core value of human capital, Economic Development, Journal of the Institute of Economics – Skopje, year 24 No.1, p. 175-189 April, Skopje, 2022

17 State Statistical Office of Republic of North Macedonia. http://www.stat.gov.mk (access date 10.2.2022)

18 The World Data Bank, https://www.enterprisesurveys.org/en/methodology (access date 12.4.2022)

19 The World Bank Group, North Macedonia, Enterprise Surveys, 2020, www.enterprisesurveys.org (access date 12.4.2022)