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## THE ROLE OF MANUFACTURING SECTOR TO ECONOMIC GROWTH IN NORTH MACEDONIA

### Abstract

*The main aim of the paper is to examine the performance of the manufacturing sector as a potential driver of economic growth in North Macedonia. The empirical research applies the comparative analysis of manufacturing sector performance, and growth sources sectoral approach for measuring the contribution of the manufacturing sector in the growth rate of GDP for the period 2002-2022. The results of the empirical analysis show a significant increase in the relative share of the manufacturing sector in GDP from 8.4% in 2002 to 13.1% in 2022 after the process of de-industrialization in the initial transition period. Additionally, the empirical analysis indicates a significant positive impact of the manufacturing sector on the economic growth of the country in the analyzed period. The country has slightly changed the unfavorable industrial structure by moving from clothing and garments to the automotive and machinery sector and it has recorded a significant improvement in the productivity level of the manufacturing sector measured by the gross added value per worker (from 3,026 US\$ in 2002 to 14,464 US\$ in 2022). However, these trends are still not enough to push forward the country's development process. Hence, the paper suggests that the policymakers should create a new approach based on industrial policy that will support modern re-industrialization by accelerating structural changes and by supporting new productive investments and technology transfer. This process is the best alternative for achieving sustainable economic growth of the country and a way for speeding up the convergence path toward the EU level of GDP per capita in the medium and long run.*

**Keywords:** Manufacturing sector, single regression analysis, sectoral approach growth accounting, North Macedonia

**JEL Classification:** O40, O14, O25.

## УЛОГА ПРОИЗВОДНОГ СЕКТОРА ЕКОНОМСКОМ РАСТУ У СЕВЕРНОЈ МАКЕДОНИЈИ

### Апстракт

Главни циљ рада је да се испита учинак производног сектора као потенцијалног покретача економског раста у Северној Македонији. Емпириско истраживање примењује упоредну анализу учинка производног

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сектора, и анализа извори раста секторски приступ за мерење доприноса производног сектора у стопи раста за период 2002-2022. Резултати емпириске анализе показују значајно повећање релативног удела производног сектора у БДП са 8,4% у 2002 на 13,1% у 2022 години након процеса деиндустријализације у почетном прелазном периоду. Поред тога, емпириска анализа указује на значајан позитиван утицај производног сектора на економски раст земље у анализираном периоду. Земља је незнатно променила неповољну индустријску структуру преласком са текстил и одеће на аутомобилски и машински сектор и забележила је значајно побољшање нивоа продуктивности производног сектора мерењем бруто додатом вредношћу по раднику (са 3.026 УС \$ у 2002. на 14.464 УС \$ у 2022. години). Међутим, ти трендови још увек нису доволни да би се погурао развојни процес земље. Стога рад сугерише да би креатори политике требало да створе нови приступ заснован на индустријској политици која ће подржати модерну реиндустријализацију убрзавањем структурних промена и подршком новим продуктивним инвестицијама и трансферу технологије. Овај процес је најбоља алтернатива за остваривање одрживог економског раста земље и начин да се средњорочно и дугорочно убрза пут приближавања нивоу БДП по глави становника.

**Кључне речи:** Производни сектор, јединствена регресивна анализа, рачуноводство раста сектора, Северна Македонија

## Introduction

Academic and scientific debate regarding the role and importance of the manufacturing sector for economic growth exists for a long time. Some older studies indicate that since the beginning of the industrial revolution, the manufacturing sector has had a key role in achieving long-term economic growth (Corwall, 1977; Kaldor, 1967). In fact, the success of Germany, Japan, and the United States after the Second World War is due precisely to the building of a strong processing sector. Very similar is the situation with the countries of East Asia in the aftermath of the 1960s that based the key to their impressive success on export-oriented industrialization.

The recent empirical literature confirms the validity of the thesis that manufacturing is a fundamental factor of growth. Namely, the results of these researches suggest that countries with a greater share of industry in GDP and employment noted more dynamic growth rates (Felipe, 1998; Tregenna, 2009). This correlation between the manufacturing sector and economic growth is even stronger in countries where the level of human capital is higher which indicates that modern industrialization is the key for more dynamic economic development. Additionally, the new industrial revolution based on the new technologies will significantly increase the productivity of the already existing industrial branches and will encourage the creation of new industrial branches and products with higher complexity and sophistication, which, as a final effect, will have a return to the dominant role of the industry in the new developmental economic models (Rodrik, 2014). Hence, the new industrial policy should be focused on increasing productivity level in the existing industrial branches and supporting new technology-intensive industrial branches (Réka et al., 2023).

Having in consideration that the manufacturing sector is important for economic growth, the main objective of the paper is to investigate the performance of the manufacturing sector and economic growth in North Macedonia. To fulfill this objective, we use several indicators including the added value of the manufacturing sector, the relative share of the manufacturing sector in GDP, the contribution of the manufacturing sector in economic growth, as well as, the level of productivity of each manufacturing subsectors. The empirical research is based on comparative analysis including benchmark countries from WB and SEE regions, growth sources sectoral approach, and single-country regression analysis to investigate the impact of manufacturing sector performance of economic growth for the period 2002-2022. North Macedonia as a post-transition country in the transition period towards a market-based economy has gone through the process of de-industrialization (decreasing the relative share of manufacturing in the GDP) without any significant improvements in the industrial structure. However, the FDI inflows in the last decade has slightly changed the unfavorable industrial structure and improved to some extent the industrial performance, but it is still not enough for pushing forward the country's development process.

The paper is structured as follows. In section 2, we briefly review existing empirical literature related to manufacturing sector and economic growth. The main empirical analysis including the explanation of the methodology, data, as well as the results and discussion, then appear in the section 3 and section 4, while the last section 5 presents our concluding remarks and some policy recommendations based on the empirical analysis.

## Literature Review

The theoretical and empirical literature show that the manufacturing sector has an important role in economic growth (Rodrik, 2013b). Unlike the findings of the positive link between the manufacturing sector and growth, such a strong causal relation is not found between the service sector and growth (Szirmai and Vespagen, 2015). Even some studies of India, as a country that, largely based its growth on the service sector, showed that the processing sector remained an extremely important segment for the growth of the country (Kathuria and Raj, 2013; Ray, 2015).

There are more explanations why the manufacturing sector is so significant for economic growth. First, the manufacturing sector generates statically and dynamically growing economies of scale. Mass production enables per-unit product cost reduction, where specialization increases labor productivity which de facto leads to a more efficient allocation of resources (Rosenstein-Rodan, 1943; Kaldor, 1968). Exploiting the opportunities of economies of scale in the manufacturing sector exists even for small economies with limited domestic demand through the possibility of placing production on foreign markets. This kind of possibility is limited in most of the services, except for those that are subject to trade.

Second, the manufacturing sector provides opportunities for substantial capital accumulation. The manufacturing sector is much more capital-intensive compared to the agricultural and service sectors (Hoffman, 1958; Chenery et al., 1986; Szirmai, 2012).

Third, the fact that the manufacturing sector is capital-intensive indicates that precisely in this sector technological progress is the most significant. Namely, modern

production today is increasingly based on modern technology which simultaneously makes the industry R&D-intensive. This is also the case in some parts of the agriculture sector (biotechnology and bioengineering) and service sector (ICT), however, the application of new technology and R&D activities is most present in the manufacturing sector (Lapova and Szirmai, 2014).

Fourth, the manufacturing sector has a strong reproduction connection with other sectors of the economy through vertical (“backward” and “forward”) and horizontal industrial links. Namely, the products in the processing industry are not sold only to the final consumers, but very often they are used in other sectors, thus creating complementarity and links between the various sectors in the economy. In this way, an opportunity is created for the exchange of knowledge and technology between the sectors and for generating external (multiplicative) effects from the economic activities of one sector, for the entire economy (Hirschman, 1958; Nurkse, 1953).

Fifth, the manufacturing sector has the largest advantages from the price and income elasticity. Namely, as income grows, the demand for industrial products increases, but at the same time, the demand for inputs that are needed to produce those products. If the country is not industrialized, it will face the need for greater import of industrial products that will lead to a deterioration of the balance of payments.

The new global trends have brought significant changes in the conditions, due to which existing models, which in the past provided significant convergence of developing countries towards highly developed economies, are no longer useful and functional. Namely, the manufacturing sector has become increasingly more capital-intensive with the dominant role of the newest modern technologies, which largely replace labor, and that reduces its power to absorb more workforce. Additionally, although global supply chains encourage the manufacturing sector, they give a very small opportunity to the countries that do not have many production capabilities to create local added value. All this led to a process of premature deindustrialization in developing countries and questioned the model of growth based on industrialization, through which most of today's developed countries have gained that status. (Rodrik, 2016; Palma, 2005). These new global conditions have prompted some economists to think that the manufacturing sector has lost its power and that in modern terms, the service sector will be the future engine and driving force of growth. However, such theses are naive and, largely, wrong, and, in addition, they could be supported by several arguments. Namely, there are at least three reasons why the service sector could not replace the processing industry as the basic driver of growth. First, those segments of the service sector that are subject to trading and which tend to rise in international trade are sectors that require highly skilled workers. In fact, banking, finance, and insurance, together with information, communication technologies, and business services, as services that are subject to trading, are characterized as highly productive service activities where real wages are quite high. However, these service activities are not available for a larger number of developing countries due to the fact that they are faced with high rate of low-skilled and insufficiently trained workforce that could not meet the requirements of these sectors. Therefore, these service activities in these countries could not absorb much of the supply of labor.

Hence, it could be concluded that in the service sector, there is a trade-off between absorption power for advanced technology and absorption power for the workforce. Namely, those services that are subject of trading (financial sector, information,

communications, and business services) had the opportunity for a continuous increase of productivity through the implementation of new technology, but on the other hand, because of their demands for highly skilled and trained workers, do not have the capacity to absorb higher rate of labor supply. On the other hand, services that are not subject to trading (wholesale and retail, administrative and auxiliary service activities) have the ability to absorb a higher rate of labor supply, but on the other hand do not possess a large capacity for technological improvements as a precondition for productivity growth (Rodrik, 2013a).

Second, most of the workforce in the service sector in developing countries today is located in services that are not subject to trading and in non-market services (public health, education, social work, public administration, and defense), and the activities in these sectors are characterized by a relatively lower level of productivity. Much less favorable is the fact that these services are facing serious obstacles in their growth and development, in those countries which have a small market and limited domestic demand. In fact, their productivity is largely determined by the productivity of the entire economy.

Third, today, it is less possible to make a difference between some types of services and the processing industry, such as companies in the manufacturing sector. Due to the greater specialization in primary production, a growing part of the services related to the production process are left to the service sector, thus creating production-related services (Manyika et al., 2012). These production-related services such as business services (accounting, legal, consulting, marketing and promotion, branding, and other services), transport services (internal and external transport, freight forwarding, storing, etc.), engineering services (designing, researching and developing of new products, maintaining and repairing) and other general services (security, maintenance of hygiene, food, etc.), absorb a significant part of the workforce and in the statistics are recorded as an added value in the service sector.

Practically, this is one of the reasons why in the past period a significant decrease in the added value of the manufacturing sector at the expense of the service sector was noticed, without taking into account that part of those services (production-related) were created by the processing industry and their potential for development is largely determined by the development of the processing sector.

All the above-elaborated reasons lead to the conclusion that it is very difficult to expect, especially in the case of small economies, that a service-led model of growth will be able to provide high and sustainable growth rates and new employments in a way that the model of growth based on the manufacturing sector has done it in the past (Rodrik, 2014). The above-mentioned arguments that the old growth models based on industrialization are no longer functional in the new global conditions (although in the past period this model has given exceptional results in many countries that through the process of industrialization accelerated the growth and significantly increased their GDP per capita) and the arguments that neither service-led growth can be the true alternative solution to the previous models, the question arises which is the right path to be followed by countries aspiring to intensify their growth in the coming period?

Perhaps the most valid answer to this question is the new structural economy. Namely, according to this theory, industrialization remains the most important factor for future growth, but the difference is that this approach pays much more attention to the industry and export structure (Lin and Monga, 2011; Lin and Chang, 2009; Lin

and Treichel, 2014). This theory shows that the productivity level of the manufacturing sector and the export structure are the main determinants of long-run economic growth (Hausmann et al., 2007; Felipe, 2013; Timmer et al., 2014a). There are many empirical evidence about the importance of export structure and export complexity for economic growth including for CEE countries (Lazarov and Petreski, 2023). Hence, the main recommendation for supporting long-run economic growth according to this theory is encouraging the process of modern re-industrialization by redirecting resources from industry branches with lower added value to sectors with higher productivity and export diversification by increasing the number of export products that are characterized by greater complexity and sophistication.

## Research and Methodology

The empirical analysis of manufacturing sector performance is based on several indicators. One of the standard indicators for measuring the manufacturing sector's performance is the added value of the manufacturing sector and the relative share of the manufacturing sector in GDP.

A more important indicator for measuring the manufacturing sector performance is the level of productivity measured as the gross added value per worker in each manufacturing subsectors (food and drinks, chemicals and pharmaceuticals, garments and cloths, leather plastic and rubber, wood and furniture, basic metals and fabricated metals, non-metal minerals, machinery, electro, automotive industry) according to the national classification of industrial branches.

We apply comparative analysis in order to examine the manufacturing sector performance in North Macedonia compared with other countries in the Western Balkan (WB) and broader South-East European (SEE) region measured by the relative share of the manufacturing sector in GDP in each country.

Additionally, we apply single-country regression analysis to investigate the influence of the manufacturing sector in stimulating long-run economic growth in North Macedonia for the period from 2002 to 2022, as a post-transition period.

$$GDPpc_t = \alpha_0 + \alpha_1 GDPpc_{t-1} + \alpha_2 M + \alpha_3 F + e_t \quad (1)$$

where,  $GDP_{pc_t}$  is the logarithm of GDP per capita,  $GDP_{pc_{t-1}}$ , is the logarithm of GDP per capita in the previous time period,  $M$  refers to the relative share of the manufacturing sector in GDP, while  $F$  represents the other growth determinants such as human capital, investments, FDI inflows, financial intermediation, and inflation rate.

Finally, we explore the contribution of the manufacturing sector to economic growth in North Macedonia and for that purpose we apply a sectoral approach of growth source estimation where we analyze the structure of the economy at the sectoral level and the contribution of each sector in the country's growth. The sectoral approach identifies the contribution of individual sectors (agriculture; manufacturing and non-manufacturing industrial sectors; as well as, the services sector including market and non-market services).

Below is the question for the sectoral-based approach of growth sources estimation:

$$g_Y = \sum_{(2)} r_i = \sum s_i g_i$$

where,  $g_Y$  is the growth rate of the economy,  $r_i$ , is the absolute contribution of the  $i$ -th sector to the GDP growth rate,  $g_i$ , refers to the growth rate of the  $i$ -th sector in the economy, while  $s_i$ , shows the relative share of each individual sector in GDP.

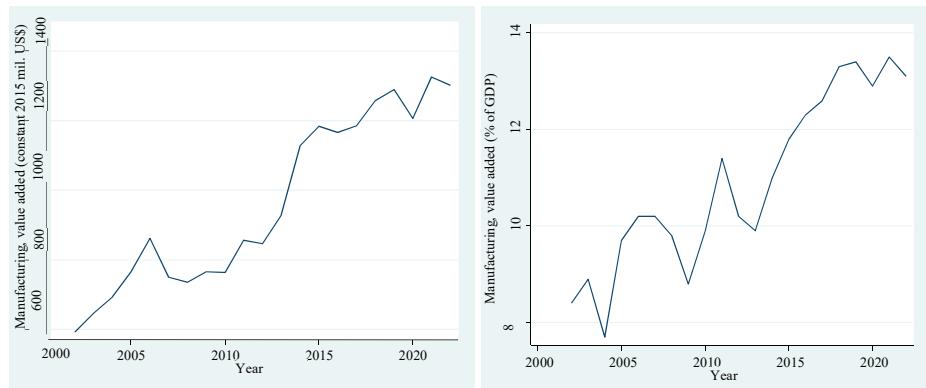
## Findings and Discussions

In the first part of the empirical research, we analyze the long-run trend of manufacturing performance measured by the added value of the manufacturing sector and the relative share of the GDP of the country in the period 2002-2022. North Macedonia has had an unsatisfied positive trend in manufacturing sector in the first part of the analyzed period (from 8.4% relative share of manufacturing sector in GDP in 2002 to 10.2% in 2012), while in the second part of the analyzed period it is recorded more significant positive trend of added value of manufacturing sector and increasing trend of relative share of manufacturing sector in GDP (from 10.2% relative share of manufacturing sector in GDP in 2012 to 13.1%).

This positive trend is largely due to the FDI inflows in the last decade which have slightly improved the manufacturing sector performance.

Below in Figure 1 are presented the trends of the gross added value of the manufacturing sector and the relative share of manufacturing in GDP.

**Figure 1. Panel A - Gross added value of the manufacturing sector, (million US\$) and Panel B – The relative share of the manufacturing sector in GDP (%) in North Macedonia**



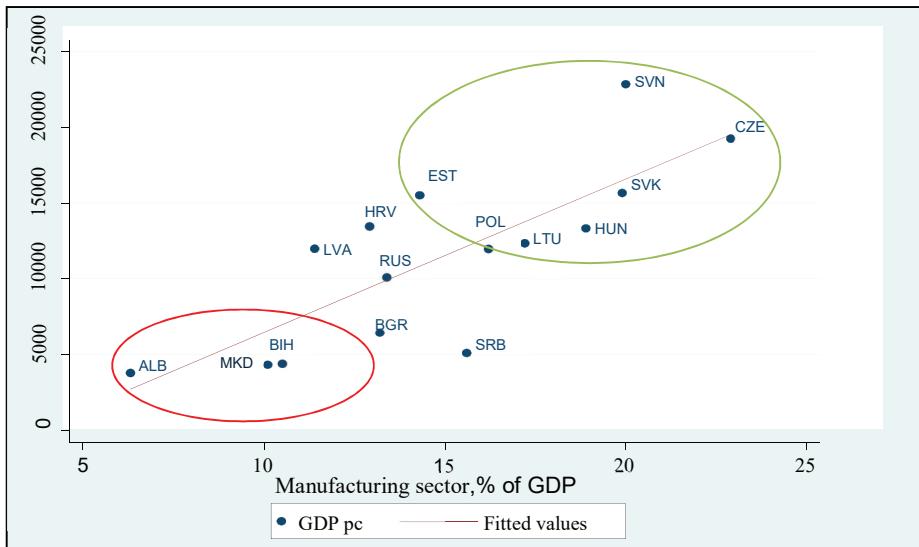
*Source: Author's calculation based on the World Bank database*

However, it is still not enough compared with the other more developed countries within the CEE region. For illustration, according to World Bank database the relative

share of the manufacturing sector in GDP in North Macedonia has reached level of 13.1%, which is below the EU average of 15%. This level is significantly higher in the more developed countries in the CEE region, such as Slovenia (19%), Slovakia (20%), Czech Republic (21%), Hungary (17%), and Poland (18%).

Figure 2 presents the relationship between the relative share of the manufacturing sector in GDP and the level of GDP per capita in selected CEE countries including North Macedonia.

**Figure 2.** Manufacturing sector (% of GDP) in CEE countries



Source: Author's calculation based on the World Bank database

The comparative analysis shows strong significant correlation between the relative share of manufacturing sector in GDP and the level of GDP per capita. Actually, the more industrialized countries such as Slovenia, Slovakia, Hungary, Poland, Estonia are in the same time more developed ones, and vice-versa, less industrialized countries such as Albania, Bosnia and Herzegovina, Bulgaria, North Macedonia and others have significantly lower level of GDP per capita.

The second part of the analysis of manufacturing sector performance refers to the number of employees in the manufacturing sector and the productivity level measured as added value per worker. The results show positive trends that are insufficient to change the unfavorable situation in the structure of employees within the country.

**Figure 3.** Productivity and employees in manufacturing sector in North Macedonia

Source: Author's calculation based on the World Bank database

Actually, despite the fact that the number of employees in the manufacturing sector in the analyzed period has increased for 34,187 new jobs (from 121,066 in 2002 to 155,253 in 2022), this growth in the number of workers in the manufacturing sector is significantly lower in relation to more than 180,000 newly created jobs in the service sector (especially in non-market services and services that are not subject of trading) for the same period.

The relatively small number of created new jobs in the manufacturing sector could not contribute to more significant structural changes in the national economy, especially given the fact that the large part of the labor force is still stuck in the agricultural sector (11.5%), construction (7%), and some branches in the service sector such as wholesale and retail trade with more than 15% (State Statistical Office of the Republic of North Macedonia). However, the level of productivity of the manufacturing sector (measured as added value per worker) in the analyzed period is significantly improved (from 3,026 US\$ in 2002 to 14,464 US\$ in 2022) which indicates that there are significant structural changes within the manufacturing sector. One of the main reasons for these significant improvements in the productivity level of the manufacturing sector is the FDI inflows predominantly in automotive and machinery sectors as high-added value sectors.

Below are presented the results of the analysis of manufacturing sector performance and structure in the period 2002-2022.

**Table 1.** Gross added value, productivity per worker and number of employees in individual industrial branches, 2002 and 2022

Sector	Relative share in manufacturing sector, %		Number of employees, %		Productivity level, US \$	
	2002	2022	2002	2022	2002	2022
Clothing	15.4	4.5	26.2	22.1	2,301	6,408
Food sector	17.1	11.9	13.3	14.7	4,012	11,310

Fabricated metals	4.9	3.6	8.1	5.6	2,863	12,087
Metals	5.3	7.6	5.7	4.0	799	19,519
Leather sector	2.5	0.4	3.4	2.0	1,245	5,714
Tobacco products	7.0	4.1	4.0	2.1	5,440	18,099
Textile	2.8	3.5	4.5	6.7	1,731	11,087
Non-metallic minerals	6.0	3.6	5.5	2.2	3,164	34,544
Rubber and Plastic	3.7	2.6	4.4	3.1	3,040	14,010
Furniture	1.2	1.2	2.5	3.9	2,110	6,900
Electrical equipment	6.2	4.4	4.3	3.7	1,047	18,059
Drinks	6.2	3.6	2.0	2.2	19,775	29,570
Wood and paper industry	2.5	1.8	4.3	3.2	2,656	10,700
Machinery sector	0.6	29.8	1.3	1.8	969	53,549
Automotive industry	3.0	11.0	2.5	15.4	1,439	9,934
Chemical industry	1.4	1.0	0.9	0.7	9,444	29,320
Pharmacy	3.5	2.8	1.5	1.7	6,425	43,809

*Source: Author's calculation based on State Statistical Office of the Republic of North Macedonia*

The data presented in the Table above show that clothing has the highest drop of the relative share in manufacturing sector in the country (from 15.4% in 2002 to 4.5% in 2022), while the highest growth has been recorded in the machinery sector (from 0.6% in 2002 to 29.8% in 2022) and automotive sector (from 3% in 2002 to 11% in 2022).

Finally, we investigate the contribution of each individual sector in the growth rate of the country with specific focus on the contribution of manufacturing sector on economic growth. The results show that the services sector has the largest relative contribution to the rate of economic growth (72.5%), while the contribution of agricultural sector is 5.5% and the contribution of the whole industry is 22%.

The contribution of the manufacturing sector is 15.5%. The mining and energy sector has a negative contribution to the GDP growth (-4%), while the relative contribution of the construction sector is 10.5% indicating that this sector is still important for the Macedonian economy, compared with the agricultural sector which has a significantly lower contribution to the economic growth of the country (only 5.5%).

According to the estimated results, we could point out that the ICT sector has a significant contribution to economic growth of 13.2%. This sector is characterized as a sector with the high level of productivity and relatively high average wages.

The financial sector is also an important services sector with a relative contribution to GDP growth of 8.9%, while the largest relative contribution to economic growth have the wholesale and retail trade; transport and storage; accommodation facilities, and food service activities sectors (25.9%).

**Table 2.** Sector based approach of growth sources in North Macedonia

Sector	2002-2022			
	Growth rate, %	Relative share in GDP, %	Absolute contribution%	Relative contribution%
A. Agriculture, forestry and fisheries	1.3%	8.2%	0.2%	5.5%
B, C and D. Mining and quarrying; Electricity, gas, water, steam and air conditioning supply	-4.6%	3.3%	-0.1%	-4.0%
C. Manufacturing sector	4.3%	9.7%	0.4%	15.5%
F. Construction	4.7%	8%	0.3%	10.5%
E, H and Z. Wholesale and retail trade; repair of motor vehicles and motorcycles; Transport and storage; Accommodation facilities and food service activities	4.6%	17.1%	0.7%	25.9%
S. Information and communications	8.3%	5.1%	0.4%	13.2%
I. Financial and insurance activities	5.1%	5.4%	0.2%	8.9%
Other services sectors: J. Activities related to real estate; K and L. Professional, scientific and technical activities; Administrative and support service activities; Q, M and N. Public administration and defense; compulsory social security; Education; Activities of health and social care; W, O and P. Art, entertainment and recreation; Other service activities; Activities of households as employers; activities of households that produce various goods and perform various services for their own needs	1.8%	31%	0.5%	19.2%
Net taxes on products	2.1%	12.2%	0.2%	5.3%
Added value	2.9%	87.8%	2.6%	94.7%
Gross domestic product	2.8%	100%	2.8%	100%

*Source: Author's calculation based on State Statistical Office of the Republic of North Macedonia*

Finally, in the table below we present the estimated results of singly country regression analysis where we investigate the link between manufacturing sector performance and economic growth in North Macedonia for the period 2002-2022.

The estimated results indicate strong and statistically significant correlation between manufacturing sector performance measured by the growth of the added value of the manufacturing sector and the growth of real GDP. The regression coefficient is 0.191 and it is statistically significant at a 5% significance level. Additionally, the results show a positive correlation between investments (measured by the growth of gross fixed capital

formation), FDIs (measured by the growth of FDI inflows), human capital (measured by the human capital index), and growth of real GDP. However, the estimated results have not found any significant relation between inflation rate and economic growth.

**Table 3.** Manufacturing sector performance and economic growth

<b>Dependent Variable:</b> Real GDP Variables:	(1)	(2)	(3)
Real GDP (t-1)	0.431** (.000)	0.437** (.000)	0.573** (.000)
Manufacturing sector performance	0.191*** (.000)	0.190** (.000)	0.152** (.000)
Human capital	1.156** (.011)	1.122** (.011)	1.175** (.011)
Investments	0.137** (.000)	0.136** (.000)	0.089** (.000)
Inflation rate		0.000** (.705)	-0.001** (.419)
FDIs			0.013** (.000)
Adj-R <sup>2</sup>	0.988	0.997	0.996

**Note:** \*\*\*statistical significance at the 1% level, \*\*significance at the 5% level, \*significance at the 10% level (in parenthesis are p-values).

*Source: Author's calculation*

The specification tests that have been conducted after the estimations indicate that the models are well specified and the conclusions based on the estimated results are fully valid. The results of Ramsey's Regression Error Specification test show that the model is well specified, while Breusch-Pagan test shows that there is no heteroscedasticity

## Conclusions

The paper explores the influence of manufacturing sector performance on economic growth in North Macedonia. North Macedonia has recorded a trend on industrialization after the transition period where the manufacturing sector has been destroyed. The FDI inflows in the last two decades have had a positive impact on increasing the relative share of the manufacturing sector in GDP and improving the productivity level of this sector by changing the unfavorable industrial structure. The country has slightly changed the unfavorable industrial structure by moving from textile and garments to the automotive and machinery sector and it has recorded a significant improvement in the productivity level of the manufacturing sector measured as gross added value per worker (from 3,026 US\$ in 2002 to 14,464 US\$ in 2022). These improvements in the manufacturing sector's performance have had a positive impact on the economic growth in North Macedonia.

The empirical research applies the comparative analysis of manufacturing sector performance including benchmark countries from WB and SEE region, growth sources sectoral approach for measuring the contribution of the manufacturing sector in the

growth rate of the country, as well single-country regression analysis to investigate the impact of manufacturing sector performance of economic growth for the period 2002–2022.

The results show a significant increase in the relative share of the manufacturing sector in GDP from 8.4% in 2002 to 13.1% in 2022. However, it is still not enough compared with the other more developed countries within the CEE region. For illustration, according to the World Bank database, the relative share of the manufacturing sector in the EU is 15%, while it is significantly higher in the more developed countries in the CEE region such as Slovenia (19%), Slovakia (20%), Czech Republic (21%), Hungary (17%), Poland (18%).

The results based on the sectoral approach of growth sources analysis indicate a significant contribution of the manufacturing sector to the GDP growth in the analyzed period in North Macedonia. Actually, the relative contribution of the manufacturing sector in the rate of economic growth in the analyzed period is 15.5% ranking this sector as the second largest sector in terms of contribution in GDP growth after the wholesale and retail trade sector. Additionally, the estimated results of the single-country regression analysis show a strong positive and statistically significant relationship between the manufacturing sector and economic growth. The regression coefficient is 0.191 and it is statistically significant at a 5% significance level. Additionally, the estimated results show a positive impact of investments (measured by the growth of gross fixed capital formation), FDIs (measured by the growth of FDI inflows), and human capital (measured by the human capital index) on the growth of real GDP. However, the estimated results have not found any significant impact of the inflation rate on economic growth.

Finally, the paper gives some suggestions to policymakers to put more effort into the process of modern re-industrialization by accelerating the structural changes and supporting the new productive investments and technology transfer. This process is the best alternative for achieving sustainable economic growth in the country and speeding up the convergence toward the EU level of GDP per capita in the medium and long run.

## References

- Chenery, H., Robinson, S. & Syrquin, M. (1986). *Industrialization and Growth: A Comparative Study*. Oxford Press, Oxford.
- Cornwall, J. (1977). *Modern Capitalism: Its Growth and Transformation*. London, Martin Robertson.
- Kaldor, N. (1967). Strategic Factors in Economic Development. New York State School of Industrial and Labor Relations. Ithaca, NY.
- Kaldor, N. (1968). Productivity and growth in manufacturing industry: A reply. *Economica*, 35(140), 385–91.
- Kathuria, V. and Raj, R. N. (2013). Is Manufacturing an Engine of Growth in India in the Post-Nineties?, *Journal of South Asian Development*, 8(3), 385-408.
- Hausmann, R., Hwang, J. & Rodrik, D. (2007). What you export matters. *Journal of Economic Growth*, 12, 1–25. <https://doi.org/10.1007/s10887-006-9009-4>

- Hoffmann, W.G. (1958). *The Growth of Industrial Economics*. Manchester, Manchester University Press, XIII p.183 p., 25/-.
- Hirschman, A. (1958) *The Strategy of Economic Development*. Yale University Press, New Haven.
- Lavopa, A, and Szirmai, A. (2014). Structural modernization and development traps: An empirical approach. UNU-MERIT Working Paper 2014-076. United Nations University - Maastricht Economic and Social Research Institute on Innovation and Technology.
- Lazarov, D and Petreski, P. (2023) Export Complexity and Economic Growth: Empirical Analysis for Selected CEE Countries, *Croatian Economic Survey Journal*, 25(2), 41-65.
- Lin, J.Y. and Chang, H.J. (2009). Should industrial policy in developing countries conform to comparative advantage or defy it? A debate between Justin Lin and Ha-Joon Chang, *Development Policy Review*, 27(5), 483–502.
- Lin, J.Y. and Monga, C. (2011). Growth identification and facilitation: The role of the state in the dynamics of structural change. Policy Research Working Paper 5313. World Bank. Washington, DC.
- Lin, J.Y. and Treichel, V. (2014). Making industrial policy work for development. In: Salazar-Xirinachs JM, Nübler I, and Kozul-Wright R, eds. *Transforming Economies: Making Industrial Policy Work for Growth, Jobs and Development*. International Labour Organization. Geneva: 65–78.
- Manyika, J., Sinclair, J., Dobbs, R., Strube, G., Rassey, L., Mischke, J., Remes, J., Roxburgh, C., Kate, G., O'Halloran, D., Ramaswamy, S. (2012). *Manufacturing the future: The next era of global growth and innovation*, McKinsey Global Institute.
- State Statistical Office of the Republic of North Macedonia, <https://www.stat.gov.mk/>
- Nurkse, R. (1953). *Problems of Capital Formation in Underdeveloped Countries*. Oxford: Oxford University Press.
- Palma, G. (2005). Four sources of “de-industrialization” and a new concept of the “Dutch-disease.” In: Ocampo JA, ed. *Beyond Reforms, Structural Dynamics and Macroeconomic Vulnerability*. Stanford University Press. Stanford, CA. Available at <https://openknowledge.worldbank.org/handle/10986/7378>
- Ray, A.S. (2015). The Enigma of the ‘Indian Model’ of Development,” Centre for International Trade and Development, Jawaharlal Nehru University, New Delhi Discussion Papers 15-01, Centre for International Trade and Development, Jawaharlal Nehru University, New Delhi, India.
- Rodrik, D. (2014a). Industrial Policy: Don’t Ask Why, Ask How, *Middle East Development Journal*, 1-29
- Rodrik, D. (2013a). Unconditional Convergence in Manufacturing, *The Quarterly Journal of Economics*, 128(1), 165–204.
- Rodrik, D. (2013b). Structural change, fundamentals, and growth: An overview. Institute for Advanced Study. Princeton, NJ.

- 
- Rodrik, D. (2014b). Are services the new manufactures? Project Syndicate. October 13. Available at <https://www.project-syndicate.org/commentary/are-services-the-new-manufactures-by-dani-rodrik-2014-10>.
- Rodrik, D. (2016). Premature deindustrialization. *Journal of Economic Growth* 21, 1–33.
- Rosenstein-Rodan, P. (1943). Problems of industrialisation of Eastern and South-eastern Europe, *Economic Journal*, 53, 202–11.
- Réka, J., Nathan J. L., & Rodrik D. (2023). The New Economics of Industrial Policy,”NBER Working Papers 31538, National Bureau of Economic Research, Inc.
- Tregenna, F. (2009). Characterising deindustrialisation: An analysis of changes in manufacturing employment and output internationally, *Cambridge Journal of Economics*, 33(3), 433-466
- Timmer, M.P., de Vries G, & de Vries K (2014b). Patterns of structural change in developing countries. GGDC Research Memorandum 149. Groningen Growth and Development Centre, University of Groningen.
- Szirmai, A. and Verspagen, B. (2015) Manufacturing and Economic Growth in Developing Countries, 1950-2005. *Structural Change and Economic Dynamics*, 34, 46-59. <https://doi.org/10.1016/j.strueco.2015.06.002>
- Szirmai, A. (2012). Industrialisation as an engine of growth in developing countries, 1950–2005, *Structural Change and Economic Dynamics*, 23(4), 406-420.

