

UNVEILING NATIONAL COMPETITIVENESS: DRIVERS AND IMPACTS ON PRODUCTIVITY³

Unlike competition at the level of businesses, national competitiveness represents the ability of nations to deliver products and services into international markets to increase the progress and well-being of their residents. Cross-country data on the main drivers is used to estimate competitiveness empirically. The study employs survey data from the World Economic Forum's Executive Opinion Survey (EOS) as well as a useful dataset of indicators from Our World in Data. The study will use econometric models to investigate the most influential factors in national competitiveness. The data was analyzed using panel data and hierarchical regression. The main competitive drivers and our dependent variable of GDP per employed worker among the working-age population are found to have a positive relationship in this study. The results of the study show that microeconomic factors like business sophistication, technological readiness, efficiency, flexibility, and quantity of education have a positive effect on output per employed worker.

Keywords: national competitiveness; productivity; business environment; output per employed worker; microeconomic factors

JEL: J21; J24; N90; O12; O44; C23

1. Introduction

In recent years, the concept of competition triggered by international competition between countries competing to achieve economic superiority has attracted attention. The progress of the international market has increased scientists and experts are concerned about competition. According to Eckinger et al. (2013), national competitiveness is defined as “the ability of a country (region, place) to achieve Porter's (1990) goal of providing services to its population above GDP.” Competitiveness is the result of the country's ability to achieve or maintain a better position compared to other countries in the main market.

The Organization for Economic Co-operation and Development (OECD) (1992, p. 237) defines competition as "a country producing goods and services that meet and at the same time control the needs of the international market through free and fair trade", and where the

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real market expands" people's long-term income. The World Economic Forum (WEF) in its Global Competitiveness Report (2017-2018, p. 11) define competitiveness as „the set of institutions, policies, and factors that determine the level of productivity of an economy, which in turn sets the level of prosperity that the economy can achieve“. "International trade has increased the importance of competition and requires a good understanding of the factors affecting the country's competitive position on the world stage. This article focuses on the evaluation of microeconomic factors affecting national competition. Ghosh (2022) examines the concept of productivity (output per worker) and argues that although it is widely used by workers and professionals, it is an imperfect and inadequate measure of economic performance. Delgado, Ketels, Porter, and Scott (2012) analyzed 8 years of data (2001-2008) from 104 countries and found a positive relationship between employee productivity and many variables, such as talent, use of technology, business sophistication, labour market efficiency, financial management, and business practices. The variations in export among countries can be attributed to the varying levels of productivity of firms (Kolarov et al., 2021). Research from Vesal et al., (2013) has shown a positive and significant relationship between labour market efficiency and business sophistication in improving national competitiveness among different countries around the world. Further, they confirm that the development of each of these two pillars causes the promotion of other pillars and causes improved competitiveness ranking position among the nations of the world. Kirikkaleli & Ozun (2019) found a positive relationship between innovation capacity, business sophistication, and macroeconomic stability in OECD countries, finding that improving business sophistication leads to increased innovation capacity and supports macroeconomic stability in the long run. This demonstrates the interconnectedness and importance of microeconomic factors in driving economic growth and development. By focusing on enhancing both aspects, countries can effectively boost their competitiveness on a global scale. Ultimately, investing in these pillars can lead to sustainable economic success and higher rankings in the global marketplace. While improving business sophistication, higher education, financial development, labour market efficiency, goods market efficiency, and innovation may lead to increased productivity and macroeconomic stability in countries, it may not necessarily result in improved national competitiveness globally as other factors such as political stability, infrastructure, and workforce skills also play crucial roles in determining a country's competitiveness ranking. Additionally, the impact of microeconomic factors on productivity may vary depending on the specific industry or sector being analyzed.

In this research, first of all, the share of different groups in the business environment and our changes due to us will be examined. We will test the level of stability per driver and their impact on GDP per employed worker. Focusing on, the analysis primarily contributes to the understanding of key microeconomic factors related to productivity. Policymakers also need to understand the impact of each piece of competition on the business, which can be done by carefully analyzing the business and the market. This article firstly devotes itself to finding the relationship between empirical data of 130 different indicators.

Labour productivity is the dependent variable that our model will attempt to explain through a comprehensive analysis of the factors affecting it, such as technology, education levels, and business practices. By understanding these relationships, businesses, and policymakers can make more informed decisions to enhance productivity and overall economic performance. To test this framework, our analysis uses 130 business climate indicators and sustainability

indicators for 124 countries between 2007 and 2017. This study includes the World Economic Forum dataset and Public Resources from Our World in Data.

In the first part of this article, we examine the evolution of the concept from focusing on "inputs" to the country's competitiveness to focusing on "outputs". The second part of the article

describes the methods and techniques used in the article. In the third part of this article, we use panel data analysis to examine the relationship between outcomes and factors of competition. Chapter 4 presents the main findings and conclusions of this study.

1.1 Factors of National Competitiveness

One of the main questions in economics since the days of Adam Smith is why some countries prosper and others fail in an environment where competition is the driving force of the economy (Berger, 2008). "The result of this competition is that successful companies or new businesses can increase their business, reduce their average costs, and reduce costs for customers" (Greene et al., 2007).

Paul Krugman said that the concept of national competition is a "dangerous idea" or a trivial and fragile concept (Kettels, 2016). He believes that the definition of national competition is more controversial than the definition of competitors because countries "do not go out of business." He also pointed out that focusing on the idea of competition in the country is very dangerous because countries that want to improve competition will enable the government to use bad money, may lead to conservation and commercial transactions, and may cause economic decline. The result may be poor public policy. Despite Krugman's criticisms, many scholars still accept the concept of national competitiveness as the main driver of national prosperity and economic growth (Porter, 1990; Schwab, 2018). There are two different perspectives on national competitiveness: price/export and production (Ketels, 2016). The level of housing costs in a location affects a company's ability to compete profitably in the international market. These areas are considered "competitive" if the macroeconomic magnitudes are equal.

A place's ability to create value depends on its productivity. Much of the literature considers productivity to be important in explaining national differences in well-being (Lewis, 2004; Grover et al., 2022). Many experts associate the concept of competition with the concepts of rivalry and rivalry on the site. The only problem in competition policy is often the interest in foreign competition. Productivity is a determinant of long-term success and is therefore an important goal for policymakers. However, considering the importance of production, paying attention to the price level is essential (Kettels, 2016). The basic debate over the word "competition" has not changed much since the early 1990s. It also follows the method described above. However, there are some changes worth mentioning according to these two dimensions: First, the ideas that are starting to be applied to the national economy are increasingly being applied to other areas, especially the local one (Ketels, 2014). Second, there is a growing debate about whether GDP per capita is an appropriate measure of the region's standard of living. The main purpose of this is to promote production in terms of competition (Aiginger, 2015). The prosperity and productivity achieved by a country are

variably measured by changes in GDP per capita. But in addition to these changes, there is also a debate about how the GDP indicator (Stiglitz et al., 2009) could be modified to better measure life. Measures other than inequality and GDP are at the centre of this debate. Large differences in labour productivity and labour mobility across countries are related to differences in GDP per capita.

1.2 Macroeconomic competitiveness

According to Acemoglu and Robinson (2019), international business companies need to create support and social opportunities, and thus achieve business success.

Institutional dimensions examined in the literature include law (Haggard and Tiede, 2011), rule of law (Acemoğlu, 2003), good governance (Kaufmann et al., 2008), and the impact of corruption (Mauro, 1995; Mungiu-Pippidi and Hartman, 2019). Sachs (2005) carefully examines education, healthcare, and public safety as other aspects of the overall healthcare system that are necessary to encourage development. If the majority of the population cannot read and write, their ability to participate in the economy is severely limited.

If malaria or HIV/AIDS epidemics meant that most of society had to focus on health management, then there was no hope that they would do so; it was better (Lorentzen et al., 2008). Warfare, domestic violence, and high crime rates also reduce business development opportunities. However, empirical support for the relationship between safety and productivity is limited (Stone, 2006). Another aspect of macroeconomic competition, namely fiscal and monetary policy, is the focus of much public debate (Fischer, 1993). The data shows a clear impact on the short-term market but weak long-term productivity. The main reason for this is that differences between the quality of financial management and the use of funds can be well explained by differences in organizational quality (Acemoğlu et al., 2003).

1.3 Microeconomic competitiveness

Microeconomic factors are factors that have a direct impact on sustainable production and employment support. Increasing production makes the country more competitive internationally, which affects its success. The policy literature often distinguishes between material (often coming from government investments) and incentives (competition, openness) as factors that lead to positive outcomes. Porter (1990) integrates strategic products, incentives, and other dimensions of the National Business Environment (NBE) into a comprehensive plan, capitalizing on local needs and influencing and stimulating business (Porter, 1990).

Conditions (quality and quantity) directly affect production and marketing. Physical development plays an important role in productivity, although the magnitude of the effect remains controversial (Calderon and Servén, 2004; Lee et al., 2020). Good access to capital is important for companies to make the long-term investments necessary to increase productivity (Levine, 2005). However, Aghion et al. (2018) found that access to credit has two effects on productivity growth.

The quantity and quality of workforce training, higher education, management training, and business research contribute to labour productivity (Barro, 2002; Gennaioli et al., 2011; Ferguson and Roof, 2020), as do the broader institutions and policies supporting innovation (Furman et al., 2002). Lifelong learning is extremely important in the changing global economy, and countries that encourage and provide opportunities for education and training over the entire life cycle benefit from skilled human capital capable of generating added value, resulting in a more competitive economy and productivity (Dima et al. 2018).

Janukait and Uien (2018) found from data and statistical analysis that intellectual capital is associated with almost everything that affects regional competitiveness. Another important input to business productivity and new business formation is the quality of administrative practices, such as low startup costs (Branstetter et al., 2010; World Bank, 2010a). The vitality of competition affects the entry of new firms, the exit of underperforming old firms, and the performance patterns across existing firms (Bloom and van Reenen, 2007). Company productivity is also strongly related to the set of incentives and rules that govern local competition. High levels of competition in local markets are crucial for high performance (Lewis, 2004). The owners of firms receiving the incentives benefit directly from productivity and demand spillover (Slattery & Zidar, 2020). Labour market policies are important for the productivity of companies as well as for labour force mobilization, but there remain significant disagreements about the role of specific policies (OECD, 1994; Criscuolo et al., 2012; World Bank, 2011). Research by Vesal et al. (2013) found an important relationship between the business sophistication sub-indices and labour market efficiency sub-indices, and they have a direct effect together. They also found a positive and significant relationship between labour market efficiency and business sophistication in improving national competitiveness among different countries around the world.

An important factor not only for the company's performance but also for the health of competition is the company's ownership (private or state ownership; group or corporate) (Bena and Xu, 2017). Opening up to international trade through trade and investment allows the country to develop local products, expand local businesses with top-quality products, acquire more knowledge and technology from abroad, and expose local businesses to a higher level of competition. Several studies using firm data, including MacGarvie (2006) and Branstetter (2006), have shown that trade has a positive impact on a country's knowledge transfer and firm innovation. However, empirical data on long-term differences in productivity and openness to growth at the country level yield mixed results. Many researchers have found a positive relationship between openness and success (Manyika, 2011; Justiniano, 2010). Technological innovation is key for SME growth, with factors like workforce competence and social relationships playing a role. Collaboration and technology transfer are recommended for SMEs to improve productivity and competitiveness (Prasanna et al., 2019).

The economic literature has given far less attention to demand conditions across all factors. Market data that has been available for some time has shown that strict local regulations that anticipate future changes and opportunities in other markets can encourage companies to innovate and create a valuable international position. These new regulations can provide the best results for companies to pay attention to (Esty and Porter, 2005; Porter and van der Linde, 1995).

Another aspect of the business environment that directly affects the company's efficiency is the existence and business support of relevant business groups. Clusters are collections of companies, suppliers, service providers, and related organizations in a specific area, connected by various types of external networks and connections (Porter, 1990). The existence of strong clusters allows companies to achieve better productivity and increase regional performance (Delgado et al., 2014). Additionally, Moretti (2021) found that regional integration may be beneficial for producers who move to places where producers in the same region are more concentrated.

Finally, the effectiveness and efficiency of a company's marketing and strategy (COS) in a country's operations, including production, marketing strategies, practices, and degree of integration, vary from place to place (Porter, 1996; Bloom & van Reen, 2007). Gosnell et al. (2020) tested the relationship between diversity management and productivity in a pilot project and found significant productivity improvements. Therefore, part of the production gap across the country is due to poor management of local companies. Although it is clear that a business's productivity is the result of its companies' products, the impact of this internal control has received little attention in business scholarship. Recent research shows that management complexity varies even in countries with similar economic integration (Porter et al., 2007; Bloom and van Reenen, 2007; Freeman and Shaw, 2009; Delgado, 2010).

1.4 Endowments

All people have talents, given and received. Success is directly related to these benefits, such as sales of natural products. Therefore, for our empirical analysis, we need to control for the impact of these values when estimating the role of competition in the economy. The monetary value of the endowment will be affected by the preferred law in each country. A country's competitiveness lies in maximizing the value of its resources by improving the business environment. But while gifts such as natural resources can have a direct impact on productivity, they can also lead to competition through political bias and influence economic policy (Arezki and van der Ploeg, 2007).

Previous studies show that geography, natural resources, and country size are factors affecting success (Delgado et al., 2012). A country's location affects the ease of trade, for example, due to long travel distances from the coast or proximity to major markets (Boulhol et al., 2008). Geography also influences patterns of disease transmission and colonization, which in turn influence historical and contemporary institutions. A large country can attract foreign direct investment into the local economy and achieve economies of scale in areas such as R&D (Romer, 1990). Larger countries may have an easier time investing, even if they are less competitive. However, empirical studies show that small countries prefer openness more than large countries or find no evidence of the impact of large businesses on the administrative functions of organizations (Hall and Jones, 1999). In this article, we use the size of the country as a gift, represented by the population. Based on this literature review, we formulate the following hypothesis:

H1 = Higher education and training, labour market efficiency, goods market efficiency, financial development, business sophistication, and innovation factors have a positive impact on the GDP per employed worker.

2. Objectives and Methodology

Reliable international data on these factors is needed for an empirical analysis of competition. Over the past few years, the knowledge available in many different areas, especially in microeconomic competition, has undoubtedly improved. This study draws on all available data to calculate our measures of microeconomic and macroeconomic competitiveness, using a rich data set of 130 indicators across 124 countries. Countries with incomplete data are removed from further analysis, and finally, the dataset from the World Economic Forum is reduced to 124 countries. In addition to public sources from the World Economic Forum's Executive Opinion Survey (EOS), we used data from Our World in Data. EOS research has begun to include a variety of microeconomic indicators that allow annual assessment of the impact of the business environment not only on microeconomics but also on business transactions in countries around the world (Porter, 2004). This study examines the individual role each of the competitive bottom factors plays in productivity and the business's ability to support its employees. Estimating various aspects of the country's economic environment and market to understand the factors that stimulate productivity is an interesting topic of policy debate in many countries.

An important feature of EOS is that the respondents are managers of companies that record the decisions of participants in the economy of the country under study. Participants rated each question using a 7-point Likert scale. The number of countries covered by EOS has changed over time. The countries covered increased from 76 countries in 2001 to 152 countries in 2008. There are an average of 80 participants per year per country, with larger countries having more participants. The average response rate across the country is approximately 40%. To calculate representative country-year averages for each indicator, individual responses were averaged using a weighted average (Browne, 2008). There may be biases and measurement errors in the evaluation of the quality of some indicators in countries with a good economic situation (Delgado, 2010). However, the study also uses hard data based on the World Bank's Doing Business Indicators, which measure differences in the cost of doing business within a country. These components of NBE (mainly strategic and competitive strategies and concepts) have high correlation coefficients with our main variables and give a good name to microeconomic outcomes. The macroeconomic environment includes 32 indicators (11 of which are hard data indicators) that include all three dimensions: health and education, political institutions (decision-making and management's respect for performance), and the rule of law (security, corruption, and the rule of law), effectiveness of the legal process). The paper also uses 68 microeconomic indicators, including five dimensions: company performance and strategies; conditions; needs; business support; categories; strategy; and competition. Data for the dependent variable of GDP per employed worker and the control variable of the population are retrieved from the database Our World in Data.

The best measure of output per worker, widely used in many fields, is the logarithm of purchasing power parity (ppp) adjusted for GDP per capita of working age (15–64 years). In our dataset, there are 152 countries, and the average GDP per employed worker is 49353.1470 (see Table 1.0).

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
GDP per employed worker	1364	1820.27	275388.70	50659.80	41482.09
Valid N (listwise)	1364				

Panel data or pooled data (Gujarati & Porter, 2009) enable the movement over time of cross-sectional units. There are mainly three types of panel data analytic models: (1) models with constant coefficients (pooled regression); (2) models with fixed effects; and (3) random effects models. This paper uses the first estimation method, even though it ignores time and space because we are interested in coefficient estimation. However, the other two methods are more powerful for panel data analysis. As dependent variables in the model, the study will use GDP per employed worker. The pooled regression model with two predictors has this form:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + u_{it}; i = 1, 2, \dots, N; t = 1, 2, \dots, T. (1)$$

where i represents cases and t represents time.

The empirical model of the hierarchical regression equation using the specified aggregated main pillars of the WEF and Our World in Data datasets includes the following variables: Y = Ln GDP per employed worker (dependent variable), X_1 (institutions), X_2 (infrastructure), X_3 (macroeconomic environment), X_4 (health and primary education), X_5 (higher education and training), X_6 (goods market efficiency), X_7 (labour market efficiency), X_8 (financial market development), X_9 (technological readiness), X_{10} (business sophistication), X_{11} (innovation) as independent variables, and C_1 (Ln population) as the control variable. The following coefficients will be estimated: $\beta_0, \beta_1, \dots, \beta_{11}, \gamma_1, \gamma_2$. The hierarchical regression is structured as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \gamma_1 C_1 + \varepsilon$$

Where:

Y = Ln GDP per employed worker

$X_1, X_2, \dots, X_{11}$ are independent variables representing macroeconomic and microeconomic factors.

C_1 = Ln Population (control variable)

$\beta_0, \beta_1, \dots, \beta_{11}$ = coefficients representing the effect of each independent variable and dependent variable.

γ_1 and γ_2 are coefficients representing the effect of each control variable on the dependent variable.

ε = error term accounting for unexplained variance.

The hierarchical regression model aims to assess the relationship between the dependent variable (Ln GDP per employed worker) and the independent variables while controlling for the effects of the control variable. The model would be built in steps, with each step adding a set of independent variables while controlling for the effects of the control variables. The steps are structured as follows:

Step 1: Entering the control variable (Ln Population) into the regression equation.

Step 2: Enter the independent variables related to basic economic factors (institutions, infrastructure, macroeconomic environment, health, and primary education).

Step 3: Include the independent variables related to microeconomic factors (higher education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, business sophistication, and innovation).

After testing the basic regression assumptions of normality, linearity, multicollinearity, and heteroscedasticity, we run the analysis to test the empirical model. The variance inflation factor (VIF) was applied to diagnose the possibility of multicollinearity among all the explanatory variables. A VIF less than 5 indicates that there is no serious multicollinearity. All of the VIF values were < 5 in this study, except business sophistication and goods market efficiency. To test for multicollinearity between sub-indices, we used the VIF method. Most of the variables are under the accepted range except business sophistication and innovation, and market size which is excluded from further analysis because of high values of VIF. GDP per employed worker and population are transformed to Ln because of the violation of the assumption of normality.

At each step, the model assesses the additional variance explained by the newly added set of independent variables while controlling for the effects of variables entered in previous steps. This hierarchical approach allows for the identification of the most significant factors influencing Ln GDP per employed worker, considering the various economic, social, and institutional dimensions captured by the independent variables.

3. Results and Discussion

As prior studies suggest, there is a strong positive relationship between broad or main pillars and GDP per employed worker (Dima et al., 2018; Delgado & Mercedes, 2012; Prasanna et al., 2019). As reflected in the literature, the causes of competitiveness are usually attributed to the effects of an aggregate of factors rather than the impact of any individual factor. First, our basic regression model incorporates the following broad micro factors: higher education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, business sophistication, and innovation. The study further includes in the analysis individual micro factors to explore the differences between broad categories.

The analysis of panel regression, including broad categories or main pillars from the GCI dataset and our dependent variable from Our World in Data, controlling for the Ln population, shows a positive relationship between higher education and training,

technological readiness, and business sophistication, supporting other studies (Gosnell et al., 2020; Moreti, 2020; Janukait & Uien, 2018). Labour market efficiency and innovation are negatively related to GDP per employed worker ($B = -.321$, $B = -.460$), and goods market efficiency is not significant ($=0.257$) at $p < 0.05$.

Table 2. Panel data regression between broad categories of micro factors and Ln GDP per employed worker as dependent

		B	Std. Error	Beta	t	Sig.
1	(Constant)	12.839	.285		44.979	.000
	Lnpopulat	-.149	.017	-.227	-8.547	.000
2	(Constant)	8.255	.224		36.914	.000
	Lnpopulat	-.067	.010	-.103	-6.999	.000
	Higher educat. and training	.565	.034	.524	16.756	.000
	Goods market efficiency	-.067	.059	-.036	-1.134	.257
	Labor market efficiency	-.321	.036	-.166	-9.044	.000
	Financial market develop.	.131	.030	.093	4.312	.000
	Technological readiness	.394	.033	.431	12.025	.000
	Business sophistication	.492	.063	.338	7.821	.000
	Innovation	-.460	.045	-.373	-10.264	.000

a. Dependent Variable: Lngdpperemployed

The second step includes in the model micro factors higher education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, and innovation and sophistication factors. The first step in hierarchical regression analysis is to identify the most important independent variable or variables and enter them into the regression equation first. Subsequent variables are then added in subsequent steps to see how they contribute to explaining additional variance in the dependent variable. This allows for the assessment of how much additional variance in the dependent variable is explained by each additional independent variable. In hierarchical regression analysis, independent variables are entered into the regression equation in a specific order, with each subsequent variable added after controlling for the effects of the variables that were entered earlier. This allows researchers to assess the incremental predictive power of each variable and determine how much variance in the dependent variable is explained by each variable.

Hierarchical regression analysis is often used in research to explore complex relationships between variables and to identify the most important predictors of a particular outcome. By controlling for the effects of other variables, researchers can more accurately assess the unique contribution of each variable to the prediction of the dependent variable.

The effect of adding the group of microeconomic variables to the model is expressed through R^2 change. The output table of the ANOVA indicates a significant R^2 change of 0.055.

The results in Table 4.0 are in line with other studies (Dima et al., 2018; Prasanna et al., 2019; Vesal et al., 2019; Kirikkaleli & Ozun, 2019) showing the significant positive relationship between higher education and training, financial market developments, and sophistication factors to GDP per employed worker, significant at $p < 0.05$.

Labour market efficiency, goods market efficiency, and technological readiness are negatively related to our dependent variable.

The third model, after running hierarchical regression, shows a positive relationship between all of the macroeconomic variables except institutions after including microeconomic variables in the model. The R square change between model two, or macroeconomic variables, and model three, which includes microeconomic factors, is 0.055 (.830-.775). This is a low R square change, but the results show a strong positive relationship between higher education and training, financial development, and business sophistication. Meanwhile, the variance of the dependent variable explained by microfactors is 83%. Further, the analysis shows that including microeconomic factors in the model decreases the importance of institutions ($p = .147$). The explanation could be that, due to the influence of microfactors or business practices, the importance of institutions weakens.

Table 3. Hierarchical Regression broad aggregated categories or main pillars Ln GDP per employed worker as dependent

		B	Std. Error	Beta	t	Sig.
1	(Constant)	12.839	.285		44.979	.000
	Lnpopulat	-.149	.017	-.227	-8.547	.000
2	(Constant)	7.435	.209		35.575	.000
	Lnpopulat	-.090	.009	-.137	-10.067	.000
	Institutions	-.142	.028	-.119	-5.107	.000
	Infrastructure	.515	.025	.598	20.824	.000
	Macroecon. environment	.182	.017	.155	10.531	.000
	Health and primary educ.	.378	.025	.316	15.241	.000
3	(Constant)	8.245	.230		35.779	.000
	Lnpopulat	-.082	.010	-.125	-8.418	.000
	Institutions	-.052	.036	-.044	-1.451	.147
	Infrastructure	.227	.029	.263	7.931	.000
	Macroecon. environment	.181	.015	.155	11.724	.000
	Health and primary educ.	.096	.029	.081	3.364	.001
	Higher educ. and training	.402	.040	.373	10.011	.000
	Goods market efficiency	-.214	.059	-.114	-3.598	.000
	Labor market efficiency	-.295	.033	-.153	-8.851	.000
	Financial market develop.	.104	.029	.074	3.584	.000
	Technological readiness	.248	.034	.271	7.300	.000
	Business sophistication	.435	.060	.299	7.290	.000
	Innovation	-.375	.045	-.304	-8.291	.000

a. Dependent Variable: Lngdpperemployed

Table 5. presents our main results on the relationship between individual subcategories of indicators of the GCI dataset and GDP per employed worker. The analysis examines the effects of microeconomic competitiveness. We found a positive and robust relationship between most of the sub-aggregated indicators and the dependent variable.

Table 4. Output table of R change after including micro factors.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.227	.051	.051	1.02334
2	.880	.775	.774	.49935
3	.911	.830	.829	.43474

Each broad factor in the GCI dataset comprises subcategories, further represented by the individual variables. We tested the relationship between subcategories and GDP per employed worker to find the influence of subcategories. The results show a positive relationship between the quantity of education, flexibility, technological adoption, ICT use, and business sophistication. Flexibility is a sub-indices of labour market efficiency which comprises further individual indicators (cooperation in labour-employer relations, hiring and firing practices, the flexibility of wage determination, the effect of taxation on incentives to work, redundancy costs, weeks of salary) and is positively related to GDP per employed worker and significant at $p < 0.05$.

Table 5. OLS Regression micro subcategories, GDP per employed worker as Dependent

		B	Std. Error	Beta	t	Sig.
1	(Constant)	12.827	.333		38.539	.000
	Lnpopulat	-.146	.020	-.225	-7.227	.000
	(Constant)	8.026	.239		33.621	.000
2	Lnpopulat	-.057	.010	-.088	-5.843	.000
	A. Quantity of education	.249	.013	.422	18.454	.000
	B. Quality of education	-.044	.034	-.036	-1.307	.192
	C. On-the-job training	.003	.055	.002	.062	.951
	A. Competition	-.064	.047	-.034	-1.377	.169
	Quality of demand conditio.	-.164	.058	-.098	-2.802	.005
	A. Flexibility	.117	.025	.068	4.595	.000
	B. Efficient use of talent	-.387	.027	-.268	-14.167	.000
	A. Efficiency	.178	.035	.128	5.072	.000
	Trustworthiness and confid.	-.009	.022	-.007	-.394	.693
	A. Technological adoption	.335	.041	.227	8.091	.000
	B. ICT use	.188	.018	.318	10.627	.000
	Business sophistication	.462	.084	.318	5.525	.000
	Innovation	-.110	.048	-.090	-2.283	.023

a. Dependent Variable: Lngdpperemployed

This study aims to find different underlying factors affecting the dependent variable of the study. The results of the regression output in Table 3. are in line with other studies (Delgado et al., 2010).

Almost all aggregated indicators have a statistically significant ($p < 0.05$) relationship with GDP per employed worker. We find that macroeconomic competitiveness, especially institutional factors, has a positive impact on country output per potential worker. This is consistent with prior work on the role of institutional factors in explaining productivity (e.g., see La Porta et al., 1998; Hall and Jones, 1999; Acemoglu et al., 2001; Balázs, 2016; Castelnovo et al., 2019). However, with the inclusion of micro factors, the role of institutions

weakens, and the effect of other macro variables (infrastructure, macroeconomic environment, and health and primary education) remains positive and significant. This is the main finding of this study based on the results of the hierarchical regression analysis. Business sophistication, technological readiness, and higher education and training are positively related to productivity. That is also an indication of the strong influence of the microeconomic environment on the GDP per employed worker.

In addition to other studies, this research paper tests the relationship between our dependent variable and each of the individual indicators. To examine whether the microeconomic environment has a separate positive influence, we put in the analysis only microeconomic sub-aggregated indicators. This time, we run hierarchical regression with macroeconomic indicators as control variables and hierarchical analysis with two blocks of indicators divided into microeconomic subcategories. Among the key individual subcategories of indicators (significant at $p < 0.05$) contributing to this significant positive relationship to the GDP per employed worker are quantity of education, flexibility, technological adoption, ICT use, and business sophistication.

Factor conditions, the quality and sophistication of company operations and strategies, organizational practices, and the context for strategy and rivalry are dimensions that directly influence labour productivity. However, almost all of the macroeconomic categories are significantly related positively to the GDP per employed person, implying the influence of macroeconomic drivers on productivity.

These results show that higher education and training, financial market developments, and sophistication factors are good predictors of GDP per employed worker. However, the effect of the microeconomic environment is in conjunction with the broader context of macroeconomic factors. Microeconomic dimensions are important drivers if primary education, institutions, health, and macroeconomic environment have been developed to the point of enhancing the effect of microeconomic factors pertinent to productivity.

From the output table 5.0, it is clear that the microeconomic environment has a strong positive relationship with our dependent variable. It is argued that microeconomic underlying variables play a significant role in productivity. This study supports the prior findings of an important influence of the microeconomic environment on GDP per employed worker. With $R^2 = 0.830$, all microeconomic aggregated indicators are significant at $p < 0.05$. Positively related to GDP per employed worker are: business sophistication, technological readiness, efficiency, flexibility, ICT use, and quantity of education.

The relationship between independent variables and dependent variables was tested for significance through hierarchical regression analysis. Table 3.0 provides the results of the analysis. After including the second block of microeconomic factors in the model, the broad macroeconomic factors are almost all statistically significant, except institutions ($p < 0.147$), whereas the control variable of the Ln population is negatively related to our dependent variable.

Research on the effect of quality and quantity of education on economic growth, using cross-country evidence, from Castello & Hidalgo (2012) shows that this effect depends on the stage of development. Within a category, numerous individual indicators are highly correlated and

related to the underlying phenomenon of labour productivity. The large number of observations across the period of 2007–2017 makes it possible to include many variables in the process of estimation. The regression analysis with individual indicators is consistent with previous analysis with broad groups of indicators and sub-groups. The analysis of individual indicators is included in the appendix section at the end of the references page. The individual indicators statistically significant to GDP per employed worker are secondary education enrollment, gross %, tertiary education enrollment, gross %, quality of math and science education, availability of research and training, no. days to start a business, buyer sophistication, financing through the local equity market, individuals using the Internet, int'l internet bandwidth, kb/s per user, production process sophistication, capacity for innovation, quality of scientific research institutions, gov't procurement of advanced tech.

4. Conclusions

While confirming previous findings on the role of broad institutional circumstances, this study found that the microeconomic environment has a separate and robust positive effect on productivity, even after controlling for population, current institutional conditions, the macroeconomic environment, and monetary and fiscal policy. The main finding of this paper based on hierarchical regression is the relationship between institutions and GDP per employed weakens after controlling for macro factors in the model. The reason could be of decreasing importance of the institutional environment after countries reach a level of development. After that point, productivity is more dependent on other microfactors. The research paper from Delgado and Mercedes (2012) uses only broad aggregated economic indicators. This study is the first to our best knowledge to incorporate all microeconomic indicators from the GCI dataset and GDP per employed worker. Paying attention to the complex concept of competitiveness at the country level, the challenge for the researchers lies in obtaining a profound understanding of the pertinent factors determining country-level competitiveness. The study looks at productivity as a measure of competitiveness – GDP per employed worker.

Drivers of the GDP per employed worker are in line with other studies (Dima et al., 2019; Castelnovo et al., 2019; Prasanna et al., 2019). Positively related to higher education and training, financial market development, technological readiness, and business sophistication. Microeconomic variables negatively related to GDP per employed worker are labour market efficiency, goods market efficiency, and innovation. The authors of the paper emphasize that microeconomic drivers should be evaluated in association with other categories of factors and that states must cooperate for sustained fundamental competitive performance. First, the key role of regional and national institutions in increasing the productivity of the labour force is to design rules supportive of the development of higher education and training, the quality of math and science education, strengthening relations in labour-employer cooperation, the availability of research and training, enabling venture capital availability, the quality of scientific research institutions, and ensuring the quality of management schools. Firms, including internationally competitive companies, on the other hand, need to improve organizational practices and the quality and sophistication of company operations and strategies. They must concentrate on the degree of customer orientation, capacity for

innovation, production process sophistication, extent of staff training, firm-level technology absorption, and willingness to delegate authority. Such consolidated endeavours lead to the evolution of the competitiveness of a whole economy. Second, the evaluation of our productivity measure-dependent variable, GDP per employed worker, indicates a wide range of individual indicators. Many microeconomic dimensions should be prioritized, including demand conditions, science and innovation infrastructure, strategy and operational effectiveness, supporting and related industries and clusters, communications infrastructure, capital market infrastructure, administrative procedures, organizational practices, and the context for strategy and rivalry. While investing in communications infrastructure and streamlining administrative procedures can certainly improve productivity, it is important to consider the potential negative effects of increased competition on workers, such as job insecurity and wage suppression. Additionally, focusing solely on microeconomic dimensions may overlook broader societal impacts and inequalities that can arise from prioritizing efficiency over other social considerations.

This paper aids in understanding and increasing the knowledge of the foundational microeconomic factors contributing to the development of productivity and national competitiveness. Because of their geographic location and various underlying factors, further research should focus on the role of the microeconomic environment in sub-national regions. Another limitation of this study is that the dataset is only for 11 years. Future studies could use new releases of data and combine them with different data from other sources.

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APPENDIX

Table 6. regression analysis of micro individual factors

		B	Std. Error	Beta		
1	(Constant)	12.839	.469		27.355	.000
	Lnpopulat	-.146	.029	-.230	-5.115	.000
2	(Constant)	10.522	.426		24.714	.000
	Lnpopulat	-.097	.018	-.153	-5.302	.000
	Secondary education enrollment, gross %*	.008	.001	.208	7.327	.000
	Tertiary education enrollment, gross %*	.009	.001	.250	7.536	.000
	Quality of the education system, 1-7 (best)	-.272	.055	-.238	-4.912	.000
	Quality of math and science education	.138	.043	.126	3.200	.001
	Quality of management schools, 1-7 (best)	-.019	.044	-.016	-.443	.658
	Internet access in schools, 1-7 (best)	-.048	.037	-.053	-1.303	.193
	Availability of research and training	.174	.061	.139	2.844	.005
	Extent of staff training, 1-7 (best)	-.028	.077	-.018	-.367	.714
	Intensity of local competition, 1-7 (best)	-.094	.057	-.051	-1.655	.099
	Extent of market dominance, 1-7 (best)	.071	.045	.050	1.584	.114
	Effectiveness of anti-monopoly policy,	-.244	.059	-.169	-4.152	.000
	Effect of taxation on incentives to invest,	.070	.050	.058	1.389	.166
	No. procedures to start a business*	.000	.007	.001	.033	.974
	No. days to start a business*	.005	.001	.088	4.705	.000
	Agricultural policy costs, 1-7 (best)	-.013	.034	-.008	-.366	.715
	Total tax rate, % profits*	.000	.001	-.002	-.153	.879
	Prevalence of trade barriers, 1-7 (best)	.119	.045	.060	2.645	.008
	Prevalence of foreign ownership, 1-7 (best)	.077	.043	.058	1.795	.073
	Business impact of rules on FDI, 1-7 (best)	-.031	.039	-.024	-.807	.420
	Burden of customs procedures, 1-7 (best)	.052	.044	.042	1.180	.239
	Imports as a percentage of GDP*	-.003	.001	-.088	-4.126	.000

	B	Std. Error	Beta		
Trade tariffs, % duty*	-.017	.005	-.077	-3.331	.001
Degree of customer orientation, 1-7 (best)	-.137	.056	-.088	-2.474	.014
Buyer sophistication, 1-7 (best)	.108	.054	.071	2.012	.045
Cooperation in labor-employer relations,	.001	.047	.000	.015	.988
Hiring and firing practices, 1-7 (best)	.056	.034	.039	1.650	.100
Flexibility of wage determination, 1-7 (best)	.012	.028	.010	.426	.670
Effect of taxation on incentives to work,	.003	.049	.002	.053	.958
Redundancy costs, weeks of salary*	-.001	.001	-.011	-.624	.533
Pay and productivity, 1-7 (best)	-.076	.056	-.048	-1.363	.174
Reliance on professional management,	-.087	.062	-.077	-1.410	.159
Country capacity to retain talent, 1-7 (best)	-.021	.054	-.019	-.386	.700
Country capacity to attract talent, 1-7 (best)	-.024	.044	-.024	-.548	.584
Women in labor force, ratio to men*	-1.407	.113	-.258	-12.456	.000
Affordability of financial services,	.072	.059	.056	1.222	.222
Availability of financial services,	.078	.047	.068	1.659	.098
Financing through local equity market, 1	.196	.040	.174	4.841	.000
Ease of access to loans, 1-7 (best)	-.047	.037	-.041	-1.294	.197
Venture capital availability, 1-7 (best)	-.159	.062	-.111	-2.576	.010
Soundness of banks, 1-7 (best)	-.031	.030	-.030	-1.030	.304
Regulation of securities exchanges,	-.034	.043	-.032	-.794	.427
Legal rights index, 0–10 (best)*	.011	.006	.028	1.721	.086
Availability of the latest technologies,	.074	.072	.063	1.016	.310
Firm-level technology absorption,	-.002	.076	-.001	-.029	.977
FDI and technology transfer, 1-7 (best)	-.026	.060	-.016	-.429	.668
Individuals using Internet, %*	.009	.002	.245	5.577	.000
Fixed broadband Internet subscriptions.	.002	.003	.026	.604	.546
Int'l Internet bandwidth, kb/s per user*	.000	.000	.090	5.489	.000
Mobile broadband subscriptions/100 pop.*	.001	.001	.028	1.079	.281
Local supplier quantity, 1-7 (best)	.025	.063	.012	.393	.695
Local supplier quality, 1-7 (best)	-.088	.086	-.060	-1.017	.310
State of cluster development, 1-7 (best)	.095	.057	.067	1.682	.093
Nature of competitive advantage,	-.048	.045	-.050	-1.073	.284
Production process sophistication,	.405	.077	.394	5.291	.000
Willingness to delegate authority,	.002	.060	.002	.036	.972
Control of international distribution,	-.073	.061	-.046	-1.202	.230
Extent of marketing, 1-7 (best)	-.058	.064	-.041	-.909	.364
Value chain breadth, 1-7 (best)	-.003	.072	-.002	-.046	.963
Capacity for innovation, 1-7 (best)	-.162	.067	-.124	-2.403	.017
Quality of scientific research institutions,	.222	.059	.222	3.746	.000
Company spending on R&D, 1-7	.131	.084	.112	1.559	.120
University-industry collaboration in R&D	-.095	.057	-.081	-1.652	.099
Gov't procurement of advanced tech.	.175	.049	.106	3.609	.000
Availability of scientists and engineers,	-.130	.047	-.087	-2.782	.006
PCT patents, applications/million pop.*	-.001	.000	-.101	-2.895	.004

a. Dependent Variable: Lngdpperemployed