



Research Article

Impact of business environment, entrepreneurship and competitiveness indicators on per capita income

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Abstract: Many parameters effect on the Gross Domestic Product per capita (GDPPC) index of countries. Including population, population growth rate, natural resources, economic growth, business performance, exports and imports, etc. The main purpose of this study is to investigate the impact of business environment, entrepreneurship, and competitiveness indicators on the GDPPC. For this purpose, 42 countries from around the world have been selected and analyzed between 2013 to 2019. World Bank annual reports, Global Competitiveness Index, Global Entrepreneurship Index, and Doing Business reports were used to collect the data. Also the data analysis was done according to the panel data method using Stata software. The results shows that in general, there is a positive relationship between business environment, entrepreneurship, and competitiveness indicators with GDPPC.

Keywords: Competitiveness; Entrepreneurship; Business environment; GDPPC; Panel data

1. Introduction

Per capita income is important because it acts as an indicator of the stability and wealth within a country. Per capita income is a proportion of the amount of all a country's income divided by its population. Thus, per capita income demonstrates standard of living in a region.

The final goal and output of the Global Entrepreneurship Index framework is economic growth and per capita income growth (GEI, 2018). The Global Competitiveness Index also seeks productivity by combining macro and micro indicators through entrepreneurship development and the application of the highest governance standards (GCI, 2018). The World Bank also uses doing business indicators to encourage business start-ups and simplifying of business processes (DB, 2018). Each of these three world-referenced center seeks economic growth in some way. Numerous macro-indicators that affect the economy of a country have been introduced by reliable sources. But it is not clear to us which of them has the greatest impact on per capita income.

On the other hand, studies have been conducted on the factors affecting GDP, which have often been conducted on a country and have identified the internal factors of a country. The results of some of these studies show that the men and women labor force participation, foreign direct investment, inflation rate and the amount of goods and products consumed are effective in per capita growth (Aziz and Azmi, 2017). Some authors also consider employment, activity rate and population ratio as factors affecting per capita income (Marattin & Salotti, 2011). In addition, some authors, in addition to foreign investment, have considered a country's imports and exports to be effective in per capita income growth (Jain, D., Nair, K., & Jain, V. 2015). To solve this problem, according to the Fortune 500 list, we identified three low income, middle income and high income

countries and their rank and score in the indicators of doing business, entrepreneurship and competitiveness during the years 2013 to 2018 from the main sources.

Our study makes multiple contributions. First, we are one of the first studies to concentrate on the relationship between entrepreneurship and business environment indicators and per capita income from an international environmental perspective. Second, we are the first to examine the main macro business and entrepreneurship environment index as a longitudinal study. Third, our factual data results demonstrate that entrepreneurship and doing business environment indexes have a strong positive impact on per capita income.

The remainder of this paper is structured as follows. In Section 2, we provide the theoretical foundations and research background. In Section 3, we describe the research method. We present the data for our empirical analysis along with findings in Section 4 and report the discussion and recommendations in Section 5. And, finally In Section 6, we subject limitations and propose future researches.

2. Research Background

Contingency theory was introduced by Thompson in 1967, and he knows the key to business in how to achieve its goals in an uncertain environment based on rationality. According to Parsons (1960), businesses manage and control their affairs at the three technical, managerial, and institutional levels. These three levels differ in their origin and degree of uncertainty. The underlying assumption in this theory is that in order to achieve rationality and control the activities of the business, the business aims to reduce the impact of uncertainty on the technical core. This policy can only be enforced when the activities related to the supply of product and supply factors are separated from the technical sector, and there is a greater uncertainty over the managerial and institutional levels. The key contingency factors that influence the structure of an organization are uncertainty, complexity, and variability.

According to Scott (1983), institutional theory emphasizes that the organizational environment must be seen in cultural, technical, and economic relations. Organizations and their members are rooted in cultural systems, which include a set of rules, norms, and assumptions about how to govern the world. The origin of the power of cultural dimensions is one of modern beliefs and the other of modern statehood. As a result, the institutional approach directs attention to two aspects: one at the macro-level government structures such as legal systems and the other at the micro-level in daily interactions. In the institutional approach and in the modern state, the forms and sources of beliefs are rationalized and optimized, and beliefs and customs form the basis of rules, laws and regulations. This approach redirects attention from material factors, such as the location of physical or consumer resources, to the government and to specialized and professional individuals because they are directly influenced by the organization through indirect imposition of constraints and requirements. And spreading new logical beliefs are vital.

2.1 Global Competitiveness Index

Global Competitiveness Index is a comprehensive tool for measuring the components of national competitiveness in micro and macroeconomic countries. According to the World Economic Forum, competitiveness is used in the sense of a set of institutions, policies, and factors that determine the level of productivity of countries. On the other hand, the productivity level of each country represents the level of economic prosperity it can achieve. The Global Competitiveness Index includes 12 pillars: Institutions, Infrastructure, ICT adoption, Macroeconomic stability, Health, Skills, Product market, Labor market, financial system, Market Size, Business dynamism and Innovation capability (GCI, 2018).

2.2 Institutions

Institutions include Security, property rights, social capital, checks and balances, transparency and ethics, public-sector performance and corporate governance. By establishing constraints, both legal (laws and enforcement mechanisms) and informal (norms of behaviors), institutions determine the context in which individuals organize themselves and their economic activity. Institutions impact productivity, mainly through providing incentives and reducing uncertainties (GCI, 2018).

2.3 Infrastructure

Infrastructure include the quality and extension of transport infrastructure (road, rail, water and air) and utility infrastructure. Better-connected geographic areas have generally been more prosperous. Well-developed infrastructure lowers transportation and transaction costs, and facilitates the movement of goods and people and the transfer of information within a country and across borders. It also ensures access to power and water—both necessary conditions for modern economic activity (GCI, 2018).

2.4 ICT adoption

ICT adoption include the degree of diffusion of specific information and communication technologies (ICTs). ICTs reduce transaction costs and speed up information and idea exchange, improving efficiency and sparking innovation. As ICTs are general purpose technologies increasingly embedded in the structure of the economy, they are becoming as necessary as power and transport infrastructure for all economies (GCI, 2018).

2.5 Macroeconomic stability

Macroeconomic stability include the level of inflation and the sustainability of fiscal policy. Moderate and predictable inflation and sustainable public budgets reduce uncertainties, set returns expectations for investments and increase business confidence—all of which boost productivity. Also, in an increasingly interconnected world where capital can move quickly, loss of confidence in macroeconomic stability can trigger capital flight, with destabilizing economic effects (GCI, 2018).

2.6 Health

Health-adjusted life expectancy (HALE)—the average number of years a newborn can expect to live in good health. Healthier individuals have more physical and mental capabilities, are more productive and creative, and tend to invest more in education as life expectancy increases. Healthier children develop into adults with stronger cognitive abilities (GCI, 2018).

2.7 Skills

The general level of skills of the workforce and the quantity and quality of education. While the concept of educational quality is constantly evolving, important quality factors today include: developing digital literacy, interpersonal skills, and the ability to think critically and creatively. Education embeds skills and competencies in the labor force. Highly educated populations are more productive because they possess greater collective ability to perform tasks and transfer knowledge quickly, and create new knowledge and applications (GCI, 2018).

2.8 Product market

The extent to which a country provides an even playing field for companies to participate in its markets. It is measured in terms of extent of market power, openness to foreign firms and the degree of market distortions. Competition supports productivity gains by incentivizing companies to innovate; update their products, services and organization; and supply the best possible products at the fairest price (GCI, 2018).

2.9 Labor market

It encompasses “flexibility, namely, the extent to which human resources can be reorganized and “talent management”, namely, the extent to which human resources are leveraged. Well-functioning labor markets foster productivity by matching workers with the most suitable jobs for their skillset and developing talent to reach their full potential. By combining flexibility with protection of workers’ basic rights, well-functioning labor markets allow countries to be more resilient to shocks and re-allocate production to emerging segments; incentivize workers to take risks; attract and retain talent; and motivate workers (GCI, 2018).

2.10 Financial system

The depth, namely the availability of credit, equity, debt, insurance and other financial products, and the stability, namely, the mitigation of excessive risk-taking and opportunistic behavior of the financial system. A developed financial sector fosters productivity in mainly three ways: pooling savings into productive investments; improving the allocation of capital to the most promising investments through monitoring borrowers, reducing information asymmetries; and providing an efficient payment system. At the same time, appropriate regulation of financial institutions is needed to avoid financial crises that may cause long-lasting negative effects on investments and productivity (GCI, 2018).

2.11 Market size

The size of the domestic and foreign markets to which a country’s firms have access. It is proxied by the sum of the value of consumption, investment and exports. Larger markets lift productivity through economies of scale: the unit cost of production tends to decrease with the amount of output produced. Large markets also incentivize innovation. As ideas are non-rival, more potential users means greater potential returns on a new

idea. Moreover, large markets create positive externalities as accumulation of human capital and transmission of knowledge increase the returns to scale embedded in the creation of technology or knowledge (GCI, 2018).

2.12 Business dynamism

The private sector's capacity to generate and adopt new technologies and new ways to organize work, through a culture that embraces change, risk, new business models, and administrative rules that allow firms to enter and exit the market easily. An agile and dynamic private sector increases productivity by taking business risks, testing new ideas and creating innovative products and services. In an environment characterized by frequent disruption and redefinition of businesses and sectors, successful economic systems are resilient to technological shocks and are able to constantly re-invent themselves (GCI, 2018).

2.13 Innovation capability

The quantity and quality of formal research and development; the extent to which a country's environment encourages collaboration, connectivity, creativity, diversity and confrontation across different visions and angles; and the capacity to turn ideas into new goods and services. Countries that can generate greater knowledge accumulation and that offer better collaborative or interdisciplinary opportunities tend to have more capacity to generate innovative ideas and new business models, which are widely considered the engines of economic growth (GCI, 2018).

Competitiveness is related to an increasing standard of living, developing employment opportunities, and the ability of a nation to maintain its international obligations. Competitiveness can be limited as an open market environment, which can produce goods and services that pass the competitiveness test and at the same time maintain and expand domestic real income (Monga & Lin, 2015). A country is said to be competitive if its population can enjoy a high standard of living and increase and its employment opportunities are always high continuously. The WEF publishes the GCI Report every year with the aim of assessing the capacity of the world economy to achieve sustainable economic growth (McArthur & Sachs, 2002). One important component of the GCI Report is to summarize a nation's technological strengths, features of public institutions and the macroeconomic environment. This index underwent a major revision in 2005 due to the inability to capture the effects of globalization. Due to the GCI measures the productivity of a country, it is often interpreted that a country's economic growth can not only be made but also must be sustainable which can be demonstrated by a high index. Therefore, the GCI contains the short-term components and the long-term components that can explain the economic growth potentiality. As claimed by the authors of this index, the GCI can determine the aggregate growth of the economic level (Lopez-Claros et al., 2007). Kordalska & Olczyk (2016) and Martin (2004) state, in fact, most of these pillars are taken from six major economic theories: classical, neoclassical and Keynesian economic theory, development economics, trade theory, and economic growth theory. Therefore, the determinants of economic growth often become "key drivers" simultaneously in the GCI pillars, so it can be said that the GDP growth rate can predict the Global Competitiveness Index (GCI). Vice versa that the GCI can be a good predictor of the GDP growth (Rota, 2013). This statement has been reinforced by Lopez-Claros et al. (2007) which state that GCI can determine the aggregate level of economic growth. Schwab (2015) also argues that a more competitive economy will grow faster over time.

2.14 Doing Business

According to the Doing Business report, 10 indicators of the business environment affect entrepreneurship and business performance (financial and non-financial). Being wealthy, of course, does not mean being in the right position for business ease, as many high-income countries are still far from their ideal location. In fact, less bureaucratic hurdles, powerful legal institutions, and laws and regulations developed based on successful international trade are factors that play a decisive role in the ease of doing business. Here are two examples of Georgia and Macedonia. Since the first Business Ease Report was released in year 2003, Georgia and Macedonia have had the highest rate of reforms among the countries in the world by applying 47 and 41 amendments to business laws, respectively. The result of the reforms was Georgia's rank 9 and Macedonia's rank 11 in the 2018 report.

Each year, the World Bank assesses 10 indicators for countries in its Ease of Business report. These are 10 indicators: "Starting a business", which covers the process, time, cost and minimum capital needed to start a limited liability company. " Dealing with construction permits", which measures the process, time and cost of completing the administrative process of building construction and quality control and safety mechanisms, " Getting electricity " which measures the process, time and cost of connecting to the electricity grid and ensuring electricity supply and tariff transparency, " Registering property" which measures the process, time and cost of the asset transfer and the quality of the property administration system, " Getting credit" which measures the status of the collateral and the credit information system, " Protecting minority investors" which examines the

rights of micro investors in corporate management, "Paying taxes" which reviews payments, timing and compliance with tax laws, "Trading across borders" which measures the time and cost of exporting advantageous goods and importing machinery, "Enforcing Contract" which measures the time and cost of resolving economic disputes and the quality of judicial proceedings, And "Resolving insolvency" which examines the timing, cost, consequences, and rates of economic bankruptcy recovery and the power of the legal framework to deal with bankruptcy. In this report, higher scores and lower ratings mean better economies. Although economies that have the best business laws have different spectra, they have some commonalities, according to the Doing Business. Out of the top 20 ranking countries in 2018, 14 of the high-income countries are members of the Organization for Economic Co-operation and Development, three from Europe and Central Asia, and three from East Asia and Oceania. Also, 18 of the top 20 economies are from the group of high-income countries (Doing Business, 2018).

The issues of business environment are more often taken up in scientific studies in the context of interaction with other subjects or research areas. And so it can affect the business environment on the functioning of companies or on the macroeconomic perspective of the economy (Lizińska, Marks-Bielska, & Serocka, 2014). The prerequisites for seeking the dependence between business environment and economic growth are derived from the theoretical assumptions of institutional economics, international business and entrepreneurship. According to institutional economics, it is quite obvious that the knowledge and understanding of economic processes can only take place through widely defined institutions which encompass not only the economic category but also the legal, political, sociological or organizational categories. The first work on the impact of institutions on economic growth was published at the end of the 1980s. The pioneering work of Kormendi and Meguire (1985) did not confirm fully the hypothesis of the relationship between civil liberty and political rights and economic growth in the 47 countries surveyed. Similar conclusions are drawn from the elaboration of Scully (1988) and Helliwell (1994). Knack and Keefer (1995) have shown that law enforcement institutions are crucial for economic growth. The authors were the first to apply the aggregate measures developed by inter-national institutions: International Country Risk Guide (ICRG) and Business Environment Risk Intelligence (BERI). The 1990s were filled with numerous publications using the Economic Freedom Index by the Fraser Institute, on the basis of which attempts were made to demonstrate the relationship between the regulatory environment and the growth of economy (Ayal & Karras, 1998; Dawson, 1998; Easton & Walker, 1997).

2.15 Global Entrepreneurship Index

The Global Entrepreneurship Index (GEI) is composed of three building blocks or sub-indices: entrepreneurial attitudes, entrepreneurial abilities, and entrepreneurial aspirations. Entrepreneurial attitudes are about how a country thinks about entrepreneurship. These three sub-indices stand on 14 pillars, include: Opportunity Perception, Startup Skills, Risk Acceptance, Networking, Cultural Support, Opportunity Startup, Technology Absorption, Human Capital, Competition, Product Innovation, Process Innovation, High Growth, Internationalization, and Risk Capital. Each of which contains an individual and an institutional variable that corresponds to the micro- and the macro-level aspects of entrepreneurship. Unlike other indexes that incorporate only institutional or individual variables, the pillars of the GEI include both. These pillars are an attempt to capture the open-ended nature of entrepreneurship; analyzing them can provide an in depth view of the strengths and weaknesses of those listed in the Index (GEI, 2018).

2.16 Opportunity Perception

This pillar captures the potential "opportunity perception" of a population by considering the state of property rights and the regulatory burden that could limit the real exploitation of the recognized entrepreneurial opportunity (GEI, 2018).

2.17 Startup Skills

Launching a successful venture requires the potential entrepreneur to have the necessary startup skills. Skill Perception measures the percentage of the population who believe they have adequate startup skills (GEI, 2018).

2.18 Risk Acceptance

Of the personal entrepreneurial traits, fear of failure is one of the most important obstacles to a startup. Aversion to high-risk enterprises can retard nascent entrepreneurship. Risk Perception is defined as the percentage of the population who do not believe that fear of failure would prevent them from starting a business.

Country Risk reflects to transfer and convertibility risk of a country and believed to closely correlate to business (GEI, 2018).

2.19 *Networking*

Networking combines an entrepreneur's personal knowledge with their ability to connect to others in a country and the whole world. This combination serves as a proxy for networking, which is also an important ingredient of successful venture creation and entrepreneurship (GEI, 2018).

2.20 *Cultural Support*

This pillar is a combined measure of how a country's inhabitants view entrepreneurs in terms of status and career choice, and how the level of corruption in that country affects this view (GEI, 2018).

2.21 *Opportunity Startup*

This is a measure of startups by people who are motivated by opportunity but face red tape and tax payment. An entrepreneur's motivation for starting a business is an important signal of quality (GEI, 2018).

2.22 *Technology Absorption*

In the modern knowledge economy, information and communication technologies (ICT) play a crucial role in economic development. Not all sectors provide the same chances for businesses to survive and or their potential for growth. The Technology Level variable is a measure of the businesses that are in technology sectors (GEI, 2018).

2.23 *Human Capital*

The prevalence of high-quality human capital is vitally important for ventures that are highly innovative and require an educated, experienced, and healthy workforce to continue to grow. An important feature of a venture with high growth potential is the entrepreneur's level of education (GEI, 2018).

2.24 *Competition*

Competition is a measure of a business's product or market uniqueness, combined with the market power of existing businesses and business groups and the effectiveness of anti-monopoly regulation (GEI, 2018).

2.25 *Product Innovation*

New products play a crucial role in the economy of all countries. While countries were once the source of most new products, today developing countries are producing products that are dramatically cheaper than their Western equivalents. New Product is a measure of a country's potential to generate new products and to adopt or imitate existing products (GEI, 2018).

2.26 *Process Innovation*

Applying and/or creating new technology is another important feature of businesses with high-growth potential. New Tech is defined as the percentage of businesses whose principal underlying technology is less than five years old (GEI, 2018).

2.27 *High Growth*

High Growth is a combined measure of the percentage of high-growth businesses that intend to employ at least 10 people and plan to grow more than 50 percent in five years (Gazelle variable) with business strategy sophistication (Business Strategy variable) and venture capital financing possibility (Venture Capital) (GEI, 2018).

2.28 *Internationalization*

Internationalization is believed to be a major determinant of growth. A widely applied proxy for internationalization is exporting. Exporting demands capabilities beyond those needed by businesses that produce only for domestic markets (GEI, 2018).

2.29 *Risk Capital*

The availability of risk finance, particularly equity rather than debt, is an essential precondition for fulfilling entrepreneurial aspirations that are beyond an individual entrepreneur's personal financial resources (GEI, 2018).

The relationship between entrepreneurship and economic growth was also analyzed by Galindo and Méndez (2014), who points out that there is a close connection between entrepreneurship, innovation, and economic growth, entrepreneurship and innovation would contribute to the increase of economic activity, and the latter would promote entrepreneurship and innovative activities. In their study, the authors identified a virtuous cycle between innovation, entrepreneurship, and economic growth, in which each of the three factors would have positive effects on the others. Wong et al. (2005) examined the impact of technological innovation and of different types of entrepreneurial activities on GDP growth. The results of the study show that innovation is a positive and significant determinant of GDP growth. With regards to entrepreneurship, the authors find that high-potential entrepreneurial activity influences GDP growth more strongly than other types of entrepreneurial activity. Mueller (2007) tested the West German regions for whether increased entrepreneurship contributes to regional economic growth. Empirical results showed that an increase in the activity of innovative start-ups contributes more to economic growth than to an increase in entrepreneurship in general. Based on the above, it can be concluded that the indicators of competitiveness, entrepreneurship and business environment affect the economic growth of countries. Therefore, the present study was conducted to investigate the effect of these indicators on GDPPC.

According to the above, the research hypotheses are as follows:

Hypothesis 1: The Global Competitiveness Index (GCI) has a positive relationship with the GDPPC.

Hypothesis 2: The Doing Business (DB) index has a positive relationship with the GDPPC.

Hypothesis 3: The Global Entrepreneurship Index (GEI) has a positive relationship with GDPPC.

2.30 Hypothetical Research Model

Based on the hypotheses presented, the hypothetical model of the present study is expressed as follows: (Figure 1)

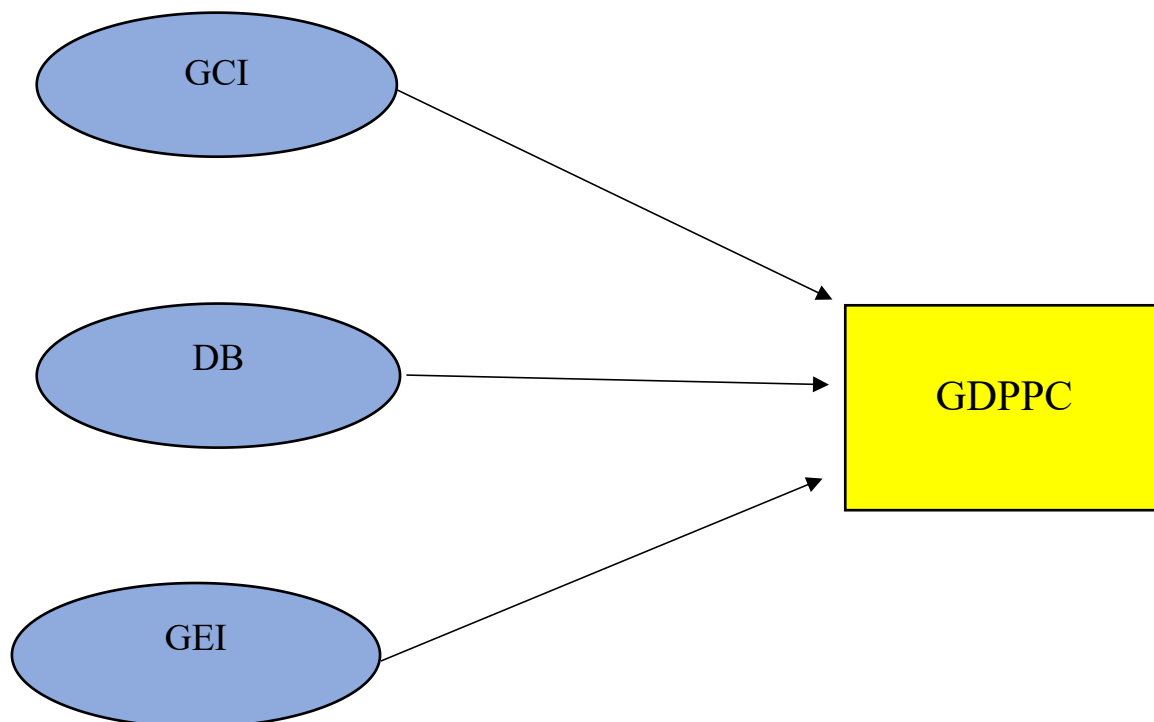


Figure 1. The hypothetical research model

3. Research Method

This study is practical and in terms of data collection method, this is secondary data. It is also a quantitative research method because it seeks to distribute the characteristics of a statistical population. How is the available situation and what is the relationship between the events. The research consists of three general stages; firstly, using library studies, reviewing existing texts, models, and related theories, and selecting the appropriate model. In the second step, the data are collected and pre-processed according to the hypotheses and sample size, and in the last step, using panel data modeling approach and using SPSS and Stata software, the collected data were analyzed using econometric methods and data were analyzed.

The dependent variable of the research is the GDPPC. The independent variables of the research are GCI, DB, and GEI.

Every year, the World Bank publishes information on countries' per capita incomes. On the other hand, the scores of different countries in GCI, DB and GEI indices are reported annually. As the present study attempts to investigate the impact of GCI, DB, and GEI indices on the GDPPC. The statistical population of this study consists of 42 countries from around the world. The method of selecting countries is clustered and from all continents, Lower-middle income, Upper-middle income, and high-income countries (World Bank, 2020) are selected.

3.1 Data analysis

Descriptive statistics and inferential statistics were used to analyze the collected data. The descriptive statistics of the graphs, Central indicators (mean) and dispersion (standard deviation) indices and SPSS software is used for this purpose. In the inferential statistics section, since the nature of the data is cross-sectional and time series, the panel data technique is used.

Panel data is a combination of cross-sectional data and time series, meaning that we observe cross-sectional data over time. It is clear that such data have two dimensions, one dimension being related to different units at each specific time point and the other dimension being time. The use of panel data methods over cross-sectional and time series methods has two major advantages: First, it allows the researcher to consider the relationship between variables and even units (companies) over time, and The second advantage is the ability of this method to control the individual effects of companies (as cross-cutting units) that are not observable and measurable.

Regression is often used to explore the linear relationship model between variables. In this case, it is assumed that one or more descriptive variables whose value is independent of the other variables or under the researcher's control can be effective in predicting the response variable whose value is not dependent on the descriptive variables under the researcher's control. The purpose of regression analysis is to identify the linear model of this relationship.

The general form of the linear K-variable regression model is as follows:

$$Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + \dots + \beta_K X_{Ki} + u_i \quad (i = 1, 2, \dots, N)$$

Where the β_1 is width of the origin, β_K is the coefficients of partial angles, u are the random disruption component (estimation error), N is the size of the original population, and i represents the i-th observation. Y denotes the dependent variable and X denotes the independent variable. (Gujarati, 1995:323).

By expanding the main equation we will have:

$$Y_1 = \beta_1 + \beta_2 X_{21} + \beta_3 X_{31} + \dots + \beta_K X_{K1} + u_1$$

$$Y_2 = \beta_1 + \beta_2 X_{22} + \beta_3 X_{32} + \dots + \beta_K X_{K2} + u_2$$

⋮

$$Y_N = \beta_1 + \beta_2 X_{2N} + \beta_3 X_{3N} + \dots + \beta_K X_{KN} + u_N$$

$$\begin{bmatrix} Y_1 \\ Y_2 \\ \vdots \\ Y_N \end{bmatrix} = \begin{bmatrix} 1 & X_{21} & X_{31} & \dots & X_{K1} \\ 1 & X_{22} & X_{32} & \dots & X_{K2} \\ \dots & \dots & \dots & \dots & \dots \\ 1 & X_{2N} & X_{3N} & \dots & X_{KN} \end{bmatrix} \begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_K \end{bmatrix} + \begin{bmatrix} u_1 \\ u_2 \\ \vdots \\ u_N \end{bmatrix}$$

$$Y = X\beta + u$$

$N \times 1$ $N \times K$ $K \times 1$ $N \times 1$

4. Results

The minimum, maximum, mean, standard deviation, Kurtosis and skewness of the research variables are listed in Table 1. Also, Figure 2. shows the average trend of research model variables between 2013 to 2019.

Table 1. Descriptive indices of the research variables

Variable	Skewness	Kurtosis	Std. Deviation	Mean	Max.	Min.
GDPPC	0.891	1.33	21465.93	37418.58	121293	5025.19
DB	-0.511	-0.686	8.31	71.92	84.97	53.31
GCI	-0.198	-1.086	8.25	72.28	87.90	53.60
GEI	0.233	-1.098	17.87	48.21	86.20	16.10

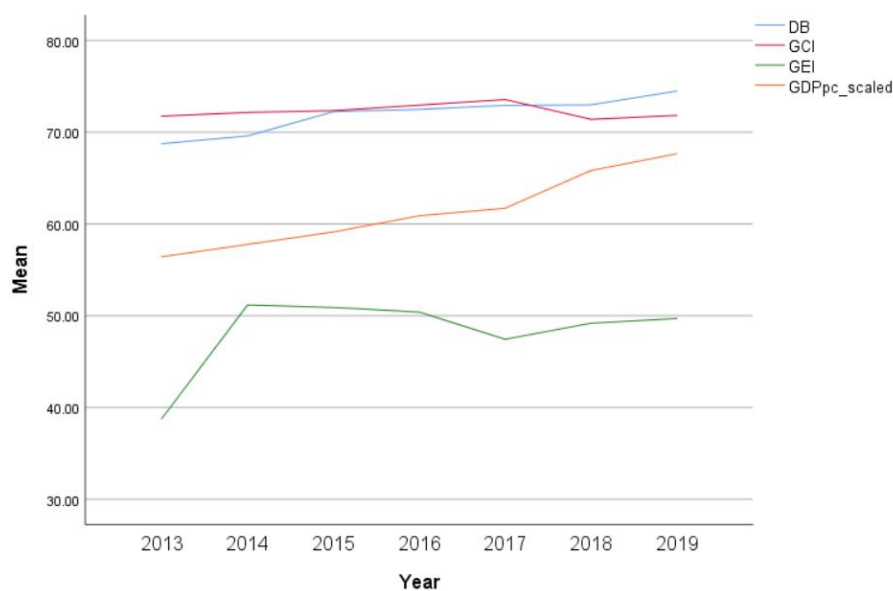


Figure 2. The average trend of research model variables between 2013 to 2019

In order to analyze the data using the panel data method, a number of tests must be performed in the first step to determine the method of analysis.

4.1 Research model analysis

The purpose of this study is to investigate the effects of DB, GEI, and GCI indices on GDPPC. This model has the following functional form:

$$GDPPC_{i,t} = \alpha_0 + \beta_1 GCI_{i,t} + \beta_2 DB_{i,t} + \beta_3 GEI_{i,t} + \varepsilon$$

Where α_0 is the width of the origin and ε is the estimated error. In order to estimate the above model, the F-Limer test and then the Hausman test for the type of estimation model should be performed. After confirming the results of these tests, the final model is estimated.

4.2 Unit root test

Before estimating the model, it is necessary to Durability test all variables used in the research model. Because the inaccuracy of the variables causes the problem of false regression. In this study, the Levin, Lin, and Chu (LLC) Unit Test were used to investigate the variables maneuverability. The basic assumption of the LLC test is the existence of a single root process between sections. Based on the results of Table 2, all the research variables are either at a stable level or in other words zero degree of accumulation.

Table 2. Unit Root Test

Degree of accumulation	Prob.	Statistic	Var.
I(0)	0.000	-51.202	GDPPC
I(0)	0.000	-29.913	GCI
I(0)	0.000	-13.265	DB
I(0)	0.000	-18.894	GEI

4.3 F-Limer test

In order to investigate the type of model in panel data method, F-Limer test was used. In this test, the null hypothesis of the existence of a pool method is tested against the hypothesis of a panel data method. If the null hypothesis is rejected, the model is panel data type and then fixed and random effects tests should be performed in the next step. If the null hypothesis is confirmed, the pool model should be used. Based on the results in Table 3, the null hypothesis is rejected. Therefore, panel data method should be used to estimate the model.

Table 3. F-Limer fixed effects test for the research model

Prob.	d.f.	Statistic	Test
0.000	(41,249)	73.03	F

Once the type of data has been determined, it is now clear which model should be used Fixed effects model or random effects model. In this study, the Hausman test was used to determine the type of model. If the null hypothesis of this test is rejected, the fixed effects model should be used, otherwise the random effects model should be used. Based on the results in Table 4, the null hypothesis is rejected. Therefore, the fixed effects model should be used to estimate the model.

Table 4. Hausman test for the research model

Prob.	d.f.	Statistic	Test
0.000	7	17.91	Chi-square

4.4 Test of Homoscedastic of likelihood ratio

Homoscedastic is a phenomenon in which the variance of disruption components changes over time or between sections. The existence of variance heterogeneity in the model results in estimates that, despite being consistent, are inefficient. Therefore, to ensure that there is no homogeneity variance problem, and homogeneity variance test should be performed. In this study, the likelihood ratio test was used to investigate the presence or absence of heterogeneity variance. The null hypothesis of this test is the homogeneity variance. Therefore, if the null hypothesis is rejected, it means that there is heterogeneity in the research model. In such circumstances, the GLS method should be used (Hawkins, 1981).

Based on the results in Table 5, the null hypothesis of the homogeneity variance test is confirmed, meaning that the research model did not face the problem of heterogeneity variance.

Table 5. Homoscedastic test for the research model

Prob.	d.f.	Statistic	Test
0.248	7	-2.174	likelihood ratio

4.5 Wooldridge test for autocorrelation

Another test to be taken in panel models is the autocorrelation test. In this study, Wooldridge autocorrelation test was used. The null hypothesis of this test is the absence of autocorrelation with the disorder. If this assumption is rejected, the research model should estimate the model with AR (1). Based on the results of Table 6, the null hypothesis of the Wooldridge test has been confirmed, this means that the research model did not encounter automatic correlation problem (Wooldridge, 2002).

Table 6. Wooldridge test for research model

Prob.	d.f.	Statistic	Test
0.2415	7	1.230	Wooldridge

4.6 Research model estimation

According to the results, the estimated coefficient for GCI is 30.048, which is significant at 90%. The estimated coefficient for DB is 361.94, which is significant at 99%. The estimated coefficient for GEI is 180.59 which is significant at 99% level.

At the end of Table 7, the coefficient of determination, the adjusted coefficient and the Durbin-Watson statistic are presented. The coefficient of determination is 0.980, indicating that the independent variables were able to explain 98% of the dependent variable changes. Also the adjusted coefficient of determination is 0.975 which due to the small difference of this coefficient with the coefficient of determination it can be said that there is no surplus variable model and the model is well fitted. Durbin-Watson statistic is also 1.514, so there is no correlation between the residuals.

Table 7. Estimation of Research Model

Prob.	t-Statistic	Std.error	Coefficient	Var.
0.006	3.60	8.3403	30.048821	GCI
0.000	4.45	81.4218	361.9485	DB
0.000	4.02	44.8799	180.5917	GEI
0.820	0.23	12701.05	2899.9	C
D.W=1.514164		R ² _{adjusted} = 0.975		R ² =0.980

5. Discussion

Hypothesis 1: The Global Competitiveness Index (GCI) has a positive relationship with the GDPPC.

The GCI can determine the aggregate growth of the economic level (Lopez-Claros et al., 2007). Competitiveness is related to an increasing standard of living, developing employment opportunities, and the ability of a nation to maintain its international obligations. Competitiveness can be limited as an open market environment, which can produce goods and services that pass the competitiveness test and at the same time maintain and expand domestic real income (Monga & Lin, 2015).

According to the results of this study, Global Competitiveness Index has a significant positive effect on GDPPC. The estimated coefficient is 30.048, which is significant. Therefore, this hypothesis is confirmed.

Hypothesis 2: The Doing Business (DB) index has a positive relationship with the GDPPC.

Knack and Keefer (1995) have shown that law enforcement institutions are crucial for economic growth. Ayal and Karras (1998), Dawson (1998), Easton and Walker (1997) showed that there is a positive and significant relationship between business environment and economic growth.

According to the results of this study, Doing Business index has a significant positive effect on GDPPC. The estimated coefficient is 361.94, which is significant. Therefore, this hypothesis is confirmed.

Hypothesis 3: The Global Entrepreneurship Index (GEI) has a positive relationship with GDPPC.

Galindo and Méndez (2014) identified a virtuous cycle between innovation, entrepreneurship, and economic growth, in which each of the three factors would have positive effects on the others. Wong et al. (2005) examined the impact of technological innovation and of different types of entrepreneurial activities on GDP growth. The results of the study show that innovation is a positive and significant determinant of GDP growth.

According to the results of this study, Global Entrepreneurship Index has a positive and significant effect on GDPPC. The estimated coefficient is 180.59, which is significant. Therefore, this hypothesis is confirmed.

6. Conclusions

The purpose of this study was to investigate the relationship between competitiveness, entrepreneurship and business environment indices with countries' per capita income. These indicators are published annually by international reports and examine the situation of countries on various factors affecting businesses. Given that the per capita income of countries is directly related to production, the more appropriate the factors affecting the production and start-up of businesses, the higher the production of products and services, and consequently the higher the per capita income. The results of this study show that business and entrepreneurship environment indicators have a direct impact on countries' per capita income. Improving the business environment and entrepreneurship conditions will lead to an increase in the number of businesses and consequently an increase in per capita income.

List of abbreviations

GCI: Global Competitiveness Index.
GEI: Global Entrepreneurship Index.
DB: Doing Business
GDP: Gross Domestic Product.
UK: United Kingdom.
GDPPC: Gross Domestic Product Per Capita.
GLS: Generalized Least Square.
OLS: Ordinary Least Square.
LLC: Levin, Lin, and Chu.
d.f.: degree of freedom.
Prob.: Probability.

Availability of data and materials

Data on the Global Competitiveness Index are extracted from the GCI Annual Reports between years 2013 to 2019.

Data on the Global Entrepreneurship Index are extracted from the GEI Annual Reports between years 2013 to 2019.

Data on the Doing Business Index are extracted from the World Bank Annual Reports between years 2013 to 2019.

Countries' GDPPC data are also extracted from World Bank reports between the years 2013 to 2019.

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The Competing interests

The author declare that they have no competing interests.

Availability of data and material

All data are available.

Code Availability

Data were extracted from Doing business, Global Competitiveness Index and Global Entrepreneurship Index.

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