MACROECONOMIC DETERMINANTS OF COMPETITIVENESS: EVIDENCE FROM FACTOR EFFICIENCY AND INNOVATION-DRIVEN COUNTRIES

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ABSTRACT

The investigation of factors that increase or hinder competitiveness has been one of the core tenets of theoretical and empirical researchers, but so far there has been no consensus. This study responds to this issue by exploring how different facets of the macroeconomic environment influence competitiveness in the three Global Entrepreneurship Monitor (GEM) types of economy (factor-driven economy, efficiency-driven economy, innovation-driven economy). Using Porter's classification, we divided countries based on factor, efficiency and innovation. Additionally, the generalized method of moments (GMM) was used to capture endogeneity and unobserved heterogeneity of data in an unbalanced panel data for 81 countries (2002-2018). The results show that the variations of competitiveness across countries are mainly determined by variations in the stage of economic development. Firstly, GDP growth, low start-up costs and higher R&D expenditure play a key role in explaining the variation in competitiveness in three country clusters. Secondly, as regards Stage 1 countries, we find that trade openness, tax rate, GDP growth, start-up costs, real effective exchange rate, R&D expenditures and labor productivity are particularly vital for competitiveness. Concerning Stage 2 countries, we may observe that trade openness, tax rate, GDP growth, inflation, start-up costs, financial development, real effective exchange rate, R&D expenditures and labor productivity had a statistically significant impact on competitiveness. When it comes to Stage 3 countries, factors such as trade openness, FDI, tax rate, GDP growth rate, inflation, tax rate, start-up costs, financial development, R&D expenditures, and labor productivity have an impact on competitiveness.

This article presents some essential features, such as the macroeconomic index to determine competitiveness. These features can be used as guidelines for decision makers because they identify areas where taking further actions can improve competitiveness. Finally, our obtained results are highly consistent across a series of robustness tests and robustness checks covering alternative samples and alternative variable groups.

1. INTRODUCTION

1.1. General approach

Recently, the competitiveness of nations in the modern world has drawn a lot of attention and research literature has shown that when increasing competitiveness and interdependence, national economies are more influenced by the global business environment and its development (Dobrovic et al., 2018; Bacik, Kloudova, Gonos & Ivankova, 2019; Roszko-Wójtowicz & Grzelak, 2020; Marian, 2019). Thus, integration and globalization processes in the world economy force one to search for sources and factors determining the competitiveness of economies (Pérez-Moreno, Rodríguez & Luque, 2016; Petricevic & Teece, 2019).

However, there is no unified approach in the literature on the concept of national competitiveness. Extensive literature also shows that the approach to the assessment and measurement of competitiveness has varied over time, indicating the need for further research to present the complexity of this economic phenomenon from various perspectives. Competitiveness has been the subject of economic research and analysis since the second half of the 20th century among scientists, economic politicians, and representatives of businesses. Hence, as a complex phenomenon its discussion requires various criteria and methods of measurement (Gu & Yan, 2017). For example, Porter (1998) defines competitiveness in terms of economic development in three different phases: (1) factor-driven, (2) efficiency- driven, and (3) innovation-driven, as well as two transition phases between these steps (Momaya, 2019). Factor-driven countries compete for cost efficiency in the production of raw materials or products with low added value (Urbaniec, 2019). These economies are based on non-agricultural independence (necessity entrepreneurship). Taking advantage of economies of scale in large markets, efficiency-driven countries need to increase

productivity and skills to adapt to technological developments. At this stage, the increase in foreign direct investment (FDI) occurs along with the declining trend of imperative entrepreneurship (Schwab, 2018). Innovation-driven economies need to expand the business environment to create entrepreneurship based on information and communication technologies. At this point, many SMEs that focus on innovation factors characterized by strong growth potential have emerged in service sectors. Furthermore, the dynamics of competitiveness can be vastly different depending on the macroeconomic environment and level of economic development (Alomari, Marashdeh & Bashayreh, 2019; Gallo & Tomčíková, 2019). Likewise, there is a paucity of research on analyzing the international competitiveness of economies from the point of view of various macroeconomic indices.

Although there is a lot of research on the determinants of competitiveness in the current literature (Ehigiamusoe & Samsurijan, 2020; Boikova, Zeverte-Rivza, Rivza & Rivza, 2021), the existing literature shows that few empirical studies formally theorize and examine the effects of macroeconomic indicators on national competitiveness. Our study, therefore, attempts to clarify the understudied but important relationship between these macroeconomic determinants of competitiveness in three different GEM economies and fill this gap by offering an integrated conceptual model to examine the macroeconomic determinants of competitiveness. Specifically, this study focuses on global sample of countries in different stages of development because of increasing competition due to global integration pressure. Thus, authors realize that it is necessary to have intensive research on how to enhance countries' competitiveness in a sustainability manner. This paper will be of important contribution to the current literature of competitiveness and this will differentiate the study findings from previous ones. Firstly, it provides a comprehensive understanding of competitiveness concept and proper practices for countries. Secondly, it defines a mechanism of how macroeconomic variables, namely GDP growth, total tax rate, inflation, trade openness, foreign direct investment and cost required to start a new business improve competitiveness of countries in different stages of development. Thirdly, this paper effectively considers the issues of endogeneity by using a two-step system generalized method of moments (GMM). Lastly, this paper can provide a deep insight into the comparative analysis between the three types of GEM economies. To address the objectives, this study has conducted a 17-year extended analysis of 81 countries (grouped by the stage of development) and considered six economic indicators that have potential impacts on international competitiveness to contribute to the expansion of knowledge in this field.

Our analysis is in a sense close to Mohammadi Khyareh and Rostami (2021), who also analyze the macroeconomic factors that encourage the competitiveness of emerging countries. However, differences from Mohammadi Khyareh and Rostami (2021) and some related studies can be outlined. First, we contribute to the literature by addressing the macroeconomic determinants of competitiveness in a completely different way. Second, our sample is larger than that considered by Mohammadi Khyareh and Rostami (2021). The sample covers more countries (81 countries instead of 16), a longer period (17 years instead of 9), and more importantly, our analysis is less biased towards emerging countries (instead, we consider the WEF distinction on factor-driven, efficiency-driven, and innovation-driven countries). Finally, the data is analyzed globally and in three economic stages (factor-driven economy, efficiency-driven economy, innovation-driven economy).

The structure of this research begins with the introduction, followed by different parts such as literature review, research model and hypothesis, research method, results and discussion, and conclusion.

1.2. Literature review

The concept of competitiveness. Different organizations offer different approaches to understanding the concept and defining competitiveness (Farinha, Ferreira, & Nunes, 2018; Falciola, Jansen & Rollo, 2020). One of the pioneers in the past 30 years is Michael Porter (1998) whose groundbreaking work is "The Competitiveness of Nations" which focuses on national productivity as a primary measure of success. Fagerberg & Srholec (2017) stated that competitiveness determines the ability to conquer new markets, to outplay other actors in the market, to attract investment and to grow. On the macro level, we can use a much more general concept of competitiveness, used by OECD, which says that "Competitiveness is a measure of a country's advantage or disadvantage in selling its products in international markets" (OECD, 2020). Other studies in this area define competitiveness as a set of hard and soft factors influencing a country's productivity, and consequently, its ability to grow over time (Rusu & Roman, 2018; Schwab & Sala-i-Martin, 2017). The world economic forum (WEF, 2016, p. 4) defines competitiveness as "a series of institutions, policies and factors that determine the level of economic productivity, which in turn determines the level of prosperity that the country can achieve." Since 2005, the WEF has assessed the level of competitiveness of countries using a comprehensive index, which consists of twelve pillars to measure competitiveness at macro as well as microeconomic levels. The global competitiveness index (GCI), based on

'the 12 pillars of competitiveness', compares economies worldwide. The GCI includes 2 types of data: statistics (from the IMF, UN and other international agencies) and surveys (conducted annually by WEF itself to obtain respondents' perceptions of their countries and to fill gaps in statistics). The use of not only statistics but also survey data has been widely criticized by economists (Zinnes, Eilat & Sachs, 2001), who argue that opinions are subjective and depend on countries' cultures and attitudes. The GCI is influenced by the theory of stages of development. It assumes that countries in different stages of development show different characteristics for competitiveness and require different factors for being competitive. The 12 pillars of competitiveness as shown in Table 1 are restructured into 3 clusters corresponding to three stages of development for economies: factor-driven, efficiency-driven, and innovation-driven. The 12 pillars are divided into these three stages and correspond to the specific factors required at each stage to be competitive. The World Economic Forum has chosen GDP per capita as a criterion for classifying regions into stages of economic development by defining precise ranges for this indicator for each stage (Schwab & Sala-i- Martin, 2017) (see Table 1).

Table 1: Classification of competitiveness factors based on the WEF methodology

Global Competitiveness Index					
Basic factors		Efficiency enhancers		Innovation and sophistication factors	
Institutions Infrastructure Macroeconomic environment Health protection and primary education		Higher education and training Labor market efficiency Financial market development		Business sophistication innovativeness	
Factor-driven economy		Efficiency-driven economy		Innovation-driven economy	
Stages of competitiveness development	Stage 1	Transition from stage 1 to stage 2	Stage 2	Transition from stage 2 to stage 3	Stage 3
GDP per capita (US$) thresholds	<2,000	2,000–2,999	3,000–8,999	9,000–17,000	>17,000
Weight for basic factors	60%	40-60%	40%	20-40%	20%
Weight for efficiency enhancers	35%	35-50%	50%	50%	50%
Weight for innovativeness and sophistication factors	5%	5-10%	10%	10-30%	30%

Source: Schwab & Sala-i-Martin, 2017

Table 1 shows that for the countries at the lowest stage of production, the most important factor to improve competitiveness is the fundamental factor (60%), followed by the factors of efficiency improvement (35%), and only 5% is allocated

to the factors of innovation and specialization. At the same time, for countries in the innovation stage, foundational factors (20%) and efficiency improvement factors (50%) are still quite significant, while innovation and specialization factors are much more important - 30%, which means that in the highest stage of competitiveness, innovation and specialization factors have the greatest impact on competitiveness. This paper aims to further clarify this issue and analyze potential differences between competitiveness dimensions and economic types. From the above literature, we expect that the competitiveness of countries based on three economic stages differ depending on various macroeconomic conditions.

1.3. Determinants of competitiveness

The competitiveness literature has identified several determinants of competitiveness (Mentel & Hajduk-Stelmachowicz, 2021; Fagerberg & Srholec, 2017; Braja & Gemzik-Salwach, 2019). In this regard, Porter (2004) distinguished two categories: macro and microeconomic dimensions. The microeconomic foundation traditionally ignored by policymakers is the foundation of macroeconomic reforms to achieve sustainable economic prosperity. Furthermore, other studies focused on other competitiveness determinants such as financial economic performance (Sigue & Barry, 2020), basic requirements, efficiency enhancers, innovation, sophistication factors (Roy, 2018), institutions (Ibragimov, Vasylieva & Lyulyov, 2019) and innovation (Ferreira, Fernandes & Ratten, 2017). Moreover, several studies cover economic aspects determining sustainability and competitiveness of countries, some others use multi-criteria indices (Kiseľáková, Šofranková, Onuferová & Čabinová, 2019), such as: the global competitiveness index (Roy, 2018; Marčeta & Bojnec, 2020), the economic freedom index (Mushtaq, Ejaz & Khan, 2018), the global innovation index (Jankowska, Matysek-Jędrych & Mroczek-Dąbrowska, 2017), and the human development index (Khan, Ju & Hassan, 2018). It is worth mentioning that the COVID-19 epidemic has had many impacts on the development of countries and their competitiveness (Dziembała, 2021). However, of all factors affecting competitiveness, the macroeconomic environment is vital (Alomari, Marashdeh & Bashayreh, 2019; Musyoka & Ocharo, 2018). In response, what follows addresses the main macroeconomic determinants of competitiveness:

Trade Openness (TP). The development literature shows that a country's trade policy has a significant impact on its competitiveness (Rakhmanova, & Kryukov, 2019). Therefore, just like being exposed to international competition, more domestic competition will also stimulate the improvement of resource allocation and industrial efficiency (Coulibaly, 2021). The existing literature provides a sufficiently comprehensive view of the impact of trade openness on the country's

economic growth and competitiveness (Simionescu, Pelinescu, Khouri & Bilan, 2021). As pointed out by Mohammadi Khyareh & Zivari, (2019), more open countries can catch up with leading technologies. Coulibaly (2021) proposed that open trade helps allocate resources more effectively and can take advantage of the country's competitive advantages. However, research on the linkage between trade openness and competitiveness shows that the influence of trade openness is irregular and depends on general economic theory (neoclassicism, Keynesianism, etc.). Marčeta & Bojnec (2020) found the negative impact of trade openness on the competitiveness of countries. Other studies (Syromyatnikov, Konev, Popov & Sultanova, 2021) also analyzed the relationship between international trade and national competitiveness. It has been proven that as trade improves country's access to global resources and broadens market access, a country's business performance depends on its competitiveness (Reyes & Useche, 2019). Considering the previous arguments, our first research hypothesis is:

H1: At the national level, trade openness is positively associated with competitiveness of countries.

Foreign Direct Investment (FDI). In the process of world economic globalization, foreign direct investment has a significant impact on the economic growth and development of the national economy (Raeskyesa & Suryandaru, 2020; Syromyatnikov et al., 2021). Thus, to fully promote the development of competitiveness, these countries usually intervene through tax policy measures. Considering that this is one of the ways to ensure more capital inflows, one of the main tasks of developing countries is to create an enabling environment for investors (Domazet & Marjanović, 2018). However, the relationship between foreign direct investment and trade and export competitiveness is more complex. Foreign direct investment has been questioned due to reducing employment in the home country, as well as increasing employment, promoting technology transfer, and encouraging growth and exports in the host country. Foreign direct investment (FDI) through increased capital inflows leads to more employment, more innovation, and development of national industry and higher exports, which in turn improves national competitiveness (Owczarczuk, 2020; Avioutskii & Tensaout, 2020). Furthermore, based on some empirical literature, the impact of foreign direct investment on national competitiveness and entrepreneurship depends on the level of development of the countries (Rusu & Roman, 2018). Aiming to explore, through real data, how FDI influences the competitiveness of countries, our second research hypothesis is:

H2: At the national level, foreign direct investment significantly influences the competitiveness of countries.

GDP Growth (GDPG). Past research findings suggest that higher economic growth through the creation of new jobs also has a positive impact on GC (Yerbanga, 2017). In the past various authors mentioned the importance of GDP and confirmed that if the goal of policymakers is to increase competitiveness, then the key task is to increase GDP growth (Dagilienė, Bruneckienė, Jucevičius & Lukauskas, 2020; Nogueira & Madaleno, 2021). Therefore, our third hypothesis attempts to explore the impact of GDP growth on competitiveness.

H3: At the national level, high GDP growth is positively associated with competitiveness of countries.

Total Tax Rate (TR). Tax rates play an important role in international competitiveness (Dezhina, Nafikova, Gareev & Ponomarev, 2020; Lyon & McBride, 2018). A generally supported attitude is that fiscal policy is an effective tool to attract investment, meaning that tax competition is one of the most important indicators of comprehensive competitiveness (Marjanović, 2018). In addition, competitive tax laws can minimize the impact of tax rates on the decisions of workers and companies. In today's globalized world, companies can choose to invest in any number of countries to find the highest rate of return. If a country's tax rate is too high, it will promote investment and employment in other places, leading to a slowdown in economic growth (Bunn, Pomerleau & Hodge, 2018). Furthermore, excessive taxation on foreign trade is an important factor in the poor performance of the international industry and high corporate tax rates weaken a country's international competitiveness (Rusu & Dornean, 2019). Lowering corporate tax rates can be a way to attract more investment, increasing business productivity and encouraging more investment (Kiseľáková et al, 2019). Conversely, Shafiq, Hua, Bhatti & Gillani (2021) argue that tax measures which attract foreign capital can be an important factor in increasing the real exchange rate while reducing the international competitiveness of national industries. Therefore, we aim to explore how changing tax rate influences the competitiveness of countries, and thus, the fourth research hypothesis is:

H4: At the national level, tax rate significantly influences the competitiveness of countries.

Inflation (INF). The relationship between inflation and competitiveness can also be analyzed from two perspectives. The improvement in employment opportunities resulting from rising inflation can be due to the premise that higher price levels lead to higher expectations of entrepreneurs' income and stimulate business development and implicitly increase competitiveness (Rusu & Roman, 2018; Yanar & Celik, 2021). However, rising inflation increases the cost of starting a business that can adversely affect entrepreneurs (Roman, Bilan, &

Ciumaş, 2018). Company-related regulations, often expressed as higher start-up costs, can adversely affect entrepreneurship, and affect competitiveness (Kusnarno & Suratman, 2021; Roszko-Wójtowicz & Grzelak, 2020). Thereby, our aim is to verify the impact of inflation on the competitiveness of countries. Thus, the fifth research hypothesis is:

H5: At the national level, inflation significantly influences the competitiveness of countries.

Cost of Starting a Business (CSB). In today's complex and competitive business environment, adjusting an appropriate strategy is a particularly important effort to promote the development of the companies. Tan et al. (2018) in a survey study confirmed that eliminating barriers to business is a prerequisite for improving domestic and foreign investment and national competitiveness. Likewise, one of the fundamental prerequisites for the successful operation and development of all enterprises is to create a good business environment. Thus, the society's positive view of business conditions may mean greater interest in entrepreneurship, which can further lead to higher GDP rates and higher employment rates (Dobeš, Kot, Kramoliš & Sopkova, 2017; Rusu & Dornean, 2019). Some studies like Roszko-Wójtowicz & Grzelak (2020) showed that more labor market regulations and business regulations bring more cost and competitiveness. Regulations on doing business often expressed by the higher level of costs for starting and running a business, negatively influence the entrepreneurial activity and lower competitiveness (Hossain, Hassan, Shafiq & Basit, 2018) which mainly focuses on investigating the positive impact of ease of doing business on competitiveness. Therefore, our aim is to understand how the cost of doing business influences the competitiveness of countries.

H6: At the national level, high cost of starting a business is negatively associated with competitiveness of countries.

Financial Development (FD). Developed financial systems are characterized by access to credit, deep financial markets and efficient banking networks. A strong financial system ensures that businesses are financed for innovation, productivity, growth and competitiveness (Alomari, Marashdeh & Bashayreh, 2019). Countries with better functioning banking and financial markets expand faster and are therefore more competitive (Zanella & Oyelere, 2021). Few studies investigated the impact of financial market development on economic growth as a strong indicator of competitiveness and found a positive relationship between the two (Jungo, Madaleno & Botelho, 2022; Postula & Raczkowski, 2020). According to the literature, financial development is assumed to have a positive impact on competitiveness.

H7: At the national level, higher financial development is positively associated with competitiveness of countries.

Real Effective Exchange Rate (REER). Several authors consider that depreciation of a national currency would help boost export marketing activities, and appreciation would damage exporters (Dhiman, Kumar & Rana, 2020). Some studies established a significant relationship between competitiveness and REER (Mensah & Quaye, 2017). On the other hand, another set of studies highlights that REER does not have a significant impact on exports (Paul & Dhiman, 2021). Therefore, from the literature, a mixed impact of RER on GC is found ((Bostan, Toderaşcu & Firtescu, 2018; Dhiman and Sharma, 2020). In other words, the appreciation of REER means less competitiveness and the depreciation of REER means more competitiveness. So, we propose the following hypothesis:

H8: At the national level, the real effective exchange rate significantly influences the competitiveness of countries.

R&D Expenditure (RD). R&D spending (that is, government spending on R&D initiatives) has been shown to positively impact innovation in recent decades and is seen as a key driver of national competitiveness and economic growth. R&D investment is undoubtedly regarded as a basic condition for global economic growth (Ivanová & Čepel, 2018). It contributes to rapid growth in production and wages, creates new jobs and strengthens international competition. The literature has widely acknowledged that R&D plays an important role in sustainability and acceleration of not only the business of the enterprise, but also its economic growth and competitiveness (Kiselakova et al., 2018; Caballero-Morales, Cordero-Guridi, Alvarez-Tamayo & Cuautle-Gutiérrez, 2020; Širá, Vavrek, Kravčáková Vozárová & Kotulič, 2020). Due to the importance of R&D in the economy and the large amount of money that companies and government departments spend on R&D activities, R&D investment is one of the main topics discussed by researchers and doctors.

H9: At the national level, higher R&D expenditure is positively associated with competitiveness of countries.

Labor productivity (LP). Labor productivity (LP) is not only a key factor in determining the competitiveness and long-term survival of an enterprise, but also the basis for increasing income and creating a good working environment for employees. Arguably, the most important factor in improving competitiveness is increasing productivity. In other words, the primary indicator of the competitiveness of any economic activity is its productivity, which shows the ability of the activity to generate income and generate returns for factors of

production over the long term (Dhiman, Kumar & Rana, 2020). The development of LP often leads to innovation and thus to international competition (Dhiman & Sharma, 2019). Therefore, we propose the following hypothesis:

H10: At the national level, a higher level of labor productivity is positively associated with competitiveness of countries.

2. MATERIALS AND METHODS

Estimation procedure. The general econometric equation is estimated for the entire sample and for each of the three economic phases (factor-driven, efficiency-driven, and innovation-driven economies) as follows:

$$GCI_{it} = \alpha + \beta \cdot Macro_{it} + \eta \cdot X_{it} + \mu_{it} \quad (1)$$

Where *GCI* is an indicator of competitiveness for country *i* at time *t*, *Macro* is macroeconomic indicators for country i at time t, and X_{it} is a vector of control variables for country *i* at time *t*. The variables and η are coefficients of *Macro* and *X*, respectively, is a constant, and μ is the error term. The parameter of interest is β, which is the response of competitiveness to macroeconomic indicators. The composition of the control vector *X* is important because it controls other factors that influence competitiveness, allowing neutralizing the effect of macroeconomic indicators on competitiveness much more effectively. Variables included in *X* are selected to control for as many other factors as possible while guarding against too much multicollinearity among the regressors. The control variables included were business factors (business sophistication and degree of innovation), structural factors (quality of institutions, the quality of the financial system, availability of advanced technology) and systemic factors (infrastructure, basic education, and health), all of which were taken from the World Economic Forum's (WEF) Global Competitiveness Report.

Business, structural and systemic factors are included because they are essential in competitiveness and can improve the competitive advantages of countries. Here, they act as proxies by the competitiveness sub-index scores of the WEF Global Competitiveness Report. Finally, we also include year and country dummies to control for regional differences as well as time differences, which allows us to perform longitudinal analyses of the data. The list of all variables used in this paper, including their resources is mentioned in Table 2.

Table 2: The variables of the model, their measurement and source

Variable	Units	Source	Authors
Global Competitiveness Index (GCI)	1–7 (best)	World Economic Forum	Van Stel, Carree & Thurik (2005)
GDP Growth (GDPG)	Annual %	World Bank	Hooy, Law & Chan (2015)
Labor Productivity (LP)	GDP per employed person	World Bank	Dhiman and Sharma (2019)
Financial Development (FD)	Domestic credit to private sector by banks (% of GDP)	World Bank	Zanella & Oyelere (2021)
Inflation (INF)	Annual %	World Bank	Kusnarno & Suratman (2021)
Total Tax Rate (TAX)	% Of commercial profits	World Bank	Dezhina et al., (2020)
Foreign Direct Investment (FDI)	% Of GDP	World Bank	Syromyatnikov et al., (2021)
Cost of Starting a Business (CSB)	% Of GNI per capita	World Bank	Rusu & Dornean (2019)
Trade Openness (TO)	% Of GDP	World Bank	Simionescu et al., (2021)
Real Effective Exchange Rate (REER)	Real effective exchange rate index (2010 = 100)	International Monetary Fund	Dhiman, Kumar & Rana (2020)
R&D Expenditure (RD)	% Of GDP	World Bank	Kiselakova et al. (2018)
Business sophistication (BS)	1–7 (best)	World Economic Forum	WEF
Degree of innovation (INO)	1–7 (best)	World Economic Forum	WEF
Quality of institutions (INS)	1–7 (best)	World Economic Forum	WEF
Quality of the financial system (FIN)	1–7 (best)	World Economic Forum	WEF
Infrastructure (INFRA)	1–7 (best)	World Economic Forum	WEF
Basic education and health (EDU)	1–7 (best)	World Economic Forum	WEF

Source: Authors' compilation

This paper uses panel data taken from more than 81 countries from 2002 to 2018. We select countries based on the data availability of the variables considered in the analysis. To ensure that the primary purpose of this article is met, we separate countries at different stages of development (24 factor-driven1, 27 efficiency-driven2 and 30 innovation-driven3) based on the global competitiveness report (WEF, 2018).

Theoretically, the explanatory variable on the right side of equation (1) should not be related to the error term. Therefore, the Durbin-Wu-Hausman test was used to detect the endogeneity in equation (1). The Durbin-Wu-Hausman test

statistics shows that the GDP growth in Model 1 is determined endogenously. If only one variable in the regression model is an endogenous variable, the results reported by OLS are inconsistent. In addition, in the model (1), under the assumption of strict exogeneity, fixed effects estimation techniques can potentially control unobservable heterogeneity (Wintoki, Linck & Netter, 2012). However, this strictly exogenous assumption is violated because the past/current macroeconomic conditions of a country may affect the current/ future competitiveness of a country. In addition, the relationship between our explanatory variables and competitiveness is dynamic - past realization of dependent variables may also affect current year competitiveness. With the above rationale, we carried out a final check with the system generalized moment method (GMM) technique (Blundell and Bond, 1998). By adding a lagged dependent variable to the regression variable, equation (1) can be modified to make it a dynamic panel, i.e.

$$GCI_{it} = \alpha + \theta \cdot GCI_{it-1} + \beta \cdot Macro_{it} + \eta \cdot X_{it} + \mu_{it} \quad (2)$$
$$\text{where } \mu_{it} = \varepsilon_{it} + \nu_{it}$$

Where ε_i is an unobserved fixed effect; when the time period is small, the main problem of equation (2) is that the lagging dependent variable is correlated with the fixed effect, and it thus correlates with the error term (Roodman, 2009), resulting in what Nickel (1981) describes it as dynamic panel bias. One solution here is to convert variables through first-order differentials to eliminate fixed effects. So, equation (2) becomes:

$$GCI_{it} - GCI_{i,t-1} = \alpha + \theta \cdot (GCI_{i,t-1} - GCI_{i,t-2}) + \beta \cdot (Macro_{it} - Macro_{i,t-1}) + \\ + \eta \cdot (\mathrm{X}_{it} - X_{i,t-1}) + (\varepsilon_i - \varepsilon_{i-1}) + (\nu_{it} - \nu_{i,t-1}) \quad (3)$$

Although the fixed effects have been removed, the difference lagged dependent variable may still be endogenous because GCI i,t-1 is related to vi,t-1 (Roodman, 2009). The variable ν is an idiosyncratic component of the error term, that is, it is composed of time-varying unobserved heterogeneity or time-varying factors that affect competitiveness. This problem can be solved by instrumenting the differenced endogenous regressors with their lagged levels (Arellano and Bond 1991). Overall, four reasons motivate us to adopt the sys-GMM method. The first reason one consists of conditions for adopting the sys-GMM method, while the next three reasons present its advantages. First, the number of countries (N = 81) is higher than the number of years (T = 17), which in turn leads to control for dynamic panel bias (Baltagi, 2021). The N > T condition for adopting the

GMM method is, therefore, satisfied. Second, compared to the different GMM (DGMM) methods, sys-GMM produces more efficient estimates by reducing the finite sample bias (Baltagi, 2021). Third, since this method is consistent with a panel data structure, cross-country variations are not excluded in the regressions. Fourth, the estimation method also addresses the reserve causality and endogeneity issues in some regressors.

3. RESULTS AND DISCUSSIONS

The estimation results for overall sample of countries are reported in Table 3. As discussed in the methodology section, the appropriate lags to be used as instruments are determined using the results of the Hansen J test and the autocorrelation test. As discussed earlier, the econometric model was estimated using three different groups of countries based on Porter's (1998) classification. In addition, WEF classifies countries' levels of development into three categories based on per capita income and share of industrial exports: resource-based economies, efficiency-based economies and innovation-based economies. The econometric results are reported in Table 4, Table 5 and Table 6. The results provide the sys-GMM findings linked to the empirical association among macroeconomic indicators and competitiveness in factor-driven (Table 4), efficiency-driven (Table 5) and innovation-driven (Table 6) countries. For each regression, four types of information criteria are employed to evaluate these estimated models. First, the absence of second-order Arellano and Bond autocorrelation test (AR (2)) in residuals must be checked while a presence of first-order autocorrelation (AR (1)) must be detected. Second, the set of instrumental variables must be uncorrelated with the error terms. This second hypothesis is confirmed by employing Sargan and Hansen OIR tests, which should be insignificant.

Table 3: Estimation results for overall sample

Dependent variable: competitiveness	Model 1	Model 2	Model 3
Log GCI (-1)	0.051*** (0.013)	0.054*** (0.015)	0.052*** (0.014)
Log (TO)	0.029 (0.017)	0.026 (0.019)	0.031 (0.022)
Log (TAX)	0.041 (0.028)	0.043 (0.031)	0.049 (0.033)
Log (FDI)	0.037 (0.027)	0.033 (0.025)	0.039 (0.031)
Log (GDP)	0.036** (0.016)	0.039** (0.018)	0.034** (0.015)
Log (INF)	0.039 (0.024)	-0.044 (0.028)	0.035 (0.022)
Log (CBS)	-0.048** (0.017)	-0.059** (0.022)	-0.065*** (0.019)
Log (FD)	0.038 (0.025)	0.033 (0.024)	0.036 (0.026)
Log (RD)	0.056** (0.024)	0.053** (0.022)	0.051** (0.021)
Log (REER)	-0.022 (0.014)	-0.027 (0.017)	0.024 (0.016)

Dependent variable: competitiveness	Model 1	Model 2	Model 3
Log (LP)	0.031 (0.022)	0.035 (0.021)	0.029 (0.018)
Business sophistication	0.044 (0.029)	0.047 (0.031)	0.042 (0.030)
Degree of innovation	0.037* (0.021)	0.031* (0.018)	0.039** (0.018)
Quality of institutions	-	-0.025* (0.011)	-0.021* (0.012)
Quality of the financial system	-	0.033 (0.024)	0.037 (0.025)
Infrastructure	-	-	0.041 (0.032)
Basic education and health	-	-	0.036 (0.025)
Ar (1)	(0.031)	(0.069)	(0.041)
Ar (2)	(0.169)	(0.336)	(0.410)
Hansen OIR test	(0.223)	(0.171)	(0.487)
Sargan OIR test	(0.644)	(0.582)	(0.733)

Source: Authors' calculation

Note: AR (1) is the first-order autocorrelation of residuals. AR (2) is the second order autocorrelation of residuals. *** Shows the significance at 1%. ** Shows the significance at 5%. * Shows the significance at 10%, respectively

Table 4: Estimation results for factor-driven countries

Dependent variable: competitiveness	Model 1	Model 2	Model 3
Log GCI (-1)	0.044*** (0.010)	0.047*** (0.016)	0.049*** (0.012)
Log (TO)	-0.039** (0.014)	-0.037** (0.011)	-0.036** (0.016)
Log (FDI)	0.042 (0.027)	0.058 (0.035)	0.065 (0.043)
Log (GDP)	0.044*** (0.011)	0.049*** (0.013)	0.055*** (0.010)
Log (TAX)	0.053*** (0.019)	0.052** (0.021)	0.055** (0.023)
Log (INF)	-0.065 (0.036)	-0.061 (0.043)	-0.069 (0.031)
Log (CBS)	-0.055*** (0.010)	-0.062*** (0.011)	-0.059*** (0.009)
Log (FD)	0.034 (0.025)	0.036 (0.022)	0.039 (0.026)
Log (REER)	0.039** (0.016)	0.036** (0.013)	0.035** (0.013)
Log (RD)	0.049** (0.021)	0.047** (0.022)	0.043** (0.019)
Log (LP)	0.029* (0.017)	0.031** (0.012)	0.038* (0.018)
Business sophistication	0.057 (0.041)	0.055 (0.035)	0.054 (0.036)
Degree of innovation	0.046** (0.023)	0.044* (0.024)	0.049** (0.022)
Quality of institutions	-	0.038*** (0.011)	0.032** (0.012)
Quality of the financial system	-	0.028 (0.019)	0.031 (0.021)
Infrastructure	-	-	0.052** (0.031)
Basic education and health	-	-	0.054*** (0.016)
Ar (1)	(0.035)	(0.077)	(0.048)
Ar (2)	(0.189)	(0.393)	(0.426)
Hansen OIR test	(0.261)	(0.198)	(0.465)

Source: Authors' calculation

Table 5: Estimation results for efficiency-driven countries

Dependent variable: competitiveness	Model 1	Model 2	Model 3
Log GCI (-1)	0.047*** (0.010)	0.054*** (0.011)	0.052*** (0.006)
Log (TO)	0.029*** (0.008)	0.032*** (0.010)	0.034*** (0.009)
Log (FDI)	-0.046 (0.033)	-0.049 (0.037)	-0.054 (0.036)
Log (GDP)	0.048*** (0.013)	0.042*** (0.012)	0.052*** (0.018)
Log (TAX)	-0.041** (0.016)	-0.048** (0.018)	-0.053** (0.025)
Log (INF)	0.039*** (0.011)	0.049*** (0.015)	0.047*** (0.013)
Log (CBS)	-0.052*** 0.011)	-0.055*** (0.013)	-0.059*** (0.014)
Log (FD)	0.036**(0.013)	0.033**(0.015)	0.039**(0.014)
Log (REER)	0.041** (0.016)	0.047** (0.023)	0.046** (0.021)
Log (RD)	0.045*** (0.013)	0.046*** (0.012)	0.051*** (0.011)
Log (LP)	0.059*** (0.010)	0.071*** (0.011)	0.068*** (0.009)
Business sophistication	0.053*** (0.019)	0.062*** (0.017)	0.069*** (0.019)
Degree of innovation	0.081** (0.032)	0.076** (0.029)	0.072** (0.027)
Quality of institutions	-	0.082* (0.043)	0.068 (0.044)
Quality of the financial system	-	0.042** (0.019)	0.039* 0.021)
Infrastructure	-	-	0.073 (0.054)
Basic education and health	-	-	0.046 (0.038)
AR (1)	(0.036)	(0.065)	(0.039)
AR (2)	(0.216)	(0.349)	(0.411)
Hansen OIR test	(0.219)	(0.179)	(0.445)
Sargan OIR test	(0.716)	(0.595)	(0.763)

Source: Authors' calculation

Table 6: Estimation results for innovation-driven countries

Dependent variable: competitiveness	Model 1	Model 2	Model 3
Log GCI (-1)	0.043*** (0.011)	0.048*** (0.013)	0.052*** (0.016)
Log (TO)	0.031** (0.012)	0.033*** (0.009)	0.038*** (0.008)
Log (FDI)	0.045*** (0.013)	0.048*** (0.015)	0.041*** (0.012)
Log (GDP)	0.049*** (0.015)	0.042*** (0.013)	0.055*** (0.014)
Log (TAX)	0.056** (0.024)	0.061** (0.026)	0.066** (0.025)
Log (GDP)	0.049*** (0.015)	0.042*** (0.013)	0.055*** (0.014)
Log (INF)	0.042*** (0.011)	0.045*** (0.012)	0.054*** (0.016)
Log (CBS)	-0.046** (0.017)	-0.049** (0.014)	-0.042*** (0.012)
Log (FD)	0.038** (0.015)	0.044** (0.018)	0.041** (0.014)
Log (REER)	0.52 (0.032)	0.059 (0.033)	0.049 (0.031)
Log (RD)	0.041*** (0.011)	0.039*** (0.012)	0.043*** (0.012)
Log (LP)	0.052*** (0.013)	0.056*** (0.016)	0.058*** (0.019)
Business sophistication	0.072** (0.025)	0.071** (0.024)	0.069** (0.025)
Degree of innovation	0.068*** (0.022)	0.055*** (0.018)	0.057** (0.022)

Dependent variable: competitiveness	Model 1	Model 2	Model 3
Quality of institutions	-	0.057*	0.063**
		(0.032)	(0.022)
Quality of the financial system	-	0.082** (0.029)	0.096** (0.041)
Infrastructure	-	-	0.049* (0.025)
Basic education and health	-	-	0.057** (0.021)
Ar (1)	(0.033)	(0.077)	(0.046)
Ar (2)	(0.174)	(0.329)	(0.473)
Hansen OIR test	(0.245)	(0.177)	(0.468)
Sargan OIR test	(0.681)	(0.531)	(0.704)

Source: Authors' calculation

Analysis and Implications. Our results provide statistical support for non-empirical claims in existing literature (Roszko-Wójtowicz & Grzelak, 2020; Rusu & Dornean, 2019) arguing that a stable macroeconomic environment fosters the competitiveness of countries, albeit having a different impact based on the development stages of countries. Results demonstrate that countries with the highest levels of competitiveness feature are of low inflation rate, a higher growth of GDP, higher degree of trade openness, minimal cost to start a new business, lower rates of tax rate, and higher inflow of foreign direct investment. Findings also show that the lagged value of competitiveness has a positive coefficient, implying that a country with higher competitiveness in the past will continue to have more competitiveness in the present.

Concerning trade openness, it has a negative impact on the overall competitiveness in factor-driven economies. This result can be understood as follows: openness has exposed national companies to fierce competition led by multinational companies that are more armed than them. Therefore, they cannot enter the local market and reach the mature stage and will soon disappear. This result theoretically supports this view to prove the necessity of protecting the economy at a certain stage of economic development. While in the case of efficiency and innovation-driven countries, trade openness has a statistically significant positive effect on the overall competitiveness. Thus, H1 could be verified in the case of efficiency and innovation-driven countries. In line with our expectations, such a result can be explained by the fact that the increasing trade openness improves countries' access to global resources, broadens market access and improves international competitiveness. The same result was found by Rusu & Roman (2018), Avioutskii & Tensaout (2020), who documented that an increase in trade determines an increase in countries' access to global resources and extends market reach, thus, enhancing international competitiveness.

With regards to GDP growth, there are statistical evidences to validate hypothesis H2 in overall sample and sub-samples. The positive contribution of GDP growth is also supported by Khyareh & Rostami (2021) regarding emerging countries and confirmed the positive and statistically significant effect of economic growth on global competitiveness. In addition, Nogueira & Madaleno (2021) documented that economic growth boosts competitiveness, suggesting that economic growth performance leads to a higher level of competitiveness (Boikova, et al., 2021). Moreover, this positive effect, especially in innovation-driven countries is probably due to many economic reforms in these countries, and good political stability, which affects the capital accumulation and, finally economic growth (Rostami, Khyareh & Mazhari, 2019; Dagilienė et al., 2020). Regarding the tax rates, results show that the taxes imposed by factor-driven countries have a positive and significant impact on their overall competitiveness. With similar findings, Marjanović (2018), Rusu & Dornean (2019) also highlight the impact of alternative tax reforms on international competitiveness. In the case of efficiency-driven countries, the tax rate has a negative statistical coefficient. This can be explained by the fact that lowering corporate tax rates can be a way to attract more investment and increase business productivity. In addition, in innovation-driven countries, the relationship between a country's tax rate and competitiveness is positive. This has allowed verifying H3 in the case of factor and innovation-driven countries. Surprisingly, we did not find any statistical support for the impact of FDI in the case of factor and efficiency-driven countries. It is probably because weakness in absorbing foreign direct investment and the activities of foreign companies have played an essential role in the industrialization and modernization process of many developing countries, and have had a significant impact on some of their productive transformations. However, we find a positive relationship between foreign direct investment and economic competitiveness in innovation-driven countries. Thus, H4 could be verified in the case of innovation-driven countries. The same result was also found by FABUS and Suryandaru (2020) in ASEAN countries. They document that most of ASEAN countries have a strong and positive association between competitiveness and the FDI inflow. Therefore, an increase in investments in and out of one country stimulates the competitiveness of the countries.

Regarding inflation, the estimated results indicate that it has had a positive and significant impact on the overall competitiveness in efficiency and innovation-driven economies; thus, H5 could be verified in these countries. The results are consistent with those of Rusu & Roman (2018), Yanar & Celik (2021), Musyoka & Ocharo (2018). Thus, an increase in the inflation rate will determine an increase in business opportunities because the higher level of prices for products and services can lead to increased expectations of the earnings of entrepreneurs,

business development and sustaining the competitiveness (Kusnarno & Suratman, 2021).

We also find that the cost of starting a business significantly decreases competitiveness in our full sample and sub-samples. Thus, there is statistical evidence to validate the hypothesis H6. These results are also supported by Ernst & Haar (2019) and Fabus (2018) who documented that more labor market regulations and regulations about doing business, will have higher costs and lower competitiveness. Thus, lowering business costs increases the competitiveness of company goods and services and boosts the country's international competitiveness.

Arguably, we find no evidence that the financial development influences competitiveness in both overall sample and factor-driven economies. This may be due to the underdevelopment of the financial sector and weak financial institutions in factor-driven countries. Therefore, successful development of the financial system could be expected to lead to competitiveness in these countries (Haini, 2020). However, the effect of FD is positive in the case of efficiency- and innovation-driven countries, thus confirming the H7 in these countries.

Our findings also provide strong evidence that the impact of REER on competitiveness is not uniform across country clusters, as documented by Paul & Dhiman (2021) and Dhiman & Sharma (2020). The results show that in factor- and efficiency-driven countries, a depreciation of the REER leads to a depreciation of the real effective exchange rate, thereby becoming more trade-competitive. Thus, in factor-driven and efficiency-driven countries, H8 is supported.

Findings also show that high R&D expenditure is the most important factor to increase competitiveness among countries globally, thus confirming the H9. This result is in line with Kiselakova et al. (2018) who documented that growth of R&D expenditure can significantly contribute to increasing the countries' competitiveness levels.

Across the country clusters used, the evidence for labor productivity appears to be significantly positive, confirming H10. In exploring the link between competitiveness and labor productivity, it is assumed that countries with higher labor productivity are expected to be more successful in competitive international markets (Paul & Dhiman, 2020).

Robustness check. As a robustness check, several combinations of control variables were tested, adding them on a staggered basis. At first, only the business factors (business sophistication and degree of innovation) were controlled. Next, structural factors (quality of institutions, the quality of the financial system, and

availability of advanced technology) were included. Finally, the systemic factors (infrastructure, basic education, and health) were included (the results are report in Tables 3-6). Furthermore, we categorized countries into low-income, middle income and high-income in the period from 2001-2018 and analyzed it by using 2 step GMM system. We observed similar results which are not reported here for sake of brevity. Finally, we cast another look at the heterogeneity across countries by dividing countries into different continents. Then, we augment the baseline model with interaction terms between fiscal variables and transfer dependency. In this case, we define transfer dependency as the difference in relation to the average transfer in each federation. Table 7 summarizes findings from our analysis in relation to the hypotheses postulated for the overall sample and sub-samples.

Table 7: Summary of findings

Hypothesis	Overall sample	Factor driven	Efficiency driven	Innovation driven
H1: At the national level, trade openness is positively associated with competitiveness of countries.	No support	Yes support	Yes support	Yes support
H2: At the national level, foreign direct investment significantly influences the competitiveness of countries.	No support	No support	No support	Yes support
H3: At the national level, high GDP growth is positively associated with competitiveness of countries.	Yes support	Yes support	Yes support	Yes support
H4: At the national level, tax rate significantly influences the competitiveness of countries.	No support	Yes support	Yes support	Yes support
H5: At the national level, inflation significantly influences the competitiveness of countries.	No support	No support	Yes support	Yes support
H6: At the national level, high cost of starting a business is negatively associated with competitiveness of countries.	Yes support	Yes support	Yes support	Yes support
H7: At the national level, higher financial development is positively associated with competitiveness of countries.	No support	No support	Yes support	Yes support
H8: At the national level, the real effective exchange rate significantly influences the competitiveness of countries.	No support	Yes support	Yes support	No support
H9: At the national level, higher R&D expenditure is positively associated with competitiveness of countries.	Yes support	Yes support	Yes support	Yes support
H10: At the national level, a higher level of labor productivity is positively associated with competitiveness of countries.	No support	Yes support	Yes support	Yes support

Source: Authors' compilation

4. CONCLUSIONS

This study represents an attempt to assess the impact of the main macroeconomic determinants of competitiveness at the country level, stage of economic development and a specific period of 2002-2018. Our framework allows us to study how macroeconomic conditions in countries affect competitiveness. However, our findings might vary upon a country's stage of economic development. The study analysis yielded three main results. First, considering the results of the global model, we can report that most macroeconomic variables have a statistically significant effect on the global competitiveness index. The model reports that both GDP growth and R&D expenditures have a positive effect on competitiveness, while higher costs of starting a business have a negative effect.

Secondly, by deepening the analysis on the economic development stage, as regards Stage 1 countries (Table 4), we find that trade openness, tax rate, GDP growth, start-up costs, real effective exchange rate, R&D expenditures and labor productivity are particularly vital for competitiveness. Concerning Stage 2 countries (Table 5), we may observe that trade openness, tax rate, GDP growth, inflation, start-up costs, financial development, real effective exchange rate, R&D expenditures and labor productivity had a statistically significant impact on competitiveness. When it comes to Stage 3 countries (Table 6), factors such as trade openness, FDI, tax rate, GDP growth rate, inflation, tax rate, start-up costs, financial development, R&D expenditures, and labor productivity have an impact on competitiveness.

This study contains several contributions to the theoretical and empirical literature on competitiveness. First, from a theoretical viewpoint, it addresses the relevant gaps in the literature. Also, in research literature, fewer indicators, or fewer countries (sometimes just a specific country) have been studied to determine competitiveness. Likewise, there is no comparative analysis on the global scale. Second, prior empirical studies only focused on individual variables and did not consider all these variables together. Third, to the best of our knowledge, no empirical study has considered the combined impacts of these variables on competitiveness. Determining the macroeconomic determinants of international competitiveness (according to the country's development stage) will help policymakers to decide which economic issues should be intervened to enhance their country's international competitiveness.

This study has some important implications for policy-makers concerned with boosting competitiveness in the situation of macroeconomic instability. It seems vital for governments to enhance policies to promote the business environment

and create new business opportunities by stimulating the conditions for raising the degree of competitiveness of countries. In addition, results may also spell out new insights for scholars, practitioners, and policymakers. Public policies and private endeavors whose aim is to foster competitiveness could become more efficient by drawing more attention to the mechanisms proposed here to describe how macroeconomic stability may interact with countries' competitiveness.

While our study contributes to an enhanced understanding of competitiveness and may have beneficial implications for policymakers and researchers, there are inherent limitations. We use secondary data to analyze the impact of eight macroeconomic indicators on competitiveness. Further, although the existing literature confirms the linear relationship between macroeconomic indicators and competitiveness, it is still necessary to improve the potential nonlinear relationship between some macroeconomic indicators (such as inflation, taxation, and GDP growth) and competitiveness. Finally, the COVID-19 epidemic has affected the specific determinant of competitiveness, such as international trade, foreign direct investment flows, global production and employment. Therefore, it is interesting to study the resilience to instability and change in the external environment caused by the epidemic, especially in developing countries. The main conclusions of the study may be presented in a short Conclusions section, which may be a separate section or form a subsection of a *Discussion* or *Results and Discussion* section. Conclusions should provide a summary of important findings and their implications for the area of research.

Conflict of interests

The authors declare there is no conflict of interest.

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МАКРОЕКОНОМСКЕ ДЕТЕРМИНАНТЕ КОНКУРЕНТНОСТИ: ДОКАЗИ ИЗ ФАКТОРСКЕ ЕФИКАСНОСТИ И ЗЕМАЉА КОЈЕ СЕ ВОДЕ ИНОВАЦИЈАМА

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САЖЕТАК

Истраживање фактора који повећавају или ометају конкурентност једно је од основних начела теоријских и емпиријских истраживача, али до сада није постигнут консензус. Ова студија одговара на ово питање истражујући утицај различитих аспеката макроекономског окружења на конкурентност у три типа економије према глобалном предузетничком монитору (ГЕМ) (економија вођена факторима, економија вођена ефикасношћу, економија вођена иновацијама). Користећи Портерову класификацију, подијелили смо земље на основу фактора, ефикасности и иновација. Поред тога, генерализована метода момената (ГММ) коришћена је за идентификовање ендогености и неопажене хетерогености података у неуравнотеженим панел подацима за 81 земљу (2002-2018). Резултати показују да су варијације конкурентности међу земљама углавном одређене варијацијама у степену економског развоја. Прво, раст БДП-а, ниски почетни трошкови и већи издаци за истраживање и развој играју кључну улогу у објашњавању варијација конкурентности у три кластера земаља. Друго, што се тиче земаља у фази

1, налазимо да су отвореност трговине, пореска стопа, раст БДП-а, почетни трошкови, реални ефективни курс, расходи за истраживање и развој и продуктивност рада од посебног значаја за конкурентност. Када су у питању земље из фазе 2, можемо примијетити да су отвореност трговине, пореска стопа, раст БДП-а, инфлација, почетни трошкови, финансијски развој, реални ефективни курс, расходи за истраживање и развој и продуктивност рада имали статистички значајан утицај на конкурентност. Када је ријеч о земљама из фазе 3, фактори као што су отвореност трговине, стране директне инвестиције, пореска стопа, стопа раста БДП-а, инфлација, пореска стопа, почетни трошкови, финансијски развој, издаци за истраживање и развој и продуктивност рада имају утицај на конкурентност. Овај рад презентује неке битне карактеристике, као што је макроекономски индекс за одређивање конкурентности. Ове карактеристике се могу користити као смјернице за доносиоце одлука, јер идентификују области у којима предузимање даљих акција може побољшати конкурентност. Напосљетку, добијени резултати су високо конзистентни у низу тестова робусности и провјера робусности који покривају алтернативне узорке и алтернативне групе варијабли.

Кључне ријечи: *конкурентност, глобални индекс конкурентности, економски раст, ГММ*