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## **An empirical study of competitiveness and international economic growth: The case study of EU**

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**ABSTRACT**

The paper's general topic considers national competitiveness, a factor suppressing the competitiveness and economic growth of the EU member states, including the UK. The paper's main objective is to investigate possible causal links between economic growth and competitiveness with an exclusive focus on factors which disadvantage national competitiveness. As a primary source of data, results compiled within the Global competitiveness report (GCR 2017-2018) and provided by the World Economic Forum (WEF) have been used. The national competitiveness of each member state was expressed by its unique Global competitiveness index (GCI) elaborated according to the GCR methodology. Part of the report was an exclusive business opinion survey about general business and entrepreneurial conditions in each state. Firstly, the probability distribution of each random variable was established. As most problematic factors were highlighted taxes and tax regulations, inefficient state bureaucracy and restrictive labor conditions. Subsequently, the relations between the national competitiveness (GCI), factor score, and economic growth were analyzed. The results point to a relatively weak link between the GCI vs factor score and GCI vs economic growth, which was statistically insignificant. However, there was a moderately strong negative correlation between the factor score and economic growth, suggesting a higher factor score means lower economic growth and vice versa. There is a number of EU member states, including 'old' member states afflicted by slow economic growth. Also, these states have a higher factor score. Conversely, there are states, mostly 'new' ones, which are less developed, however, were able to achieve higher economic growth rates. In turn, their factor score is lower. Based on the results, the possible causal relationship between the economic growth and factors suppressing the business cannot be ruled out. The position of each EU member state is mainly a consequence of its own social-economic policy framework design and implementation.

**KEYWORDS:** competitiveness, GCI, factor score, economic growth, social-economic policy, international economics

**JEL CLASSIFICATION:** M21, M38, E02

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## INTRODUCTION

Currently, many countries focus on the strategy of national competitiveness build-up for fostering economic development. Achieving this objective is a long-term policy mantra for many developed and developing economies worldwide. However, the paper instead focuses on another side of the competitiveness – factors which are hindering the national competitiveness of the countries. The factors contributing to the deterioration of the business environment and, subsequently, the competitiveness of national economies is just the other side of the same coin. These factors are tightly linked with government regulatory framework or general business conditions prevailing in the national economy. Competitiveness is the invisible hand, along with globalization governed by the visible hand of governability.

As Delgado et al. (2012) explain, 'foundational competitiveness' across the nations comprises macroeconomic and microeconomic factors which should determine the national level of competitiveness. Macroeconomic factors set a general condition that creates opportunities for higher productivity but is not directly linked to company productivity and labor mobilization. The second broad of macroeconomic competitiveness is the monetary and fiscal policy for management of short and medium-term business cycle fluctuation. Microeconomic determinants of competitiveness are very different. Microeconomic competitiveness is focused on specific attributes of the national business environment, the organization and structure of economic activity, and the use of sophisticated business management practices. Ernst & Haar (2019) distinguish the four main drivers of competitiveness that is firm-level competitiveness, human resources, inclusive growth, and regional competitiveness. Firm-level competitiveness is tightly connected with governability, e.g., stable institutions and stable political, legal, and social framework of the country.

Kao et al. (2008) propose a comprehensive framework for the competitiveness evaluation of the sample of Southeast Asian economies. At the first level, national competitiveness was broken down into four areas: economy, technology, human resource, and management. Furthermore, each area was subsequently fielded into other 3-5 subfactors. There were significant differences in the factor endowment between the countries. The main factors which likely do contribute to the deterioration of the competitiveness are R&D level, labor productivity and management. This topic still represents a continuously evolving concept, retracting inwardly previously unknown factors with often polarizing effects and regions due to the ongoing globalization.

## Literature review

A valuable contribution to this concept was provided by Porter's (1990), seminal work: *The Competitive Advantage of Nations*. Porter proposed a national diamond model, which outlines four classes of country attributes determining national competitive advantage: factor conditions; demand conditions; related and supporting industries; and company strategy, structure, and rivalry. He also indicates two other factors – government policy and chance (exogenous shocks) which do support competitiveness in general but do not create it (Porter, 1990). Later, the model was replenished by other factors like foreign direct investment, government policies and pro-competitive policies (Kordalska & Olczyk, 2015). Earlier, this

concept emerged as a postulate based on Ricardo's (1817) comparative advantage theory, where he showed that even if one nation is more efficient in producing all goods, still it is advantageous to trade with other nations, as they can focus their production on the internally and relatively most efficient products, and trade those products where they don't have a relative comparative advantage (Berger, 2008).

National competitiveness is being also highlighted due to the ongoing process of globalization (Lal, 2001; Chikan, 2008). Globalization represents a set of worldwide processes that make the world economy more integrated and interdependent. These areas of economic interconnection include international finance, transnational corporations (TNCs), foreign direct investment, the location of production, and globalization of the economy tertial sector (Stutz & Warf, 2012). Globalization has had a strong impact on national economies since the late 1970s. The impact was manifested in rich countries, where the average income per capita increased enormously, as well as in poor countries, which became even more impoverished.

Meanwhile, globalization has resulted in the consolidation of the core of the world system. The core is now a close-knit triad of the geographic centers of the United States, the European Union and Japan. Most of the world's flows of goods, capital and information are within and between these three centers (Knox, Agnew and McCarthy, 2008). Most of the academic, scientific, and professional literature sources devote to research and evaluation of the factors and attributes contributing to the countries' competitiveness built-up. However, Mura & Hajduova (2021) stress observing the national competitiveness topic through the lens of the economic growth. This topic should be investigated through the optics of the macro dimension (Siggel, 2006; Waheeduzzaman, 2011), which deals with the competition among the nations, while the micro dimension (Dvouletý & Blažková, 2020; Özçelik & Taymaz, 2004; Rugman, Oh & Lim, 2012) involves the competition among the firms within the nation. However, there is less evidence toward the factors which generally suppress national competitiveness. Ghemawat (2007) argues that doing business is affected by cultural, administrative, geographic, and economic conditions specific to the country. The link between national competitiveness/development and favorable business environment is apparent; it is the question of the easiness of doing business and the factors which increase or decrease this ability (Besley, 2015; Fernández-Serrano & Romero, 2014). There are some studies providing causal evidence between the business environment and development through the economic growth (Djankov et al., 2006; Haidar, 2012; and Ani, 2015). The links between the business regulatory reforms, 'ease' of doing business and subsequent economic growth were studied. On the other side, high regulatory barriers to entry, in general, hinder the market entry, especially for new firms and in industries with high entry costs, Klapper et al. (2004). Bota-Avram (2014) explored the relationship between the good governance and the business environment. The rule of law, efficient regulatory framework and corruption curb are the key governance factors for the business environment.

European Comission (2017) recognizes that improving public administration's business regulation and quality is an important part of policy strategies to boost growth and employment. Also, it has an important impact on firm entry, exit and growth as well as productivity and profitability. Contrary, barriers to competition can prevent the reallocation of resources (capital, labor), enabling inefficient firms to survive while hampering the growth of efficient companies. According to the report, in the EU, there are significant differences between EU member states, and the best performers are non-euro area countries. Among the

most tackling issues were dealing with the construction permits, getting credits, protecting minority investors, and enforcing contracts. Codruta & Denisa (2018); Rusu & Toderascu (2016), in their study about the competitiveness of Central and Eastern Europe countries, cite the most problematic factors for doing business: inefficient government bureaucracy, access to financing and corruption. The corruption issue as a major obstacle to development was highlighted also in empirical study on V4 countries, Linhartová & Halasková (2022). Secondly, tax rates and restrictive labor policies are considered in the second line of factors hindering the country's competitiveness. Rusu & Toderascu (2016) define as most tackling issues regarding the CEE's regarding the competitiveness labor market efficiency, health and primary education, business sophistication and innovation.

Moreover, financial market development and ease of accessing finance pose an additional challenge to national competitiveness in transitional economies (Ricart et al., 2004). Commonly, tax rates and regulations are often cited as a major disadvantage of the competitiveness of developed countries. High corporate tax rates undermine the international competitiveness of a country. The excessive tax burdens are frequently blamed for the poor international performance of industries. The reductions in corporate taxes could be essential for attracting more investment capital and increasing firms' productivity and investment incentives. Thus, in turn, the reduction of corporate taxes could stimulate the country's long-term competitiveness by enhancing economic freedom (Knoll, 2010). High job creation expectation rate, tax rate and the costs of starting a new business are negatively related to the economic competitiveness of analyzed countries (Rusu & Dornean, 2019). Fishman & Golden (2017) consider that corruption reduces entrepreneurship opportunities, undermines confidence in public institutions, and widens the income gap with an impact on economic growth. Loch et al. (2007) analyze structural prerequisites for competitive business in the EU states. Particularly consider the role of the government, unions, and education system as relevant factors in its analysis. The competition increases if businesses, governments, and unions collaborate and educate the public.

The general overview of EU member states is diverse. The reason that economic conditions and institutional constraints in European regions differ substantially is the profound cause of competitive differences among the EU member states (Lehmann & Jungwirth, 2019). Stancikova (2015) found significant differences in the EU28 competitiveness in global terms. In most cases, the old EU countries did reasonably well in terms of drivers of the competitiveness and functioning of the societies. However, new member states got unsatisfactory results regarding lower economic efficiency and economic prosperity. Lacka (2015) highlights the bond between the innovation capabilities and level of competitiveness of EU member states. Mostly new member states are on the tail of the innovations rankings of the EU. The most problematic bottlenecks are weaknesses of the research system, undeveloped relations between science and the economy and little public financial support for innovation activities. Resultingly, states that do not have such strengths in innovations are less competitive globally. In their paper, Dima et al. (2018) point out the competition deficiencies of developed EU member states, noted as "soft" pillars such as innovation, business sophistication and social cohesion. In contrast, in the case of developing EU countries, there are "hard" pillars such as energy intensity and debt-to-equity. On a global scale, EU economies rank high in regulatory processes with solid legal institutions protecting investors' property and rights, whereas the 'old' member states score as a frontrunner. However, the 'new' member states lag (Povrazníková & Hamplova, 2013).

## MATERIAL AND METHODS

The paper's focus is to investigate the possible link between national competitiveness and the most critical factors, which pose serious obstacles to doing business and consequently hamper economic growth in the EU. As a source of the data for the evaluation, the *Global Competitiveness Report (GCR)* issued annually by the World Economic Forum (WEF) has been used. The GCR 2017-2018, along with the regular Global competitiveness index (GCI) score provided for each country, also includes a special issue of Executives' opinion survey providing country's data about 'most problematic factors for doing business,' e.g. *factor score* (GCR 2017-2018).

Firstly, the paper aims at statistical inference on data provided by the GCR. The *GCI* and *factor score* on the level of EU countries are studied. The probability distribution of each sample is established. The value  $F(x)$  of distribution function  $F$  of continuous random value  $X$  for some value of  $x \in R$  is found.

$$F(x) = \int_{-\infty}^x f(t)dt \quad (1.1)$$

Statistical inference becomes helpful for analyzing possible links between the economic growth, competitiveness and factor score suppressing the competitiveness of EU countries.

Secondly, the paper investigates the possible link between the search variables on three levels:

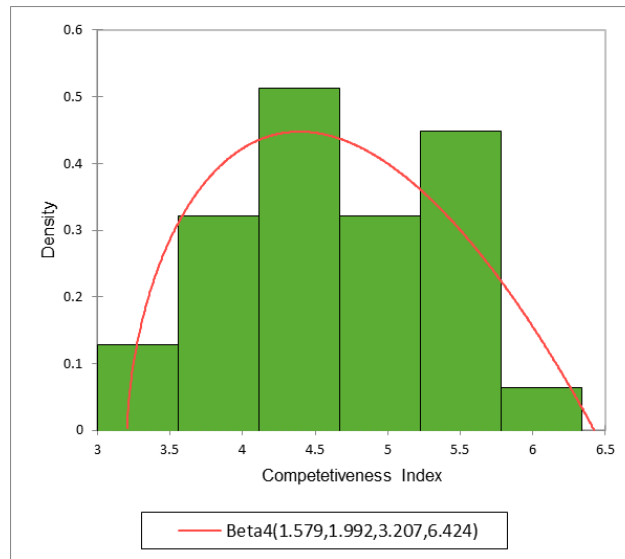
- Competitiveness vs Factor score,
- Growth vs Competitiveness,
- Growth vs Factor score.

For measuring of the economic growth we used 5-year average growth rates (period 2012-2017) due to the smoothing out possible business cycle. Before conducting the analysis, the factor score has to be weighted according to the results stated in GCR.

Formally, the statistics  $Y$  is being investigated (weighted problematic factor score), written as  $Y = \sum x_i n_i$ , where statistical sample comprises  $m$  subsamples denoted as  $x_1, x_2, \dots, x_m$  and subsample frequencies denoted as  $n_1, n_2, \dots, n_m$ , where statistical sample is  $x_1 n_1 + x_2 n_2 + \dots + x_m n_m = \sum_{i=1}^m x_i n_i$  and weighted problematic factor score of country  $Y_j$  is  $\sum x_i n_i$ , respectively.

## RESULTS

According to the methodology in the first step, the probability distribution of search variables (competitiveness index and factor score) was established. Priorly, it is essential to set a correct number of intervals. For determining the proper number of intervals  $m$ , common rule has been used  $m = 1 + 3.3 \log(n)$ , where  $n$  is research sample. Based on the results six intervals for both variables (Competitiveness index and Factor score) were established After some experimenting, the probability distribution with the best fit was associated with the sample and search variable in both cases.

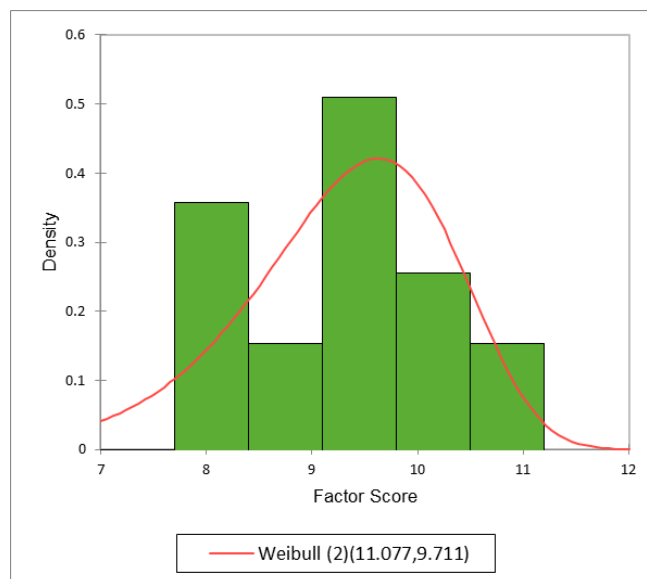


**Figure 1** Probability distribution of competitiveness index variable

Figure 1 presents probability distribution function for the Competitiveness index of EU28 countries (including the UK). According to the results, the shape of the histogram resembles the bimodal distribution with two peaks where most sample units are concentrated. Generally, a higher competitiveness index was achieved mainly through the ,old‘ member EU states, and on the contrary, a lower index was achieved mostly by the ,new‘ member states accessed into the EU after 2004. Underlying probability distribution function fits to the Beta distribution,  $X \sim \text{Beta}(\alpha, \beta)$  formally written:

$$f(x; \alpha, \beta) = \text{constant} \cdot x^{\alpha-1}(1-x)^{\beta-1} = \frac{1}{B(\alpha, \beta)} x^{\alpha-1}(1-x)^{\beta-1} \tag{1.2}$$

For  $0 \leq x \leq 1$ , and shape parameters  $\alpha, \beta > 0$ , is a power function of the variable  $x$  and of its reflection  $(1-x)$ .



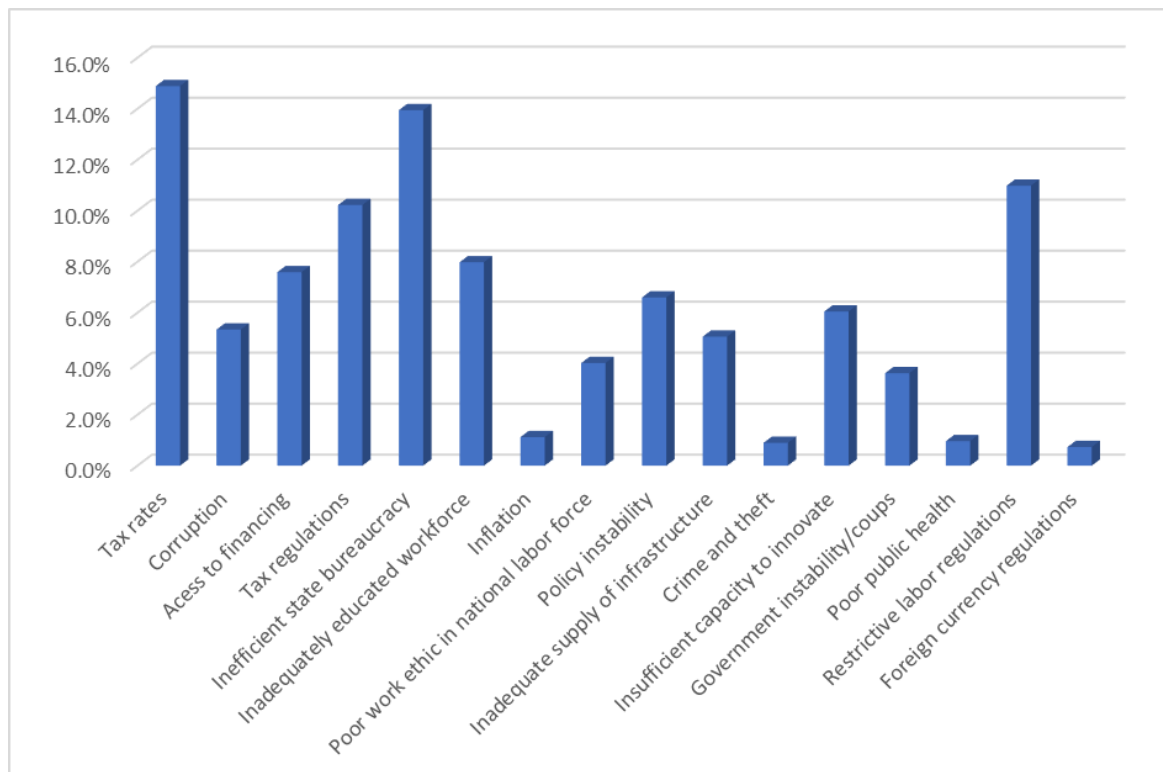
**Figure 2** Probability distribution of Factor score variable

Figure 2 presents probability distribution function for the Factor score of EU 28 countries (including the UK). Again, the underlying shape of the probability distribution resembles bimodal distribution with two peaks and slightly negatively skewed data. The higher Factor score reflects more negative weights attributed to governmental policies observed by the enterprises. In this case, there are a number of old EU member states with higher factor load; conversely, new member states generally have lower factor load. Underlying probability distribution function fits Weibull distribution,  $X \sim Weibull(\delta, \beta)$  formally written

$$f(x) = \frac{\beta}{\delta} \left(\frac{x}{\delta}\right)^{\beta-1} \exp\left[-\left(\frac{x}{\delta}\right)^\beta\right], \tag{1.3}$$

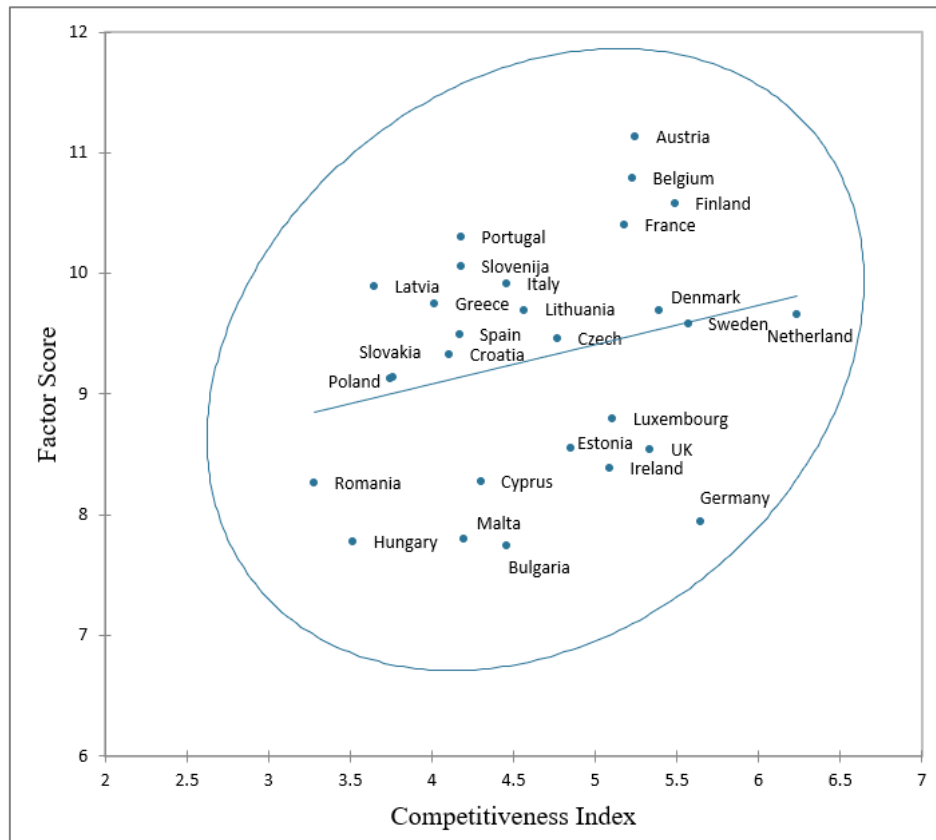
for  $x > 0$  and with scale parameter  $\delta > 0$  and shape parameter  $\beta > 0$ .

Next, the investigation of links between the Competitiveness index, most problematic factor score and economic growth is explored. However, different problematic factors have different weights (scores) due to the business executive survey. For this purpose, factors were weighted according to their weight resulting from calculation. Fig. 3 (below) represent factor weights as a share of a factor on total factors weight. For instance, factors like tax rates, inefficient state bureaucracy or restrictive labor regulations get relatively higher weight (more than 10%), suggesting that these conditions represent a severe challenge to the enterprisers. Otherwise, factors like inflation, crime rate and theft or public health represent a minor concern for the enterprises.



**Figure 3** Calculated factor weights based on business executives opinion survey, GCR 2017-2018

Next, the link between the Competitiveness index and problematic Factor score is established. For every member state, a weighted factor score was calculated, as a sum of factor weights, respectively.

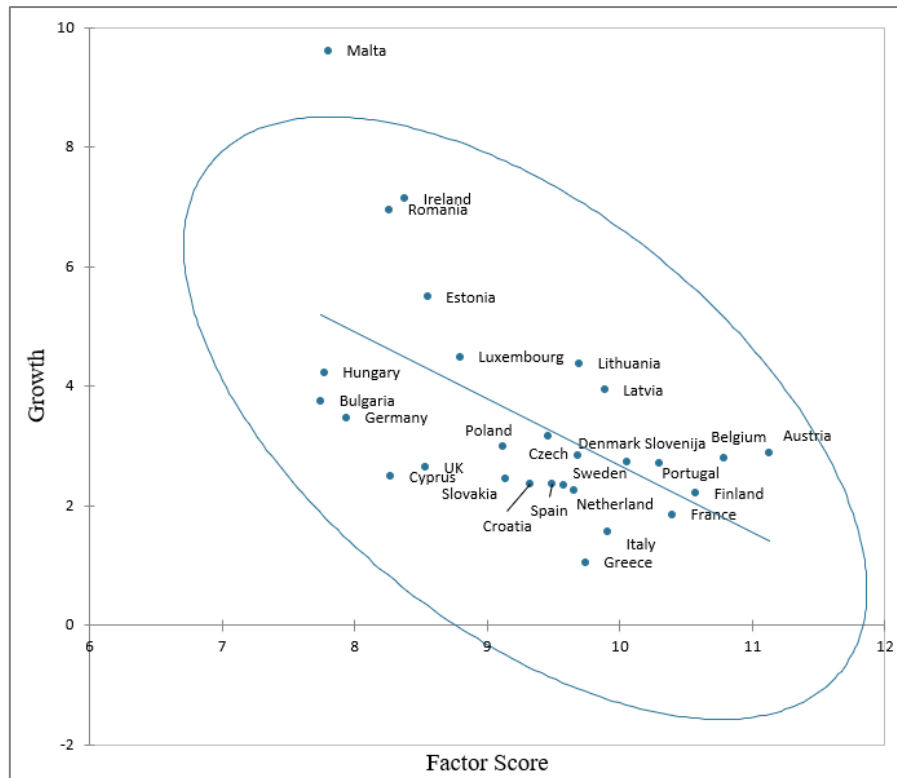


**Figure 4** Factor score vs. Competitiveness index scatterplot

Figure 4 displays a scatterplot of the sample (EU member states) relating the Competitiveness index and Factor score. It might be seen that the relationship is somewhat ‘loose’, which suggests a weak link between national competitiveness and problematic factors for doing business. Indeed, the calculated value of Pearson’s correlation coefficient is just and not statistically significant at all ( $p\text{-value} = 0.193$ ).

Figure 5 displays a scatterplot of the sample relating the Economic growth of EU-28 states (five-year average 2012-2017) and Factor score. The link between the variables is established. The relation is negative, which suggests that countries with higher factor load are also achieving lower economic growth, which is a reasonable outline. The correlation coefficient  $\rho_{YZ} = -0.572$ , suggests a moderately strong negative association, and the coefficient is also statistically significant ( $p\text{-value} < 0.01$ ). It should be noted that several most developed EU states (France, Italy, Finland, etc.) display shallow average economic growth along the higher factor load, whereas many Eastern Europe countries like (Poland, Hungary, and Slovakia) record relatively higher economic growth and comparably lower factor load. The evidence of the relatively higher economic growth of CEEC countries is also provided by Mura et al. (2020).





**Figure 5** Growth vs. Factor score scatterplot

Finally, the association between the Competitiveness index and Economic growth was investigated (not displayed). Again, the relationship is rather weak, and the correlation coefficient and not statistically significant ( $p$ -value = 0.293).

## CONCLUSION

The paper's objective was to investigate relations between national competitiveness, the most problematic factors for doing business and economic growth in the sample of EU member states, including the UK. The competitiveness index and business executives survey compiled in GCR 2017-2018 ed. was used as an essential primary data source. Economic growth data were provided by Eurostat and averaged over the period 2012-2017.

The probability distribution of both random variables based on a sample of EU member states points to a bimodal shape distribution pattern, which suggests more significant heterogeneity of underlying data. Subsequently, the relations among each pair of variables (GCI, factor score and economic growth) were further analyzed.

Results pointed to a relatively weak link between the GCI vs factor score and GCI vs economic growth. Pearson's correlation coefficient between both pairs of variables was low and statistically insignificant. There is possible reasoning that constructing GCI used specific methods which assemble data to index, and some 'information' could be lost. Furthermore, some authors object to using GCI data, especially when comparing economic growth (Xia et al., 2012; Kordalska & Olczyk, 2015; Djogo & Stanisic, 2016).

However, there was found to be a moderately strong link between the factor score and the economic growth of the EU member states. Priorly, factor weights were calculated to discover the relative weight of each factor, which is problematic for doing business. According to the results, the most problematic factor appears to be the high tax burden applied primarily to old member states. Other concerning factors for doing business became corruption, restrictive labor regulation, inefficient state bureaucracy and tax regulation. On the other hand, factors like crime and theft, inflation and public health do pose a minor concern. Similar conclusions were found by Nababan (2019) in his study, whereas the most problematic factors in improving the national competitiveness were identified as corruption, inadequately educated labor, access to financing, tax regulation and inefficient government bureaucracy. These factors became a source of concern in most of the member states of the EU, except for corruption. Most of the old member states showed just scant concern about public corruption. These results are in some way in cohesion with empirical results provided by Rusu & Dornean (2019), who found a negative relation between the high corporate tax level and the country's global competitiveness. On the other hand, factors like high FDI inflow and innovation rate stimulate competitiveness.

There are also some limitations of the study. The statistical sample – EU member states are relatively small for the analysis. GCR includes up to 200 countries, based on the data availability. Including all these countries might improve overall results in terms of GCI data or the probability distribution. Nevertheless, the results of the paper point to apparent heterogeneity between the EU member states traditionally divided into 'old' and 'new' member states. The divide between these groups of countries is manifested mainly by differences in GCI. However, a high factor score becomes a severe issue for some developed old member states. Thus, the effect of the factor score, and economic growth cannot be ruled out.

Finally, every member state is primarily responsible for its own social-economic policy framework design and implementation. Bernardelli, Próchniak & Witkowski (2021) suggest, that good institutions reflected in the greater scope of economic freedom and better governance lead to the higher economic growth of the EU countries. However, the impact of institutions on economic growth was not stable over time. In turn, too stringent or too loose policies finally in effect could backfire in a current increasingly globalized world.

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