

**CDSSES 2020****IV International Scientific Conference "Competitiveness and the development of socio-economic systems" dedicated to the memory of Alexander Tatarkin****MIGRATION EFFECT ON THE COMPETITIVE GROWTH IN GERMANY AND THE UK**

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**Abstract**

The article considers the impact of migration processes on the GDP per capita. Numerous studies examine the reasons for changes in the vector of migration policy and indicate various factors of migration influx rate. However, the most recent observations indicate an almost stagnant migration flow being affected by the COVID-19. As a result of the ongoing impacts, the requirements for the quality of human capital will be changed completely, and the volume of GDP will be decreased. As examples of two countries, Germany and Great Britain, having different migration policy approaches, authors analyze the importance of migration flows. Based on this fact, the authors suggest that migration processes can be one of the statistically significant factors affecting GDP per capita. It also can be used in the building of mathematical forecasting models. Analyses of variance (ANOVA) method is used to test the hypothesis. The linear regression is used to build models and show how factor influences the linear approximation. As a result, the hypothesis of the impact of the migration flows on GDP per capita was confirmed with the econometric models' support and their indicated explanatory abilities. Inflation and unemployment rates were considered as complement factors. The results of the models allow predicting migration policy based on migration quotas.

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## 1. Introduction

In contemporary society, the problem of migration processes associated with military conflicts and low living standards in the Near and Middle East countries is quite relevant. Recently, there has been an active process of forced resettlement from these regions to European countries.

According to the UN, Europe had the largest number of migrants in 2019 (82 million). Germany, in terms of the number of living migrants (13 million), already shares the second and third places in the world with Saudi Arabia (13 million), followed by the Russian Federation (12 million), the United Kingdom (10 million) and the UAE (9 million), France, Canada and Australia (about 8 million in each country) and Italy (6 million) (The number of international migrants reaches 272 million, continuing an upward trend in all world regions, says UN, 2019).

The migration rate increased rapidly throughout 2013-2017. The migration flows occurred in two ways: from the EU countries and mostly from the Middle East (Dogan & Rakacheva, 2019).

In 2013, there were 16.5 million migrants to Germany. However over the next 4 years, their number increased to 18.6 million (22.5% of the German population (18,6 Millionen Einwohner mit ausländischen Wurzeln in Deutschland, 2017). Moreover, in 2017, 2.3 million migrants had arrived from the Middle East. Since 2017, the flow of migrants has sharply decreased. This trend is observed in other European countries with less intensity. It has happened due to Germany adheres to a quite loyal migration policy providing high-level social benefits and the possibility to gain citizenship. Other European countries, notably the UK, have suspended migrant flows by making it more difficult to cross the borders and obtain residence permits. On the one hand, there is no doubt that migrants' flow creates additional economic expenditures of the host countries. On the other hand, refugees' flows represent a new labor force to be used effectively to boost the economy under certain conditions. (Ostrand, 2018).

## 2. Problem Statement

Europe has faced the most serious migration crisis in 2014-2015. It has been caused by the internal political destabilization in several countries of the Middle East and North Africa (Sadykova, 2013).

European countries have been swept by a flow of illegal immigrants from Africa and the Middle East. If in 2010s 20-25 thousand people a year came to Europe illegally, then in 2014, according to the IOM, 900 thousand people arrived to Europe, and 1.048 million people next year. The main flow came from Syria and Afghanistan. Also, a big amount of people were immigrants from Iraq and Libya. Approximately 25% came from African countries (Eritrea, Sudan, South Sudan, DR Congo, Somalia, Mauritania, Morocco, Tunisia, Algeria, Mali, Nigeria, Cameroon, Gabon). In 2016 the number of migrants and refugees who had arrived to the European continent decreased to 390 thousand, in 2017 to 186 thousand respectively (Pimenova, 2016).

Germany obtains a reputation as one of the most attractive countries for migrants. The number of refugees from the Middle East, North Africa and South Asia during the migration crisis of 2015 exceeded several hundred thousand. Germany's migration attractiveness is largely explained by a tolerance towards refugees and by a simplified procedure for obtaining citizenship associated with a developed system of social adaptation (Martynov & Sazonova, 2017).

Another important factor is Germany's position as the European Union leader is active promotion of the «open borders». When other European countries refused refugees or established the requirement of compulsory employment, Germany, in most cases, accepted them (Bol'shova, 2016; Bol'shova, 2017). These decisions were made due to the strengthening of the country's position in the foreign policy arena since they were quite effective in the context of a low migration level from the former USSR countries. However, after the migration crisis, the attitude of the population towards migrants has deteriorated significantly. This happened due to the increase in terrorist threats associated with penetration into German territory under the guise of refugees by radical Islamists. The current situation has become a stimulus for an internal political conflict in government bodies. In particular, between German Chancellor Angela Merkel and German Interior Minister Horst Seehofer in 2018. (Guiraudon, 2018). The Interior Minister asked to close the borders for refugees already registered in other EU countries when the current chancellor defended the position that such a decision would violate the EU agreements on free movement. As a result of the discussion, a new border regime was introduced on the German-Austrian border in order to stop the refugees who should be accepted by other EU countries. But the German nation was divided in two parts: the first supported Merkel's tolerant position while others were against (Hainmueller & Hopkins, 2014). Thus, Germany's relatively loyal relation to refugees led to instability in society and conflicts in government. In 2015, 2.14 million people arrived to the country. At the moment, there is a tendency of tightening the migration policy, however, the consequences of the 2015 crisis still affect the development of the country's economy. By 2018, the number of refugees from Middle East to Germany was 207 thousand people (Dauke, 2015).

The United Kingdom has historically been attractive to visitors and migrants. This reputation is mostly associated with the high stability that was formed back in the time of great geographical discoveries. For almost 300 years, until the beginning of the 20th century, the national currency remained stable. Nowadays, the UK is still attracting immigrants from all over the world (Malhotra et al., 2013). In 2010, the Conservatives became the ruling power with a goal of reducing the flow of migration to the United Kingdom to 100 thousand people a year. According to a 2013 survey, 75% of the population was in favor of reducing migration flows. Among the supporters of the usefulness of immigration for the country, more than half of the respondents expressed that it is necessary to reduce the flow, 2/3 of them perceived immigrants' flow as a potential threat to the labor market (Klupt, 2014). In the period of 2010-2014 the UK government has taken steps to complicate the immigration process. For this, the procedure for testing the knowledge of English by immigrants and the presence of basic knowledge of the country's history was complicated. In addition, the government decided to revoke about 300 licenses from educational institutions that issued fictitious visas to visitors. The quotas for foreign specialists were also reduced. About 500 language schools in Great Britain lost the right to finance foreign students who came to study and sought to stay in the country for permanent residence (Issifou & Magris, 2017). The Prime Minister of Great Britain Cameron contributed to introducing restrictions on the entry of migrants and the payment of social benefits to them. All of the above measures had a beneficial effect on reducing migration flows to the country, but not to an adequate extent. The EU's desire to expand its spheres of influence by providing asylum for large numbers of refugees was one of the reasons for the UK's withdrawal from the European Union. Thus, the UK can be viewed as a state with a relatively complex

system of obtaining asylum for refugees, but at the same time, it does not completely refuse to accept immigrants (Goodman et al., 2017).

In this regard, an urgent scientific task is to identify the context and features of the migration features in the migration crises context. The differentiation in the countries' policies and attitudes to the changes in migration flows creates the lack of shared understanding of this phenomenon. As a result, there are no common ways to control migration flows, especially during crises. The change in net migration may cause the change in national wealth, so the understanding of the correlation between the migration balance and GDP per capita is quite relevant.

### **3. Research Questions**

The main research issue lies in the assumption that net migration and GDP per capita have statistical dependence. The application of that dependence on economic models may help increase the ability and develop macroeconomic planning.

### **4. Purpose of the Study**

The paper explores the hypothesis of the statistical correlation between the net migration and GDP per capita using two developed host countries (Germany and the UK) as examples. The purpose of the study is to accept or deny the assumption based on the mathematical and statistical methods. Using the result of the analyses, authors conclude about the characteristics of the influence of net migration on the GDP per capita for Germany and the UK.

### **5. Research Methods**

To study the impact of migration processes on the economic development of Germany and the Great Britain, the net migration indicator has been chosen as a determinant variable, since it reflects both immigration and emigration flows. GDP per capita (in US dollars) was chosen as a dependent variable. To build models for each of the countries, an analysis included the net migration indicators for the period of 1950 - 2019, GDP per capita from 1970 - 2019. The variable of unemployment and inflation were chosen as complementary ones that undoubtedly affect GDP's value (for Germany from 1991 to 2019, for Great Britain from 1980 to 2019). These variables are necessary to build the linear model and come up with the explanatory power.

### **6. Findings**

To conduct a one-factor analysis of variance, researchers needed to make sure that the sample under study has a normal distribution. To check this fact, the Pearson  $\chi^2$  statistic criteria was chosen. For the net migration of each of the countries, in the period from 1970 to 2019, an interval variation series was created, with the help of which the nominal value of  $\chi^2$  was calculated. The statistical hypothesis of a normal distribution was confirmed: for Germany  $\chi^2$  real less than the critical value ( $23.9 < 27.7$ ), similarly for the UK ( $18.2 < 27.7$ ). Modelling was performed using the Excel spreadsheet analysis package. As a

result of one-factor analysis, the significance of the migration balance factor for Germany and the Great Britain was confirmed ( $2.13 > 2$  for Germany;  $53.74 > 2$  for the Great Britain). Thus, using the method of one-way analysis of variance, the influence of the migration balance on the level of GDP per capita in the studied European countries was approved.

To determine the direction and level of influence of the migration balance factor on the GDP per capita indicator researchers have used the linear regression. 3 models were built for each of the countries: a one-factor model, including the migration balance; two-factor model, including the factor of inflation and unemployment; three-factor model with migration balance, inflation and unemployment. Taking into account the fact that the statistical significance of the factor was approved for the migration balance of each country but the GDP per capita indicator is influenced by many other factors, explanatory ability of the first model, according to the authors' assumption, should not be high. The factors of unemployment and inflation have a significant impact on the level of economic development of countries; therefore, the two-factor model should have a satisfactory explanatory power ( $r_2^2 > 0.5$ ). If the hypothesis about the impact of the migration balance on the level of GDP per capita is confirmed, the three-factor model should be more reliable than the two-factor model ( $r_3^2 > r_2^2$ ).

The one-factor model of the dependence of GDP per capita in Germany on the net migration has an explanatory ability of 21.7% ( $r_{g1}^2 = 0.217$ ), which is not sufficient to be considered satisfactory. The two-factor model with inflation and unemployment variables allows for an explanatory power of 46% ( $r_{g2}^2 = 0.46$ ), the model is also not satisfactory. The three-factor model is characterized by 53.5% ( $r_{g3}^2 = 0.46$ ) explaining ability which is a satisfactory result but requires a search for complementary factors to improve reliability. The model is described by the following equation:

$$GDP_G = 69227,7536 - 1790,7115NM - 1799,866\pi - 3345,85521U$$

$GDP_G$  –GDP per capita in Germany, US \$.

NM – Net migration by 1000 people, people.

$\pi$  – inflation rate, %.

U – unemployment rate, %.

In the case of the United Kingdom, the one-factor model of GDP per capita from the migration balance already has a sufficient explanatory power of 84.4% ( $r_{gb1}^2 = 0.844$ ), but such a high result may happen due to a false correlation and it's necessary to check the complementary variables. The two-factor model with inflation and unemployment variables allows achieving 68.8% ( $r_{gb2}^2 = 0.688$ ) of explanatory power. In the case of a three-factor model (migration balance, inflation, unemployment), it is possible to achieve 93% ( $r_{gb3}^2 = 0.93$ ) explanatory ability which rejects the assumption of a false correlation. The model is described by the following equation:

$$GDP_{GB} = 32627,7496 - 567,82721NM + 4320,23981\pi - 1692,5521U$$

$GDP_{GB}$  –GDP per capita in Great Britain, US \$.

NM – Net migration by 1000 people, people.

$\pi$  – inflation rate, %.

U – unemployment rate, %.

Based on the results of statistical analysis, we can conclude the migration balance as one of the key drivers to affect the level of GDP per capita in Germany and the UK. The models obtained confirm the fact of the negative impact of an increase in immigrant flows (coefficients with the variable NM are negative) in the linear model as well as the assumption of a decrease in the economic burden on the country by introducing additional requirements for immigrants in the UK (the coefficient of impact of the migration balance for the UK is lower than for Germany). These results may indicate a higher quality of education for immigrants in the UK. For example, higher quality of human capital directly and indirectly contributes to the development of science, education, as well as the growth in the standard of living in the country. Moreover, due to high requirements for migrants, government expenditures for their assimilation and adaptation are reduced. This reflects the positive aspect of the requirements for migrants in the UK.

## 7. Conclusion

Within this study's framework, the assumption of a diverse influence of the migration balance on GDP per capita takes place as one of the key factors of economic development was confirmed. Using Germany and the Great Britain as an example, the statistical significance of the migration balance (net migration) factor was accepted. A three-factor model was compiled that predicts the change in GDP per capita in given countries with a certain level of reliability. Analyzing the obtained models, the assumption of various migration policies to influence the importance of the economy's migration factor was approved. The conclusion is that migration balances the GDP per capita change depending on the requirements and restrictions of migration flows.

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