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MODELING THE IMPACT OF E-COMMERCE ON GLOBAL GDP

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Abstract

Nowadays electronics commerce is developing at a rapid pace and its value cannot be diminished. Information and Communication Technology (ICT) promotes the development of international cooperation between various companies, opening new opportunities for enterprises and customers. Thus, there is no doubt that these technologies effects economic growth and share of e-commerce will increase in the future. This study provides the analysis and modeling of relationship between global GDP and some e-commerce indicators such as individuals using Internet (% of population), individuals using the internet for ordering goods or services, and investment in ICT with private participation.

Keywords: e-commerce, GDP, economic growth, economic development, econometric analysis, regression.

Introduction

E-commerce as a set of economic relations between subjects of different national economies regarding the exchange, distribution, and redistribution of goods using computer technologies as an instrument of information exchange, becomes a natural consequence of scientific and technological progress and profound changes in the structure of global consumption and economic growth.

The transition of enterprises to electronic methods of doing business makes it possible to upturn the effectiveness of marketing promotion, improve customer service and communications with the target audience, expand distribution channels, and help optimize financial and time costs.

E-commerce helps an organization cut the cost of distributing, receiving, and managing paper-based information by digitalizing information. Besides, ICT helps the government provide public services such as health care, education, social services at reduced prices and in an upgraded way.

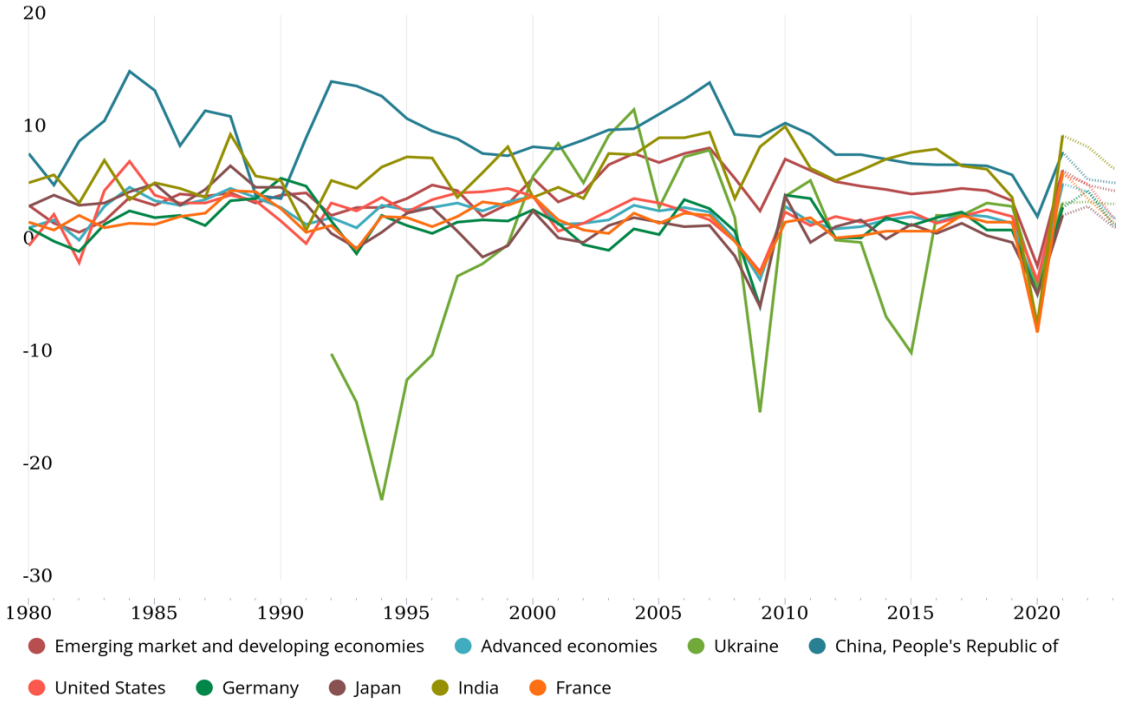

Figure 1. Real GDP growth (annual percentage change)

Source: IMF Datamapper [1]

Gross Domestic Product (GDP) is the outcome of the production activities of resident producers during a given period and is calculated in market prices. It characterizes the interrelated aspects of the economic process: the production of goods and services, the distribution of income, the final use of goods and services. Besides, GDP is the main indicator of economic development.

The coronavirus pandemic forced many countries to establish quarantine measures and widespread lockdowns, which, as expected, led to a decrease in GDP. According to the International Monetary Fund, the global economic decline in 2020 was 3.5%, while the US economy contracted 3.4%, Japan –5.1%, Germany – 5.4%, France – 9.0%, India – 8.0% [1]. According to State Statistics Service of Ukraine, Ukraine's GDP decreased by 4% [2]. Among the world's largest economies, only China showed 2.3% growth (Figure 1).

However, the results could have been much worse unless the explosive growth of e-commerce. Its development is facilitated by a high level of Internet penetration, which on average in the world at the beginning of 2021 amounted to 64.7%, in Europe – 87.1%, in North America – 89.9%, in Asia – 62.6%, in Africa – 46.2% [3].

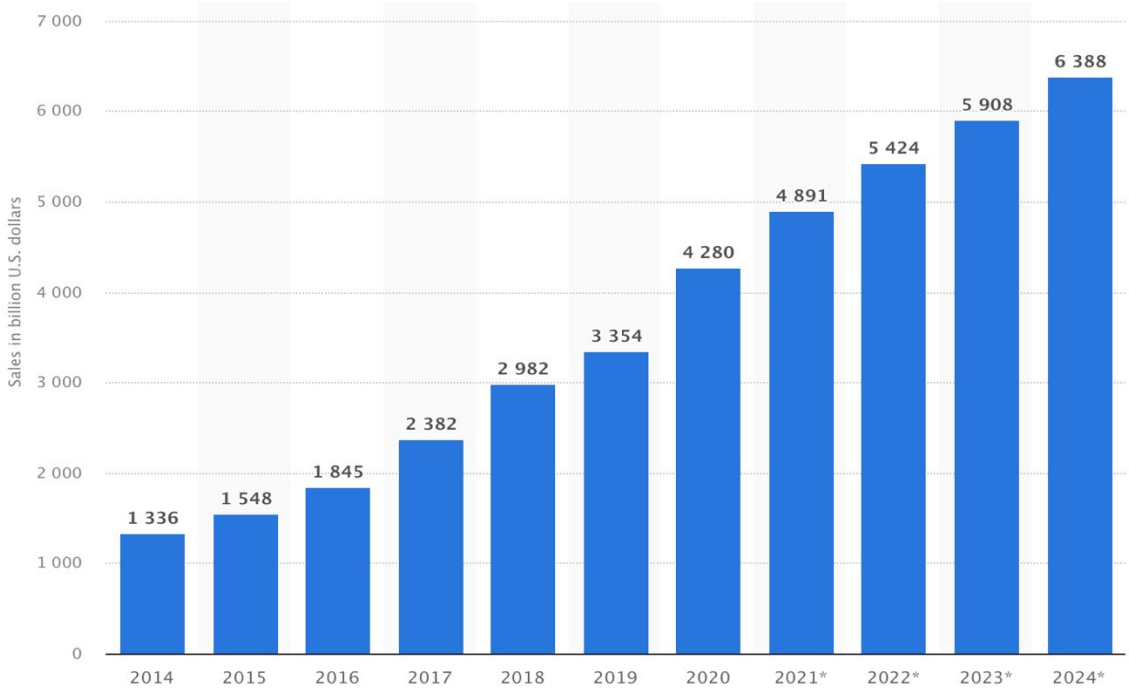

Figure 2. Retail e-commerce sales worldwide from 2014 to 2024 (in billion U.S. dollars)

Source: Statista [4]

The amount of retail e-commerce sales worldwide was increasing during last year and has tendency to grow, as shown in Figure 2. The purpose of this study is to analyze the relationship between some selected indicators of the e-commerce market and global GDP.

Literature overview

Topical studies of foreign and domestic authors have shown that an escalation in the share of ICTs in the global economy leads to an increase in GDP. For example, RD Anwari and D Norouzi in their 2016 study observed the impact of e-commerce on economic development in 21 selected countries. Generalized Least Squares Regression (GLS) method was used for data between 2005 and 2013 in this study [5].

Romanian authors FV Pantelimon, TM Georgescu, BS Posedaru in their paper compared two countries from European area and analyzed how Covid-19 influences

the e-commerce activity worldwide [6]. They gathered different types of statistics: the internet access and evolution of internet adoption, the level of GDP between 2014 and 2019 in analyzed countries, and data about ICT during the same years. Regression was used to correlate the data. The research proved positive relationship between mobile commerce growth and the GDP both of Romania and Germany. Furthermore, results displayed positive effect of pandemic on the online shopping.

T Zatonatska, O Rozhko, N Tkachenko observed modern trends of impact e-commerce and R&D on economies of Austria, Poland, and Ukraine [7]. By means of econometric analysis three models were built for each country. The hypothesis about significant impact if ICTs on GDP per capita was confirmed.

Results

The modeling was performed using linear regression method. For analysis e-commerce data was selected: individuals using Internet (% of population), individuals using the internet for ordering goods or services, investment in ICT with private participation. GDP (in billion U.S. dollars) was used as macroeconomic factor of economic development. The model explains the relationship between ICTs and economic growth and shows the positive impact of e-commerce on global GDP (R^2 = 0,89).

Conclusions

Although the global economy is in decline because of Covid-19 pandemic, some sectors are seeing a rise in values, including e-commerce. Moreover, it is an effective way to increase economic development worldwide. The analysis given in this paper provides the evidence of positive impact of e-commerce on global GDP and shows that the future ICTs growth is evident.

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