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MODELING OF IMPACTING OF E-COMMERCE ON WORLD GDP

Abstract

Nowadays e-commerce is developing with rapid growth and the value of it cannot be detracted. The purpose of this article is to analyze the e-commerce worldwide trends and explore the impact of e-commerce on GDP. E-commerce leads to development of international cooperation of different companies, making new opportunities both for enterprises and customers. Thus, no doubt, that this sphere will increase in next decade.

Key words: e-commerce, GDP, economic development, econometric analysis, multiple regressions.

Introduction

With the rapid development of the Internet, more and more new sectors of the economy are emerging. E-commerce is an area of the economy where financial transactions are conducted over the Internet. Thanks to modern technology, e-commerce opens up unprecedented opportunities for businesses and consumers that are not available in the offline world. E-commerce is expanding the market, giving consumers the opportunity to buy a wider range of goods and services for both local and foreign businesses. E-commerce also causes a change in the way companies work. Thus, by rethinking inventory management, distribution and customer service, e-commerce contributes to the development of new supply networks, services and business models, which in turn is accompanied by increased efficiency, better use of assets, faster delivery to the market and consumers and improved customer service. So it is obvious that the additional benefits that e-commerce creates for both producers and consumers have a positive impact on global economic development. Moreover, in times of pandemic, when the governments of many countries are confused to impose certain restrictions, and sometimes complete lockdown, e-commerce is becoming a lifeline for

the world economy. But for bigger development of e-commerce, it is necessary pay attention for security issues, fraud attacks and so on.

As shown in Figure 1, retail e-commerce sales in the world during last years the amount is increasing and this trend will continuous in future. Given the rapid development of this area, more and more economists are analyzing the impact of e-commerce on the world economy.

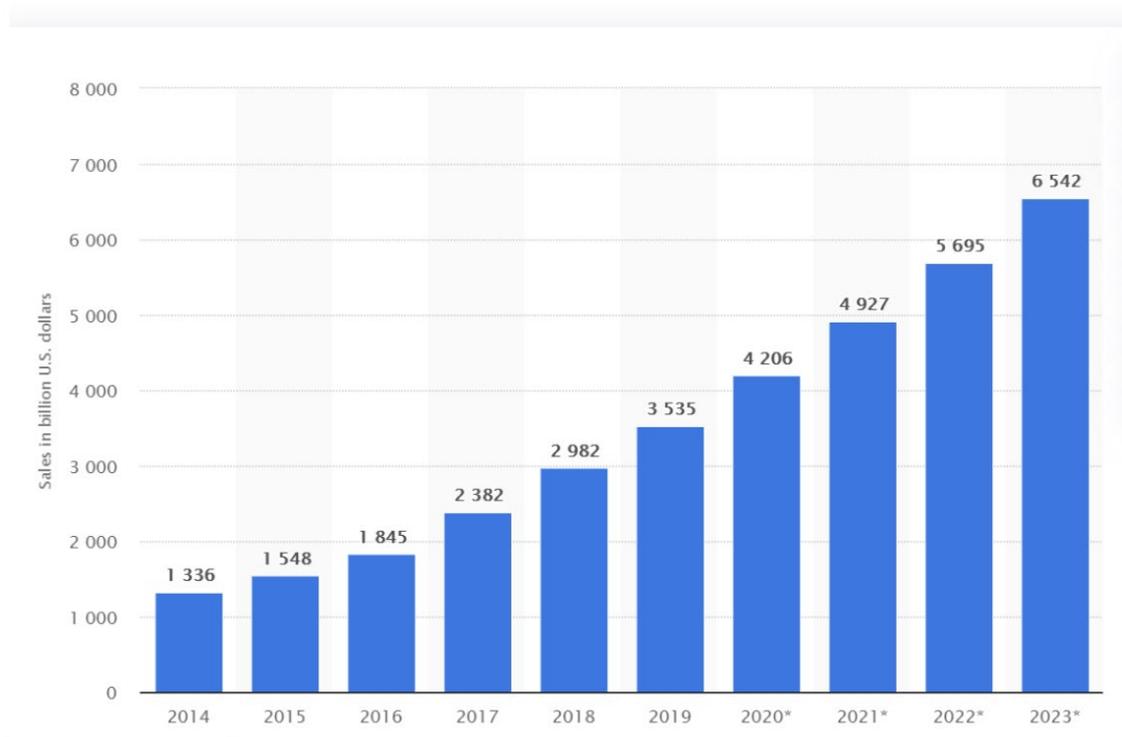


Figure. 1. Retail e-commerce sales worldwide from 2014 to 2023, in billion U.S. dollars.

Source: Statista [2].

The purpose of this work is to define the impact of e-commerce on GDP. To achieve this goal, firstly, it is needed to analyze existed researches in this sphere, secondly, analyze the trends of e-commerce and GDP dynamic, and the last stage is to modelling GDP to prove the positive correlation and to define the real effect that e-commerce makes on economic growth.

Literature overview

Recent studies of the impact of e-commerce proved that increasing the share of e-commerce in the world economy leads to GDP growth. For example, R. D. Anwari in

her work published in 2016, "The impact of e-commerce on economic development in some countries", examines the impact on GDP per capita of factors such as: e-commerce, measured in the number online purchases, research and development expenditure, government size, calculated on the basis of government final consumption expenditures and health expenditures (% of GDP). Based on data from 2005 to 2013 for 21 countries (Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Great Britain) with the help of panel regressions this hypothesis was tested. The results showed that these factors have a significant impact on GDP, in addition, it was proved that the increasing of e-commerce will lead to growth of GDP per capita [6].

Sixus Liu at his work "An Empirical Study on E-commerce's effects on Economic Growth" provide an analysis of impact of e-commerce on GDP as the indicator of economic growth in China. Through regression he tries to prove that such factors as the number of domain names, the international outlet bandwidth, the number of Internet users, the number of online shopping users, the scale of online advertising and the number of websites will promote the growth of GDP. In fact, all these factors reflect development of e-commerce. As a result, after econometric analysis the impact of e-commerce on GDP was proved. The coefficient of determination is more than 0,98, indicating a high level of dependence. As conclusion, author advice to increase government expenses on e-commerce, because it will be positive impact on national economic growth [7].

Florin Pantelimon, Tiberiu-Marian Georgescu, Bogdan-Stefan Posedaru from Bucharest University of Economic Studies investigated the impact of e-commerce on GDP on example of Romania and Germany. Moreover, they analyzed how changed this impact during pandemic. At their article "The Impact of Mobile e-Commerce on GDP: A Comparative Analysis between Romania and Germany and how Covid-19 Influences the e-Commerce Activity Worldwide" authors showed that during several last years the share of e-commerce has been increased with very big speed, furthermore the mobile e-commerce market rise by 3 times in Romania and by 2 times in Germany during 2017-2019. After measuring correlation between GDP and sales in the mobile e-commerce, the positive relation was proved. No doubt, the pandemic

impacted on development of e-commerce, more and more people avoid physical connections and prefer online shopping. The biggest changing of share is Asian countries such as India, China, Vietnam, where online shopping was not popular before pandemic [4].

Erdal Aydin in his article "The Relationship between globalization and e-commerce" claim that the process of globalization and the development of e-commerce are interconnected. Globalization led to the emergence of e-commerce. In contrary, e-commerce promoted the development of globalization. This connection is clear during 2006-2014 when both globalization and e-commerce were increasing. Especially it works with developing countries: the bigger globalization process, the more e-commerce become popular. But now when globalization is not rise so much, the e-commerce is increasing much more than ever [1].

Kiran Nair in the article "The Impact of E-Commerce on Global Business and New Opportunities" argues that e-commerce will contribute to the extraordinary growth and advancement of global business, breaking down barriers between countries and will be an integral part of the contribution to GDP. Such changes will benefit different segments of society in terms of knowledge, skills, technological progress and improved sales, as well as employment. There will be some reductions in traditional jobs through e-commerce and digital business, but this will open a new horizon for jobs in the information and communication technology sector [5].

Results

In this work multiple regression model is used as effective tool to analyze the correlation. The European Union data was collected for modelling the impact on e-commerce on GDP. The dependent variable is GDP, calculated in billion dollars of USA [8]. All independent factors indicate the dynamic of e-commerce development, there are percentages of individuals using the Internet, percentages of individuals who ordered goods or services over the internet for private use (this indicator is consider all people who make online purchasing during last 12 months) and percentages of enterprises with e-commerce sales of at least 1% turnover (it is important to mention that this indicator is consider all enterprises, without financial sector) [3]. Two different models were built to analysis the added value that e-commerce make for GDP. The first model was created to prove the existing of impact:

$$GDP_t = -1622,19 + 399,56i_users_t + 170,42orders_t + 364,27enterprises_t$$

All coefficients of independent variables are significant, and the model is adequate (p-value of model is smaller than 0,05). Moreover, the constant is not significant in this model that means that other factors are not needed to add.

The next step of analysis was creating the model that identify the real impact on e-commerce on GDP. The main model is:

$$\log(GDP_t) = 3,84 + 0,2\log(i_users_t) + 0,064\log(orders_t) + 0,021\log(enterprises_t)$$

The model is adequate, all coefficients are significant that also confirm the impact of e-commerce development on economic growth. The result can be interpreted as added value that e-commerce makes for GDP. During research it was determined that 1% of increasing the internet users will lead to 0,2% of growth GDP, the changing the people who buy online by 1% causes to change of GDP by 0,064%, the same situation is with percentage of enterprises with e-commerce sales – 1% of increasing of this indicator will create added 0,021% of growth of GDP level.

Conclusions

The impact of e-commerce on GDP is obvious: the bigger the scale of e-commerce – the bigger share of GDP will belong to this sphere. On the example of European Union data, this correlation was proved. Now when word economy struggles of lockdowns and unstable situations, e-commerce is the effective way to make the business profitable. So, the future e-commerce growth is evidently. But, for my opinion, later the impact of GDP will be lower because a lot of offline services will be disappeared in contrary of high increasing of online. Nowadays when such replacement is not so big, the impact is significant and research and analysis in this paper provide all evidence about it.

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