

The Impact of ICT Exports on The Economic Growth of The BRICS Countries

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Abstract: Information and Communications Technology (ICT) is regarded as an essential tool for enhancing the productivity and efficiency of an economy. The increasing dependence and expanding demand for ICT products has led to a momentum of their trade worldwide. This paper is an attempt to look at a relatively less explored area of ICT, that is, the export of ICT goods and services. The paper aims at exploring how the exports of ICT goods and services determine the economic growth of the BRICS countries using panel regression analysis.

Keywords: Fixed Effect Model, Information and Communication Technology, Random Effect Model, Trade

I. INTRODUCTION

According to the United Nations Development Programme (UNDP) [1], “ICTs are basically information-handling tools – a varied set of goods, applications and services that are used to produce, store, process, distribute and exchange information” [1, pp. 2]. According to [1] ICTs facilitate the flow of information, capital, ideas, people and products [1, pp. 2], thus promoting globalization. Use of ICTs is also considered to be an essential element enhancing productivity and efficiency of an economy further leading to growth and development. Over the years with significant development of ICTs, various studies have tried to analyze how the uses of different ICT goods & services and ICT infrastructure help in enhancing growth, development, trade etc. in different regions and countries. Liu and Nath (2013) [2] examined the effects of ICT on the trade of EMEs. Their study suggested the use of ICT to have positive impact on trade in the EMEs [2]. Khalili *et al.* (2014) [3] undertook a study to assess the overall influence of ICT variables on the growth of ICT leading countries in the EU. Their study found that the coefficient of ICT variable increased significantly from 1990-2000 to 2001-2011, indicating its magnitude and significance in affecting economic growth [3]. Fernández-Portillo *et al.* (2019) [4] undertook a similar study to inspect whether or not investing in ICT variables have any influence on the sustainable economic development of the European Union countries. According to their study, three variables, namely, connectivity, human capital, and the use of the internet were found to have a positive result on development of the GDP [4, pp. 7]. Toader *et al.* (2018) [5] undertook a study to examine the influence of ICT infrastructure use on economic growth in European Union (EU) countries. They conducted their study for the period 2000–2017 [5]. Their study found the

ICT infrastructure use variables to have a positive effect towards enhancing the economic growth [5]. Bahrini and Qaffas (2019) [6] undertook a similar study for the Middle East and North Africa (MENA) and the Sub-Saharan Africa (SSA) region. Their study found a negative influence of fixed telephones but a positive influence of other ICTs variables (like mobile subscriptions, internet users and fixed broadband subscriptions) on the economic growth of both the regions [6]. Thus it is quite evident that most of the earlier studies have mainly focused on the different components of ICT infrastructure and their uses. Very little evidence is found explaining an important area of ICT, that is, the export of ICT goods and services. It won't be wrong to say that increasing dependence and expanding demand for ICT products as well as the opening up of the borders to international trade has led to a momentum of the trade of ICT products worldwide. The present paper aims at exploring how the exports of ICT goods and services determine the economic growth of the BRICS countries using panel regression analysis.

II. METHODOLOGY

The study used dataset from period 2002-2017. GDP is used as a proxy for economic growth. The source of data is World Bank. The different variables used in the study are shown in the following table 1.1.

Variable	Name of the variable	Description
Dependent variable	GDP	Current US\$
Independent variables	ICT service exports	% of service exports, BoP
	ICT goods exports	% of total goods exports
	Foreign direct investment, net inflows	BoP, current US\$
	Fixed broadband subscriptions	Per 100 people

The variables are converted into their logarithmic form. The relationship between the variables is tested using panel regression analysis.

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Two panel regression models are taken into consideration namely- the fixed effect regression model and the random effect regression model. To choose between the two models, the Hausman test is used. The Hausman test is based on the following hypothesis:

Null Hypothesis = Random-effect model is appropriate

Alternative Hypothesis = Fixed-effect model is appropriate

When the $p < 0.05$, we can reject the null hypothesis or in other words, the alternative hypothesis can be accepted and vice versa. Further, it is to be noted that robust standard errors regression is used in the paper.

III. RESULT AND FINDINGS

The finding of the paper is divided into two sections as mentioned below:

1. Impact of ICT service exports on GDP and
2. Impact of ICT goods exports on GDP

1. Impact of ICT service exports on GDP

This section of the paper shows the impact of ICT service exports on GDP.

Chi ²	p-value
108.21	0.0000
<i>Source: Author's calculation</i>	

As shown in Table 1.2, the p-value is 0.0000 (that is, $p < 0.05$). The null hypothesis can thus be rejected and the alternative hypothesis can be accepted. In other words, we can accept that the fixed effect model is a better fit for our analysis.

	Coef.	p-value
ICT service exports	.2847036	0.373
Foreign direct investment, net inflows	.1997527	0.063
Fixed broadband subscriptions	.1870574	0.008
Constant	22.44061	0.000
R-sq: overall = 0.8167		
<i>Source: Author's calculation</i>		

As shown in Table 1.3 the overall R-square value is significantly large indicating the model explains around 81.67 per cent goodness of fit. Based on the p-value we can infer that the foreign direct investment significantly determines GDP at 10 percent level of significance, while fixed broadband subscriptions significantly determines GDP at 1 percent level of significance. Further both the variables have a positive impact on GDP. That is, with an increase in the foreign direct investment (net inflows) and fixed broadband subscriptions, GDP increases. In the case of ICT service exports, although it positively impacts GDP, it is not a statistically significant variable in the model.

2. Impact of ICT goods exports on GDP

This section of the paper shows the impact of ICT goods exports on GDP.

Chi ²	p-value
6.03	0.1103
<i>Source: Author's calculation</i>	

As shown in Table 1.4, the p-value is 0.1103 (that is, $p > 0.05$). Thus the null hypothesis cannot be rejected. Thus we have to accept the null hypothesis that the random effect model fits for our analysis.

	Coef.	p-value
ICT goods exports	.1185212	0.024
Foreign direct investment, net inflows	.3800287	0.000
Fixed broadband subscriptions	.1585815	0.000
Constant	18.59965	0.000
R-sq: overall = 0.8555		
<i>Source: Author's calculation</i>		

Table 1.5 shows that the overall R-square value is significantly large, indicating that the model explains around 85.55 per cent goodness of fit. Based on the p-value we can infer that the ICT goods exports significantly determines GDP at 5 percent level of significance, while, foreign direct investment and fixed broadband subscriptions are significant determinants of GDP at 1 percent. Further all the variables have a positive impact on GDP. That is with increase in the ICT goods exports, foreign direct investment (net inflows) and fixed broadband subscriptions, GDP increases.

IV. CONCLUSION

According to the United Nations Development Programme (UNDP) [1], "ICTs are basically information-handling tools – a varied set of goods, applications and services that are used to produce, store, process, distribute and exchange information" [1, pp. 2]. It is evident that most of the earlier studies have mainly focused on the different components of ICT infrastructure and their uses. Very little evidence is found explaining an important area of ICT, that is, the export of ICT goods and services. The present paper aims at exploring how the exports of ICT goods and services determine the economic growth of the BRICS countries using panel regression analysis. The regression analysis found both foreign direct investment and fixed broadband subscriptions to have positive and significant impact on GDP in both the models. Further, both ICT service exports and ICT goods exports have been found to have positive impact on economic growth (GDP).

The basic argument behind such positive association might be that the increase in ICT exports may have a positive influence on the inflows, investment and employment of the exporting country. It may also help in enhancing and boosting innovations and technological developments in the exporting country. All this may further lead to a rise in the economic growth. Future researchers may take into consideration the other determinants related to ICT, considering it is one of the limitations of the present study.

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