Internet and International Trade in Services

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Abstract

The aim of this research paper is to look into empirical evidence to determine the impact of the internet upon the international service trade in the Organization of the Islamic Cooperation (OIC) over the period of 1990 - 2011. To measure the impact of the Internet upon international service trade, we apply the method of unbalanced panel data and modified gravity model. Results reveal that during the investigation period, the Internet has had a positive and significant effect on the service trade of OIC. Furthermore, there is a positive relation among service trade and GDP, financial depth and population.

Keywords: Internet, Service Trade, Panel Data, Gravity Model

JEL Classification: C23, F10, O3

1. Introduction

The scope of trade in services is vast. It has experienced many qualitative and quantitative changes in recent years. The share of services in international trade has increased dramatically and continuously. This has played an important role in increasing value added, resources allocation, gross domestic product, employment and development. On this basis, its trade has been of utmost importance in both inside and outside of each country.

Moreover, regarding increasing developments of information and communicational technologies in recent years, lots of services have gradually drifted from the physical to the virtual world. The main characteristics of these technologies include the removal of many geographical and time limitations across the world. It has also offered unique opportunities to both individuals and companies in order for increased transactions in less time, beyond geographical borders, and without time limitations. Therefore, it can be declared that the Internet has provided a suitable opportunity for countries by domestic and international transaction services. Furthermore, using the Internet helps omit market intermediates and this in turn lowers prices dramatically and leads to a rise in competition. The Internet consequently enables regional companies to offer their products and services overseas and thus overcome one of the most important world competition obstacles facing countries. In this modern age, one cannot ignore the impact the internet has on international service trades.
Despite the importance of the Internet on service trade, the number of related studies is few. There is however, one issue to be considered: is there a positive correlation between the Internet and international service trade? In this framework, considering the relation between the Internet and international trade will experience the utmost importance. The purpose of this paper was to consider the impact of the Internet on international service trade in OIC countries.

The paper proceeds as follows: Section two is a review of literature. In section three, the used model and data will be presented. In section four, the estimated results will be both presented and analyzed. Section five is dedicated to the presentation of conclusions and policy implications.

2. Review of the Literature

The Purpose of this section is to provide a theoretical framework for an empirical examination of how the Internet influences service trade. In the past, economic theories did not determine a special place to the services (Except financial services). The first theory was presented by Goldsmith (1969) about the importance of services emphasizing the role of financial services in shifting capitals to the position that have the best efficiency (Jones and Kierzkowski, 1990). A key difference between trade on “goods” and “services” is that the import of services must be done locally (Sabagh, 2008) e.g. the production and consumption of services must be done simultaneously, and service providers and consumers are to be present. A key element that must be considered in service trade is technological emergence and the import of services.

On the other hand, having entered the trade arena as the most important form of information and communication technology on an international level, the Internet provides a multitude of opportunities for trade facilitation and increased competition across the world.

In this regard, one of the frequent models for reviewing the rate and direction of Internet impact on service trade is by using the gravity model. It is an important means used widely in international trade to explain bilateral trade flows (Bougheas et al (1999), Huang D (2003), Grunfeld, L & A, Moxnes (2003)). On the basis of the aforementioned issues, the common gravity model for service trade is as follows:

\[ T_{ij} = \beta_0 G_i^{\beta_1} G_j^{\beta_2} P_i^{\beta_3} P_j^{\beta_4} D_{ij}^{\beta_5} \]  

(1)

Where, \( T_{ij} \) = bilateral service trade flows (exports and imports) between country i and country j

G= GDP of country i and j

P= Countries’ populations

$D_{ij} =$ Geographical distance between the capitals of country i and country j.\(^1\)

The model with which the Internet variable is included in is as follows:

$$X = (2)$$

In this model, “IT” stands for the Internet variable of both importing and exporting countries. The model is meant to be illustrative and highlights the ways in which the Internet is likely to impact service trade. The relevant innovation of the internet lowers entry costs into a new market through organized exchanges with numerous buyers and sellers, and through powerful search engines, which enable sellers and buyers to find each other at low cost (Freund and Weinhold, 2003). The Internet can lower prices by lowering search costs and is especially useful in reducing international communication and searching costs. Both lower search costs and lower entry barriers in a greater market competition can be improved by intensified competition (Miraskari, 2011). A related strand of literature focuses on the entry costs associated with imperfect information and emphasizes the importance of local networks in overcoming these costs (Ruach, 1996).

In the following, some of the empirical studies on Internet and trade are indicated.

Freund and Weinhold (2002) by using data for 31 countries in 2000 and gravity equation have investigated the effect of the Internet on trade in services. In this study, the number of Internet hosts in a country has measured Internet penetration. The results suggest that Internet development abroad has already begun facilitating increased exports of services to the United States. In another study in 2004, Freund and Weinhold have estimated the effect of the Internet on international trade by using data for 56 countries for 1995-1997. The results are similar to the previous study.

Clarke and Wellsten (2004) examined whether the Internet is causing an increase in trade in developed and developing countries. In this study, the number of Internet hosts and users in a country has also measured Internet penetration. The results in this article imply that Internet penetration in developing countries is positively correlated with exports to developed countries. Moreover, the recent growth of the Internet might explain some of the recent growths in trade and are consistent with the dynamic results in Freund and Weinhold (2004). Choi (2010) by using a modified gravity equation “i.e. unlike the traditional gravity equation model, the distance variable is omitted” has investigated the effect of the Internet on service trade. The results showed that the increase in Internet usage proved to increase total service trade, as well as service export and service import. In another study, the effect of Internet on trade flow has been investigated by Miraskari et al (2011). The results indicated that an increase in the number of Internet users have a positive and significant effect on bilateral export and trade volume in exporting and importing countries. Salmani et al (2013) has examined the impact the Internet has on international trade in services for developing countries. The results showed that the Internet has had a positive and significant effect on the service trade of developing countries.

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\(^1\) DISTANCE is measured as the great circle distance between the capitals of home countries and partner countries.
3. Model and Data

The model used in this paper to study impact of the Internet on service trade is the gravity model, that will be as following in the framework of standard thematic literature and on the basis of model (2) in review of the literature section that is converted into a linear equation by taking logarithms from both sides of the equation.

\[ \ln(X_{ijt}) = \beta_0 + \beta_1 \ln(GDP_jt) + \beta_2 \ln(GDP_jt) + \beta_3 \ln(POP_jt) + \beta_4 \ln(D_i) + \beta_5 \ln(Host_i) + \beta_6 \ln(Host_j) + \gamma_{ij} + \epsilon_{ijt} \] (3)

In which the “GDP”, stands for a country’s gross domestic product, “POP” stands for population, “Dis” stands for the geographical distance between two countries and the “Host” stand for the number of Internet hosts in both importing and exporting countries respectively. “\( \gamma_{ij} \)” states the individual effects each pair of countries can express and finally “\( \epsilon_{ijt} \)” is the disturbance term of the model and “i”, “j”, and “t” stand for the countries and time of study respectively. For instance, it can be pointed out to Freund and Weinhold (2004) that have used this model in their research.

In this paper, “the Choi 2010” model has been used in order to analyze the impact of Internet development on international service trade increase. This model is the modified gravity equation. Unlike the traditional gravity equation model, the distance variable has been omitted in this analysis. Therefore, the used model for this paper is as follows:

\[ \log(service_{it}) = \beta_0 + \beta_1 \log(INTERNET_{it}) + \beta_2 \log(GDP_{it}) + \beta_3 \log(POP_{it}) + \beta_4 \log\left(\frac{M_2}{GDP}\right)_{it} + \gamma_{j} - 1990 \text{year}_j + c_i + u_{it} \] (4)

“Service” as an independent variable stands for service trade, and “Internet” represents the number of Internet users. “GDP” stands for a country’s gross domestic product and “pop” stands for population, as dependent variables for controlling the effects of every country size and income. The financial depth variable, “\( M_2/GDP \)” is used as a proxy comparative advantage of services in every country. “\( c_i \)” represents a country fixed effect and “\( \text{year}_j \)” represents a year dummy where \( \text{year}_j \) is equal to 1 when the year is j, and 0 otherwise. “\( u_{it} \)” is the disturbance term. “i” and “t” stand for a country and time of study undertaken respectively.

In this study, data from OIC member states were used during 1990 to 2011. These countries were selected from the organization of Islamic cooperation (OIC) (2014). All the required data have been used from the World Bank\(^4\) and were estimated using an unbalanced panel data regression model.

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1. To read more about the history of Gravity Model, look Tinbergen (1962) and PÖyhÖnen (1963).
2. Internet users per hundred people
4. World Bank Data, World Development Indicators (WDI), (2013), Retrieved January 9, 2013 from
4. Estimating the Model

The results estimating model (4), for OIC member states have been presented in table 1. Note that in estimation being done using test “F”, the existence of individual effects has been verified. Next, fixed effects have been accepted using the Hausman test. Using the Groupwise Heteroskedasticity Test, existences of Heteroskedasticity have been verified. Hence to resolve the Heteroskedasticity, GLS methods have been used. The results show that the Internet has a positive and significant effect on international service trade of OIC member states. GDP and population (pop) have positive and significant effects on service trade. Estimating the coefficient of $M_2/GDP$ also as the proxy comparative advantage of services indicates a positive relation between financial depth and international service trade i.e. with development and improvement of financial depth in OIC countries, the international service trade level will also rise.
### Table 1: Estimation results- Equation (4)

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Fixed effect</th>
<th>GLS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(a)</td>
<td>(b)</td>
</tr>
<tr>
<td>Log(Internet)</td>
<td>0.077*(0.014)</td>
<td>0.082*(0.014)</td>
</tr>
<tr>
<td>Log(GDP)</td>
<td>0.958*(0.093)</td>
<td>0.923*(0.093)</td>
</tr>
<tr>
<td>Log(Pop)</td>
<td>0.210(0.224)</td>
<td>-0.271(0.225)</td>
</tr>
<tr>
<td>Log(M2/GDP)</td>
<td>-0.015(0.046)</td>
<td>0.069****(0.046)</td>
</tr>
<tr>
<td>Constant</td>
<td>10.736(3.936)</td>
<td>17.997*(3.951)</td>
</tr>
</tbody>
</table>

Year dummy included: Yes

$R^2$: 0.811

### Notes:

* Indicates significance at 1%.
** Indicates significance at 5%.
*** Indicates significance at 10%.

Robust standard errors are reported in parentheses.

Source: authors’ calculation
To analyze the sensitivity of the results, the impact of the Internet on international service trades of developing countries and the rest of the countries in the world has been estimated. The results are the same as the previous. Consequently, it is not sensitive to the sample. In the next step, instead of using the international service trade, the impact of the Internet on service export and import of OIC member states has been estimated. As the results are shown in table 1, they are the same as the previous ones. It is therefore not sensitive to that of proxy change. In the next step of analyzing the sensitivity of the results, Internet proxy has been changed to Internet hosts and model 4 has been estimated. The results are broadly similar to the results using Internet users. Therefore, the obtained results are not sensitive to that of proxy change.

In fact, results obtained in this study, verify the explained model and are compatible with results of previous studies conducted by Freund and Weinhold, (2002), and Choi, (2010). This means that there is a positive relation between Internet and international service trade. The only incompatibility in our results with that of Choi, (2010), is the population variable relation with that of the service trade. The results obtained in our study shows a positive relation between population and service trade, but the relation of these variables is negative in Choi’s study.

5. Conclusions and Policy implications

The aim of this paper was to investigate the impact of the Internet on International service trade in OIC countries from 1990 to 2011 using unbalanced panel data. The results revealed that the Internet has a positive and significant effect on international service trade in OIC countries. The results of this study are similar to the previous ones conducted.

On the basis of our findings, development of the Internet is expected in the future, and it will contribute to the expansion of services, and it seems that the expansion of Internet users will lead to the development of the service trade on an International level. It is thus suggested that OIC countries provide conditions for the development of Internet users.

References


