Analyzing the Determinants of Services Trade Flow between Vietnam and European Union: Gravity Model Approach

Pham, Van Nho and Dao, Ngoc Tien and Doan, Quang Hung

Hanoi University Of Economics and Business, Vietnam, Faculty of Economics and International Business, Foreign Trade University of Vietnam, Foreign Trade University of Vietnam

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ANALYZING THE DETERMINANTS OF SERVICES TRADE FLOW BETWEEN VIETNAM AND EUROPEAN UNION: GRAVITY MODEL APPROACH

PHAM Van Nho[1], DAO Ngoc Tien [2] and DOAN Quang Hung[3]

ABSTRACT

This paper aims at analyzing the determinants of services trade flows between Vietnam and European Union. In this respect, a gravity model has been estimated with panel data and pooled, random and fixed effect estimation covering the period of ten years from 2002 to 2011 for total services trade, services exports and services imports between Vietnam and European Union separately. The estimated results on total services trade indicate that bilateral services trade flows between Vietnam and its European partner countries are mainly affected by GDP per capita gap between Vietnam and partner countries, population of partner countries, real effective exchange rate, colonial relationship and being former members of CMEA.

Key words: Gravity model, Services Trade, Vietnam, EU

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[1] Hanoi National University, Vietnam, email: vannhopham@gmail.com
[2] Faculty of Economics and International Business, Foreign Trade University of Vietnam, Corresponding email: dntien@ftu.edu.vn.
[3] Foreign Trade University of Vietnam, email: hungdq@ftu.edu.vn

1. INTRODUCTION

Service is a vital part of Vietnam's strategy to become a modern economy by 2020. The service sector is playing an important role in the nation's economy and contributing significantly to the economic growth. The growth in Vietnam's service sector has exceed GDP growth annually since 2005. In 2013, the service sector of Vietnam grew by 6.56 percent and accounted for 43.4 percent of the country's over $170 billion gross domestic product (GDP) that year[4]. Currently, Vietnam's largest services industries are tourism, wholesale and retail services, repair of vehicles and personal goods, hotel and restaurants, transport and storage, and telecommunications.

The service sector is forecast to grow by 8 - 8.5 percent per year and to account for 42-43 percent of Vietnam's GDP during 2016 - 2020[5], and the Vietnamese government is implementing aggressive policies intended to accelerate the development of high-value-added services. Vietnam is increasing its presence in the global services market through its membership in the Association of Southeast Asian Nations (ASEAN) and through the commitments, it made upon acceding to the World Trade Organization (WTO) in 2007.

Although service sector accounted for the largest share in Vietnam's GDP, the trade in services only accounted for less than 10 percent of total trade of Vietnam. The value of services trade has more than doubled since 2007 but its share in total trade has decreased quite significantly. This is because the trade in goods has grown faster than trade in services during that time. The biggest export and import markets of Vietnam are the United State, European Union, ASEAN, Japan, Korea, and China. Among those markets, European Union has been reported as the largest importer of goods from Vietnam since 2012. In 2013, the value of European Union's goods imports from Vietnam was nearly 24.5 billion USD, accounted for over 18 percent of total exports of Vietnam. However, the value of services imports of European Union from Vietnam is relatively small compared to the value of goods imports. Precisely, in 2011, the value of services imports of EU from Vietnam was about 2.1 billion USD compared to nearly 17 billion USD of goods imports. It raises the question that whether the services imports of EU from Vietnam in particular and total services trade between EU and Vietnam in general could be more than its real value.

In attempt to better understand the flow of trade in services between Vietnam and EU and which factors affect that flow, especially in the context of Vietnam - EU FTA negotiation, this research is conducted with the title: "***Analyzing determinants of services trade flows between Vietnam and European Union: gravity model approach***". The objectives of this research are twofold. First, it aims at providing an overview picture about international trade in services of Vietnam, particularly its services trade relationship with EU. Second, it attempts to analyze the determinants that affect the services trade flows between Vietnam and EU using gravity model approach.

This paper is structured as follows. Section 2 provides a general picture about international trade in services of Vietnam in general and services trade flows between Vietnam and European Union in particular. Section 3 presents the gravity model approach used in this research and reviews the existing literature on gravity model applications to services. In section 4 the gravity model is estimated for total services trade between Vietnam and its

[4] General Statistic Office (GSO), Vietnam, 2014.
[5] Vietnam Prime Minister, "Decision No. 175/QD-TTg," January 27, 2011.

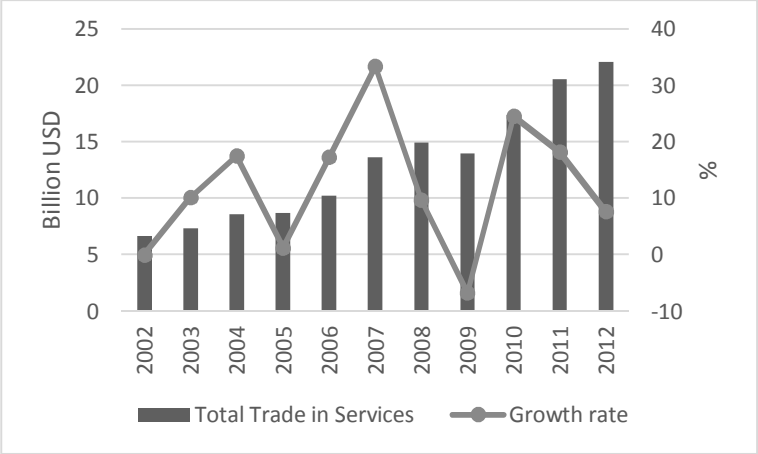
European trading partners and the results and findings are then discussed. Section 5 is conclusion.

2. SERVICES TRADE OF VIETNAM

2.1 Overview of Trade in Services of Vietnam

Although Vietnam accounts for a very small share of global trade in services[6], its total services trade value (exports plus imports) has increased strongly over the last decade (Figure 2.1).

Figure 2.1 Vietnam's total services trade value and growth rate, 2002 – 2012

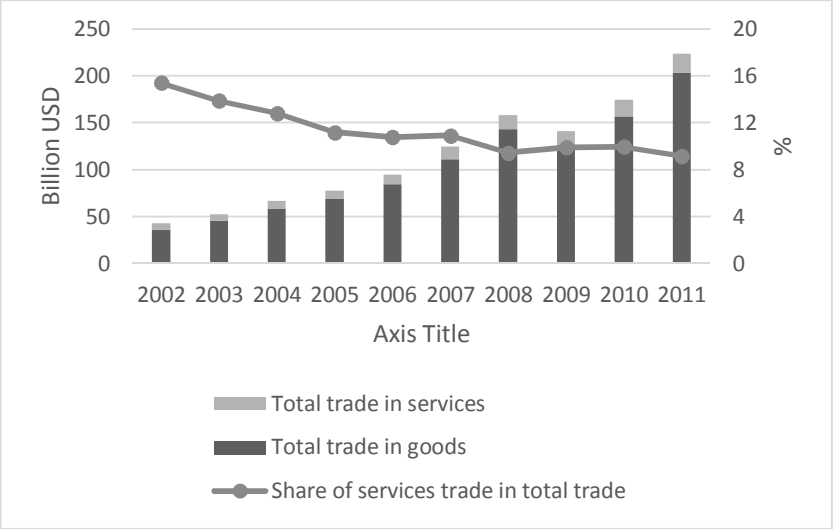


Source: Calculation of the author from Trade map Database (2014)

The value of services trade of Vietnam has more than tripled since 2002. In 2002, the total value was nearly 7 billion USD and this number went up significantly to just over 22 billion USD in 2012. From 2002 to 2012, the value of services trade has increased at double-digit average annual rate. Although there was a substantial drop in 2009 in the wake of the global economic downturn, in 2010, Vietnam's services trade recovered and resumed its growth trajectory, with a growth rate of around 25 percent as shown in Figure 2.1.

[6] Vietnam's total services trade accounted for around 0.2 and 0.25 percent of the world total in 2002 and 2012 respectively. Source: Calculation of the author from Trade map database, 2014

Figure 2.2 Share of services trade in total trade of Vietnam, 2002-2011

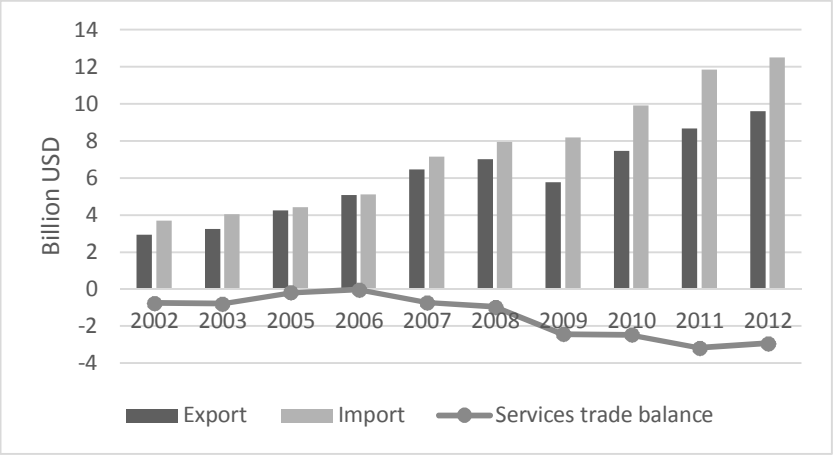


Source: Calculation of the author from Trade map Database (2014)

Although services trade value has increased, its share in total trade has been decreasing significantly (Figure 2.2). In 2002, services trade accounted for nearly 16 percent of total trade of Vietnam, but up to 2011, the share of services trade was only around 9 percent, a decrease of 7 percent over 10 years. This might be explained by the sharp increase in the value of trade in goods. Specifically, from 2002 to 2011, the value of trade in goods has increased six-fold while that of trade in services only more than tripled.

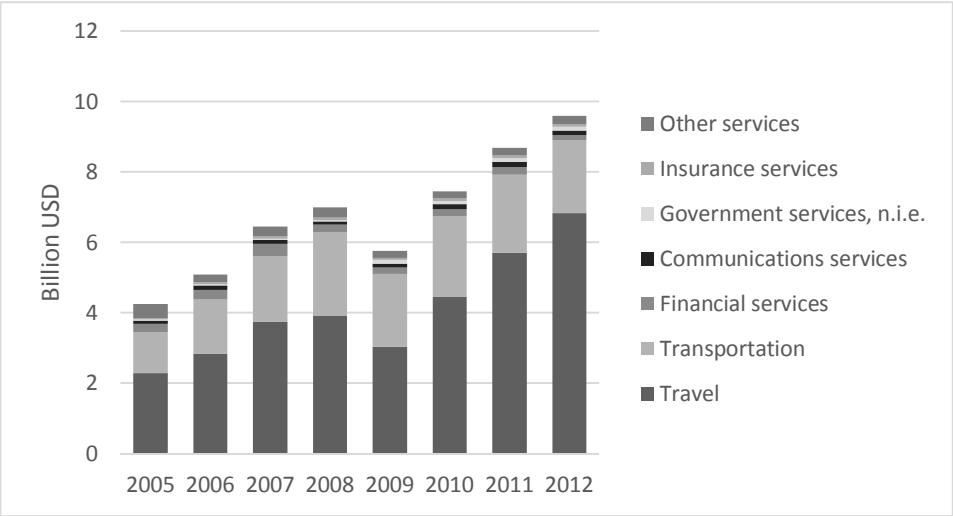
Moreover, imports of services have increased at a much faster rate than exports of services; therefore, Vietnam remains a net importer of services with a growing services trade deficit. The difference between exports and imports has become much more larger since 2008. In 2006, the services trade of Vietnam was nearly in balance but from that up to 2012, the trade deficit has gone up to nearly 3 billion USD (Figure 2.3)

Figure 2.3 Vietnam's services trade balance, 2002-2012



Source: Trade map Database (2014)

Figure 2.4 Exports of services by sectors of Vietnam, 2005-2012



Source: Trade map Database (2014)

By sectors, travel and transportation accounted for the bulk of both service exports and imports of Vietnam in the period 2005-2012 (Figure 2.4 and Figure 2.6).

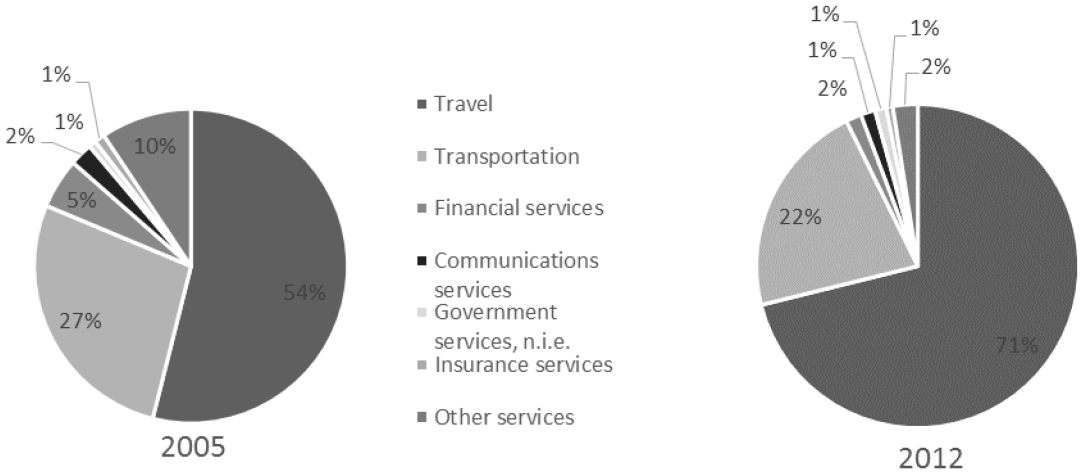
Travel was Vietnam's largest commercial service export, accounting for almost third-fourths of all such exports in 2012. Its share in total exports has increased from over 50 percent in 2005 up to over 70 percent in 2012, a rise of nearly 20 percent in only seven years. In 2012, Vietnam hosted around 6.5 million foreign visitors, nearly double than its 3.4 million visitors in 2005. Vietnam is a desirable tourist destination due to its unique natural resources and historical sites, particularly the seven destination granted status as UNESCO World Heritage sites[7]. Vietnam's tourism industry has also benefited from the economic development and growing discretionary incomes of its regional neighbors, particularly China[8].

The second largest service export of Vietnam was transportation. Although the export volume of transportation sector has almost doubled, its share in total exports decreased around 5 percent from 2005 to 2012. It is worth noticing that travel and transportation accounted for more than 90 percent of total services exports in 2012.

[7] The seven sites, in chronological order of inscription, are the complex of Hue monuments (1993); Ha Long Bay (1994); Hoi An Ancient Town (1999); My Son Sanctuary (1999); Phong Nha-Ke Bang National Park (2003); Central Sector of the Imperial Citadel of Thang Long–Hanoi (2010); and the Citadel of the Ho Dynasty (2011). UNESCO Web site, http://whc.unesco.org/en/statesparties/vn

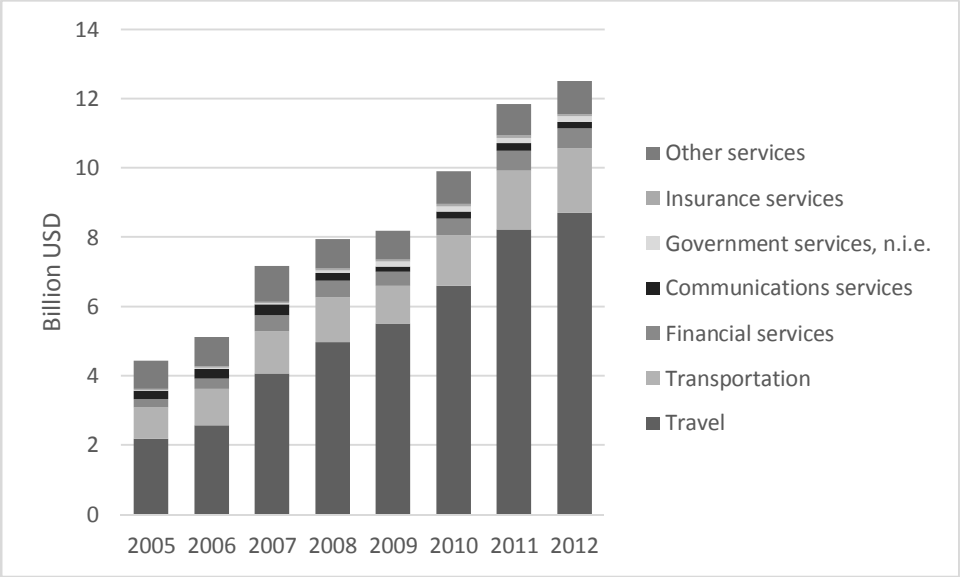
[8] From 2007 to 2012, the number of Chinese visitors grew from 574 thousand to 1429 thousand, and in 2013 Vietnam had already hosted 1907 thousand visitors from China, accounted for over 25 percent of total foreign visitors came to Vietnam. General Statistics Office (GSO), Vietnam, 2014

Figure 2.5 Share of service sectors in total exports in 2005 and 2012



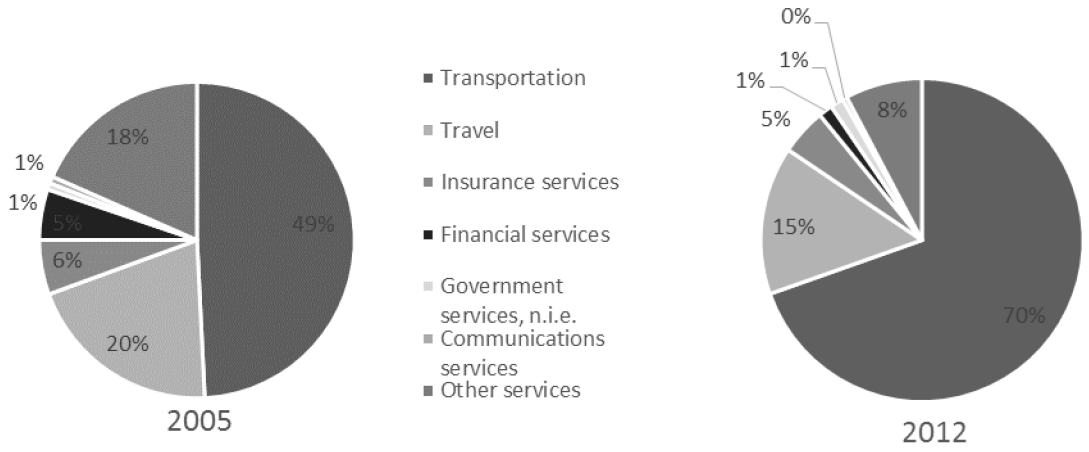
Source: Trade map Database (2014)

Figure 2.6 Imports of services by sectors of Vietnam, 2005-2012



Source: Trade map Database (2014)

Figure 2.7 Share of service sectors in total imports in 2005 and 2012



Source: Trade map Database (2014)

Meanwhile, transportation was the largest commercial service import of Vietnam. Transportation accounted for nearly a half of the total service import in 2005 and more than two-thirds in 2012. While profitable opportunities to support manufacturing industries have driven growth in some service industries, Vietnam still relies heavily on imports of trade-related services. This is especially true of transportation services and that is the reason why transportation accounted for more than two-thirds of Vietnam's services imports in 2012 (Figure 2.7).

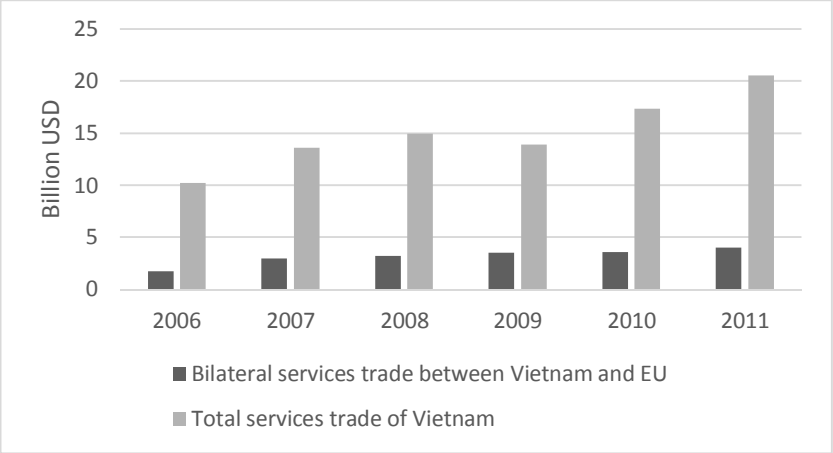
Outbound tourism from Vietnam has also increased in recent years, and travel services are Vietnam's second-largest services import. The majority of outbound tourists from Vietnam travel within the Southeast Asian region, however, a growing number of tourists travel to the United States and Europe.

With the exception of travel and transportation, Vietnam trade few in other service sectors. However, over the past decade, Vietnam's participation in a growing number of trade agreement has driven modernization and pro-market reforms that support the development of services sectors and international trade in services.

2.2 Trade in Services between Vietnam and EU

Over the period 2006 - 2011, the bilateral trade flow of services between Vietnam and EU has more than doubled. Total value of trade in services has increased quite significantly from over 1.7 billion USD in 2006 up to nearly 4 billion USD in 2011.

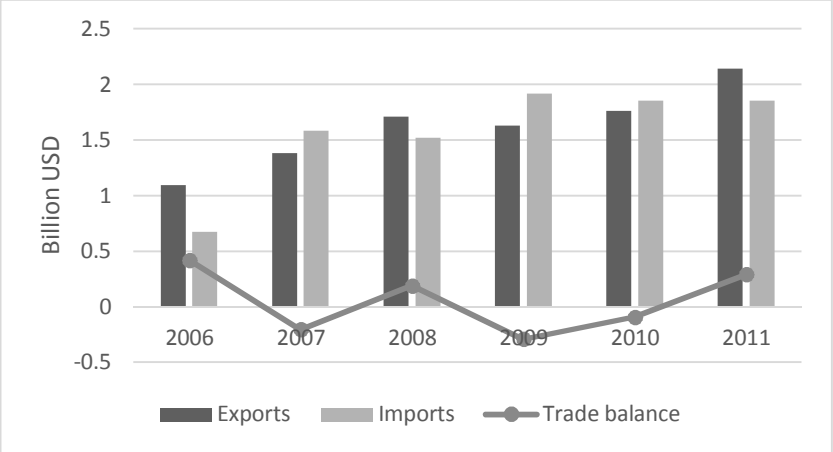
Figure 2.8 Bilateral services trade between Vietnam and EU, 2006-2011



Source: EBOPS 2002 - OECD Database (2014) and Trade map Database (2014)

However, its share in total services trade of Vietnam was quite stable, around 19-21 percent, except for the year 2009 when the share went up to over 25 percent. This is because there was a significant decrease in the total trade in services of Vietnam in 2009 due to the global economic downturn but the trade flow between Vietnam and EU still increased despite the crisis.

Figure 2.9 Service trade balance between Vietnam and EU, 2006-2011



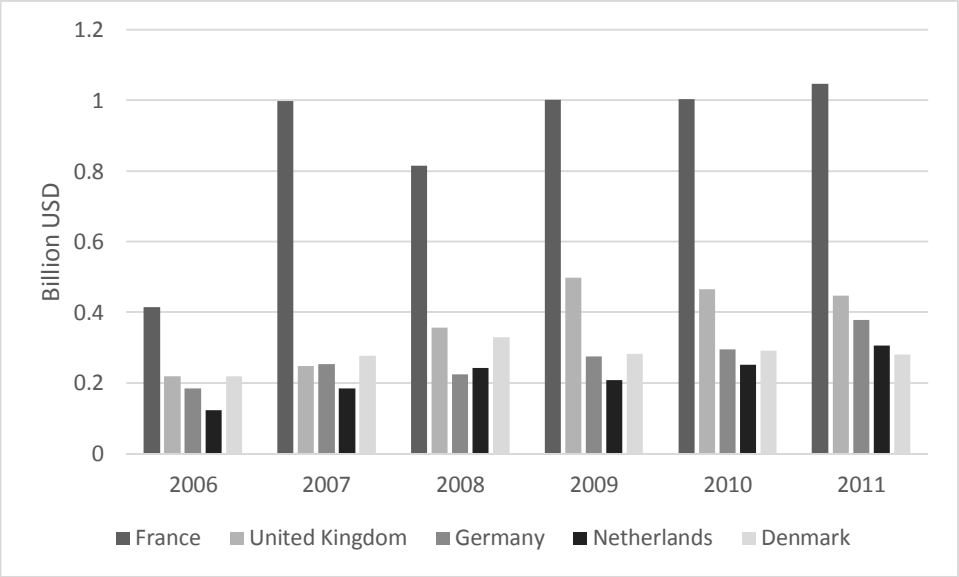
Source: EBOPS 2002 - OECD Database (2014)

Although Vietnam has trade deficit in services with the world since its imports were much higher than exports, Vietnam, however, has enjoyed trade surplus in services with EU in several years. As can be seen from Figure 2.9, trade surplus in services has been over 400 million USD in 2006, nearly 200 million USD in 2008 and nearly 300 million USD in 2011.

Vietnam also traded unequally with individual countries in EU, most of growth in bilateral between Vietnam and EU can be attributed to the increasing in trade between Vietnam and France, United Kingdom, Germany, Netherlands and Denmark (Figure 2.10). These five countries accounted for over 65 percent in total trade flow of services between EU and Vietnam in 2006 and nearly 62 percent in 2011. Among these five countries, France was the

largest services trade partner with Vietnam. The bilateral services trade between Vietnam and France was 415 million USD in 2006 and 1047 million USD in 2011, accounted for more than 23 and 26 percent in total services trade of EU with Vietnam, respectively. United Kingdom was the second largest with trade flows of 477 million USD in 2011, followed by Germany with flows of 378[9] million USD.

Figure 2.10 Top 5 countries have largest trade in services with Vietnam, 2006 – 2011



Source: EBOPS 2002 – OECD Database (2014)

3. GRAVITY MODEL AND APPLICATION FOR TRADE IN SERVICES

3.1 Gravity model

The gravity model was first applied to examine international trade flows by Tinbergen (1962). It has since become a useful tool in international trade literature, especially with a renewed interest among economists in geography and the impacts of distance on international trade.

One of the criticism of the gravity equation is that it has no theoretical foundation. In fact, there are several theoretical foundation for the gravity equation ranging from Anderson (1979) to Bergstrand (1985, 1989). Anderson and Bergstrand modeled the value of bilateral trade (imports or exports) as a function of income and transport costs by using Amrington (1969) assumption wherein consumers regard goods as being differentiated by location of production.

Subsequently, it has been recognized that the gravity equation can be derived from different models, including Ricardian, Hecksher-Ohlin, and the monopolistic competition models. Specifically, Helpman and Krugman (1985) have shown that the gravity equation can be derived from the monopolistic competition model with increasing returns to scale. Deardorff (1998) has shown that a gravity equation can also be derived from a Hecksher-Ohlin model

[9] This is only the value of services imports of Vietnam from Germany in 2011 since the data on services exports of Vietnam to Germany is not available. However, it is expected that the value of services exports of Vietnam to Germany is nearly the same with or even much more larger than the value of services imports of Vietnam from Germany. Therefore, Germany would be the second largest services trade partner with Vietnam instead of United Kingdom.

without assuming product differentiation. Eaton and Kortum (2002) derived a gravity-type equation from Ricardian type of model, and Helpman et al. (2008) and Chaney (2008) obtained it from a theoretical model of international trade in differentiated goods with firm heterogeneity.

In its general formulation, the gravity equation has the following multiplicative form:

$$X_{ij}=GS_iM_je_{ij}$$

Where X_{ij} is the monetary value of exports from i to j , M_j denotes all importer-specific factor that make up the total importer's demand (such as the importing country's GDP) and S_i comprises exporters-specific factors (such as the exporter's GDP) that represent the total amount exporters are willing to supply. G is a variable that does not depend on i or j such as level of world liberalization. Finally, e_{ij} represents the ease of exporters i to access of market j (that is, the inverse of bilateral trade costs).[10]

3.2 Application of Gravity Model for Trade in Services

Over the last 40 years there has been a lot of studies using gravity model to investigate trade flows and related polices. For instance, some studies analyze trade flows between regions in general or flows of disaggregated products. However, most recent studies pay more attention to trade flows of goods rather than flows of services.

Can the gravity model be used to study service trade? Arguably, the gravity model would appeal more to services trade than goods trade as physical proximity between producer and consumer is very important for certain types of services trade. Secondly, service products are often differentiated by quality and location, which may give rise to monopolistic competition. Thirdly, the market for services is often characterized by asymmetric information where reputation and signaling play a central role. Thus, firms would tend to become more oriented towards the home market when the efficiency of the sunk costs increases. In a gravity model setting, if trade costs increase with distance, the elasticity of exports with respect to distance will be higher in sectors such as services where fixed market investments are important.

The existing literature on the application of the gravity model to services trade is quite limited. One of the first papers on the subjects is Francois (2001. Francois models the demand for imports of services as a function of the recipient country's GDP per capita and population. Data on services trade flows are taken from the Global Trade Analysis Project (GTAP) database.

In an extension of this approach, Park (2002) also uses services data from GTAP to calculate tariff equivalent for a larger selection of countries and sectors. The gravity model is modified to include price indices to capture differences in prices between countries. With the publication of the OECD database, Grunfeld & Moxnes (2003), Kimura & Lee (2004), Lejour & Verheijden (2004), Mirza and Nicoletti (2004), Kox & Lejour (2005), Lennon (2006) and Walsh (2006) have used this dataset to assess determinants of bilateral services trade using the gravity framework.

[10] See Bacchetta, M., C. Beverelli, O. Cadot, M. Fugazza, J. M. Grether, M. Helble, A. Nicita, and R. Piermartini. (2012). Chapter 3: Analyzing Bilateral Trade using the Gravity Equation. In *A Practical Guide to Trade Policy Analysis.* United Nations and World Trade Organization for more information.

Grunfeld and Moxnes (2003) apply a gravity model to the bilateral export of services and FDI flows using data from OECD. Their regression include the level of GDP and GDP per capita in the importing and exporting countries, the distance between them, a dummy variable if they are both members of a free trade area (FTA), a measure of corruption in the importing country and a trade restrictiveness index (TRI[11]) to measure the barriers to services trade in the importing country. Their results suggest that the standard gravity model effects found in studies on trade in goods apply to service too. Trade between two countries is positively related to their size and negatively related to the distance between them and barriers to services in place in the importing country.

Kimura and Lee (2004) use a mix of OLS and fixed effects for time to compare trade in goods with that in services in a gravity model setting. As with Grunfeld and Moxnes (2003), they use the OECD statistics on trade in services. They include the standard gravity model variables including adjacency and language dummies and in addition they include a measure of remoteness as a regressor. They find out that distance between trading partners to be more important in services trade than in goods trade and suggest that this implies higher transport costs for services but fail to provide any reason why this may be the case.

Lejour and Verheijden (2004) also compare gravity model estimate for trade in goods and services, examining intra-regional trade in Canada and the EU using the OECD services trade statistics and data from the official Canadian statistical agency. Unlike Kimura and Lee (2004), distance is found to be less important for services compared to goods. Lennon (2006) compares trade in goods and services with a focus on the commercial services sector of the OECD database and finds distance and adjacency to be less significant for trade in services than in goods, and common language and RTAs to be more important for services trade. The impact of the latter, however, is found to be insignificant with GDP per capita included in the estimation.

Walsh (2006) uses the Hausman-Taylor method (HTM) to estimate a gravity model for services trade and finds the wealth of countries and a common language to be the most important determinants of services trade. The impact of distance is generally found to be insignificant. A measure of services restrictiveness based on the TRI is also found to be weakly significant.

As can be seen from the preceding section, there is a general lack of consensus on the key findings in the literature analyzing the determinants of services trade using gravity-based approaches. For instance, Grunfeld and Moxnes (2003) find the impact of FTAs to be insignificant. Kimura and Lee (2004) find distance to be more important for services trade while Lejour and Verheijden (2004) and Lennon (2006) report the converse to be true. Walsh (2006), on the other hand, finds the impact of distance to be insignificant.

3.3 Application of Gravity Model for Trade in Vietnam

In Vietnam, there are also several studies using gravity model to analyze international trade flows as well as bilateral trade flows of Vietnam. Thai (2006) applies gravity model in order to explain bilateral trade flows between Vietnam and 23 European countries from 1993 to 2004. His regression includes GDP and population of exporting and importing countries, real exchange rate and distance between them and history dummy variable. He finds that the

[11] The TRI is the augmented frequency index based on research by the Australian Productivity Commission.

determinants of bilateral trade between Vietnam and European countries are economic size (GDP), market size (population) and the real exchange rate volatility. However, distance and history seem to have no effect.

Bac (2010) also uses gravity model to analyze exporting flows of Vietnam with dependent variable being the exporting value from Vietnam to other countries during the 20 years period up to 2006. After regressing both static and dynamic models, he find that there is a strong correlation between the Vietnamese contemporary export flows and those of the previous year and the value of export from Vietnam to another countries has positive relationship with GDP, exchange rate and the partner being in ASEAN and negative with distance.

Binh, Duong and Cuong (2011) use gravity model to analyze bilateral trade activities between Vietnam and 60 countries in the period from 2000 to 2010 with the data taken form the data banks of ITC, IMF and WB. Their results suggest that the bilateral trade flows between Vietnam and 60 countries were strongly affected by economic size of Vietnam, economic size and market sizes of partners, distance and culture.

However, it is worth noting that studies using gravity - based approach in Vietnam only focus on trade in goods, and it seems to be that there is no study applied gravity model to analyze the trade flows in services of Vietnam. Therefore, the aim of this paper is using gravity model to analyze the service trade of Vietnam, specifically examine the determinants of services trade of Vietnam with European Union.

4. DATA ANALYSIS AND FINDINGS

4.1 Estimated model

The gravity model estimated in this paper is (1), in which all continuous variables are expressed in logarithms.

$$\mathbf{LnT_{ijt} = a_{ij} + a_1 lnGDPPCGAP_{ijt} + a_2 lnPOP_{it} + a_3 lnPOP_{jt} + a_4 lnDISTANCE_{ij} + a_5 lnREER_{ijt} + a_6 CONOLY_{ij} + a_7 CMEA_j + e_{ijt}} \quad (1)$$

The equation (1) would be estimated three times for total services trade (exports plus imports), services exports and services imports separately. Therefore, the dependent variable lnT_{ijt} would be logarithm of total services trade, services exports and services imports between Vietnam and partner country j at time t.

In the literature on gravity models, three variables are considered for use as measures of the size of a country, Gross Domestic Product (GDP), Gross Domestic Product per capita (GDP per capita) and population. In this paper the latter two are included. As countries tend to consume more service commodities as they become richer, GDP per capita is of more relevance than GDP itself.

The first continuous variable is the difference between GDP per capita of Vietnam and GDP per capita of partner country j at time t[12], GDPPCGAPijt. The GDP per capita gap is created

[12] Actually, at first, the two variables which are GDP per capita of Vietnam and GDP per capita of partner country are included in the model. However, because of the high correlation between two variables population and GDP per capita of Vietnam, the estimated results could be biased. Therefore, the two variables GDP per capita of Vietnam and GDP per capita of partner country are dropped out and the variable GDP per capita gap is used as substitution.

by taking the GDP per capita of partner country subtract the GDP per capita of Vietnam. Since the GDP per capita of EU partner countries are much higher than that of Vietnam, the GDP per capita gaps always take the positive sign and thus logarithms can be taken. The coefficient of GDP per capita gap is expected to take either positive or negative sign because the impact of GDP per capita gap on total services trade is not straightforward. An increase in GDP per capita of either Vietnam or partner country would lead to an increase in services trade flow between the two countries because the country would demand more services as well as produce and export more services when it becomes richer. Unlike GDP per capita, an increase in GDP per capita gap could be either the increase in both GDP per capita of Vietnam and partner country but the latter has greater growth rate or an increase in GDP per capita of partner country and a decrease or even unchanged in GDP per capita of Vietnam. However, it makes sense that GDP per capita of both Vietnam and partner country would increase but with different rate of growth. Therefore, an increase in GDP per capita gap will lead to an increase in services trade flow if the gap is small or a decrease in services trade flow if the gap is extremely big since countries with similar levels of per capita income trade more intensively with each other.

The coefficients on the population of Vietnam and partner countries at time t, POP_{it} and POP_{jt} respectively, are expected to take either a negative or positive sign. As Zarzosa and Lehmann (2002) show, population size may have a negative effect on export if countries export less as they become larger as they rely more on internal trade or a positive effect if they export more as they become larger as they are able to achieve economies of scale. Population size will have a similar effect on imports.

Distance, $DISTANCE_{ij}$, is involved as proxy for trade cost between Vietnam and partner countries, and distance employed in this paper is weighted distance taken from CEPII. Although distance between the two countries is typically expected to have a negative impact on trade in goods, it is not clear from the review of the existing literature that this is necessarily the case for services. Service products do not have to be physically transported from location to location. Depending on the nature of the services, in some cases it will require movement of physical persons but in others, it may be communicated electronically. Consequently, the importance of distance in services trade may be low or even insignificant (Walsh, 2006).

The last continuous variable is real effective exchange rate ($lnREER_{ijt}$) between Vietnam and partner countries at time t. An increase in real effective exchange rate would make goods and services of Vietnam much cheaper relative to those of foreign partners, and thus encouraging exports and discouraging imports of Vietnam. Therefore, the coefficient of real effective exchange rate is expected to have positive sign on exports and negative one on imports. Whereas the effect of real effective exchange rate on total services trade is ambiguous.

The final two regressors are dummy variables indicating whether Vietnam and partner country have ever had a colonial link ($COLONY_{ij}$) and whether partner country was a former member of Council of Mutual Economic Assistance ($CMEA_j$). Colonization is used to describe a relationship between two countries, independently of their level of development, in which one has governed the other over a long period of time and contributed to the current state of its institutions. The effect of colonial link between Vietnam and partner country is expected to be positive since having colonial relationship may promote the trade flow between the two countries. The last dummy variable is also expected to have positive sign since being members

of the same association would support and promote the economic and trade relationship between Vietnam and those partner countries not only in the past but also at present.

Data source

Exports and Imports of Services between Vietnam and EU

There is a dearth of data on Vietnam's bilateral services trade since Vietnam did not report bilateral trade data of trade volumes with its major services trading partners. Instead, data on Vietnam's imports and exports of services is extracted from OECD database[13] on international trade in services. The OECD dataset provides statistics on international trade in services by partner country for 34 OECD countries plus EU, Euro Area, European Union Institutions, Hong Kong (SAR China) and the Russian Federation for the period from 2000 to 2012.

Among reported countries, there are only 20 European countries[14] in which Vietnam is reported as one of their trading partners. Therefore, the data on Vietnam's bilateral services trade with European countries is available for only these 20 countries. The exports of services from these countries to Vietnam would be the imports of services of Vietnam from those countries and vice versa. For example, Germany reported exporting $378.12 million of services to Vietnam in 2011, corresponding to $378.12 million of services import of Vietnam from Germany in 2011.

GDP per capita and Population

Data on GDP per capita (in current USD) and population variables are drawn from the World Development Indicators database (World Bank, 2014)[15].

Distance

The distance used in this paper is weighted distance taken from CEPII's database on distance[16]. This distance is calculated between two countries based on bilateral distance between the biggest cities of those two countries, those inter-city distances being weighted by the share of the city in the overall country's population. The general formula developed by Head and Mayer (2002) and used for calculating distances between country i and j is

$$dij = \left(\sum_{k \in i} \left(\frac{popk}{popi} \right) \sum_{l \in j} \left(\frac{popl}{popj} \right) d_{kl}^{\theta} \right)^{1/\theta}$$

Where pop_k designates the population of agglomeration k belonging to country i. The parameter θ measures the sensitivity of trade flows to bilateral distance d_{kl}. For the distance, distw, used in this paper, θ is set equal to 1.

Real effective exchange rate

[13] Trade in Services EBOPS 2002 - Trade in services by partner country. Available at http://stats.oecd.org/Index.aspx?DataSetCode=TISP

[14] The 20 European countries that have bilateral trade data with Vietnam include Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Slovak Republic, Slovenia, Spain, Sweden and United Kingdom.

[15] Available at http://data.worldbank.org/indicator

[16] Mayer and Zignago (2011), Notes on CEPII's distances measures (GeoDist), CEPII Working Paper 2011-25. Available at http://www.cepii.fr/anglaisgraph/bdd/distances.htm

The real effective exchange rate, REER, between Vietnam and partner countries is calculated by taking the real effective exchange rate index of Vietnam divided by the real effective exchange rate index of partner countries. Real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs. The data on real effective exchange rate index (2005=100) of Vietnam and partner countries are taken from World Development Indicators (World Bank, 2014)[17].

Dummy Variables

The dummy variable for colony is equal to unity if Vietnam and partner country j were once in a colonial relationship, and the CMEA dummy is equal to unity if the partner country was a former member of CMEA.

Description of data

There are 270 observation on the variables in the model for Vietnam and 27 European countries in the sample. However, there are quite a lot missing values for dependent variable[18], while the coverage of explanatory variables is complete.

Either missing values may correspond to zero trade or very little trade, which falls below the threshold, required the trade to be registered. The most common response to deal with missing values is to truncate the sample by deleting the observations with missing value. This procedure is correct if all the left out data have to be missing and the data come from a random process, in the sense that the restricted sample of positive trade pairs must not be systematically different from the sample of missing country-pairs and from that of country-pairs, which do not trade with each other. It is very likely that many bilateral trade flows are zeros rather than missing and the limiting of the analysis to observations where bilateral trade flows are positive might be a significant source of bias if the selected sample is not random.

Therefore, the response to the issue of missing data in this paper is to treat all missing values as zero trade. The first reason is that many studies in the literature do not distinguish missing values from zero trade flows and consider them as one. The second one is in this case of my sample it is very likely that most of the missing values are real zero trade flows, i.e., Vietnam do not trade with those partner countries in given time.

These zero trade observations are then replaced with 1 before taking logarithms. The problem stems from the fact that the standard way of estimating a gravity model is to take logarithms and estimate its log-linear version. Therefore, zero trade flows will be dropped out of the estimation as the log of zero is not defined.

The summary statistics for each of variables are shown in Table 4.1.

Table 4.1 Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max

[17] Available at http://data.worldbank.org/indicator/PX.REX.REER

[18] Specifically, there are 113 missing value observations for exports of Vietnam to and 110 missing value observations for imports of Vietnam from European partner countries.

IMPORTijt	270	39360.3	81633.25	1	524200
EXPORTijt	270	32436.46	97675.43	1	750670
TRADEijt	270	71796.29	162561.5	1	1046770
GDPPCGAPijt	270	27.24949	19.43542	1.55368	110.864
POPit	270	8.37E+07	2650941	7.95E+07	8.78E+07
POPjt	270	1.84E+07	2.28E+07	395969	8.25E+07
DISTANCEij	270	9061.271	812.1724	7629.566	11140.04
COLONYij	270	0.037037	0.1892033	0	1
REERijt	270	0.9072721	0.1203427	0.6967219	1.502877
CMEAj	270	0.2592593	0.4390419	0	1

Source: Calculation of the author

4.2. Specification Tests

A panel framework is designed to cover services trade variation between Vietnam and its European trading partners during a period of ten years. Panel estimation reveals several advantages over cross section data and time series as it controls for individual heterogeneity, time series and cross section studies do not control for this heterogeneity and may give biased estimated results. Panel data offer more variability, more degree of freedom and reduce the collinearity among explanatory variables therefore improving the efficiency of the econometric estimates. Panel estimation can be done using pool estimation, fixed effect (FEM) and random effect (REM).

Pooled estimation assumes there is one single set of slope coefficients and one overall intercept. It disregards the time and space dimension of panel data; the error term captures the difference over time and individuals. The pooled estimation, however, may provide inefficient and biased estimated results because it assumes there are no individual effects and time effects. It has been shown that OLS suffers from heterogeneity bias in the gravity model context (Cheng and Wall, 2005). Trade between any pair of countries is likely to be influenced by certain unobserved individual effects. In addition, if these effects are correlated with the explanatory variables, it will lead to pooled OLS estimates being biased.

The fixed effect takes into account the individual and time effects by letting the intercept varies for each individual and time period, but the slope coefficients are constant. However, one of the shortcomings of fixed model is that it may not be able to identify the impact of time invariant such as distance or colonial link, and these variables would be excluded from estimation.

The random effect treats the intercept as a random variable and the individual included in the sample are drawn from a larger population. It is assumed that the individual error components are not correlated with each other and are not auto correlated across both cross section and time series units. In this paper, all methods are estimated and their efficiency are compared.

First, the Breusch-Pagan test is applied to the REM, comparing it to the pooled OLS estimator. The result of Breusch-Pagan test is given in Table 4.2.

Table 4.2 Breusch-Pagan Lagrangian multiplier test for random effects

LnTRADE [id, t] = Xb + u[id] + e[id,t]

Estimated results:

	Var	Sd = Sqrt(Var)
LnTRADE	**26.95169**	**5.191501**
e	**6.527874**	**2.55497**
u	**5.684948**	**2.384313**

Test: Var(u) = 0

Chi2(1) = **177.52**

Prob > Chi2 = **0.0000**

Source: Calculation of the author

As can be seen, the p-value is less than 0.05 so that the null hypothesis[19] has been rejected, indicating that REM is a better estimator than OLS.

Table 4.3 Hausman test for random and fixed effects

	Coefficients			
	(b) Fixed	(B) Random	(b-B) Difference	Sqrt(diag(V_b - V_B)) S.E.
LnPOPit	**23.25913**	**4.971408**	**18.287722**	**9.024912**
LnPOPjt	**0.2403016**	**0.5141872**	**-0.2738856**	**0.250419**
LnGDPPCGAP	**1.74183**	**3.905043**	**-2.163213**	**1.014805**
LnREER	**5.353026**	**7.60386**	**-2.250834**	**1.605172**

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

Chi2 (4) = (b-B)[(V_b - V_B)^(-1)](b-B) = **8.03**

Prob > Chi2 = **0.0904**

(V_b - V_B is not positive definite)

Source: Calculation of the author

Second, the Hausman test is applied to REM and FEM. The result of Hausman test is give in table. Once again, we fail to reject the null hypothesis[20] since p-value is greater than 0.05, indicating that REM is better than FEM.

[19] The null hypothesis in the LM test is that variances across entities is zero. This is, no significant difference across units (i.e no panel effect).

4.3. Results and Findings

Since the above results reveal that the random effect model (REM) is the best one, in this section, the direction of my analytical efforts focuses only on the random effect estimation. The estimation results of equation (1) for logarithms of total services trade (exports plus imports) are given in Table 4.4.

Table 4.4 Estimated results using random effects

	(1) Pooled OLS	(2) Fixed Effect	(3) Random Effect
Dep. var		LnTRADE	
LnPOPit	1.430	23.259	4.971
	(7.989)	(14.497)	(9.645)
LnPOPjt	0.812***	0.240**	**0.514*** **
	(0.162)	(0.112)	(0.149)
LnGDPPCGAP	4.873***	1.742	**3.905*** **
	(0.317)	(1.598)	(0.592)
LnREER	4.435***	5.353*	**7.604*** **
	(1.704)	(2.959)	(2.339)
LnDISTANCE	-8.199**		-3.477
	(3.449)		(9.291)
COLONY	4.389***		**4.901*** **
	(0.580)		(0.862)
CMEA	3.901***		**3.716*** **

[20] The null hypothesis is that the preferred model is random effects

	(0.595)		(1.313)
_cons	26.650	-426.425	-72.940
	(153.584)	(261.058)	(204.088)
Observations	270	270	270
R^2	0.591	0.245	0.578

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Source: Calculation of the author

As shown in Table 4.4, when the gravity model is estimated using random effect for total services trade (Column 3), all variable except distance and population of Vietnam are 1 percent statistically significant and their coefficients take the signs that would be expected from the standard gravity literature. The model fits the data relatively well, its R^2 is 0.578, which means that the explanatory variables account for nearly 60 percent of the observed variation in trade in the data.

Firstly, population of partner countries rather than that of Vietnam is found to have high significance and positive influence on total services trade. An increase of 1 percent in population of foreign partner tends to enhance services trade flows by approximately 0.5 percent. The positive relationship between population of partner country and services trade flows indicates that the country would export and import more services when its market size becomes larger. It is, however, worth noting that population of Vietnam does not have influence on services trade. This reason for this is probability that population of Vietnam is hold constant to all partner countries, therefore, the effect of it may not be captured.

Secondly, the coefficient of GDP per capita gap is also 1 percent statistically significant and has positive sign. Specifically, if the gap increases by 1 percent, the services trade flows will go up by roughly 4 percent. This implies that the larger the difference in GDP per capita between Vietnam and partner countries is, the bigger volume of services they trade with each other. In other words, Vietnam tends to trade more with countries that have high income per capita. This finding is opposite to the Linder's hypothesis that countries with similar level of income per capita trade more intensively with each other or an increase in GDP per capita gap will reduce the services trade flow.

Estimated results obtained from the model in this study are consistent with findings of other studies in the application of gravity model to evaluate trade in services. Economic size and market size are influential in trade activities, which means large countries, which can produce more services for exports and have high-income with a large consumer market, will increase the demand of services imports.

The real effective exchange rate is found to have strong and positive impact on total services trade. An increase of 1 percent in real effective exchange rate will boost the value of services

trade by about 7.6 percent. Distance is another explanatory that found to be statistically insignificant. This finding is not surprising and in line with suggestion of Walsh (2006). Unlike trade in goods that requires physical movement across borders, trade in services may not have to physical transported from location to location. Depending on the nature of the service, in some cases it will require movement of physical person, but in others it may be communicated electronically.

The coefficient of colony is 1 percent statistically significant with positive sign. The positive coefficient indicates that the services trade flow between Vietnam and its partner country is strongly supported by the colonial link between two countries. Amongst reported partner countries, France is only the country that once had colonial link with Vietnam. Therefore, it is not surprising that France is the largest services trade partner of Vietnam for years.

The last variable, CMEA, also has expected sign and statistical significance. The positive coefficient of CMEA implies that being a former of CMEA will positively influence the services trade flows between these countries and Vietnam. Amongst 27 European countries, Bulgaria, Czech Republic, Slovakia, Germany[21], Hungary, Poland and Romania were former members of CMEA.

Further analysis on services imports and services exports

In attempt to further interpretation, the equation (1) is estimated for services exports and services imports. The estimation results using random effect model are given in Table 4.5.

Table 4.5 Estimated results on services exports and services imports

	(1)	(2)	(3)
Dep. Var	LnTRADE	LnEXPORT	LnIMPORT
LnPOPit	4.971	12.456	-1.361
	(9.645)	(10.369)	(9.152)
LnPOPjt	0.514***	**0.220***	**0.470*****
	(0.149)	(0.132)	(0.176)
LnGDPPCGAP	3.905***	**2.285*****	**3.844*****
	(0.592)	(0.806)	(0.658)
LnREER	7.604***	**5.129****	**7.625*****

[21] In fact, East Germany was the former member of CMEA.

	(2.339)	(2.371)	(2.172)
LnDISTANCE	-3.477	0.029	-2.660
	(9.291)	(9.235)	(8.826)
COLONY	4.901***	**6.017*** **	**4.957*** **
	(0.862)	(0.997)	(1.089)
CMEA	3.716***	1.036	**4.173*** **
	(1.313)	(2.319)	(1.359)
_cons	-72.940	-232.449	35.025
	(204.088)	(211.990)	(206.817)
Observations	270	270	270
R^2	0.578	0.374	0.569

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Source: Calculation of the author

The estimated coefficients for services exports are in Column 2 and services imports in Column 3. As can be seen, the estimated results for services exports and services imports are quite consistent with those for total services trade and the services imports fits the data better than services exports.

Population of Vietnam and distance are two only variables that also do not have impact on both services exports and services imports, while CMEA is found to have no impact on only services exports. Population of partner country, GDP per capita gap and real effective exchange rate are found to have greater impacts on services imports than services exports, whereas the opposite is true for colonial link.

The difference in GDP per capita has greater impact on services imports than services export, which implies that Vietnam imports more from and exports less to countries that have greater growth rate of income per capita. Therefore, an implication should be made is that Vietnam should trade more with countries with lower growth rate of income level. In addition, it is

worth noting that real effective exchange rate has positive influence on both services export and services import. This finding is quite interesting. Since Vietnam exports mostly services of Mode I and II, like trade in goods, an increase in exchange rate will make services of Vietnam become relatively cheaper than those of foreign partners, and exports of services will increase as a result. Whereas, Vietnam imports mostly services of Mode III, which mainly are foreign direct investment (FDI), therefore, an increase in exchange rate will encourage investors to invest more in Vietnam or services imports would increase.

5. CONCLUDING REMARKS

The main purpose of this paper is to analyze the factors influencing the services trade flow between Vietnam and European Union. In this respect, a gravity model has been estimated with panel data and pooled, random, fixed effect estimation covering the period of ten years from 2002 to 2011 for total services trade, services exports and services imports separately. The estimated results on total services trade indicate that bilateral services trade flows between Vietnam and its European partner countries are mainly affected by GDP per capita gap between Vietnam and partner countries, population of foreign partner countries, real effective exchange rate, colonial relationship and being former members of CMEA.

Population and GDP per capita gap are found to be highly significant and have expected influence on total services trade. However, only population of foreign partner countries is found to have positive influence on total services trade but the influence is insignificant. Real effective exchange rate also has statistical significance and positive expected influence on total services.

Distance is the only explanatory that is statistically insignificant. This result is not so surprising and in line with other findings in literature. The two dummy variables are both highly significant and take the expected sign.

This study also has some limitations. It is limited in the data of dependent variables. There are quite a lot missing values in the dataset. The method that missing values are retained and replaced with 1 before taking logarithms may lead to bias estimation. However, this study also provides some interesting results and may help the readers and policy makers to obtain clear view on services trade of Vietnam and European Union.

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APPENDIX

Table A1: Correlation between explanatory variables

	POPi	POPj	GDPPCGAP	REER	DISTANCE	COLONY	CMEA
POPi	1.000						
POPj	0.008	1.000					
GDPPCGAP	0.240	0.096	1.000				
REER	0.295	0.275	0.364	1.000			
DISTANCE	-0.000	0.373	0.3722	0.155	1.000		

COLONY	0.000	0.391	0.080	0.066	0.200	1.000	
CMEA	0.000	0.162	-0.437	-0.248	-0.290	-0.116	1.000

Table A2: Variance-inflating factor (VIF) of independent variables

Variable	Description	VIF
LnGDPPCGAP	GDP per capita gap between Vietnam and partner country	1.99
LnPOPi	Population of Vietnam	1.22
LnPOPj	Population of partner country	1.67
LnREER	Real effective exchange rate	1.33
LnDISTANCE	Weighted distance	1.58
COLONY	Colonial link	1.15
CMEA	Former member of CMEA	1.95
Mean VIF		1.55