



국제학석사학위논문

Determinants of Intra-Industry Trade in Services

서비스 산업의 산업내무역 결정요인 분석

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서울대학교 국제대학원

국제학과 국제통상전공

노영수

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A thesis presented by Youngsoo Noh to

Graduate Program In International Commerce in partial fulfillment of the requirements for the degree of Master in the subject of International Studies

Graduate School of International Studies Seoul National University Seoul, Korea August, 2012 Determinants of Intra-Industry Trade in Services

서비스 산업의 산업내무역 결정요인 분석

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Have examined a thesis entitled

Determinants of Intra-Industry Trade in Services

Presented by Youngsoo Noh

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ABSTRACT

Determinants of Intra-Industry Trade in Services Youngsoo Noh

This research employs a gravity model approach to analyze the determinants of bilateral intra-industry trade in services. A panel dataset, based on data from the UN Service Trade statistic database, has been used to examine selected OECD and EU countries for 11-year time period, starting from the year 2000 to 2010. In total, the panel dataset contains 12,647samples. Using the Grubel-Lloyd index as the measurement of intra-industry trade, standard gravity models are tested for the entire service trades and distinct sectors.

When total service trades are considered as a whole, the results found that size of economies, similarity of income structure, geographical closeness and regional integration have significant effect on the intra-industry trade in services in the same manner they do regarding to trade in goods. However, when trade in services is broken down into sectors, the results have shown different stories. For transportation, computer and information services, and royalties and license fees, the sign of variables remain the same. In contrast, the standard gravity model loses its explanatory power when applied to travel, communication services, other business services, and government services.

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Keywords: Trade in Services, Intra-Industry Trade, Gravity Model, Panel Econometrics, OECD, EU Student ID: 2004-23959

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I. Introduction

Traditionally, services were considered to be untradeable. Intangibility of its nature makes production and consumption inseparable, and this characteristic of service made it inherently unsuitable to trade. Consequently, it is not surprising that there had been a long standing academic apathy towards trade in services. When trades were referred in traditional economic literatures, they meant trade in goods. It was taken for granted and was of no problem as it was a reflection of reality of the time.

However, as new technologies allow new forms of transactions, people have acquired means to buy, sell and exchange services across borders. Reflecting these new trends, the first international regime dealing with trade in services came into being along with the establishment of the World Trade Organization (WTO). The General Agreement on Trade in Services (GATS), which entered into force in January 1995, is of unprecedented trade regime in the regarding sectors and has made important contributions to facilitate trades in services. Total amount of trade in commercial services has grown from 1.2 trillion dollars in 1995 to 4.2 trillion dollars in 2011. As in the year 2011, trade in services explains 18.8% of total world trade.¹

Consequently, economists are paying more attention to trade in services. One of the most frequently asked questions has

¹ The World Trade Organization statistics database http://stat.wto.org/Home/WSDBHome.aspx?Language=E

been how trade in services is different from or similar to trade in goods: those traditional economic theories and empirical findings apply to trade in services as they do to trade in goods? This research is also in line with those previous studies and aims to test applicability of a gravity model to intra-industry trade in services.

1. Definition of Services in International Trades

Manual on Statistics of International Trade in Services² describes services as "a heterogeneous range of intangible products and activities that are difficult to encapsulate within a simple definition." This statement captures essence of services: heterogeneity and intangibility.

Due to this heterogeneity and intangibility of services, founders of GATS had to come up with a very creative solution to define services for its purpose. Under the GATS, services are divided into four distinctive modes: cross-border supply, consumption abroad, commercial presence, and presence of natural persons. The four modes and defined as follows.³

Cross-border supply (Mode 1): service flows from the

² The United Nations (UN), the European Commission (EC), the International Monetary Fund (IMF), the Organization for Economic Co-operation and Development (OECD), the United Nations Conference on Trade and Development, and the World Trade Organization (WTO) have made a joint effort to set out an internationally agreed framework for statistics of international trade in services, and they published the Manual on Statistics of International Trade in Services in 2002. ST/ESA/STAT/SER.M/86

³ The definitions are taken word-by-word from the WTO websites. <u>http://www.wto.org/english/tratop_e/serv_e/gatsqa_e.htm</u>

territory of one Member into the territory of another Member. For example, if one uses a German banking service in China via the Internet, the banking service crossed border can be classified as mode 1.

Consumption abroad (Mode 2): it refers to situations where a service consumer moves into another Member's territory to obtain a service. Recently promoted medical tour can be an example.

Commercial presence (Mode 3): it implies that a service supplier of one Member establishes a territorial presence, including through ownership or lease of premises, in another Member' s territory to provide a serve. A British florist Jane Packer' s shop in Seoul can be an example.

Presence of natural persons (Mode 4): it consists of persons of one Member entering the territory of another Member to supply a service. A Dutch architect Winy Maas participating the Seoul Yongsan master plan or an American cellist Yo-yo Ma playing at a concert hall in Seoul can be examples of mode 4.

Because of its nature, mode 3 and 4 cannot be captured in the Extended Balance of Payments Services (EBOPS) Classification. As this research uses the United States Service Trade Statistics database, which is broken down by EBOPS categories, mode 3 and mode 4 of trade in services are beyond the scope of this research. This research only covers mode 1 and mode 2 of trade in services.

2. Overview of Trade in Services

In 1995, the volume of world EBOPS trade in services marked \$1.2 trillion, and it has grown to \$4.2 trillion in 2011. During those 17 years, trades in services has accounted for approximately 20% of total world trades. The portion of service trade in total volume of world trade has been quite steady over the period.

However, in 2009, in the wake of worldwide recession, trade in services fluctuated much less compared to trade in goods. The former only dropped 10.95%, while the latter was cut by 22.32%. This figure implies that service trades tend to be much more resistant to market fluctuation. This characteristic of trade in services may render stability to world trade during economic turmoil.

In sum, trade in services has not grown much faster than trade in goods. Both have been growing about the same speed for last 17 years: service trades steadily explain about one fifth of world total trades. However, service trades fluctuate less with the market, and this may contribute to counteract shrinking trades during global economic downturn.

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	Services	Goods	Total	
1995	1.2207E+12	5.164E+12	6.38E+12	
1996	1.3062E+12	5.403E+12	6.71E+12	
1997	1.3569E+12	5.591E+12	6.95E+12	
1998	1.3927E+12	5.501E+12	6.89E+12	
1999	1.4289E+12	5.712E+12	7.14E+12	
2000	1.5182E+12	6.456E+12	7.97E+12	
2001	1.523E+12	6.191E+12	7.71E+12	
2002	1.6398E+12	6.492E+12	8.13E+12	
2003	1.8835E+12	7.586E+12	9.47E+12	
2004	2.286E+12	9.218E+12	1.15E+13	
2005	2.5552E+12	1.0495E+13	1.31E+13	
2006	2.8922E+12	1.212E+13	1.5E+13	
2007	3.4769E+12	1.4012E+13	1.75E+13	
2008	3.9046E+12	1.6132E+13	2E+13	
2009	3.4769E+12	1.2531E+13	1.6E+13	
2010	3.8194E+12	1.5254E+13	1.91E+13	
2011	4.2244E+12	1.8217E+13	2.24E+13	

Figure 1 & Table 1. Overview of World Trade Source: The World Trade Organization Statistics Database⁴

⁴ http://stat.wto.org/Home/WSDBHome.aspx?Language=E

II. Literature Review

1. Application of Gravity Model to trade in services

Since Tinbergen (1962) and Pöyhönen (1963), the simple gravity equation, which explains the volume of bilateral trade as a direct function of the economic sizes of the two and an inverse function of the distance between them, has been widely adopted in the literature. Its popularity is mainly due to its empirical success and simplicity of its concept. It was not only the case for trade in goods but also for trade in services. When economic researchers expanded their interests into trades of intangibles, the gravity model still maintained to be one of the most widely tested equation. Scholars have wanted to see if its explanatory power stays the same when applied to services.

Grünfeld and Moxnes(2003) is one of the first study which applied a gravity model to the bilateral exports of services using OECD services trade statistics. Independent variables included are GDP, GDP per capita, the distance between parties, a dummy variable for FTA, a measure of corruption and Trade Restrictiveness Index (TRI). Their results suggest that service trades to be positively related to sizes of economy and negatively related to distances and barriers. They found FTA insignificant, but it may be explained by the fact that most of FTAs concerned do not cover service sectors.

Kimura and Lee(2004) also used OECD datasets, covering 26 OECD member countries for the years 1999 and 2000. Their

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regressors include standard gravity model variables, adjacency, language dummies, and a measure of remoteness. Distance between countries found to be more important in services than in goods. They suggest this implies that there are higher transport costs for services. Unlike Grünfeld and Moxnes(2003) FTA found to have positive effect on trade in services.

Lejour and de Paiva Verheijden (2004), Lennon (2006), and Walsh (2006) also used OECD dataset to apply gravity based models to trade in services. Unlike Kimura and Lee (2004) Lejour and de Paiva Verheijden (2004) found distance less important for services than for goods. Lennon (2006) found distance and adjacency less significant in services while common language is more important in services. Walsh (2006) found wealth of countries and common languages the most important determinants. Unlike other studies. Walsh found distance insignificant.

2. Intra-industry trade in services

Intra-industry trade (IIT) is defined as the simultaneous export and import of similar products. Theoretical explanations for IIT are mainly emphasizing the role of product differentiation and increasing returns to scale. The Grubel-Lloyd (GL) index is most widely adopted measurement of IIT. The index has a value of one when all trade is intra-industry trade and a value of zero when no intra-industry trade is of an existence.

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$$GL_i = 1 - \frac{|X_i - M_i|}{X_i + M_i}$$

 X_i =Export of country i
 M_i =Import of country j

The existing literature on analyzing intra-industry trade in services is quite limited. Leitão (2012) states that, "the discussions of intra-industry trade in tourism services have been negligence." Even though, Leitão (2012) is only concerned with tourism services, it is much the same for the cases of other service sectors and the entire service trade as a whole. This is mainly due to lack of available data, however it becomes less problematic as data accumulates over time and more countries volunteers to participate in the process. Also, considering the actual amount of service trade volume, the topic cannot be of ignorance.

III. Methodology

1. Database used

This research employs the United Nations Service Trade statistics. The scope of the data is trades between resident to non-resident in services, and services are classified according to Extended Balance of Payments Services Classification (EBOPS). This research covers entire list of sub-sectors to their broadest categorization. The table 1 shows the list of categories this research looks into.

Code	Description				
200	Total EBOPS Services				
205	Transportation				
236	Travel				
245	Communications services				
249	Construction services				
253	Insurance services				
260	Financial services				
262	Computer and Information services				
266	Royalties and License fees				
268	Other Business services				
	Personal, Cultural, and Recreational				
287	services				
291	Government services, n.i.e.				

Table 2. The Selected List of Services from the UN Service Trade Database

As categories and partners to be reported are left to each country' s own discretion, a high level of asymmetries exists regarding data availability. In order to secure as many bilateral data for each sector, the countries which are members of both the OECD and the EU have been selected as they report relatively completed data in terms of partner breakdowns and reported categories.⁵ The selected twenty countries are Austria,

 $^{^5}$ For the list of classification and data availability of the OECD countries for the year 2010, please refer to the appendix.

Belgium, the Republic of Czech, Denmark, Estonia, Finland, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and the United Kingdom. As for the time period, the UN Service Trade data is available from 2000 to 2010. In total, 12647 bilateral data in service trades are derived from twenty reporting countries for 11 years.

2. Hypotheses

Hypothesis 1: The economy sizes of trading partners are positively related to the volume of intra-industry trade in services.

The total market value of officially recognized economic activities, Gross Domestic Product (GDP), has positive effect on the total volume of intra-industry trade. Helpman and Krugman (1985), Deardorff (1998), and Eaton and Kortum (2002) have proven the relation; each derived the equation from the monopolistic competition model with increasing returns to scale, a Heckscher–Ohlin model, and a Ricardian model.

Hypothesis 2: The difference in GDP per capita is negatively related to the volume of intra-industry trade.

Linder (1961) and Balassa and Bauwens (1987) find that countries with similar income level show similar demand structure, which in turn translates into higher share of intraindustry trade as differentiated products within similar categories are exchanged. Therefore, gap in GDP per capita represents different demand structures and less demands for the same or similar products.

Hypothesis 3: The distance between trading partners is inversely related to the volume of intra-industry trade.

Compared to trades in goods, previous studies have shown a lack of consensus on the impact of geographical closeness regarding trades in services. It may be explained by facts that some forms of services do not have to be transported in material sense from one place to the other, so the distance does not work as cost proxy. However, services also involve a lot of interactions, and geographical closeness is expected to render easiness for those interactions.

Hypothesis 4: The European Union (EU) membership is expected to have positive impact on the volume of intra-industry trade.

The EU represents an unprecedented level of cooperation among sovereign states. The membership of EU definitely allows much more free flows of people and capital across borders among its members. The EU membership is highly expected to facilitate trades of all kinds among its members.

Hypothesis 5: The relation between GL index and RCA reveals whether intra-industry trade or inter-industry trade prevails within the sector.

The definition of Revealed Comparative Advantage (RCA)

is as follows.

$$RCA = \frac{Eij}{Eit} / \frac{Ewj}{Ewt}$$

Where,

- Eij The volume of exports of services sector j of country i
- Eit The volume of exports of the total EBOPS service of country i
- Ewj The volume of World exports of service sector
- Ewt The volume of World exports of the total EBOPS services

By the definition, the denominator of RCA does not vary across countries for a given year. Besides, as the selected 21 countries are those of top ranking exporters, the volume of exports of the total EBOPS service of country i(Eit) is expected to be big in absolute numbers. This means that a high level of RCAij for a given year can be interpreted as a high level of Eij, at least for those 21 selected countries. This chain of logic leads to an analysis that a positively correlation of RCAij and GLij shows intra-industry trade prevails within the sector. That is to say big RCAij means big Eij, and big Eij combined with big GLij means big Mij. By the same reasoning, small RCAij means small Eij, and small Eij combined with small GLij means small Mij. In short, a positive correlation of RCA and GL says predominance of intra-industry trade within the sector. The vice versa is true: a negative correlation of RCA and GL shows dominance of inter-industry trade within the sector.

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3. Model Specification

$$GL_X_{ijt} = \beta_0 + \beta_1 LAverage_GDP_{ijt} + \beta_2 LGap_in_GDPPC_{ijt} + \beta_3 LDist_{ij} + \beta_4 EU_j + \beta_5 RCA_Xit$$

Where,

GL_X_{ijt}	=	Grubel-Lloyd (GL) index between
		country i and country j for service
		code X in year t
$LAverage_GDP_{ijt}$	=	the logarithm of average GDP of
		country i and country j in year t
LGap_in_GDPPC _{ijt}	=	the logarithm of absolute difference in
		GDP per capita between country i and
		country j in year t
LDist _{ij}	=	the logarithm of distance between
		country i and j
EU_{j}	=	a dummy variable for the EU
		membership
RCA_Xit	=	Revealed Comparative
		Advantage(RCA) of country i for
		service code X in year t

IV. Empirical Results and Analysis

The same equations are tested for total EBOPS services and each service sectors to see if the simple gravity based approach explains the level of intra-industry trade. The regression results are as follows.

1. Total EBOPS Services

When the gravity model is estimated using OLS method, all variables are appeared to be significant and the signs of their coefficients are as expected. The size of economies of trading partners are positively related; the more similar income levels imply the more exchanges of services across borders; the more distant the partners are the less they trade services; EU membership facilitates service trades among its members. In summary, the gravity model explains share of intra-industry trade in total EBOPS services in the same manner it does trade in goods.

Dependent Variable: GL200 Method: Least Squares Date: 05/11/12 Time: 19:31 Sample (adjusted): 2 12647 Included observations: 8647 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAVERAGE_GDP	0.041064	0.002832	14.50019	0.0000
LGAP_IN_GDPPC	-0.010643	0.002788	-3.817858	0.0001
LDIST	-0.027104	0.003630	-7.466833	0.0000
EU	0.030526	0.008041	3.796510	0.0001
C	-0.080366	0.088233	-0.910848	0.3624

R-squared Adjusted R-squared	0.046975 0.046534	Mean dependent var S.D. dependent var	0.717121 0.284227
S.E. of regression	0.277535	Akaike info criterion	0.274838
Sum squared resid	665.6554	Schwarz criterion	0.278923
Log likelihood	-1183.262	Hannan-Quinn criter.	0.276231
F-statistic	106.4921	Durbin-Watson stat	2.132378
Prob(F-statistic)	0.000000		

Table 3. Total EBOPS Services (service code 200)

2. Transportation

As for the transportation sector, all the variables are significant and have expected signs. That is to say transportation services are exchanged more between bigger economies; similar income level economies; closer economies; and EU members. What is worth to notice in this result is that geographical closeness lead to more intra-industry trade in transportation This means that more balanced number of transports sector. between closer countries, comes and goes while higher asymmetries exist for in and out transports between more remote countries. One possible explanation for this phenomenon is that the transportation cost for a single trip may be higher between distant states, which in turn result in bigger difference in EBOPS figure for one difference of in-and-out frequency. In other words, the same proportional difference between exports and imports in terms of frequency may appear to be a greater gap between distant nations when it is calculated in terms of dollars. That being the case, the coefficient of distance on intra-industry trade within transportation sector should be interpreted differently. Also, the positive sign of variable RCA205 shows that intra-industry

trade prevails within transportation sector. In other words, trades in transportation are rather bilateral. This may reflect nature of transportation: vessels and flights are bound to make round trips.

Dependent Variable: GL205 Method: Least Squares Date: 06/05/12 Time: 13:20 Sample (adjusted): 3 12647 Included observations: 7147 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAVERAGE_GDP LGAP_IN_GDPPC LDIST EU RCA205 C	0.049484 -0.009852 -0.017624 0.046871 0.042903 -0.506769	0.002675 0.002555 0.003346 0.007467 0.004292 0.083215	18.49871 -3.855425 -5.266602 6.276783 9.996311 -6.089844	0.0000 0.0001 0.0000 0.0000 0.0000 0.0000
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.074898 0.074250 0.233832 390.4528 247.5147 115.6299 0.000000	Mean depend S.D. depende Akaike info Schwarz crit Hannan-Quin Durbin-Wats	dent var ent var criterion erion nn criter. on stat	0.668004 0.243029 -0.067585 -0.061814 -0.065598 1.879721

Table 4.	Transportation	(service	code	205)
	-			

3. Computer and Information service

As for the computer and information service sector, all the variables, except the dummy variable for the EU membership, are significant and have the same expected signs that would be expected from the standard gravity literature. However, why the membership of EU is insignificant remains to be answered. Also, the negatively sign of the variable RCA262 shows that interindustry trade prevails in the computer and information sector. In other words, trades are rather conducted in one way: exporters export whereas importers import. Possible explanations for this phenomenon may include economies of scale, technology gap, and cost as prime competitive edge.

Dependent Variable: GL262 Method: Least Squares Date: 06/04/12 Time: 15:48 Sample (adjusted): 18 11235 Included observations: 3706 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAVERAGE_GDP	0.048317	0.004538	10.64809	0.0000
LGAP_IN_GDPPC	-0.018954	0.004192	-4.521840	0.0000
LDIST	-0.054571	0.005261	-10.37205	0.0000
EU	0.010216	0.011644	0.877363	0.3803
RCA262	-0.048816	0.004026	-12.12628	0.0000
С	-0.090264	0.136211	-0.662678	0.5076
R-squared	0.108790	Mean depend	lent var	0.573203
Adjusted R-squared	0.107586	S.D. depende	ent var	0.295839
S.E. of regression	0.279472	Akaike info	criterion	0.289787
Sum squared resid	288.9866	Schwarz crit	erion	0.299854
Log likelihood	-530.9755	Hannan-Quir	nn criter.	0.293369
F-statistic	90.33216	Durbin-Wats	on stat	1.870631
Prob(F-statistic)	0.000000			

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								/

4. Royalties and Licenses fees

As for the royalties and licenses fees, all the variables are significant and have expected signs except for the EU dummy variable. The negative coefficient of the EU dummy variable indicates lower share of intra-industry trade exists among EU member states regarding royalties and license fees. In other words, there are bigger discrepancies between volume of exports and imports of the royalties and license fees between EU states compared to those between EU and non-EU states. One possible explanation may be driven from the fact that EBOPS only covers Mode 1 and 2 of service trades. If EU membership stimulates Mode 3 and 4 trades in royalties and licenses, Mode 3 and 4 may substitute Mode 1 and 2. That being the case, even though EBOPS data shows decreased volume of trades within EU members, total amount of service trades in concerned sector may have actually been growing. To see the complete picture Mode 3 and 4 data should be examined. As for the variable RCA 266, it shows a negative sign which stands for dominance of inter-industry trade. Trades in royalties and licenses are carried out in more unilateral manner rather than bilateral manner.

Dependent Variable: GL266
Method: Least Squares
Date: 06/04/12 Time: 13:13
Sample (adjusted): 2 4193
Included observations: 3282 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAVERAGE_GDP LGAP_IN_GDPPC LDIST EU RCA266	0.023627 -0.076912 -0.048063 -0.074343 -0.041116 0.925026	0.005154 0.004736 0.005782 0.013119 0.008165 0.155357	4.584487 -16.24116 -8.313113 -5.667049 -5.035435 5.954193	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.107295 0.105933 0.295270 285.6151 -650.3508 78.74937 0.000000	Mean depende S.D. dependen Akaike info cri Schwarz criter Hannan-Quinn Durbin-Watsor	nt var t var terion ion criter. 1 stat	0.400220 0.312272 0.399970 0.411115 0.403961 1.834747

Table 6.	Royalties	and	Licenses	fees	(service	code	266)
							/

5. Others:

Travel/ Communication services/ Construction services/ Insurance services/Financial services/Other business services

As for the travel sector, none of the variables are significant; the gravity model loses its explanatory power when it comes to intra-industry trade of travel services. As a matter of fact, this is not counter-intuitive. Those gravity variables may not be important check points when people make decisions for traveling. Citizens of rich nations would go relatively poor state as well as wealthier state for their vacation, and the vice versa is true for the nationals of developing countries. If the travel sector is broken down further to business travel versus personal travel,⁶ the story may change as those gravity variables may have implications to business activities between the parties which would be correlated with business trips.

6 '	The	UN	service	trades	statistics	categorization	is	as	follows.
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Service Code	Description
236	2. Travel
237	2.1 Business travel
240	2.2 Personal travel

Dependent Variable: GL236
Method: Least Squares
Date: 06/05/12 Time: 13:40
Sample (adjusted): 2 12647
Included observations: 6537 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAVERAGE_GDP	-0.015261	0.199923	-0.076335	0.9392
LGAP_IN_GDPPC	0.130235	0.192409	0.676862	0.4985
LDIST	-0.188483	0.251710	-0.748807	0.4540
EU	-0.615915	0.549944	-1.119961	0.2628
RCA236	0.353353	0.392700	0.899805	0.3683
С	1.337964	6.289913	0.212716	0.8316
R-squared	0.000394	Mean depend	dent var	0.755469
Adjusted R-squared	-0.000371	S.D. depende	ent var	16.69180
S.E. of regression	16.69490	Akaike info	criterion	8.469001
Sum squared resid	1820318.	Schwarz crit	erion	8.475229
Log likelihood	-27674.93	Hannan-Quin	nn criter.	8.471154
F-statistic	0.514643	Durbin-Wats	on stat	3.065419
Prob(F-statistic)	0.765418			

Table 7. Travel (service code 236)

As for other service sectors, gravity based approach is not a useful tool to explain intra-industry trade; such sectors includes communication, construction, insurance, financial, other business services and government services.⁷ In other words, the size of economies, income levels, geographical closeness, regional integrations, and revealed comparative advantages are irrelevant regarding those sectors.

 $^{^{7}}$ As for those industries, the regression results are attached to Appendix 2

6. Summary of the results

code		Average _GDP	Gap in GDP per capita	Distance	EU Membership	RCA
200	Total EBOPS Services	0	O	\bigcirc	\bigcirc	
205	Transportation	O	0	0	O	$\bigcirc(+)$
236	Travel	_	-	_	_	_
245	Communications services	_	-	_	_	_
249	Construction services	-	-	_	_	_
253	Insurance services	-	_	_	_	-
260	Financial services	-	_	_	_	-
262	Computer and Information	Ô	O	0	_	◎(-)
266	Royalties and License	0	0	0	\bigcirc^{8}	◎(-)
268	Other Business services	-	-	_	_	-
287	Personal, Cultural, and Recreational services	_	_	_	_	_

The results can be summarized as below.

◎: significant at 1% level, - : insignificant

Table 8: The Summary of Results.

Two interesting points can be observed. One is that the simple gravity variables maintain their explanatory power in regards to only limited sub-sectors of trade in services. The other is that the relevance came in a package. For those sectors where the gravity variables are significant, all of them are significant; for those sectors where the gravity determinants are

⁸ reported opposite of expected sign

insignificant, all of them are insignificant.

Although further research is required to examine this interesting result, some suggestions and guesses can be made as an effort to explain this packaged relevance. For example, economic logics behind supplies or motivations of consumption may vary across service sectors. For some sectors, those may be in line with traditional economic theories as commodities; for others, totally different reasoning may be of necessary. More research should be conducted why people produce and consume services for each service sector and compare the degree of resemblance between the tangibles and the intangibles. However, this job may be even more complicated and challenging when different degree of heterogeneity of each sub-sector is taken into account.

V. Conclusion

The object of this research is to analyze determinants of intra-industry trades in services. The dataset derived from the UN Service Trade database have been employed to test applicability of gravity based variables to entire service trade and individual categories of services. The results found that, when service trades are taken into account as a whole, the size of trading partners and distance between them are related to the share of intra-industry trades in services in the same manner they do to trades in goods; countries trade more with bigger and closer partners. Also, similar demand structure measured by differences in GDP per capita has shown the expected effect on intra-industry trade share of total EBOPS services, and the membership of EU matters in regards to the intra-industry trade share of total EBOPS services.

However, when services are broken down to sectors, the story changes; the variables are still significant for some sectors while they lose their explanatory power regarding some other sectors. Transportation, computer and information services, and royalties and license fees have shown the same results with the total EBOPS services. On the other hand, the intra-industry trade in travel, communication services, construction services, insurance financial business other services. services. services. and government services cannot be explained by traditional gravity based variables. In conclusion, the standard gravity model can be applied to the total service trade as a whole as it does to the commodity trade; however, when service trades are broken down to sectors, the standard gravity model may not be suitable to identify determinants of intra-industry of the sector in concern.

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APPENDIX 1

Year 2010 Data Availability	RO	US	Chi	iJap	Au	Au	Bel	Car	Chi	Cze	Dei	Est	Fin	Fra	Gei	Gre	Hu	Irel	Isra	Ital	Lux	Me	Ne	Ne	No	Pol	Роі	Slo	Slo	Spa	Sw	Sw	Tur	UK
Partner Breakdown 200 Total EBOPS Services	13	0	0	21	0	67	64 0	4	0	67	67	67	44	66	53	48	67	55	0	67	66	0	66	0	9 (N X	66	50	65	66	47	67	0		67 0
205 1 Transportation	Õ	Õ	Ō	Ō	X	Ŏ	Ŏ	Õ	Ŏ	Ō	Ō	Õ	Ŏ	Ō	Ō	Õ	Ō	Ō	Ŏ	Ō	Õ	Ŏ	Õ	Ŏ	X	Ō	Ō	Õ	Ō	Ō	Ö	Õ	Ŏ	Ō
850 Transportation of 851 Transportation of	Â	Ŷ	Â	Ŷ	Ŷ	Â	Ŷ	Â	Ŷ	Ŷ	Ŷ	Ŷ	Â	Ŷ	Ŷ	Ŷ	Ŷ	Â	Ŷ	Ŷ	Ŷ	Â	Ŷ	Â	X	Â	Ŷ	Ŷ	X	Ŷ	Ŷ	Ŷ	Â	Ŷ
852 Transportation of 206.1.1 Sea transport	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
207 1.1.1 Passenger	Ŷ	X	Ŏ	X	Ŷ	X	ŏ	X	Ŏ	X	Ŏ	Ŏ	Ŏ	Ŏ	Ŏ	X	X	Ŏ	X	Ŏ	X	X	Ŏ	Ŷ	Ŷ	Ŏ	Ŏ	X	Ŏ	Ŏ	Ŏ	Ŷ	X	Ŏ
208 1.1.2 Freight 209 1.1.3 Other	X	X	00	X	X	X	0	00	0	0	0	0	0	0	0	X	0	0	X	0	0	Ô	0	X	X	0	0	X	0	0	0	X	X	0
210 1.2 Air transport 211 1 2 1 Passenger	X	0	0	0 X	X	0 X	0	0	0	0	00	0	X	0	00	X	0	0	X	00	0	0	0	X	X	0	0	0	0	0	0	X	0	0
212 1.2.2 Freight	Ŷ	Ŏ	ŏ	Ŷ	Ŷ	Ŷ	ŏ	Ô	ŏ	ŏ	ŏ	ŏ	Ŷ	ŏ	ŏ	Ŷ	ŏ	ŏ	Ŷ	ŏ	ŏ	X	ŏ	Ŷ	Ŷ	Ŏ	ŏ	Ŏ	ŏ	ŏ	ŏ	Ŷ	ŏ	ŏ
213 1.2.3 Other 214 1.3 Other transport	X	õ	00	õ	X	0	0	ð	0	0	0	0	X	0	0	X	0	X	X	0	0	X	8	X	X	0	0	Õ	0	0	0	X	0	0
215 1.3.1 Passenger	X	X	00	X	X	X	00	00	00	0	00	8	X	0	00	X	0	X	X	00	00	X	8	X	X	00	00	Q	0	X	0	X	X	8
217 1.3.3 Other	Ŷ	Õ	Õ	Ŷ	Ŷ	Ŷ	Õ	X	Õ	Õ	Õ	ŏ	Ô	ŏ	Õ	Ŷ	Õ	Ŷ	Ŷ	Õ	Õ	Ŷ	Õ	Ŷ	X	Õ	Õ	Ô	Õ	Õ	Õ	Ŷ	X	X
218 1.4 Other transport of 219 1.5 Other transport of	X	X	X	X	X	Ô	ô	X	X	Å 0	Ô	0	Ô	0	Ô	X	Å 0	X	X	Ô	ô	X	ô	X	X	Ň	X	ô	Ô	Ô	ô	X	X	ô
220 1.5.1 Passenger 221 1 5 2 Freight	X	X	X	X	X	X	0	X	X	0	00	0	X	0	00	X	0	X	X	00	0	X	X	X	X	0	X	0	0	X	0	X	X	0
222 1.5.3 Other	X	X	Ŷ	X	X	X	ŏ	Ŷ	X	ŏ	Ŏ	ŏ	Ŷ	ŏ	Ŏ	X	ŏ	X	X	X	ŏ	Ŷ	X	Ŷ	X	ŏ	X	X	ŏ	X	ŏ	X	X	X
223 1.6 Other transport of 224 1.6.1 Passenger	X	X	X	X	X	X	0	X	X	0	0	0	X	0	X	X	0	X	X	0	0	X	X	X	X	0	0	0	0	X	0	X	X	X
225 1.6.2 Freight	X	X	X	X	X	X	00	X	X	0	00	8	X	0	×0	X	0	X	X	00	00	X	X	X	X	00	00	V	0	0	0	X	<u>v</u>	<u> </u>
227 1.7 Other transport of	Ŷ	Ŷ	Ŷ	Ŷ	X	Ô	Ŏ	X	X	ŏ	X	X	X	ŏ	Ô	Ŷ	ŏ	X	X	X	Ŏ	X	Ŏ	X	X	ŏ	X	Ô	ŏ	X	X	Ŷ	X	X
220 1.7.1 Passenger 229 1.7.2 Freight	Â	Ř	Â	Â	Â	Ŕ	Ó	Ŕ	Â	0	X	Â	Â	0	0	Â	0	X	Ŕ	X	Ó	Â	Ô	Â	Â	0	X	Ó	0	X	Â	Â	Â	Â
230 1.7.3 Other 231 1.8 Other transport of	X	X	X	X	X	X	0	X	X	0	X	X	X	0	X	X	0	X	X	X	0	X	<u> </u>	X	X	0	X	X	0	X	X	X	X	X
232 1.9 Other transport of	Ŷ	Ŷ	Â	Ŷ	Ŷ	Ŷ	ŏ	Ŷ	Ŷ	ŏ	ŏ	ŏ	Ŷ	ŏ	ŏ	ŏ	ŏ	Ŷ	Ŷ	X	ŏ	Ŷ	X	Ŷ	Ŷ	ŏ	Â	ŏ	ŏ	Ŷ	X	X	X	X
237 2.1 Business travel	X	0	X	X	Â	0	0	00	0	0	0	Ö	0	0	X	Ö	0	0	X	0	00	0	0	0	X	0	0	0	0	X	0	X	0	0
238 2.1.1 Expenditure by 239 2 1 2 Other	X	0 X	X	X	X	0	0	X	X	0	X	0	X	0	X	X	0	0	X	0	0	X	X	X	X	0	X	X	0	X	X	X	X	0
240 2.2 Personal travel	Ŷ	Ô	Ŷ	X	X	Ŏ	Õ	Ô	Ô	ŏ	Ô	ŏ	Ô	ŏ	X	Ô	ŏ	Õ	X	Ŏ	ŏ	ŏ	Ô	Ô	X	ŏ	Ô	Ô	ŏ	X	Ô	X	ŏ	ŏ
241 2.2.1 Health-related 242 2.2.2 Education-related	Ŷ	8	Â	Ŷ	Ŷ	0	Ŷ	0	Ŷ	8	Ŷ	8	Â	8	Ŷ	8	8	ô	Ŷ	0	8	0	Ŷ	0	Ŷ	8	Ŷ	Ŷ	8	Ŷ	8	Ŷ	8	8
243 2.2.3 Other	X	0	X	ŏ	X	0	0	0	X	0	X	0	X	0	X	0	0	0	X	0		0	ŏ	0	X	0	X	Ň	0	X	0	X	0	0
246 3.1 Postal and courier	X	õ	X	X	Ŷ	Q	Q	X	Ŷ	õ	0	õ	Õ	õ	0	õ	õ	0	Ŷ	0	õ	X	X	X	X	0	Q	õ	Õ	Ŷ	õ	X	Õ	õ
249 4 Construction	Â	ŏ	ô	ô	Â	ŏ	ŏ	ô	Â	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	X	ŏ	X	Â	ŏ	ŏ	X	ô	Â	Â	ŏ	Ö	ŏ	ŏ	ô	ŏ	Â	ŏ	ŏ
250 4.1 Construction 251 4.2 Construction in the	X	8	X	X	X	0	0	X	X	0	X	0	0 X	0	0	X	0	X	X	0 X	0	X	0	X	X	0	0	0	0	0	0	X	0 X	0
253 5 Insurance services	Ô	Ŏ	Ô	Ô	X	Ŏ	Ŏ	0	Ô	Ŏ	0	Ŏ	0	Ŏ	Ŏ	Ô	Ŏ	0	Ô	0	Ŏ	Ô	Ŏ	X	X	Ŏ	Ŏ	Ŏ	Ŏ	Ŏ	Ŏ	Ô	0	Ŏ
255 5.2 Freight insurance	Ŷ	Ŷ	Ŷ	Ŷ	Ŷ	ŏ	8	X	Ŷ	ô	ð	ô	X	0	ð	Ŷ	Ö	X	Ŷ	ð	8	Ŷ	8	Ŷ	Ŷ	Ŏ	ô	8	ŏ	ô	8	Ŷ	ŏ	0
256 5.3 Other direct 257 5.4 Reinsurance	X	X	X	X	X	0	8	X	X	0	0	X	X O	X	0	ŏ	0	0 X	X	0	8	X O	8	X	X	0	X	8	0	8	8	X	0	8
258 5.5 Auxiliary services	X	X	X	X	X	Õ	Õ	Õ	X	0	0	X	X	X	X	X	0	X	¥	0	0	X	X	X	X	0	X	0	0	0	Õ	X	0	0
262 7 Computer and	Ŷ	ŏ	ŏ	ŏ	Ŷ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	Ŷ	ŏ	ŏ	Ŷ	ŏ	ŏ	Ŷ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	X	ŏ	ŏ
263 7.1 Computer services 264 7.2 Information	X	0	X X	X X	X	0	0	00	X	0	0	0	0	0	X	0	0	0	X	0	0	X	X	X	X	0	0	0	0	X	0	X	Ň	0
889 7.2.1 News agency	X	X	X	X	X	X	0 X	X	X	00	X	X	X	00	X	X	00	ХO	X	00	00	X	X	X	X	00	X	X	X	X	0	X	0 X	0
266 8 Rovalties and	Ô	Ô	Ô	Ô	Ŷ	Ô	Ô	Ô	Ô	ŏ	Ô	Ô	Ô	ŏ	Ô	Ô	ŏ	Ŏ	Ŷ	ŏ	ŏ	X	Ô	Ô	X	Ŏ	Ô	Ô	ŏ	Ô	ŏ	Ô	X	ŏ
891 8.1 Franchises and 892 8.2 Other rovalties and	X	X	X	X	X	0	8	0	X	0	X	8	0	0	0	X	0	ð	X	0	0	X	8	X	X	0	0	0	0	X	0	X	X	0
268 9 Other business	0 X	N X	0	0 X	X	0	0	0	0 X	0	0	0	0	0	0	0	0	0	X	0	0	X	0	X	X	0	0	0	0	0	0	0	0	0
270 9.1.1 Merchanting	Ŷ	Ŷ	X	Ŷ	Ŷ	Ŏ	Ŏ	X	X	Ŏ	Ŏ	Ŏ	Ŏ	Ŏ	Ŏ	Ŏ	Ŏ	Ŏ	Ŷ	Ŏ	Ŏ	X	ŏ	Ŏ	X	Ŏ	X	Ŏ	Ŏ	Ŏ	Ŏ	Õ	Ŏ	Ŏ
272 9.2 Operational leasing	Â	Ŷ	Â	Ŷ	Â	ŏ	0	ŏ	0	0	0	0	ŏ	0	0	0	0	Ö	Ŷ	0	0	Â	0	ŏ	Â	Ö	ô	0	ŏ	0	0	Â	X	0
273 9.3 Miscellaneous 274 9.3.1 Legal.	X	X	0	X	X	0	0	0	0 X	0	0	0	0	0	0	0	0	0	X	0	0	X	0	0	X	0	0	0	0	0	0	0 X	0	0
275 9.3.1.1 Legal services	Ŷ	Ŷ	X	Ŷ	Ŷ	Ŏ	Ŏ	Ŏ	X	Ŏ	Ŏ	Ŏ	Ŏ	Ŏ	X	Ŷ	Ŏ	X	Ŷ	Ŏ	Ŏ	X	Ŏ	Ŏ	X	Ŏ	X	Ŏ	Ŏ	X	Ŏ	Ŷ	Ŏ	Ŏ
277 9.3.1.3 Business and	Ŷ	Ŷ	ô	Ŷ	Ŷ	ŏ	8	ô	Ŷ	Ö	ð	8	ŏ	Ö	ô	Ŷ	Ö	ô	Ŷ	ð	8	Ŷ	8	ŏ	Ŷ	Ŏ	Ŷ	8	ŏ	Ŷ	0	Ŷ	Ŷ	0
278 9.3.2 Advertising, 279 9.3.3 Research and	X	X	0 X	X	X	0	8	0	X	0	0	8	0	0	0	X	0	0	X	0	8	X	8	0	X	0	0	8	0	0	8	X	X	8
280 9.3.4 Architectural,	Ŷ	Ŷ	Ŷ	Ŷ	Ŷ	0	0	Ô	Ŷ	X	00	0	0	0	00	Ŷ	0	0	Ŷ	00	0	Ŷ	0	00	X	0	0	0	00	0	0	Ŷ	Ŷ	0
282 9.3.5.1 Waste	Ŷ	Ŷ	Ŷ	Ŷ	Â	X	ŏ	Ŷ	Ŷ	ŏ	ŏ	ŏ	Ŷ	ŏ	X	Ŷ	ŏ	X	Ŷ	ŏ	ŏ	Ŷ	ŏ	X	Ŷ	ŏ	X	ŏ	ŏ	X	ŏ	Ŷ	Ŷ	ŏ
283 9.3.5.2 Agricultural. 284 9.3.6 Other business	X	Ŏ	X	X	X	Ň	0	Ň	X	0	0	0	Ň	0	Ň	Ň	0	0	X	0	0	X	0	Ň	Ň	0	Ň	0	0	Ň	0	X	X O	0
285 9.3.7 Services between	X	X	X	X	X	0	0	X	X	0	00	X	X	0	00	X	0	0	X	00	0	X	0	X	X	0	0	0	0	0	0	X	X	0
288 10.1 Audiovisual and	Ŷ	Ŷ	Ŏ	X	X	ŏ	Ŏ	ŏ	X	Ŏ	0	ŏ	ŏ	Ŏ	Ŏ	X	Ŏ	Ŏ	X	0	ŏ	Ŏ	ŏ	ŏ	X	Ő	Ő	X	ŏ	Ŏ	ŏ	X	X	ŏ
289 10.2 Other personal, 895 10.2.1 Education	X	X	X	X	X	0	X	X	X	0	X	X	X	0	X	X	0	X	X	0	0	X	X	0	X	0	X	0	0	X	0	X	X	0
896 10.2.2 Health services	X	X	X	X	X	0	X	X	X	0	X	X	X	Q X	X	X	0	X	X	0	0	X	X	0	X	0	X	0	0	X	0	X	X	0
291 11 Government	Ô	Ô	Ô	Ô	Ŷ	ŏ	ŏ	ŏ	Ô	ŏ	Ô	ŏ	ŏ	Ô	Ô	Ô	ŏ	Ô	Ô	ŏ	ŏ	Ô	Ô	ŏ	Ŷ	ŏ	Ô	ŏ	ŏ	Ô	ŏ	Ô	ŏ	ŏ
29211.1 Embassies and 293 11.2 Military units and	Ă	0	X	Ă	X	X	Ŏ	X	X	X	X	X	X	Ŏ	Ó	Õ	Ŏ	X	Ň	0	Ŏ	X	X	X	X	Ó	X	X	X	X	Ö	X	X	Ŏ
294 11.3 Other government 983 Services not allocated	X	0	X	X	X	X	0	X	X	X	X	0	0	0	0	0	0	0	X	0	0	X	X	X	X	0	X	X	0	0	0	X	X	0
981 Other services, total	X	Ň	Ŷ	X	X	X	X	Ŷ	X	X	X	X	X	X	X	X	X	X	X	X	X	Ŷ	X	X	Ŷ	X	X	X	X	X	X	X	X	X
BOPS Memorandum	Ă	Ă	Ň	Å	Ă	Ă	Ă	Ă	Ă	Å	Ă	Ă	Ă	Å	X	Ă	Ă	Ă	Ă	Ă	Ă	Ă	Ā	X	X	Ă	Ă	X	X	X	Ă	X	Ă	Ă

APPENDIX 2

Dependent Variable: GL245 Method: Least Squares Date: 06/05/12 Time: 14:46 Sample (adjusted): 3 11235 Included observations: 4089 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAVERAGE_GDP LGAP_IN_GDPPC LDIST EU RCA245 C	-10.01400 10.65498 0.221722 -14.75371 11.62099 171.5978	6.512789 6.222493 7.564496 16.75141 14.53159 193.3977	-1.537591 1.712332 0.029311 -0.880745 0.799705 0.887279	0.1242 0.0869 0.9766 0.3785 0.4239 0.3750
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.001869 0.000647 418.0025 7.13E+08 -30478.15 1.529226 0.177114	Mean depende S.D. dependen Akaike info cri Schwarz criter Hannan-Quinn Durbin-Watsor	nt var t var terion ion criter. n stat	9.866138 418.1378 14.91032 14.91959 14.91360 0.618825

Service code 245: 3. Communication services

Dependent Variable: GL249 Method: Least Squares Date: 06/05/12 Time: 15:09 Sample (adjusted): 7 10572 Included observations: 3011 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAVERAGE_GDP LGAP_IN_GDPPC LDIST EU RCA249	-9.671966 -1.134425 3.018490 -9.821964 0.928451	4.761832 4.026750 5.025453 11.23180 6.241187	-2.031144 -0.281722 0.600640 -0.874478 0.148762	0.0423 0.7782 0.5481 0.3819 0.8818
C R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	261.6415 0.001869 0.000208 235.8760 1.67E+08 -20719.44 1.125358 0.344505	138.1429 1.893991 Mean dependent var S.D. dependent var Akaike info criterion Schwarz criterion Hannan-Quinn criter. Durbin-Watson stat		0.0583 5.784174 235.9005 13.76648 13.77846 13.77079 0.002637

Service code 249: 4. Construction services

Dependent Variable: GL253
Method: Least Squares
Date: 06/05/12 Time: 15:31
Sample (adjusted): 15 11251
Included observations: 3514 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAVERAGE_GDP LGAP_IN_GDPPC LDIST EU RCA253 C	6.162698 10.08003 10.62412 -20.99049 -8.485752 -292.0023	12.05521 11.07170 13.96779 31.27912 8.139727 370.2786	0.511206 0.910432 0.760616 -0.671070 -1.042511 -0.788602	0.6092 0.3627 0.4469 0.5022 0.2972 0.4304
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.001650 0.000227 690.6964 1.67E+09 -27956.63 1.159620 0.326599	Mean depende S.D. dependen Akaike info cri Schwarz criter Hannan-Quinn Durbin-Watsor	nt var t var iterion ion criter. n stat	38.96054 690.7748 15.91498 15.92551 15.91874 2.344269

Service code 253: 5. Insurance services

Dependent Variable: GL260 Method: Least Squares Date: 06/05/12 Time: 15:53 Sample (adjusted): 2 11446 Included observations: 3827 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAVERAGE_GDP LGAP_IN_GDPPC LDIST EU RCA260 C	-3.316105 -0.709222 -1.034390 -8.715917 -0.891751 113.5796	2.948676 2.926498 3.508337 7.904156 1.337467 90.51595	-1.124608 -0.242345 -0.294838 -1.102701 -0.666746 1.254802	0.2608 0.8085 0.7681 0.2702 0.5050 0.2096
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.000666 -0.000641 191.3230 1.40E+08 -25534.19 0.509630 0.769204	Mean depende S.D. dependen Akaike info cri Schwarz criter Hannan-Quinn Durbin-Watson	nt var t var iterion ion criter. n stat	3.667139 191.2617 13.34737 13.35717 13.35085 1.944047

Service code 260: 6. Financial services

Dependent Variable: GL268 Method: Least Squares Date: 06/05/12 Time: 16:17 Sample (adjusted): 2 11962 Included observations: 5968 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAVERAGE_GDP LGAP_IN_GDPPC LDIST EU RCA268	-0.266086 0.279525 -0.037952 -0.525891 0.483592 5 503213	0.357336 0.350396 0.437657 1.001256 0.900462 10.86041	-0.744640 0.797741 -0.086717 -0.525231 0.537049 0.506722	0.4565 0.4251 0.9309 0.5994 0.5913 0.6124
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.000315 -0.000524 28.42885 4818484. -28442.53 0.375141 0.866039	Mean dependent var S.D. dependent var Akaike info criterion Schwarz criterion Hannan-Quinn criter. Durbin-Watson stat		1.073569 28.42140 9.533691 9.540421 9.536028 1.438464

Service code 268: 9. Other business services

Dependent Variable: GL287 Method: Least Squares Date: 06/05/12 Time: 16:39 Sample (adjusted): 19 11056 Included observations: 2891 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAVERAGE_GDP LGAP_IN_GDPPC LDIST EU RCA287 C	-7.829285 7.353667 0.761273 -14.74631 -2.899772 157.8383	7.557523 6.845350 8.374421 18.60826 3.951071 223.9963	-1.035959 1.074257 0.090905 -0.792460 -0.733920 0.704647	0.3003 0.2828 0.9276 0.4282 0.4631 0.4811
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.001253 -0.000477 402.2444 4.67E+08 -21436.65 0.724159 0.605252	Mean dependent var S.D. dependent var Akaike info criterion Schwarz criterion Hannan-Quinn criter. Durbin-Watson stat		8.054074 402.1484 14.83407 14.84646 14.83853 1.947547

Service code 287: 10. Personal, cultural, and recreational services

국문초록

서비스 산업의 산업내무역 결정요인 분석

노영수

이 논문에서는 중력 모델을 이용하여 서비스 산업의 산업내 무역 결정요인을 분석하고자 한다. GL지수로 계산된 산업내무역지 수를 설명함에 있어 중력모델 변수들이 얼마나 유효한지를 검증하 는 것을 목표로 하며, 서비스무역 총량뿐만아니라 10개의 하위 서비 스 부문까지 회귀분석의 대상으로 하였다. 이를 위해 유엔 서비스 무역 통계 데이타베이스로부터 경제협력개발기구(OECD)와 유럽연 합(EU)의 교집합을 이루는 21개국의 2000년부터 2010년까지의 11년 동안의 정보를 정리하였다. 이 패널데이터는 총 12,647개의 샘플을 포함하고 있다.

모드 1과 2를 아우르는 서비스무역 세분류통계(EBOPS) 총량 에 대해서는 국내총생산(GDP)규모로 측정된 경제규모, 국민 1인당 국내총생산액 차이로 계산된 소득 구조의 유사성, 지리적 인접성 및 유럽연합 가입여부로 측정된 지역통합 여부 모두 서비스 산업의 산 업내무역을 결정하는 유의미한 요인으로 부석되었다. 이러한 결과는 중력모델이 상품교역을 설명하는데 이용되는 것과 유사한 방식으로 서비스무역 총량을 설명할 수 있음을 의미한다.

그러나 10개의 하위 서비스 부문에 대하여서는 중력모델이 3 개의 부문에 대하여만 통계적으로 유의미하다는 결론이 도출되었다. 위 3개 부문은 교통서비스, 컴퓨터 및 정보 서비스와 로열티 및 라 이센스 비용을 포함한다. 나머지 여행서비스, 통신서비스, 건축서비 스, 보험서비스, 금융서비스, 기타 경영 서비스 및 개인적·문화적·레 크리에이션서비스에 대해서는 경제규모, 지리적 인접성, 소득구조의 유사성 및 지역 통합 여부를 아우르는 중력 모델에 기반한 변수들 이 서비스 무역의 산업내 무역을 결정하는 통계적으로 유의미한 요 인이 아니라는 결론이 도출되었다. 특히, 흥미로운 점은 중력 모델 변수들이 특정 하위 부문에 대해서는 모두 함께 통계적으로 유의미 하거나 무의미했다는 것이다.

Keywords: 서비스 무역, 산업내무역, 중력모델, 패널데이터 회귀분 석, 경제협력개발기구, 유럽연합

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