The determinants of intra-industry trade in the tourism services

Leitão, Nuno Carlos

ESGTS, Polytechnic Institute of Santarém and CEFAGE-University of Évora, Portugal

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Nuno Carlos Leitão
ESGTS, Polytechnic Institute of Santarém and CEFAGE-University of Évora, Portugal.
Email: nunocarlosleitao@gmail.com

Abstract

Purpose- This manuscript examines the determinants of intra-industry trade (IIT) in the tourism services by Portugal. The trade in this sector between Portugal and 17 countries was examined between 2002 and 2009. Design/methodology/approach- The paper formulates theoretical hypothesis that may explain the intra-industry trade in the tourism services. These hypotheses are tested using a dynamic panel data analysis. Findings- The result show that intra-industry trade occurs more frequently among countries that are similar in terms of factor endowments. The economic dimension and border confirm the positive impact in IIT. Our results also show that intra-industry trade increases if transportation costs decrease. Originality of the research-This article confirms relevant theoretical hypotheses on the causes of intra-industry trade. The results obtained with the Arellano and Bond GMM system estimator suggest that the building of dynamic theoretical models will be of interest to academic researchers in tourism services.

Keywords: Intra-industry trade, tourism services, dynamic panel data, Portugal.

JEL Classification: C23, L70

INTRODUCTION

The Portuguese economy is characterized by a small open economy, where tourism has a role in economic growth. In terms of geographic location, Portugal is located in Southern Europe, and in the Western part of Iberian Peninsula. The surface of the country, including the archipelago of the Azores (2,247 square kilometers) and Madeira (794 square kilometers) is 92,345 square kilometers.

The climate is mild, which allowed that the tourist activity has developed. Portugal has a historical, rich cultural and artistic past. The country has a qualified tourist supply which allows it to receive international conferences, international exhibitions and sporting events.

According to the Bank of Portugal (statistics of tourist cash flows) in 2008, Portugal held tourist expenditure with particular emphasis on Spain, France and the United Kingdom. As regards the revenue the United Kingdom comes first in terms of ranking, followed by France and then Spain.

Balassa (1966), Falvey and Kierzkowski (1987) demonstrated that economies with lower trade barriers have higher levels of intra-industry trade.

The study of Lee and Lloyd (2002) shows that per capita gross domestic product (PCGDP), and trade orientation (TROR) has a positive impact on intra -industry trade in services.

This paper tests the determinants of intra-industry trade (IIT) in the tourism services. We analyze the trade in this sector between Portugal and foreign countries (Austria, Belgium, Canada, Czech Republic, Denmark, France, Germany, Greece, Hungary,

Italy, Ireland, Netherlands, Poland, Spain and Italy). The period 2002-2009 was chosen on the basis of its providing a sufficient number of observations. The methodology uses a dynamic panel data (GMM- System).
The results presented in this paper for this specific sector is generally consistent with the expectations of intra-industry trade studies. The remainder of the paper is organized as follows: section 2 presents the literature review; section 3 presents the index of IIT; Section 4 displays the econometric model; Section 5 presents the estimation results; and the final section provides the conclusions.

LITERATURE REVIEW

The discussion of intra-industry trade in tourism services have been negligence (Leitão, 2011c, and Webster et al., 2007).
Webster et al. (2007) apply the index of Grubel and Lloyd (1975) and the index of Brülhart (1994) in tourism services. The authors concluded that tourism is explained by product differentiation, economies of scale and monopolistic competition. The authors emphasized the "new trade" theories, i.e intra-industry trade (IIT) using a countries analysis. The authors demonstrated that Indonesia, Sri Lanka, Greece, and Mexico present highest values of IIT. Developed economies such as Canada, Netherlands, and USA present highest values of IIT. However some developed economies such as Japan and Germany have lowest values of IIT.

The study of Leitão (2011c) used the some methodology for Portuguese case. These two studies explain the intra-industry trade in evolutionary terms, ie, does not test the determinants.

There are some studies that analyzed intra-industry trade in services as in Kierzkowski (1989), Tang (1999), Lee and Lloyd (2002), Webster et al. (2007). Kierzkowski (1989) analyzed the transportation services. The study of Tang (1999) examined the international telephone industry. Lee and Lloyd (2002) applied the index of Grubel and Lloyd (1975) and the index of Brülhart (1994) in services by country and in services by industry for the period 1992-1996.
In fact, we have two types of theoretical models (HIIT-horizontal intra-industry trade and VIIT- vertical intra-industry trade). Horizontal differentiation or differentiation by attributes (Krugman, 1979, Lancaster, 1980), these models explain trade within similar countries. Vertical differentiation, differentiation by quality can be explained by traditional trade Theories (Falvey and Kierzkowski, 1987, and Shaked and Sutton 1984).

MEASUREMENT OF INTRA-INDUSTRY TRADE

The data were taken from the Bank of Portugal (statistics of tourist cash flows) between Portugal and trade partners. We calculate the intra-industry trade in tourism services considers the incoming and outgoing expenditures.

The empirical literature use the index proposed by Grubel and Lloyd (1975). The Grubel and Lloyd (1975) index is given by:

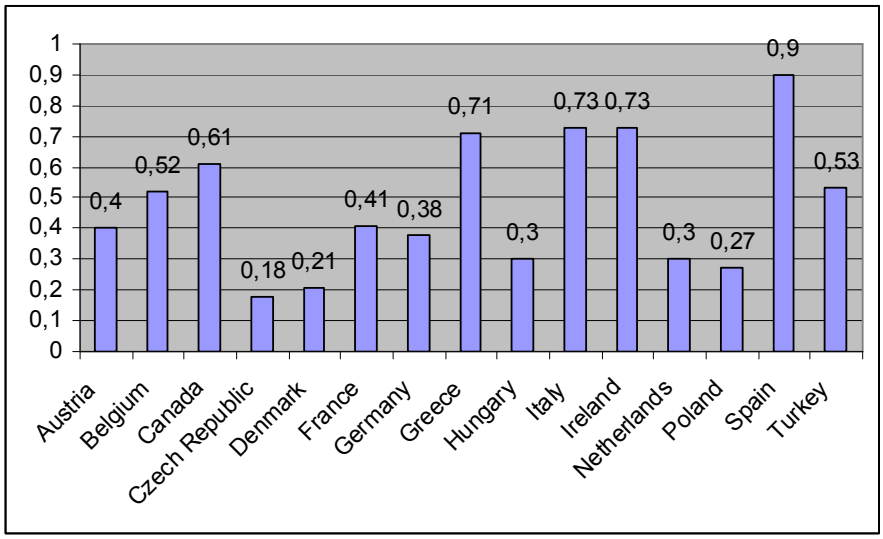
$$IIT_i = 1 - \frac{|X_i - M_i|}{(X_i + M_i)} \Leftrightarrow IIT_i = \frac{(X_i + M_i) - |X_i - M_i|}{(X_i + M_i)} \quad (1)$$

Where X_i and M_i are export and import to partner country i. The index is equal to 1 if all trade is of the intra-industry trade type. If IIT is equal to 0, all trade is inter-industry trade

Figure 1 report Grubel and Lloyd index of intra-industry trade in Portuguese tourism for the year 2009. Intra-industry trade in tourism services predominates between Portugal and the following countries: Spain, Greece, United States, Italy, Canada, and Turkey. For other words, the IIT between Portugal and these countries are over 50%.

As the figure 1 also shows, the trade partners with highest value of inter-industry trade (comparative advantage, i.e *IIT*<0,5) are Austria, Czech Republic, Denmark, Germany, Ireland, Netherlands, Poland and United Kingdom.

Figure 1: Portuguese Intra-industry trade in tourism services for the year 2009



Source: Own calculations from Bank of Portugal dataset.

ECONOMETRIC MODEL

The dependent variable used in this study is the IIT Grubel and Lloyd (1975) index the data were taken from the Bank of Portugal (statistics of tourist cash flows) between Portugal and trade partners. We calculate the intra-industry trade in tourism services considers the incoming and outgoing expenditures. The explanatory variables are the World Bank Development Indicators (2011).

Hypothesis and definition of explanatory variables

Hypothesis 1: There is a negative correlation between differences in per-capita income and IIT.

LogGDP is the logarithm of absolute difference in per capita GDP (PPP, in current international dollars) between Portugal and the trading partner.
Linder (1961) considers that countries with similar demands have similar products (Helpman, 1987; Hummels and Levinsohn, 1995). Regarding the hypothesis Balassa (1966) estimated a negative sign. The recent study of Leitão (2011b) also found a negative sign.

Hypothesis 2: The economic dimension influences the volume of intra-industry trade positively.

LogDIM, is the logarithm of the average GDP of two trading partners. The empirical studies used this variable to evaluate the economies of scales and the variety of differentiated product. A positive sign is expected (Greenaway et a. 1994). The study of Leitão et al. (2010) also found a positive sign.

Hypothesis 3: Trade increases when partners are geographical close.

LogDIST is the logarithm of geographical distance between Portugal and the partner country. We used kilometres between the capital cities of trading partners. According to the literature we expected a negative sign (Badinger and Breuss 2008, and Leitão (20011a, b).

Hypothesis 4: A common border implies lower transport costs.

Border is a dummy variable that assumes the value 1 when the trading partner of Portugal is Spain and zero otherwise.

According to the gravity models we expected a positive sign.

Model Specification

$$IIT_{it} = \beta_0 + \beta_1 X_{it} + \delta t + \eta_i + \varepsilon_{it} \qquad (2)$$

Where $IITit$ is Portuguese IIT in tourism services, X is a set of explanatory variables. All variables are in the logarithm form; ηi is the unobserved time-invariant specific effects; δt captures a common deterministic trend; ε_{it} is a random disturbance assumed to be normal, and identical distributed (IID) with E (ε_{it})=0; Var (ε_{it}) $=\sigma^2 \succ 0$.

We apply a logistic transformation (criterion of Hummels and Levinsohn 1995) to IIT because this index vary between zero and one. LOGISTIC IIT=ln[IIT/(1-IIT)].

The model can be rewritten in the following dynamic representation:

$$IIT_{it} = IIT_{it-1} + \beta_0 + \beta_1 X_{it} - \rho\beta_1 X_{it-1} + \delta t + \eta_i + \varepsilon_{it} \quad (3)$$

EMPIRICAL RESULTS

This section presents the estimation using GMM-System estimator proposed by Arellano and Bover, (1995) and Blundell and Bond, (1998, 2000). The estimator GMM- system (GMM-SYS) permits the researchers to solve the problems of serial correlation, heteroskedasticity and endogeneity for some explanatory variables. These econometric problems were resolved by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998, 2000), who developed the first differenced GMM (GMM-DIF) estimator and the GMM system (GMM-SYS) estimator. The GMM-SYS estimator is a system containing both first differenced and levels equations. The GMM-SYS estimator is an alternative to the standard first differenced GMM estimator. To estimate the dynamic model, we applied the methodology of Blundell and Bond (1998, 2000), and Windmeijer (2005) to small sample correction to correct the standard errors of Blundell and Bond (1998, 2000).

The GMM system estimator is consistent if there is no second-order serial correlation in the residuals (M_2 statistics). The dynamic panel data model is valid if the estimator is consistent and the instruments are valid.
Before estimating the panel regression model, we realize a test for unit root of the variable.

Times-Series Properties of the Variables in the Panel

Following the literature we apply a battery of unit root tests: ADF-Chi square, and PP-Chi square. The table 1 presents the results of different panel unit root test (ADF-Fisher Chi square, PP- Fischer Chi square).

The most important model variable such as intra-industry trade (LogIIT), and difference income per capita (LogDGDP), do not have unit roots, i.e are stationary, with individual effects and individual trend specifications.

Table 1 : Panel unit root test results

Panel unit root test of variables	intercept and trend	
LogIIT	Statistic	Probability
ADF-Fischer Chi-square	345.6437	0.0000
PP-Fischer Chi-square	89.3319	0.0000
LogDGDP		
ADF-Fischer Chi-square	123.2307	0.0000
PP-Fischer Chi-square	114.729	0.0000
LogDIM		
ADF-Fischer Chi-square	100.6906	0.0000
PP-Fischer Chi-square	23.92663	0.9793

Dynamic Panel

This section presents the estimation using GMM-System estimator proposed by Arellano and Bover, (1995) and Blundell and Bond, (1998, 2000). The estimator GMM- system (GMM-SYS) permits the researchers to solve the problems of serial correlation, heteroskedasticity and endogeneity for some explanatory variables. These econometric problems were resolved by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998, 2000), who developed the first differenced GMM (GMM-DIF) estimator and the GMM system (GMM-SYS) estimator. The GMM-SYS estimator is a system containing both first differenced and levels equations. The GMM-SYS estimator is an alternative to the standard first differenced GMM estimator. To estimate the dynamic model, we applied the methodology of Blundell and Bond (1998, 2000), and Windmeijer (2005) to small sample correction to correct the standard errors of Blundell and Bond (1998, 2000). The GMM system estimator is consistent if there is no second-order serial correlation in the residuals (M_2 statistics). The dynamic panel data model is valid if the estimator is consistent and the instruments are valid.

We used STATA econometric software to estimate the model.

In the table 2 we can observe the determinants of intra-industry trade in tourism service.

Table 2 : GMM-System Intra-industry trade in the tourism sector

Variables	Coefficient	Expected Sign
$LogIIT_{t-1}$	0.618(6.595)***	(+)
LogDGDP	-1.487 (-7.17)***	(-)
LogDIM	2.577 (5.34)***	(+)
BORDER	0.583 (8.181)***	(+)
LogDIST	-2.397 (1.81)*	(-)
C	0.741 (1.73)*	
M1	-1.43 [0.153]	
M2	0.97 [0.32]	
Sargan test	14.766 [0.946]	
N	140	

The null hypothesis that each coefficient is equal to zero is tested using one-step robust standard error. T-statistics (heteroskedasticity corrected) are in round brackets. P-values are in square brackets; ***/*- statistically significant at the 1 per cent, and 10 per cent levels. M_1, and M_2 is tests for first-order and second–order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation (based on the efficient two-step GMM estimator). The Sargan test addresses the over-identifying restrictions, asymptotically distributed X^2 under the null of the instruments' validity (with the two-step estimator).

All explanatory variables are significant ($LogIIT_{t-1}$, LogDGDP, LogDIM, and BORDER at 1% level); the coefficient (LogDIST) is significant at 5%level. For Lagged dependent variable ($LogIIT_{t-1}$), the expected sign is positive confirmed by the results. So we can infer that this variable has a positive impact on Portuguese economy. Faustino and Leitão (2007), and Leitão (2011b) also found a positive sign for lagged dependent variable.

As expected, the variable LogGDP has a significant and negative effect on intra-industry trade. Leitão(20011a), and Leitão et al. (2010) also found this result. According to Linder (1961) we can infer that countries have similar demands.

The variable of economic dimension (LogDIM) is positively related to the dependent variable. Therefore, the intensity of IIT is positively correlated with the similarity in per capita income between trading partners.

Regarding the hypothesis for the effect of Border on IIT, our empirical results do support that IIT is more frequent within countries with a similar cultural background, namely Portugal and Spain. The coefficient of LogDIST (geographical distance) is negative as expected. The studies of Badinger and Breuss (2008), Leitão et al. (2010), also found a negative sign.

CONCLUSIONS

The objective of this article was to analyze the determinants of intra-industry trade in tourism services sector. We apply a dynamic panel (GMM-System) to solve the econometric problems of serial correlation, heteroskedasticity and endogeneity for some explanatory variables.

The variable (LogDGDP) used to evaluate the relative factor endowments presents a negative sign. This result is according to the literature (Loertscher and Wolter, 1980). The study of Leitão (2011a) also found a negative sign to the U.S. experience. IIT occurs more frequently among countries that are similar preferences.
As regards the variable economic dimension (LogDIM), our result validates the hypothesis: the economic dimension influences the volume of intra-industry trade positively.

According to the empirical models we expected a negative sign to geographical distance, i.e, intra-industry trade increases if the partners are geographically close. The findings support this hypothesis.

The proxy common border promotes intra-industry trade. This result shows the importance of gravity model.

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