

An Investigation of the Role of Expectations in Trade: the case of the Gravity Model

(Presented at the ETSG Conference 2006 - Vienna)

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August 31, 2006

Abstract

The existence of sunk costs in bilateral trade flows has been theoretically used to introduce the lagged variable of trade (hysteresis) in the gravity model. However, based on some microeconomic foundations, Abedini (2005) showed the determining role of expectations when there are some sunk costs related to trade.

Following this approach, the present paper seeks particularly to investigate this idea through an empirical study using the gravity model. Indeed, two proxy variables, “Degree of Economic Integration” and “Rule of Law” stand for the effects of expectations on the bilateral trade model. The model is estimated

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[†]I would like to thank professor Nicolas Péridy, especially for his comments concerning this paper.

using a large number of observations (21,312) generated by 1,332 bilateral trade flows between 37 countries during 1988-2003. In addition to general estimates, it is interesting to compare the results across three groups of goods: differentiated, with price reference and homogenous, when they represent different levels of sunk costs in trade. Indeed, all results are in line with our theoretical expectations. In addition, through replacing future values for the first proxy variable, we obtain the results that confirm largely the effects of expectations on the bilateral trade model. In fact, ignoring the expectations leads to a misinterpretation in the gravity model.

1 Introduction

In Abedini (2005), we showed that expectations matter to the bilateral trade model when there are some sunk costs related to trade flows. Indeed, we developed a theoretical gravity model taking the expected trade costs into account to determine the bilateral trade model. In addition, we showed that such a gravity model explains better the empirical results concerning some variables of the model. In this case, these variables may relatively stand for the proxies of expectations in the trade model.¹

The present paper seeks particularly to investigate this idea through an empirical study. In this case, we develop an empirical gravity model augmented with the expectations factors. In particular, we assume that the expectations in trade are influenced by two principal factors: the perception on the future profitability as well as the security of bilateral trade relations. In this case, we capture the effects of each of these factors by an independent variable included in the model. In addition, our model represents the recent theoretical developments of the gravity model. Indeed, we try to test the effects of expectations after controlling for other influencing factors.

¹In fact, the expectations are difficult to be directly estimated.

Many econometric specifications, as the OLS approach, Random and Fixed Models, Hausman-Taylor estimator and the dynamic model (ABB) will be presented. Moreover, several tests leading us in this empirical approach will be used. In particular, the Lagrange Multiplier test, Hausman test, Wald tests, and the test of multicollinearity will be presented. Moreover, the robust variance matrix estimator checks our results following the serial correlation and the heteroscedasticity in the model. It allows also us to test the stability of our results.

We have studied a sample of 37 countries² generating 1332 bilateral trade flows. Moreover, our panel data covers 16 years from 1988 to 2003. This sample suggests to us an excellent heterogeneity across countries for testing our theoretical expectations.

In section 2, we define the model and its theoretical bases. Section 3 presents the data sources. Section 4 looks at the specifications issues. Section 5 displays the results, and finally, section 6 summarizes the conclusions of this study.

2 Model

Using the new theoretical developments of the gravity model, our empirical specification takes into account the factors that have been highlighted the most often in the theoretical literature.³ Moreover, this model is qualified to test our theoretical suggestions about the effects of expectations on the bilateral trade model.⁴ In this case, our empirical model is presented as follows:

²The list of countries is presented in appendix A.

³In this case, the principal approaches are the Heckscher-Ohlin theorem, monopolistic competition model and trade costs approach, as well as more traditional one: the expenditure system developed by Anderson (1979). For more information, please, see Deardorff (1998) and Anderson & Wincoop (2004).

⁴These suggestions have been developed in Abedini (2005).

$$\begin{aligned}
\ln EXP_{ijt} = & \alpha_0 + \alpha_1 \ln GDP_{it} + \alpha_2 \ln GDP_{jt} + \alpha_3 \ln dgdpp_{ijt} + \alpha_4 \ln DIST_{ij} + \alpha_5 TP_{ijt} \\
& + \alpha_6 \ln Freedom_{jt} + \alpha_7 LANG_{ij} + \alpha_8 RuleOfLaw_{jt} + \alpha_9 \ln MinTlines_{ijt} \\
& + \beta_i + \gamma_j + \delta_{ij} + \theta_t + \varepsilon_{ijt}
\end{aligned} \tag{1}$$

EXP_{ijt} represents the exports' value of country i to country j at time t . In fact, this dependent variable with three dimensions (i , j and t) allows us to take into account the direction of trade in the analysis. Additionally, Matyas (1997) indicates that three dimensions, i , j and t are essential for the correct specification of the gravity model. GDP_{it} and GDP_{jt} indicate respectively, the incomes of exporting and importing countries. The first variable shows the exporting power of country i while the second stands for the capacity of importing goods in country j . These two variables also represent the new trade theories emphasizing the role of economies of scale and differentiation of goods in the determination of the bilateral trade model.⁵

$dgdpp_{ij}$ is the difference between partners i and j in GDP per capita. This variable represents the difference between these countries in factor endowments. A positive coefficient for this variable confirms the HOS standard approach, while a negative one is in keeping with the Linder approach.⁶ In addition, our data base consists of many developed and developing countries. This fact suggests to us the important heterogeneity concerning GDP per capita across countries.

The geographical distance (a proxy for the transport costs) is one of the first variables theoretically present in the gravity model (Anderson (1979)). Moreover, some

⁵For example, Evenett and Keller (2002) consider the economies of scale and the differentiation of goods to deduce a gravity model establishing a proportional relation between the trade and incomes. According to this approach, economies of scale encourage specialisation in exporting countries. In addition, the higher the income in the exporting country, larger the variety of produced goods. These various goods are required by the importing countries due to *love for variety*.

⁶Baier and Bergstrand (2003) present also the difference between countries in terms of productivity as a reason for their difference in GDP per capita.

recent developments⁷ highlight the role of trade costs in the determination of the bilateral trade model. Particularly, Deardorff (2004 a and b) indicates that the comparative advantages of countries in terms of trade costs (for example, due to their geographical proximity) can compensate their traditional disadvantages in terms of production, and inversely their relative high trade costs create the comparative disadvantages in trade. Additionally, recent literature adds some new components (in particular information and transaction costs) to the trade costs.⁸ Following this literature, we add some variables to the model to capture principal trade costs. $DIST_{ij}$, represents the geographical distance between partners i and j . This variable stands for the transport costs in our model. However, the distance can also represent other trade costs, particularly those related to the cultural differences between countries. Indeed, these differences increase in distance and they are the origin of some trade resistances such as information and marketing costs.

To develop trade relations with foreign countries, one needs some information about traded goods, potential collaborators and trade conditions. In fact, the information costs matter to the bilateral trade model.⁹ In this case, we use $MinTlines_{ijt}$ which represents the minimum number of telephone lines in i or j at period t . In theory, we expect a positive sign for the coefficient of this variable.

Many empirical studies¹⁰ show that a common culture¹¹ stimulates bilateral trade. In this case, the variable $LANG_{ij}$ is introduced into the model (1) standing for such commonalities between countries.¹² It takes the value 1 if the language is common between i and j and zero, otherwise.

⁷For example, Evenett & Keller (2002), Deardorff (2004a), Deardorff (2004b) and Anderson & van Wincoop (2003)

⁸See for example, Anderson (1999), De Groot et.al. (2004), Combes et.al. (2005), Feenstra et.al. (2003), Fink et.al. (2002), Rauch (2001) and Anderson (2001).

⁹Rauch (1999) studies the effects of the information costs on trade in various categories of goods.

¹⁰Péridy (2005), Rose (2005), López-Córdova & Meissner (2005), Péridy (2004), Carrère (2004), Ghosh & Yamarik (2002), Fontagné et.al. (2001), Rauch (1999) are some examples.

¹¹In the case of common language or colonial relationships, for example.

¹²Anderson and Wincoop (2004) indicate that the trade costs are largely related to institutional factors and a common language.

As mentioned previously, when there are some sunk costs related to the bilateral trade flows, expectations matter to the bilateral trade model.¹³ In the current study, we introduce, in particular, two variables $RuleOfLaw_j$ and TP_{ij} in order to capture the effects of expectations on trade. TP_{ij} stands for the degree of economic integration between i and j while $RuleOfLaw_j$ represents several indicators¹⁴ evaluating the economic agents' confidence (in trade security) in the importing country j .^{15,16}

Economic integration means a great step towards the simplification and expansion of economic relations between countries. In this case, the future trade flows are expected to be more stable and profitable. In fact, such agreements foster the harmonization of services and laws between countries and encourages favorable decisions concerning their trade. Moreover, the bilateral trust between the people of member countries will be reinforced.¹⁷ These circumstances create positive expectations on trade and consequently stimulate the bilateral trade flows between countries.¹⁸

Studying the principal economic agreements¹⁹, the degree of economic integration between the countries of the sample (TP_{ij}) is evaluated. It takes the values from 0 to 7 according to the level of the economic integration between i and j . We expect positive signs for the coefficients of $RuleOfLaw_j$ and TP_{ij} in the model.

Creating positive expectations is not the only consequence of the economic agree-

¹³For more information, please, see Abedini (2005).

¹⁴It measures the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence in importing country j .

¹⁵Here, we take only this measure for the importing country because we consider that most of sunk costs related to trade are undertaken by exporting agent.

¹⁶The impact of the institutional factors on the bilateral trade model is illustrated by several recent papers: Anderson (2001), De Groot et.al. (2004), Anderson & Marcouiller (1999). Here, we consider that the trade relations will be stronger with the countries where the expectations on security issues are more favorable.

¹⁷Such a trust (confident environment) is comparable to the national trust existing due to commonalities between the people of a country.

¹⁸In Abedini (2005), we showed how such expectations stimulate the bilateral trade flows in the case of monetary unification (one step towards economic integration). Indeed, the relationship between the trade and the monetary union has been supported by numerous empirical studies. Please, see Abedini (2005) for more information.

¹⁹33 economic agreements were signed between different groups of countries in our sample. The list of these agreements is presented in appendix B.

ments. Indeed, some of these agreements, particularly in trade issues, also reduce the trade resistance between countries. So, it is necessary to distinguish the effects of freedom to trade from those of expectations when studying such agreements. The variable $Freedom_{jt}$ shows the degree of freedom in importing country j to the foreign goods.²⁰ We expect in theory, a positive sign for the coefficient of this variable.

New theoretical as well as econometric approaches show the importance of the specific exporter and importer effects (presented respectively, by β_i and γ_j in our model).²¹ Indeed, β_i and γ_j show simply the trade tendency in the exporting country i and importing country j after controlling for other effects. Additionally, in our model, δ_{ij} indicates the specific effects related to the bilateral interaction between i and j . According to new theoretical developments of the gravity model,²² these bilateral effects stand for the unobserved trade resistance between i and j .²³ Indeed, the specific effects of exporter, importer and bilateral resistance make it possible to capture the effects of some variables potentially absent from the model. In other words, these effects allow us to avoid some specification errors in the model (Péridy (2004)). Finally, θ_t (specific time effects) takes into account the impact of the world trade cycles, and ε_{ijt} represents the error term of the model considered as "white noise".

3 Data:

In this study, we are particularly interested in the effects of expectations proxied by TP_{ij} and $RuleOfLaw$ on the bilateral trade model. The sample of countries is chosen as we obtain excellent heterogeneity for studying these variables. In this case, our sample

²⁰This index is composed of several indicators presented in appendix C.

²¹See for example, Feenstra (2002), Rose and van Wincoop (2001), Egger & Pfaffermayr (2003) and Péridy (2005).

²²See for example: Egger and Pfaffermayr (2003).

²³These specific effects were also used in some other empirical papers, e.g. Péridy (2005), Carrère (2004), Baltagi et.al. (2003).

includes 37 countries belonging to two groups of developed or developing countries, and participating in 33 economic agreements between themselves. Additionally, we have chosen the period between 1988 and 2003 allowing these agreements to be in force. This wide sample of countries (with 1,332 bilateral trade flows) and time period results then, in a large number of observations (21,312).

The data for the variables of the model are obtained from the following sources:

The data for "Rule of Law" is obtained from Kaufmann et.al. (2002). However, the lack of data has obliged us to use the measurement of this variable in 1996 for the same and all previous years. In addition, possessing data only for the years 1996, 1998, 2000, 2002 and 2004, to obtain a value for the odd-numbered years, we have averaged two consecutive even-years data to estimate the lack of data (for example: averaging 1996 and 1998 to obtain the data for 1997).

However, there was no available data for TP_{ij} . In this case, we created the required data through evaluating each of the 33 bilateral/multilateral economic agreements signed by the 37 countries of the sample.²⁴ Indeed, every agreement takes a value from 0 to 7 according to its degree of economic integration. The classification is ordered as follows:

1. Non tariff economic agreement
2. Preferential trading area
3. Free trade area
4. Customs union
5. Common market (free circulation of capital and labor)

²⁴The data will be available upon demand.

6. Single Market (Harmonisation of techniques and administrative issues as well as taxes)
7. Economic and monetary union
0. If no agreement

However, it is possible that the degree of economic integration specified for an agreement changes over time. Our created data base also allows for such changes. For example, we considered the European union as a Common Market in the years between 1988 and 1992, a single market between 1993 and 1998 and an economic and monetary union for the years 1999 to 2003. Moreover, the adhesion date to the agreement is separately studied for each member. In this case, Austria, Finland and Sweden are members of the European union just after 1995.

The data for $Freedom_{jt}$ comes from the "Economic Freedom Network"²⁵. $Freedom$ is a composite index indicating "Freedom to Trade Internationally". It includes several other indexes which show the different costs related to trade due to regulations in force. Although, there is the annual data for this index between 2000 and 2003, the data for the other years is available only in periods of 5 years. In this case, we use the average of the index using the lowest and highest years (for example, 1990 and 1995) for the years between these two dates.

The data of $MinTlines_{ijt}$ comes from the development indicators of the world bank. $MinTlines_{ijt}$ shows the minimum number of telephone lines between the exporting and importing countries. The data for $LANG_{ij}$ and $DIST_{ij}$ comes from the data base CEPII.²⁶ $LANG_{ij}$ takes the value 1 in the case of common language between two countries and zero otherwise. We considered a common language between i and j if there is a common official language or a language spoken by more than 20% of

²⁵<http://www.freetheworld.com/>

²⁶<http://www.cepii.fr/>

the population in each country. Concerning the distance data, we use the weighted distance (distwces) between two countries i and j .²⁷ Finally, the data for EXP_{ijt} , GDP_{it} , GDP_{jt} and $dgdpp_{ijt}$ are obtained from the data base CHELEM²⁸.

As mentioned previously, the model (1) is also estimated for the three categories of goods: differentiated (nm), with price references (rr) and homogeneous (ww).²⁹ In this case, we classify 72 groups of goods prepared by the data base CHELEM in these three categories. Indeed, all goods will be distinguished according to their degree of differentiation.³⁰

4 Specifications issues and econometric tests:

The model (1) is a model of panel data. The most important advantage of this type of model, usually used in economics, is that it makes it possible to study the heterogeneity of data across individuals as well as over time.

We will estimate the model (1) using several estimators: the OLS approach, Fixed Effects and Random Effects models, the Hausman-Taylor method as well as the dynamic model ABB. This range of estimators allows us to verify the stability of the estimations. Moreover, many econometric tests will be applied to guide us in our empirical study. In particular, the Lagrange Multiplier test, the Hausman test, the Wald tests, and the test of multicollinearity will be presented. In addition, the robust variance matrix estimator corrects our results following the serial correlation and the

²⁷The corresponding measures were calculated from the following formula:

$$d_{ij} = \left(\sum_{k \in i} (pop_k / pop_i) \sum_{l \in j} (pop_l / pop_j) d_{kl}^\theta \right)^{1/\theta}$$

where pop_k represents the population of the area K in country i , and θ shows the trade elasticity to the bilateral distance d_{kl} . For the distwces measures, θ is equal to -1. For more information, please, see <http://www.cepii.fr/>.

²⁸Comptes Harmonisés sur les Echanges et L'Economie Mondiale

²⁹This classification was originally used by Rauch (1999).

³⁰The classification table is available upon demand.

heteroscedasticity in the model.³¹ Indeed, in the case of such problems, this estimator, at a minimum, adjust the asymptotic variance matrix estimator and test statistics. The results from this estimator will be presented in appendix D.

Firstly, we estimate the model (1) by the standard OLS method. This application is respectively done without and with the fixed effects³² whose results are presented by the table 5.1.³³ The estimated specific effects β_i , γ_j and θ_t (for countries and time) are also presented in the table 5.2. However, the OLS approach provides the convergent estimations if and only if there is no correlation between the specific effects and the explanatory variables of the model.³⁴ According to Wooldridge (2001), in the case of the general model presented below:

$$y_t = \beta_0 + X_t\beta + c + u_t,$$

where β is the vector with $K \times 1$ dimensions, c is just another unobserved factor affecting y and U_t being the error term of the model.³⁵ Wooldridge shows that in addition to the condition $E(u_t|X_t, c) = 0$, the OLS estimations are convergent if $E(\dot{X}_t, c) = 0$. In other words, c must not be correlated with X_t (explanatory variables).

We have tested for the correlation between the explanatory variables and the individual effects β_i , γ_j and δ_{ij} of the model (1). The results show that the bilateral specific effects δ_{ij} are correlated with some explanatory variables of the model, in particular,

³¹Wooldridge (2001) indicates that when the number of time periods is relatively less than the number of cross sections, the robust variance matrix estimator is valid in the presence of any heteroscedasticity or serial correlation. We use this estimator because our sample has 16 time periods comparing 1332 pairs of countries, which is largely the case. In this case, we use this method also called the "Panel-Corrected Standard Errors (PCSEs)". Please, see Marques and Metcalf (2003) for another example.

³²By an "OLS model with fixed effects", we means the augmented OLS model by the dummy variables capturing the fixed effects of countries or time in the model.

³³For some examples of using the OLS method with the fixed effects, see Martinez-Zarzoso (2003) and Hummels (1995).

³⁴Please, see Wooldridge (2001), pp. 248-249 for more information.

³⁵By adding the index i to each component of the above model, c_i represents the unobserved effects of the individual i in the model y_{it} .

the bilateral distance, language and $dgdpp$.³⁶ Following this correlation, it is necessary to remove the bilateral fixed effects from the model when using the OLS method.

In this case, we use this approach to estimate the model with and without the fixed effects β_i , γ_j and θ_t . Next, using the VIF statistics, we test the multicollinearity for the two estimated models. The VIF values obtained remain largely under the hard threshold of 10^{37} for the all variables of the first model. This shows there is no multicollinearity problem in our model. However, for the variables GDP_{it} and GDP_{jt} in the second model (with the fixed effects), the estimated values pass slightly the used threshold. In this case, we use the inverse regression to verify the potential multicollinearity in the data.³⁸ This time, the results reject the correlation between GDP_{it} and GDP_{jt} and the fixed effects β_i , γ_j . Moreover, the estimated coefficients for the explanatory variables are close in the two models (with and without the fixed effects). This confrims that the multicollinearity is not our problem in this study.

After the control for $E(\acute{X}_t, c) = 0$, the OLS regression provides convergent and efficient estimates for the vector of explanatory variables as well as c .³⁹ We discuss these results in the next section.

The FEM and REM approachs are also used to estimate the model (1). The essential question for the choice between these two models is to see whether the unobserved components are correlated with the explanatory variables. The random effects model will be only convergent if the individual effects are independent of the explanatory variables, while the fixed effects model suggests no assumption on the correlation between these two parameters. However, we cannot include time-constant factors in the set of explanatory variables under FEM. In this case, this model is not qualified to estimate the effects of distance and language in our model (model (1)). The Hausman test is

³⁶In addition, the bilateral specific effects are less significant than the exporter and importer ones.

³⁷The econometricians suggest various thresholds (50, 30 and 10) for testing the hypothesis of multicorrelation using VIF statistics. We used the hard threshold of 10 suggested by Kennedy (1998).

³⁸For more information about this technic, please, see Kennedy (1998), pp. 190 – 191.

³⁹See Greene (2003): "Models for Panel Data".

the popular technique to choose between random and fixed effects models. However, taking into account the limits of REM and FEM, the Hausman-Taylor estimator is useful because it corrects the possible endogeneity of the explanatory variables without removing the time-constant ones.⁴⁰

A dynamic specification can also be interesting in our study. In fact, the introduction of the lagged variable of trade into the gravity model is justified by the hysteresis in trade.⁴¹ However, Abedini (2005) introduced expectations in the trade model using the same reason: the presence of sunk costs related to the bilateral trade flows. In this case, the variables *TP* and *RuleOfLaw* seek to capture the effects of expectations in the model (1). So it is interesting to compare the results for these two variables in a dynamic specification. However, including the lagged variable of trade in the model violates the exogeneity condition of the explanatory variables. In this case, we use the Arellano, Bond and Bover model that, similarly to the Hausman-Taylor approach, allows for such endogeneity.

The Lagrange Multiplier test compares the appropriateness of the random and fixed effects models to the OLS regression. If the null hypothesis (independence and homoscedasticity of data across groups) is rejected, the random or fixed effects model will be preferred. In this case, if the Hausman test rejects the null hypothesis, the difference between the two models is systematic and the fixed effects model is preferred.⁴²

Using the Wald tests, the significance of each specific effect will be tested. In our model, the exporter specific effects represent the most significant ones. Next, the importer, bilateral and time specific effects are respectively significant. However, the two last effects are much weaker.

⁴⁰See Wooldridge (2001) and Greene (2003).

⁴¹The sunk costs were considered as the source of hysteresis. More discussions are provided by Dixit (1989) and Baldwin and Krugman (1989).

⁴²Nevertheless, there are also the other criteria for the choice between the REM and FEM model. For example, if we study the behaviour across a number of individuals, the fixed effects model is preferred. But, the random effects model is better if we study a sample randomly chosen, see Molinari (2003).

Indeed, we have many variables (e.g. distance and language) in the model whose variations are principally observable across countries (but not over time). In this case, most of bilateral effects are already captured by these variables. Concerning the time effects, the value shows that we have no structural changes over time in the bilateral trade model. A lower value of time effects was also observed by several studies carried out with the gravity model, e.g. Egger (2002, 2001), Baltagi et.al. (2003) and Péridy (2004).

Serial correlation and heteroscedasticity are potentially two problems related to the error term of the model. Moreover, our data base stands for a sample large but over a short period of time (1332 pairs of countries over 16 years). In this case, we can use the robust variance matrix estimator as a solution to serial correlation and heteroscedasticity problems.⁴³ This estimator, at a minimum, adjusts the asymptotic variance matrix estimator and test statistics.⁴⁴ The results are presented in appendix D.

5 Estimations and Results:

In this section, several econometric specifications will be used to estimate the model (1). In addition, the results will be presented in two sub-sections. Firstly, we estimate the model (1), using all categories of traded goods. Next, we estimate it separately for three categories of goods (differentiated, with price reference and homogenous goods). In fact, according to our theoretical development, the expectations matter more strongly to the bilateral trade model when the degree of differentiation of goods increases.⁴⁵ In this case, we expect the more significant coefficients of the variables TP

⁴³In addition, this solution is not conditioned upon the one way model, and we can largely use it for our model.

⁴⁴See Wooldridge (2001), pp. 274-276

⁴⁵In fact, as mentioned previously, the level of sunk costs is generally higher when the degree of differentiation of traded goods increases.

and *RuleOfLaw* in the categories of goods with a high degree of differentiation.

5.1 General results:

Table 5.1 presents the obtained results respectively, using the OLS method, random and fixed Effects models, Hausman-Taylor estimator and dynamic model. Following it, tables 5.2, 5.3 and 5.4 show respectively the estimated fixed effects for exporting and importing countries as well as specific time effects.

The first two columns of table 5.1 show the results from the OLS method. Firstly, we estimated the model without fixed effects while in the second model we included the exporter, importer and time specific effects. The two next columns (3 and 4) show respectively the results of the random and fixed effects models. The Lagrange Multiplier test shows the appropriateness of these last models vis-a-vis the OLS estimator. In addition, the Hausman test supports the fixed effects model against the random effects one. The Hausman-Taylor model and its dynamic equivalent are then presented respectively by columns 5 and 6.

Firstly, we analyze our results concerning the two variables *TP* and *RuleOfLaw*. These variables stand for our theoretical suggestions about the effects of expectations on the bilateral trade model. Indeed, the results confirm these suggestions. The positive and significant coefficient of *TP* (in most models) shows that even after testing for the trade resistance, the economic integration stimulates the bilateral trade flows. Indeed, the economic integration creates positive expectations and reduces the expected trade costs. In this case, the economic agents are more sure about the profitability and stability of trade flows. These expectations stimulate the bilateral trade even if current trade costs are not reduced.⁴⁶

⁴⁶For more information please, see Abedini (2005).

Table 5.1 Results of several specifications

	OLS Regression (Classic)	OLS Regression (With fixed effects)	Random Effects Model	Fixed Effects Model	HTM	Dynamic Model (ABB)
GDP _i	1.042* (.0065)	1.047* (.0756)	1.066* (.02)	.911* (.0487)	.462* (.0368)	.354* (.0337)
GDP _j	.963* (.0065)	.972* (.0774)	.991* (.02)	.914* (.0499)	.545* (.0386)	.372* (.0357)
dgdpp	.168* (.0072)	.105* (.0074)	.029* (.0087)	.009 (.0092)	.017** (.0092)	.02** (.0085)
DIST	-.925* (.0117)	-1.163* (.0131)	-1.028* (.0334)	-----	-1.252* (.0442)	-.925* (.0379)
TP	.106* (.0057)	.012** (.0055)	.016* (.005)	.0005 (.0053)	.03* (.0048)	.021* (.0045)
Freedom _j	-.029 (.0297)	.17* (.0642)	.12* (.0373)	.094** (.04)	.218* (.0359)	.222* (.0329)
LANG	.784* (.0284)	.713* (.0273)	.702* (.0975)	-----	.808* (.108)	.711* (.0877)
RuleOfLaw _j	.287* (.0104)	.359* (.0662)	.331* (.026)	.323* (.041)	.198* (.0261)	.177* (.0224)
MinTlines	.294* (.0094)	.044** (.02)	.244* (.0148)	.213* (.0186)	.45* (.0145)	.4* (.0132)
EXPlag						.2* (.0045)
Constant	-15.498* (.1682)	-12.557* (1.41)	-14.056* (.446)	-19.4* (.906)		
Number of observations	21018	21018	21018	21018	21018	20918
Number of groups				1332	1332	
Adjusted R2	0.7805	0.8622		.95		.9861
Serial correlation (rho)	0.8617	0.7865		.5357	.771	.713
VIF (Average)	1.31					
F-test	F (9, 21008) = 8306.49*	F (96, 20921) = 1370.67*		F (***, 19662) = 281.26*		
Wald Tests:						
Exporter effects (i);		F (36, 20921) = 283.79*		247.108* ¹		
Importer effects (j);		F (36, 20921) = 56.62*		53.685*		
Exp&Imp effects (ij);				49.477*		
Time effects (t);		F (15, 20921) = 10.49*		23.784*		
Exp/imp and time effects (i/j, t);				50.022*		
AIC	69010.72	59318.04				
BIC	69090.25	60089.5				
LM test			80415.61*			
Hausman test (χ^2)			106.08*			

* significant at 1%, ** significant at 5%

¹ We tested several specifications of the fixed effect model. The F statistics for the specific effects i, j, ij and t are stable across various specifications. This enables us to present all of these statistics in one presentation, without losing the consistency of the model. In this case, we can have a global idea of the relative significance of each fixed effect in our model.

According to our model, another factor influencing the trade expectations is the degree of justice efficiency and contract enforcement in the importing country $RuleOfLaw_j$. The estimated results obtained for this variable confirm our theoretical outlooks. The coefficient of $RuleOfLaw$ is positive and significant at 1 percent. Using the index of $RuleOfLaw$ in the model, the same results are obtained by Egger (2000, 2001, 2002), Rodrik (2002), De Groot et.al. (2004), and Anderson & Young (2000). De Groot et.al. (2004) defines "Rule of Law" as the quality of the legal system and the contracts application in a country.⁴⁷ However, we interpret these results under the expectations effects on the trade model.

In the second OLS model (column 2), the specific effects of countries were separately captured. This explains the fall in the TP coefficient in the second model. In other words, the variable TP captures a part of the specific effects of countries in the first model. In fact, this result suggests one explanation for the significance of exporter and importer specific effects in gravity models.

Moreover, the fixed effects added to the second model correct the $Freedom_j$ coefficient. Following these results, one can conclude that the presence of the specific effects is essential for the theoretical aspects relating to some variables of the model.⁴⁸

However, the coefficients of TP and $dgdpp$ are not significant in the fixed effects model. Indeed, the suppression of the two important variables ("Distance" and "Language") by this model can generate such results. Concerning the dynamic model ABB, all our variables have correct and significant signs. In fact, even in the presence of hysteresis in the trade model, TP and $RuleOfLaw$ have significant effects. This result confirms largely our theoretical expectations about the importance of expectations effects on the bilateral trade model.

⁴⁷Moreover, as considered in this study, Egger (2002) shows that the index of "Rule of Law" of the importing country is more significant and robust than that of the exporting country.

⁴⁸This conclusion is also indicated in Disdier & Head (2003), Egger (2001), Péridy (2004, 2005), Kandogan (2004).

Concerning the other explanatory variables, the estimated coefficients show that the incomes of partner countries increase bilateral trade with a slight superiority for the exporting country's income. Moreover, the coefficients obtained for *dgdpp* confirms the Linder approach against the HO theorem. The obtained coefficients for "Distance" and "Language" show that the level of trade drops with distance while the cultural relations stimulate the trade between partners. Lastly, the obtained results for *MinTlines* indicate that the telecommunication infrastructure motivate bilateral trade. Indeed, this infrastructure is important in reducing the information costs of trade and increasing market transparency. In other words, information is crucial in order to predict and to make relative decisions in economic fields (including trade).

The Wald tests show that the specific effects of exporter, importer and time are significant at 1 percent.⁴⁹ However, the F statistic is highest for the exporter effects and lowest for time effects. In addition, the adjusted R2 is higher in the second model (the OLS model augmented with the fixed effects) while the measurements of "AIC" and "BIC" are lower. This shows that the fixed effects have a significant role in the trade model. Tables 5.2 , 5.3 and 5.4 respectively present the estimated fixed effects for the exporter, importer and time periods.

⁴⁹As explained earlier, we removed the bilateral specific effects in the second model in order to avoid the correlation with some explanatory variables. This diagnostic is crucial for the convergence of the estimates under OLS approach.

Table 5.2 Exporter fixed effects

Exporter	Fixed effects	Exporter	Fixed effects	Exporter	Fixed effects
Argentina	.21308	Germany	.6774	Philippines	-.71228
Austria	.25742	Greece	-1.0568	Poland	-.92196
Brazil	.24742	Hungary	-.6458	Portugal	-.26619
Bulgaria	-.817	Indonesia	.06084	Spain	.06989
Canada	.00452	Ireland	1.0105	Sweden	1.22341
Chile	1.0858	Israel	.49179	Switzerland	.86245
China	-.52297	Italy	.32912	Thailand	.5403
Colombia	-.76691	Malaysia	1.44637	Tunisia	-1.53901
Denmark	.70833	Morocco	-1.101	Turkey	-1.02348
Ecuador	.20232	Mexico	-.89139	United Kingdom	.20074
Finland	1.1787	Netherlands	.89925	United States	-.04193
France	.27296	Peru	-.21113	Venezuela	-.64225

In order to avoid the colinearity among dummy variables, the Iceland variable was dropped from the list.

Some European countries, in particular, Sweden, Switzerland, Ireland, Netherlands, Germany, Denmark and Finland as well as Chile, Malaysia, Thailand and Israel represent the most significant exporter specific effects in our sample. This indicates that given all other factors as fixed, the tendency to export is stronger in these countries. Concerning the importer effects, the most positive ones are obtained for the following countries:

Table 5.3 Importer fixed effects

Importer	Fixed effects	Importer	Fixed effects	Importer	Fixed effects
Argentina	.05485	Germany	.57478	Philippines	.20685
Austria	-.07617	Greece	.38536	Poland	-.28034
Brazil	.4311	Hungary	-.32288	Portugal	.53395
Bulgaria	-.04115	Indonesia	.39241	Spain	.49454
Canada	.27004	Ireland	.31236	Sweden	.38228
Chile	.82692	Israel	.32868	Switzerland	.05723
China	-.2632	Italy	.47137	Thailand	.75856
Colombia	-.0226	Malaysia	1.0959	Tunisia	-.12118
Denmark	.34003	Morocco	-.02	Turkey	.13817
Ecuador	.66784	Mexico	.4476	United Kingdom	.30868
Finland	.45075	Netherlands	.95435	United States	.30918
France	.3153	Peru	.33776	Venezuela	.7344

In order to avoid the colinearity among dummy variables, the Iceland variable was dropped from the list.

Brazil, Chile, Ecuador, Finland, Germany, Italy, Malaysia, Mexico, Netherlands, Portugal, Spain, Thailand and Venesuela. This means that given all other factors as fixed, these countries have the more open markets to international products. Finally, table 5.4 represents the estimated results for the time fixed effects concerning the period between 1988 and 2002.⁵⁰ The coefficients are lower than those obtained for the exporter and importer effects.

Table 5.4 Time fixed effects

Year	Fixed effects	Year	Fixed effects
1988	-.3183	1996	.04084
1989	-.27402	1997	.03452
1990	-.15969	1998	-.05097
1991	-.1495	1999	-.1095
1992	-.1099	2000	-.11833
1993	-.14794	2001	-.13488
1994	-.07651	2002	-.09998
1995	.06197		

⁵⁰The year 2003 was removed to avoid the colinearity between dummy variables.

Through the obtained results for the variables TP and $RuleOfLaw$, we have shown that expectations affect the bilateral trade model. However, there is a wealth of literature explaining how expectations are created in an economy. The role of available information in this process is well highlighted by these studies.⁵¹ This fact allows us to test, in another way, our theoretical idea about the expectations' effects in trade.

If economic integration stimulates trade through creating the favorable expectations, it should also be that such economic agreements increase the bilateral trade even before the operational date of these agreements. In other words, we expect that trade will be increased when the economic agents are informed about the new economic agreements. In this case, we obtain a dynamism in trade model (as named by Broze et.al. (1990)). To test this, we generate the variables $TPf1$ and $TPf2$ respectively, by using the future values of TP of 1 and 2 periods (years). Then, we estimate the model (1) by replacing TP with these two new variables. The estimated results are presented by table 5.5.

⁵¹See for example, Minford (1992), Broze et.al. (1990), Muth (1981), Evans & Ramey (1995) and Jansen (1998).

Table 5.5 Dynamic expectations model

	OLS Regression (without fixed effects)	OLS Regression (with fixed effects)
GDP _i	1.05* (.0756)	1.05* (.0757)
GDP _j	.972* (.0775)	.971* (.078)
gdgpp	.104* (.0073)	.103* (.0073)
DIST	-1.165* (.0128)	-1.167* (.0126)
TPf1/ TPf2	.01** (TPf1) (.0053)	.009** (TPf2) (.0052)
Freedom _j	.172* (.0642)	.171* (.0642)
LANG	.712* (.0273)	.711* (.0273)
RuleOfLaw _j	.363* (.0661)	.366* (.0661)
MinTlines	.042** (.02)	.04** (.02)
Constant	-12.538* (1.4111)	-12.505* (1.4106)
Number of observations	21017	21017
Adjusted R2	.8622	.8622
Serial correlation (rho)	.7864	.7863
F-test	F (96. 20920) = 137.44*	F (96. 20919) = 137.22*
<u>Wald Tests:</u>		
Exporter Effects (i);	F (36. 20920) = 285.32*	F (36. 20919) = 286.72*
Importer Effects (j);	F (36. 20920) = 57.31*	F (36. 20919) = 57.89*
Time Effects (t);	F (15. 20920) = 1.58*	F (15. 20919) = 1.45*

* significant at 1%, ** significant at 5%

These results confirm largely our theoretical idea concerning the effects of expectations on the bilateral trade model. Indeed, the obtained coefficients for $TPf1$ and $TPf2$ show that economic integration stimulate the bilateral trade flows through the creation of positive expectations. However, the larger gap is between the operational date of agreements and the present time, the weaker effects of expectations on the bilateral trade model ($.012 \succ .01 \succ .009$). In addition, the coefficients of the other variables stay robust after changing the data for TP .

5.2 Results in groups of goods:

According to our theoretical development (Abedini (2005)), expectations matter to the bilateral trade model when there are some sunk costs related to trade flows. In the previous section, we tested this idea through the estimated coefficients for TP and $RuleOfLaw$. However, the level of sunk costs differs across groups of goods distinguished by their degree of differentiation. Indeed, the sunk costs in trade of differentiated goods are larger than the sunk costs in trade of homogenous ones. In this case, it is interesting to estimate the model (1) across three groups of goods: differentiated, with price reference, homogenous. In fact, we expect that the estimated coefficients for TP and $RuleOfLaw$ are more significant where the goods are more differentiated. Table 5.6 shows the obtained results for these three categories of goods.⁵²

The TP coefficient for the groups of homogeneous goods and goods with the price reference is insignificant. While, the same coefficient becomes positive and significant at 1 percent in the category of differentiated goods. Concerning the variable $RuleOfLaw$, the coefficient is positive in the three categories of goods but insignificant for the homogenous ones. Moreover, the value of the $RuleOfLaw$ coefficient increases with the degree of differentiation of goods, from .045 for the homogeneous goods to .553 for the differentiated ones. As expected, these results show that TP and $RuleOfLaw$ influence the bilateral trade model more in goods with a high degree of differentiation.

Our results concerning the income variables are the same as those already obtained by Mathur (2000). Indeed, the size of country in terms of income (especially exporter's income) has the largest effects on trade in the category of differentiated goods relative to the others. However, the exporter's income coefficient is negative for the category of homogeneous goods. It shows that rich countries (countries with high GDP) have a weaker tendency for the exports of these goods. On the other hand, these countries

⁵²Only the results for the OLS regression with the fixed effects are presented.

Tableau 5.6 Sectorial regressions in goods

	OLS Regression (with fixed effects) Homogenous goods	OLS Regression (with fixed effects) With price reference	OLS Regression (with fixed effects) Differentiated goods
GDP _i	-.253** (.1229)	1.079* (.0918)	1.73* (.0902)
GDP _j	1.225* (.1257)	.759* (.0944)	1.229* (.0939)
dgdpp	.021*** (.0119)	.085* (.009)	.232* (.0089)
DIST	-1.48* (.0206)	-1.212* (.0158)	-1.329* (.0156)
TP	.007 (.0086)	-.007 (.0066)	.044* (.0066)
Freedom _j	.182*** (.1011)	.176** (.776)	.135*** (.0766)
LANG	.665* (.0423)	.584* (.0327)	.976* (.0324)
RuleOfLaw _j	.045 (.1076)	.332* (.0804)	.553* (.079)
MinTlines	-.059*** (.0321)	.06** (.0244)	-.047*** (.024)
Constant	2.823 (2.281)	-1.441* (1.7133)	-26.694* (1.696)
Number of observations	19418	20508	20661
Adjusted R2	.7214	.7952	.8721
Serial correlation (rho)	.6953	.7524	.7499
F-test	F(96. 19321) = 524.79*	F(96. 20411) = 83.57*	F(96. 20564) = 1468.21*
AIC	71246.49	65141.24	65278.72

* significant at 1%, ** significant at 5%, *** significant at 10%

stand for the major markets for homogeneous and differentiated goods. This last result is obtained from the higher coefficient for the exporter's in the categories of homogeneous and differentiated goods.

The *dgdpp* coefficient confirm the Linder approach. In addition, this coefficient is higher and more significant in the category of differentiated goods. As Fink et.al. (2002) and in contrast to Rauch (1999), we obtain a higher coefficient for distance, in the category of homogeneous goods (relative to differentiated ones). However, distance represents the higher coefficient in the category of differentiated goods relative to goods with price references. There are two explanations for this heterogeneity across

categories of goods. In fact, according to Fink et.al. (2002), the higher price elasticity of demand for homogenous goods explains why the distance (transport costs) is more important in this category of goods. On the other hand, the higher coefficient of distance in the category of differentiated goods compared to the goods with price references can be explained by Rauch's approach (1999). Indeed, he indicates that for largely differentiated goods, the more interaction is necessary between the buyer and the seller. In fact, the distance reduces such interactions.

$Freedom_j$ shows the correct and significant coefficient in the three categories of goods. Nevertheless, it decreases systematically when the degree of differentiation increases. This result can be produced because in open markets, domestic homogenous goods can be easily replaced by foreign ones. The $LANG$ coefficient is positive and significant in the all categories of goods. However, it is stronger for the goods with the higher degree of differentiation. This indicates that cultural relations are relatively more required in the trade of differentiated goods. This result is similar to those obtained by Rauch (1999) and Combes et.al. (2005).

6 Conclusion

In Abedini (2005), we indicated that expectations influence the bilateral trade model when there are some sunk costs related to trade flows. In this paper, we have sought to test this theoretical approach through an empirical study by the gravity model. Our empirical model uses the new theoretical developments of the gravity model and includes particularly, the two proxy variables TP_{ij} and $RuleOfLaw_j$. Through these variables, we investigate the most important question of this paper (the effects of expectations). In fact, they respectively represent the degree of economic integration between two partners i and j and the degree of the efficiency of contracts enforcement in the importing country j . With a large number of observations (21,312 obs.), our

sample suggests a great heterogeneity in order to test our theoretical expectations.

Using several specifications, the results are consistent with the new theories of trade and our theoretical development concerning the effects of expectations on the bilateral trade model. Indeed, taking into account other important factors, the favorable expectations on bilateral trade relations increase the volume of trade.

Replacing the TP by its future values for one and two years in advance ($TPf1$ and $TPf2$) gives encouraging results. In this case, we test the effects of economic integration on the trade model, one or two years before the operational date of the agreements. We obtained the positive and significant coefficients for the replacing variables. These results largely confirm our theoretical idea concerning the effects of expectations on the bilateral trade model.

The sunk costs have already been used to explain the hysteresis in the trade model.⁵³ However, Abedini (2005) indicated that the sunk costs can also generate the expectations on trade relations. Using two proxy variables (TP and $RuleOfLaw$), the present paper shows that the expectations influence the bilateral trade model. In fact, ignoring expectations leads to a misinterpretation in the gravity model. However, estimating expectations or using other proxy variables remain as essential challenges for future studies.

Bibliographie:

1. Abedini, J., 2005, "The Gravity Model and Sunk Costs: A Theoretical Analysis", ETSG 2005, University of Dublin
2. Anderson, J.E., 2001, "Trade and Informal Institutions", www.scholar.google.com
3. Anderson, J.E., 1999, "Why Do Nations Trade (So Little)?", NBER

⁵³See for example, Dixit (1989) and Baldwin & Krugman (1989).

4. Anderson, J.E., 1979, "A Theoretical Foundation for the Gravity Equation", *American Economic Review*, Vol. 69, Issue 1
5. Anderson, J.E., Marcouiller, D., 1999, "Trade, Insecurity and Home bias: An empirical investigation", NBER: w7000
6. Anderson, J., Wincoop, E.V., 2004, "Trade Costs", NBER: w10480
7. Anderson, J., Wincoop, E.V., 2003, "Gravity with Gravitas: A Solution to the Border Puzzle", *American Economic Review*, 93, PP. 170-192
8. Anderson, J., Young, L., 2000, "Trade Implies Law: the Power of the Week", NBER: w7702
9. Baier, S.I., Bergstrand, J.H., 2003, "Endogenous Free Trade Agreements and the Gravity Equation", *Clemson University and University of Notre Dame*
10. Baldwin, R., Krugman, P., 1989, "Persistent Trade Effects of Large Exchange Rate Shocks", *The Quarterly Journal of Economics*, Vol. CIV, Issue 4
11. Baltagi, B.H., Egger, P., Pfaffermayr, M., 2003, "A generalized design for bilateral trade flow models", *Economics Letters* 80, 391-397
12. Broze, L., Gouriéroux, C., Szafarz, A., 1990, "Reduced Forms of Rational Expectations Models", *Harwood Academic Publishers*, PP. 1-19
13. Carrère, C., 2004, "Revisiting the effects of regional trade agreements on trade flows with proper specification of the gravity model", *European Economic Review*
14. Combes, P.P., Lafourcade, M., Mayer, T., 2005, "The trade-creating effects of business and social networks: evidence from France", *Journal of International Economics* 66, PP. 1-29
15. Deardorff, A.V., 2004 b, "Trade and Location: A Moving Example Motivated by Japan", Paper prepared for the conference "Japan, the United States, and the

International Economy: New Direction for Research” Tokyo, Japan, May 14-15, 2004

16. Deardorff, A.V., 2004 a, “Local Comparative Advantage: Trade Costs and the Pattern of Trade”, University of Michigan, Research seminar in International Economics, Discussion Paper No. 500
17. Deardorff, A.V., 1998, "Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World?", University of Michigan, Discussion Paper No. 382
18. De Groot, H.L.F., Linders, G.J., Rietveld, P., Subramanian, U., 2004, "The Institutional Determinants of Bilateral Trade Patterns", KYKLOS, Vol. 57, PP. 103-124
19. Disdier, A.C., Head, K., 2003, "Exaggerated Reports on the Death of Distance: Lessons from a Meta-Analysis", <http://scholar.google.com/>
20. Dixit, A., 1989, "Entry and Exit Decisions under Uncertainty", Journal of Political Economy, Vol. 97, No. 3
21. Egger, P., 2002, "An Econometric View on the Estimation of the Gravity Models and the Calculations of Trade Potentials", Blackwell Publishers Ltd 2002
22. Egger, P., 2000, “A note on the proper econometric specification of the gravity equation”, Economics Letters 66, PP. 25-31
23. Egger, P., Pfaffermayr, M., 2003, "The proper panel econometric specification of the gravity equation: A three-way model with bilateral interaction effects", Empirical Economics, 28(3), 571–580
24. Egger, P., Pfaffermayr, M., 2001, “Distance, Trade, and FDI: A Hausman-Taylor SUR Approach”, Austrian Institute of Economics Research

25. Evans, G.W., Ramey, G., 1995, "Expectations calculation, hyperinflation and currency collapse", Cambridge University Press
26. Evenett, S.J., Keller, W., 2002, "On Theories Explaining the Success of the Gravity Equation", *Journal of Political Economy*, Vol. 110, No. 21
27. Feenstra, R.C., Hanson, G.H., Lin, S., 2003, "The value of information in international trade: Gains to outsourcing through Hong Kong", NBER: w9328
28. Feenstra, R.C., 2002, "Border Effects and the Gravity Equation: Consistent Methods for Estimation", *Scottish Journal of Political Economy*, Vol. 49, No. 5
29. Fink, C., Mattoo, A., Neagu, I.C., 2002, "Assessing the Impact of Communication Costs on International Trade", World Bank Policy Research Working Paper 2929
30. Fontagné, L., Pajot, M., Pasteels, J.M., 2001, "Potentiels de commerce entre économies hétérogènes : un petit mode d'emploi des modèles de gravité", OMC
31. Ghosh, S., Yamarik, S., 2004, "Does trade creation measure up? A reexamination of the effects of regional trading arrangements", *Economics Letters* (82), 213–219
32. Greene, W.H., 2003, "Econometric Analysis", Fifth Edition, Prentice Hall
33. Hummels, D., Levinsohn, J., 1995, "Monopolistic Competition and International Trade: Reconsidering The Evidence", *The Quarterly journal of Economics*, August 1995
34. Jansen, W.J., 1998, "The mean-variance model with capital controls and expectations formation: A test on German portfolio data", *Applied Financial Economics*, 8
35. Kandogan, Y., 2004, "The role of international blocs on trade: A comparison across gravity models", <http://scholar.google.com/>

36. Kaufmann, D., Kraay, A., Zoido-Lobaton, P., 2002, "Governance Matters II: Updated Indicators for 2000-01", The World Bank
37. Kennedy, P., 1998, "A Guide to Econometrics", The MIT Press, Fourth Edition
38. López-Córdova, J., Meissner, M., 2005, "The Globalization of Trade and Democracy, 1870-2000", <http://www.nber.org/papers/w11117>
39. Maddala, G.S., 2001, "Introduction to Econometrics", John Wiley & Sons
40. Marques, H., Metcalf, H., 2003, "A Gravity Study of the Sectoral Trade: Impact of Labour Migration in an Enlarged EU", ETSG 2003
41. Martinez- Zarzoso, I., Nowak-Lehmanne, F., 2003, "Augmented Gravity Model: An Empirical Application to APPLICATION TO MERCOSUR-EUROPEAN Union Trade Flows", Journal of Applied Economics, Vol. VI, No. 2, PP. 291-316
42. Mathur, S., K., 2000, "Pattern of international trade, New trade theories and Evidence from gravity equation analysis", Indian Economic Journal
43. Matyas, L., 1997, "Proper Econometric Specification of the Gravity Model", The World Economy, Vol. 20, Issue 3
44. Minford, P., 1992, "Rational Expectations Macroeconomics", An Introductory Handbook, BLACKWELL
45. Molinari, A., 2003, "Sectoral Border Effects: Analysing Implicit EU Trade Integration", ETSG 2003
46. Muth, J.F., 1981, "Rational Expectations and the Theory of Price Movements", London George Allen & Unwin
47. Péridy, N., 2005, "The trade effects of the Euro-Mediterranean partnership : what are the lessons for ASEAN countries?", Journal of Asian Economics, Vol. 16, Issue 1, PP. 125-139

48. Péridy, N., 2004, "Trade effects of scale economies: evidence from four EU countries", *Economics Letters*, 83, PP. 399–403
49. Rauch, J.E., 2001, "Business and Social Networks in International Trade", *Journal of Economic Literature*, Vol. XXXIX, Dec., PP. 1177-1203
50. Rauch, J.E., 1999, "Networks versus markets in international trade", *Journal of International Economics*, Vol. 48, PP. 7–35
51. Rodrik, D., Subramanian, A., Trebbi, F., 2002, "Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development", CID, Working Paper No. 97
52. Rose, A.K., 2005, "One reason countries pay their debts: renegotiation and international trade", *Journal of Development Economics*
53. Rose, A.K., van Wincoop, E., 2001, "National Money as a Barrier to International Trade: The real case for currency union", *American Economic Review*, Vol. 91, No. 2
54. Wooldridge, J.M., 2001, "Econometric Analysis of Cross Section and Panel Data", The MIT Press

A Countries of the sample:

- | | | |
|--------------------|-----------------------|--------------------------|
| 1. Argentina (ARG) | 14. Greece (GRC) | 27. Poland (POL) |
| 2. Austria (AUT) | 15. Hungary (HUN) | 28. Portugal (PRT) |
| 3. Brazil (BRA) | 16. Iceland (ISL) | 29. Spain (ESP) |
| 4. Bulgaria (BGR) | 17. Indonesia (IDN) | 30. Sweden (SWE) |
| 5. Canada (CAN) | 18. Ireland (IRL) | 31. Switzerland (CHE) |
| 6. Chile (CHL) | 19. Israel (ISR) | 32. Thailand (THA) |
| 7. China (CHN) | 20. Italy (ITA) | 33. Tunisia (TUN) |
| 8. Colombia (COL) | 21. Malaysia (MYS) | 34. Turkey (TUR) |
| 9. Denmark (DNK) | 22. Mexico (MEX) | 35. United Kingdom (GBR) |
| 10. Ecuador (ECU) | 23. Morocco (MAR) | 36. United States (USA) |
| 11. Finland (FIN) | 24. Netherlands (NLD) | 37. Venezuela (VEN) |
| 12. France (FRA) | 25. Peru (PER) | |
| 13. Germany (DEU) | 26. Philippines (PHL) | |

B Economic agreements used for creating the variable TP_{ij} :

1. Asia-Pacific Economic Cooperation (APEC) (Canada, Chile, China, Indonesia, Malaysia, Mexico, Peru, Philippines, Thailand, United States)
2. Association of Southeast Asian Nations (ASEAN) (Indonesia, Malaysia, Philippines, Thailand)
3. ASEAN Free Trade Area (AFTA) (Indonesia, Malaysia, Philippines, Thailand)
4. European Union and its background (Denmark, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, United Kingdom, Austria, Finland, Sweden)

5. Mercosur (Argentina, Brazil)
6. Latin American Integration Association (Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru and Venezuela)
7. Andean Community (Colombia, Ecuador and Venezuela, Peru)
8. G3 Free Trade Agreement (Colombia, Mexico, Venezuela)
9. Canada-U.S. Free Trade Agreement (Canada, US)
10. North American Free Trade Agreement (NAFTA) (Canada, Mexico, US)
11. The Euro-Mediterranean Free-Trade Area (EMFTA) (EU, Tunisia, Morocco, Israel)
12. European Free Trade Association (EFTA) (Iceland, Switzerland)
13. European Economic Area (EEA)
14. Canada - Chile Free Trade Agreement (Canada, Chile)
15. Canada-Israel Free Trade Agreement (CIFTA) (Canada-Israel)
16. Central European Free Trade Agreement (CEFTA) (Hungary, Poland, Bulgaria)
17. "European preferences to trade (EU, Bulgaria, Hungary, Poland, Turkey)
18. EU-Turkey Customs Union (Turkey, EU)
19. EU-Israel FTA (Israel, EU)
20. EU-Tunisia FTA (Israel, EU)
21. EU-Bulgaria FTA (Bulgaria, EU)
22. EU-Mexico FTA (EU, Mexico)
23. EFTA-Turkey FTA (EFTA, Turkey)

24. EFTA-Israel FTA (EFTA, Israel)
25. EFTA-Morocco FTA (EFTA, Morocco)
26. EFTA-Bulgaria (EFTA, Bulgaria)
27. EFTA-Mexico (EFTA, Mexico)
28. Turkey-Israel FTA (Turkey, Israel)
29. Israel–United States Free Trade Agreement (Israel, US)
30. Bulgaria-Turkey Free Trade Agreement (Bulgaria, Turkey)
31. Chile-Mexico Free Trade Agreement (Chile, Mexico)
32. Israel-Mexico Sign Free Trade Agreement (Israel, Mexico)
33. Bulgaria-Israel Free Trade Agreement (Bulgaria, Israel)

C Freedom to Trade Internationally ($Freedom_{jt}$):

This index is calculated using:

"A. Taxes on international trade.

- i. Revenue from taxes on international trade as a percentage of exports plus imports.
- ii. Mean tariff rate.
- iii. Standard deviation of tariff rates.

B. Regulatory trade barriers.

- i. Hidden import barriers: No barriers other than published tariffs and quotas.

ii. Costs of importing: the combined effect of import tariffs, licence fees, bank fees, and the time required for administrative red-tape raises costs of importing equipment by (10 = 10% or less; 0 = more than 50%).

C. Actual size of trade sector compared to expected size.

D. Difference between official exchange rate and black market rate.

E. International capital market controls

i. Access of citizens to foreign capital markets and foreign access to domestic capital markets.

ii. Restrictions on the freedom of citizens to engage in capital market exchange with foreigners—index of capital controls among 13 IMF categories."

Source: <http://www.freetheworld.com/download.html>

D Robust Regression:

Results from Robust Variance Matrix Estimator

	OLS regression
	(with specific effects)
<i>GDP_i</i>	.871*
<i>GDP_j</i>	.87*
<i>dgdp</i>	.097*
<i>DIST</i>	-1.06*
<i>TP</i>	.037*
<i>Freedom_j</i>	.144*
<i>LANG</i>	.682*
<i>RuleOfLaw_j</i>	.566*
<i>MinTlines</i>	.06*
<i>Constant</i>	-10.13*
Number of observations	21018
F Test (96, 20921)	1995.61*
Serial correlation (rho)	.7962

* significant at 1%