The EU Neighborhood Policy: A Quantitative Assessment

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Abstract:
One major objective of the new EU neighborhood policy is to move towards more trade integration between the enlarged EU and its new Eastern and Southern neighbors, i.e., Russia, Ukraine, Belarus, Moldova, as well as Southern Mediterranean and Caucasus countries. Using recent theoretical developments in gravity models, this paper derives an estimable equation, which particularly focuses on trade costs. This equation is then used to investigate the new neighbors' export potential towards the EU market. For this purpose, several Hausman and Taylor models are implemented in order to consider the correlation between certain independent variables and the residuals which are used to calculate trade potentials. Results outline that the NNCs' export potential is generally significant, especially for the new Eastern neighbors. However, it seems that this potential is limited for Mediterranean countries, as they have already enjoyed preferential market access with regards to the EU. Finally, an extension of the analysis to Middle-East and Gulf countries also highlights significant trade potentials with the EU.

JEL classification : F13, F15, F17.
Keywords : Trade costs, Hausman and Taylor models, gravity models, European Union, Mediterranean countries, Eastern European countries.

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1. Introduction

Since its enlargement to Central and Eastern European countries (CEECs) on 1 May 2004, the EU has been facing new neighbor countries (NNCs), further East and South of the EU new border. These are Russia, the Western newly independent States (WNIS), i.e., Belarus, Moldova and Ukraine, as well as Southern Mediterranean countries (SMC)[2]. However, the EU trade policy substantially varies across the new border : Russia and the WNIS, for example, do not enjoy any preferential trade policy with the EU, except within the Generalized System of Preferences. By contrast, SMCs (especially Maghreb countries) enjoy a long standing preferential policy with the EU and the Barcelona agreement provides for the completion of a free trade area (FTA) by 2010.

Given this differentiated policy, the EU has recently initiated a new neighborhood policy, also called the "Wider Europe Initiative" (WEI). Its main objective is to harmonize the EU policy throughout these new partners, and to move towards more economic integration between the EU and these neighbors. More precisely, the EU members have stated that "Russia, the countries of the Western Newly Independent States and the Southern Mediterranean should be offered the prospect of a stake in the EU's Internal Market and further integration and liberalization to promote the free movement of persons, goods, services and capital (four freedoms)" (European Commission, 2003). In May 2004, the European Commission also recommended the inclusion of Southern Caucasus countries (Armenia, Georgia and Azerbaijan) within the scope of the European neighborhood policy.

This paper focuses on the trade effects of the WEI. The main issue concerns the calculation of the NNCs' export potential towards the EU.

The second section provides certain stylized facts regarding NNCs. Particular emphasis is given to the current trade relationships and preferential agreements between NNCs and the EU. The third section proposes a theoretical model based on new developments in the gravity equation, especially trade costs. This model is then estimated with several specifications in a fourth section. One major issue is to deal with the potential correlation between certain independent variables and the residuals which are used to calculate trade potentials. This issue may be addressed by using the Hausman and Taylor (HT) estimator. Thus, several HT models are estimated and discussed. Following on from this, NNCs' export

[2] Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestinian Authority, Syria and Tunisia.

potentials are calculated from out-of-sample export projections. Results generally outline a significant NNCs' export potential towards the EU market. However, it seems that this export potential is higher for the new Eastern neighbors than for Mediterranean countries and especially Maghreb countries.

2. The EU and its new neighbors: some stylized facts

This section first analyses several key indicators calculated for NNCs, compared with the EU-15 and the new EU members. These indicators cover population, GDP, GDP growth and living standards. As a second step, the trade liberalization process is briefly recalled for all NNCs, both from a multilateral and a regional standpoint (accession to WTO and preferential agreements with the EU). Finally, the main trade patterns are explored, through the analysis of NNCs' trade openness, as well as NNCs' exports by destination countries and by commodity groups.

2.1 Population, GDP and living standards: a comparative analysis

The new neighbors together account for more than 400 million inhabitants, located mainly in North Africa (155 million), Russia (144 million), and in the WNIS (63 million) (Table 1). Overall, this is as much as the EU-15 population. GDP is however particularly low, since NNCs barely reach one-tenth of the EU-15's GDP level. As a consequence, living standards are also very much lower than in Western Europe: as an example, in 2003, GDP per capita was 90% lower than in the EU-15, and more than 50% lower than in the new EU Eastern and Southern members.

Another key feature is that GDP per capita varies greatly across NNCs: a calculation of the coefficient of variation of GDP per capita demonstrates that NNCs are much more heterogeneous than the EU-15 or the new EU members (Table 1). In fact, three group of countries may be identified: the first includes Israel alone, with a GDP per capita close to the EU-15 average; the second group corresponds to intermediate countries, with GDP per capita levels ranging from US$ 1500 to 5000. These include Russia, Maghreb countries, Belarus, Lebanon as well as Syria. The last group includes countries with GDP per capita below US$ 1500, namely, Egypt, Southern Caucasian countries, Moldova and Ukraine.

Table 1 : NNCs' basic economic indicators (2003)

	Population	GDP	real GDP growth (%)	**GDP per capita**		
	million	current billion US$	yearly aver. (2000-03)	US$	% of EU-15	coeff of var.
EU-15	**403,0**	**8696.8**	**1.8**	**21580**	**100.0%**	**0.3**
New EU members (10)	**74.8**	**382.2**	**2.9**	**5110**	**23.7%**	**0.5**
NNCs, of which:	**411,0**	**917.0**	**4.2**	**2231**	**10.3%**	**1.5**
Russia	144.5	433.5	5.4	3000	13.9%	-
Ukraine	48.1	47.3	6,0	983	4.5%	-
Belarus	10.3	17.5	4.7	1699	7.9%	-
Moldova	4.4	2,0	5,0	455	2.1%	-
Algeria	32.8	65.2	2.8	1988	9.2%	-
Egypt	74.7	76.4	3.3	1023	4.7%	-
Israel	6.2	116.4	1.2	18774	87.0%	-
Jordan	5.5	9.9	4.5	1800	8.3%	-
Lebanon	3.7	18.3	1.6	4946	22.9%	-
Libya	5.5	20.2	2.2	3673	17.0%	-
Morocco	31.7	44.7	4.3	1410	6.5%	-
Syria	17.6	26.6	2.7	1511	7.0%	-
Tunisia	9.9	25.2	4.1	2545	11.8%	-
Armenia	*3.3*	*2.8*	*8.9*	*848*	*3.9%*	-
Azerbaijan	*7.8*	*7.1*	*10.2*	*910*	*4.2%*	-
Georgia	*4.9*	*3.9*	*4.1*	*805*	*3.7%*	-

sources: - United Nations, Statistics Division: National Accounts, Main Aggregates Database, 2004
- CEPII: CHELEM (Harmonised Accounts on the World Economy), vol 5.2 (2003)

In recent years however, it has been encouraging to observe that annual GDP growth is much higher in NNCs (4.2%) than in the EU-15 (1.8%) or in the new EU members (2.9%). In addition, the countries with the smallest GDP per capita generally enjoy the highest GDP growth (Azerbaidjan: 10.2%; Armenia: 8.9%; Ukraine: 6%, etc.). In the long run, a persisting above average macro-economic performance may help to gradually narrow the gap between the EU and its new neighbors in terms of living standards.

2.2 Multilateral trade liberalization and regional integration with the EU

The trade liberalization process has greatly differed among NNCs (Table 2). For instance, Israel and Egypt first opened their economies when they joined the GATT in 1962 and 1970 respectively. A second wave of trade liberalization followed in the 80s for Morocco and Tunisia, which became GATT members in the late 80s or early 90s. A third wave started in the 90s for transition economies which all applied to become WTO members. In this respect, Georgia, Armenia and Moldova completed the accession negotiations in the early 2000s and joined the WTO, in addition to Jordan. The remaining countries are still negotiating their accession. As a matter of fact, most of them have yet opened market access negotiations regarding goods and services. Negotiations are particularly advanced for Ukraine, Algeria and also Russia, which accelerated them in 2003. These three countries should become WTO members in the coming months. As for Lebanon, Belarus and Azerbaijan, market access negotiations started only recently but are making rapid progress. Finally, the WTO General Council agreed to set up a working party to examine Libya's application in Spring 2004. However, negotiations for this could take a decade before concluding. The same remark also applies to Syria, which has just applied for WTO membership[3].

Table 2 : NNCs' basic trade indicators (2003)

	Year of GATT accession	Exports (million US$) total	Exports (million US$) fuel and oils	Exports/GDP (1) US$
TOTAL NNCs, of which:		**255729.0**	**108930.5**	**16.0%**
Russia	-	133716.8	70865.3	14.5%
Belarus	-	9964.3	2187.9	44.4%
Ukraine	-	18527.4	1645.7	35.7%
Moldova	2001	790.3	4.6	39.2%
Israel	1962	31782.7	138.2	27.2%
Algeria	-	24611.5	24129.6	0.7%
Morocco	1987	8250.3	287.5	17.8%
Tunisia	1990	7354.4	632.5	26.6%
Syria	-	6230.1	4496.3	6.5%
Egypt	1970	6160.7	2266.4	5.1%
Jordan	2000	3081.6	7.5	31.1%
Lebanon	-	1523.9	3.5	8.3%
Libya	-	n.a	n.a	n.a.
Azerbaijan	-	2591.7	2229.1	5.1%
Armenia	2003	667.9	13.1	23.4%
Georgia	2000	475.4	23.3	11.5%

(1) fuel and oils excluded

sources: - WTO: accession status (http://www.wto.org/english/thewto_e/acc_e/)
- United Nations, Statistics Division: National Accounts, Main Aggregates Database, 2004
- United Nations Commodity Trade Statistics Database, 2004 (COMTRADE)

In addition to this multilateral trade liberalization process, some NNCs also implemented a sound regional partnership with the EU. The most striking example is the long standing cooperation experiment between SMCs and the EU. This experiment started in the 60s with a first EEC preferential tariff policy for selected SMCs (Morocco, Tunisia) and selected imports (some manufactured products). Subsequently, the EEC progressively extended its tariff cuts to the other Mediterranean partners (except Libya), and increased the coverage of the import products (all manufactured and some agricultural products were thus included). Despite certain limitations due to the exclusion of the agricultural products protected by the Common Agricultural Policy (CAP), some authors have

[3] Consult http://www.wto.org/english/thewto_e/acc_e/a1_country_e.htm about the WTO accession status for each country.

shown that the EU preferential tariff policy increased SMCs' exports to the EU, especially in the 70s and in the 80s (see for example Fontagné and Péridy, 1997). The final step corresponds to the 1995 Barcelona agreement, which intends to implement a Euro-Mediterranean FTA (Euromed), to be completed by 2010.

Contrary to SMCs, Russia and WNIS did not enjoy such a long standing preferential tariff policy from the EU. For example, the first legal basis for the EU-Russia relationship started with the Partnership and Cooperation Agreement (PCA) in 1997. This agreement establishes the institutional framework for bilateral relations, sets the principal common objectives, and calls for activities and dialogue in a number of policy areas. The main commercial provisions cover trade liberalization, based on the most favored nation (MFN) treatment, the elimination of quantitative restrictions as well as some legislative harmonization. Similar PCAs have also been concluded with Ukraine and Moldova (1998) as well as Georgia and Armenia (1999). Azerbaijan may follow suit soon, whereas no PCA has yet been implemented with Belarus, due to the serious setbacks to the development of democracy experienced by this country in the early 2000s[4].

To sum up, whatever the Eastern neighbors' progress towards more trade liberalization, there is yet no preferential trading policy between these countries and the EU, given that bilateral trade with the EU is still covered by MFN or GSP provisions. Thus, given the gap in the EU external policy between SMCs and the Eastern new neighbors, the Wider Europe Initiative offers the prospect of harmonizing the EU regional trade policy across all NNCs, notably by promoting the free movement of goods with all these countries.

2.3 Main trade patterns and relationships with the EU.

Overall, there are sizeable differences among NNCs with regards to their trade openness. Indeed, calculating the Export/GDP ratio (excluding oil and fuel exports) makes it possible to classify them into three groups (Table 2). The first group includes Jordan, Israel, Tunisia as well as WNIS. These countries have been increasingly integrated into the world economy, since they enjoy an Export/GDP ratio above 25%. A second group involves intermediate countries, namely, Morocco, Russia and Georgia. They display an Export/GDP ratio in the middle range between 10% and 25%. The remaining countries concern Lebanon, Egypt, as well as Algeria, Syria and Azerbaijan. Most of these countries mainly

[4] Consult http://europa.eu.int/comm/external_relations/ for more information about the EU external relations with each country.

export fuel and oil and failed to diversify their export products in the past decades. As a consequence, they face an Export/GDP ratio which still stands at below 10%.

The EU-15 is generally the main NNCs' export partner, since it accounts for 31% of their overall exports. This share swells to 38% if we include the new EU Eastern and Southern members. However, there are substantial differences in the geographic export destination across NNCs (Table 3). Indeed, the EU share is predominant with regards to Maghreb countries, Egypt, Syria, Azerbaijan, Georgia as well as Russia to a lesser extent. As for the other countries, the main export destination is either Russia (as for WNIS) or the USA in the case of Israel. As compared to 1997, the EU share significantly expanded for most Eastern NNCs. This is easily explained by the end of the Communist era, which helped these countries to trade increasingly with close market economies, namely EU countries. On the contrary, the EU share slightly declined for SMCs. In fact, this share had previously increased in the early 90s and attained very high levels (Handoussa and Reiffers, 2003). It is too early to argue whether this slight erosion in recent times is due to a real and structural diversification of SMCs' export destinations or if this is a passing tendency. In any case, this recent decrease (increase) in the EU share regarding SMCs (Eastern NNCs) leaves the EU overall share unchanged (about 31% of all NNCs' exports).

Table 3 : Export shares by destination countries (% of NNCs exports, 2003)

	EU-15	*var 1997-2003 (1)*	New EU members	USA	*Russia*
TOTAL NNCs, of which:	**31.4%**	**=**	**6.4%**	**9.6%**	**-**
Russia	26.0%	+	9.0%	4.2%	-
Belarus	6.9%	+	5.9%	1.1%	*49.2%*
Ukraine	17.5%	++	9.6%	1.8%	*17.0%*
Moldova	26.3%	++	2.1%	4.1%	*39.0%*
Israel	20.9%	--	1.3%	32.6%	*0.7%*
Algeria	41.7%	-	0.5%	8.0%	*0.0%*
Morocco	59.4%	=	1.6%	4.0%	*0.7%*
Tunisia	62.7%	--	1.8%	1.1%	*0.0%*
Syria	51.5%	*n.a.*	2.4%	2.0%	*0.2%*
Egypt	41.1%	--	1.1%	18.3%	*0.5%*
Jordan	7.5%	-	0.9%	11.1%	*0.0%*
Lebanon	9.3%	-	0.6%	3.3%	*0.1%*
Libya	n.a	*n.a.*	n.a	n.a	*n.a*
Azerbaijan	34.8%	++	8.7%	1.1%	*5.7%*
Armenia	18.8%	-	0.6%	3.8%	*14.3%*
Georgia	38.7%	++	1.6%	3.1%	*17.6%*

(1) ++ (--): increase (decrease) by more than 5 points from 1997 to 2003
+ (-) increase (decrease) by more than 1 point and less than 5 points from 1997 to 2003
= increase (decrease) by less than 1 point from 1997 to 2003

sources: - United Nations Commodity Trade Statistics Database, 2004 (COMTRADE)
- OECD : Monthly Statistics of International Trade, vol.1 (2004)

Table 4 focuses on the main NNCs' commodities exported to the EU. These exports feature just a few product groups: fuel and oil account for 58% of all NNCs' exports to the EU. The main exporters are Russia, Algeria and Libya. Syria, Egypt, Azerbaijan as well as Belarus are also heavily dependent on oil exports, since these products account for more than 25% of their total exports. The second product group includes clothing (7% of overall NNCs' exports to the EU). In this product category, Tunisia and Morocco are the main NNCs exporters, followed by Ukraine. In a third category, we can find metals, such as iron, steel, aluminum and nickel. These products account for about 6% of NNCs' exports, originating mainly from Russia, Ukraine, as well as Egypt and Israel. The other products are of lesser significance and include pearls and precious metals (3.5%), electrical machinery (2.9%) as well as basic chemicals (2.8%).

Table 4 : NNCs' exports to the EU : Breakdown by commodity groups (2003)

product code (1)	Description *	exports to the EU (million US$)	% of total exports to the EU
27	**Mineral fuels, oils**		
	total NNCs	***64790781***	**58.7%**
	of which: Russia	*33448221*	
	Algeria	*11959183*	
	Libya	*11876139*	
61-63	**clothing**		
	total NNCs	**7513169**	**6.8%**
	of which: Tunisia	*3167752*	
	Morocco	*2812801*	
	Ukraine	*433324*	
71	**pearls, precious stones and metals**		
	total NNCs	**3882083**	**3.5%**
	of which: Russia	*2030067*	
	Armenia	*1529927*	
	Ukraine	*112275*	
72	**iron and steel**		
	total NNCs	**3735894**	**3.4%**
	of which: Russia	*2420384*	
	Ukraine	*656834*	
	Egypt	*132379*	
85	**electrical machinary**		
	total NNCs	**3228075**	**2.9%**
	of which: Tunisia	*1013945*	
	Morocco	*935176*	
	Israel	*918476*	
75-76	**aluminium and nickel**		
	total NNCs	**3155541**	**2.9%**
	of which:Russia	*2867687*	
	Egypt	*143093*	
	Israel	*48917*	
28-29	**basic chemicals**		
	total NNCs	**3085648**	**2.8%**
	of which: Russia	*1672002*	
	Israel	*571520*	
	Libya	*237241*	

(1) 2-digit- Harmonised system revision 2.

sources: - United Nations Commodity Trade Statistics Database , 2004 (COMTRADE)
- OECD : Monthly Statistics of International Trade, vol.1 (2004)

To sum up, NNCs' exports to the EU obviously rely on primary products or basic manufacturing. Moreover, these countries have generally failed to diversify their export products in recent years. As an exception, Morocco and Tunisia recently succeeded in specializing in more advanced manufactured products, such as electrical machinery equipment. Certain WNIS are also attempting to specialize in these types of products, especially Ukraine and Russia. More progress may come soon if these countries join the WTO.

3. The Model

The model proposed here is based on new developments in the gravity equation, especially involving trade costs. Indeed, in order to investigate the NNCs' relative export position with regards to the EU and to calculate trade potentials, we require a model which particularly focuses on trade resistance. Anderson and van Wincoop (2003, 2005) provide such a model, in line with Baier and Bergstrand (2001) as well as Feenstra (2002). This theoretical model is first recalled and complemented with additional assumptions. As a second step, the corresponding theoretical equation is amended for purposes of estimation. Particular emphasis is given to the measurement of unobserved variables.

3.1 Theoretical underpinning

Starting from a product differentiation framework with one sector economy, and assuming that consumers have CES preferences with σ as a common elasticity, the gravity equation may be written as:[5]

$$X_{ij} = \frac{Y_i Y_j}{Y_w}\left(\frac{T_{ij}}{P_i P_j}\right)^{1-\sigma} \qquad (1)$$

with:

[5] See for instance Anderson and van Wincoop (2003) p. 175.

$$P_j^{1-\sigma} = \sum_i P_i^{\sigma-1} \theta_i T_{ij}^{1-\sigma}, \forall j \qquad (2)$$

$$P_i^{1-\sigma} = \sum_j P_j^{\sigma-1} \theta_j T_{ij}^{1-\sigma}, \forall i \qquad (3)$$

where Y_i, Y_j and Y_w denote country i's GDP, country j's GDP and world GDP respectively; T_{ij} accounts for trade costs between i and j; P_i and P_j reflect the implicit aggregate equilibrium prices and θ_i and θ_j are country i and j's income shares.

The main underlying assumptions are the following: each country produces a unique product variety, so that the export of a particular good from i to j is identical to the consumption of this good in country j; transport costs are symmetric ($T_{ij} = T_{ji}$); the production of firms exceed the net amount received by the consumer (iceberg transportation costs), and bilateral prices depend on trade barriers alone.

As compared to traditional gravity equations, the key improvement here concerns the specification of the trade cost term in brackets in equation (1). This term has two components: bilateral trade resistance (T_{ij}) as well as multilateral trade resistance, through the price indexes. Indeed, as prices in the importing country (j) depend on trade barriers charged to all exporting countries (i), P_j reflects the inward multilateral trade resistance. Similarly, P_i reflects outward multilateral trade resistance as it depends on country i's trade barriers from all its import partners. In both cases, an increase in multilateral resistance leads a country i to trade more with its bilateral partner j. Overall, the implication of the trade cost term is that trade between country i and j is determined by bilateral trade barriers relative to average trade barriers that both countries face with all their trading partners.

We complement the model described above by two additional assumptions, in line with Péridy (2004): firstly, we introduce non tradable goods (as Anderson 1979), assuming that in countries i and j, only a fraction φ of income is spent on tradables. As a consequence, spending and output on tradables are respectively $\varphi_i Y_i$, $\varphi_j Y_j$ and $\varphi_w Y_w$ with φ depending on Y:

$$\varphi_i = Y_i^{\alpha_1} \tag{4}$$

$$\varphi_j = Y_j^{\alpha_2} \tag{5}$$

$$\varphi_w = Y_w^{\alpha_3} \tag{6}$$

Substituting into (1) leads to the modified gravity equation:

$$X_{ij} = \frac{Y_i^{1+\alpha_1} Y_j^{1+\alpha_2}}{Y_w^{1+\alpha_3}} \left(\frac{T_{ij}}{P_i P_j} \right)^{1-\sigma} \tag{7}$$

A second assumption concerns the specification of bilateral trade costs. Traditional gravity equations generally include as trade cost variables, geographical distance or remoteness as well as tariffs and differences in languages. Exchange rate volatility or the existence of a common currency are sometimes also included. However, the sign of the relationship between these variables and bilateral trade is still debated both theoretically and empirically. For example, Péridy (2003) shows that this sign is not the same for all industries, and demonstrates an aggregation bias. Since the present model assumes a single aggregate industry, it cannot avoid this aggregation bias. Another potential problem is endogeneity: for instance, Estevaldeordal et al. (2003) provide examples where trade plays an important role in the decision to join a currency union. Although this problem may be dealt with through instrumental variables, the model proposed here does not include exchange rate volatility, given its uncertain theoretical and empirical effects on trade flows. More recently, some authors have added border effects as an additional measure of trade cost, since McCallum (1995)'s pioneer work (Anderson and van Wincoop, 2003, Chen 2004, Fontagné et al., 2004, etc.).

Overall, a major problem concerning the specification of the trade cost function is the choice of the appropriate variables. This may give rise to a bias due to omitted variables. The trade cost specification proposed here accounts for this problem by introducing specific bilateral interaction effects, which capture any remaining unobserved bilateral trade resistance variables (cultural, political, etc...):

$$T_{ij} = d_{ij}^{\rho} t_{ij}^{\lambda} l_{ij}^{\psi} b_{ij}^{\gamma} \eta_{ij} \tag{8}$$

with d_{ij}, t_{ij}, l_{ij}, b_{ij} and η_{ij} denoting respectively geographical distance (as a proxy for transport costs), tariffs and non tariff barriers (NTBs), differences in languages, other border effects as well as specific bilateral interaction effects.

Substituting (8) into (7) leads to the final theoretical gravity equation:

$$\begin{aligned}\ln X_{ij} = & (1+\alpha_1)\ln Y_i + (1+\alpha_2)\ln Y_j - (1+\alpha_3)\ln Y_w \\ & + \rho(1-\sigma)\ln d_{ij} + \lambda(1-\sigma)\ln t_{ij} + \psi(1-\sigma)\ln l_{ij} \\ & + \gamma(1-\sigma)\ln b_{ij} + (1-\sigma)\ln \eta_{ij} \\ & - (1-\sigma)\ln P_i - (1-\sigma)\ln P_j \end{aligned} \tag{9}$$

with $\sigma>1$; $0<\alpha_1, \alpha_2, \alpha_3<1$ and $\rho, \lambda, \psi, \gamma>0$.

The first line of this equation refers to the traditional "mass" gravity variables, the second and third lines include traditional and new bilateral trade cost variables respectively, whereas the last line captures multilateral trade costs.

3.2 The empirical model: variable measurement, data and sources

Equation (9) cannot be estimated directly. This is due to the fact that some variables are not observed. The main problem concerns the price variables. Although price indexes are regularly published in the statistical literature, these prices do not fully reflect the theoretical implicit prices P_i and P_j. Indeed, all multilateral trade costs, including home bias preferences, time and risk involved in making transactions, etc., are not passed on through price indexes (Baier and Bergstrand, 2001; Feenstra, 2002). An alternative consists in directly estimating the implicit prices in equations (2) and (3) as a function of T_{ij}. The problem with this method is that the estimated prices very much rely on the way we estimate T_{ij}. A final solution consists in estimating implicit prices by country-specific dummies. This method has been increasingly adopted in the recent empirical literature (Rose and van Wincoop, 2001; Head and Ries, 2001; Péridy, 2004; etc...). Its main advantage is to capture the unobserved price effects and to produce consistent estimates of the model parameters. Given this advantage, this approach will be adopted here.

A second unobserved variable relates to border effects. This variable is traditionally proxied by a dummy, which equals 0 for trade within countries and 1 for trade across countries (in logarithm). The implication of this variable is that it requires a measure of trade within countries (X_{ii}) as well as a measure of internal geographical distance (d_{ii}). Since Wei (1996), X_{ii} has been commonly proxied by subtracting each country's total exports from its GDP. The measurement of internal distance has given rise to much debate in the literature. Traditional proxies consisted in calculating the distance between the two main cities within a country, or the distance between the economic center in a country and the border of its nearest neighbors (Wei, 1996; Wolff, 1997). However, it has been subsequently shown that these proxies suffer from geographical inconsistency across countries. This problem has mainly been addressed by measuring a country's internal distance as a function of its size and the spatial distribution of the economic activity within this country[6]. The measure adopted here is close to Head and Mayer (2002):

$$d_{ij} = \frac{2}{3\Pi^{1/2}} S_i^{1/2} \tag{10}$$

where S_i denotes the size of country i.

It is implicitly assumed that a country's size is a disc and that the economic activity is evenly distributed within this disc. This latter assumption is motivated by the lack of data at a regional level for all the countries covered by this paper. These data are necessary if we wish to specify the spatial distribution of the economic activity within a country. As a final step, the internal distance is calculated as a proportion of this disc's radius.

The measurement of the remaining unobserved variables is more standardized. For example, as complete bilateral tariff and NTBs time series are not available for developing countries, we use regional dummy variables: a first dummy (EU) reflects the intra-EU-15 integration. A second dummy (EAST) captures the free trade agreements between the EU-15 and the ten new Eastern EU members before their integration into the EU. A last dummy (MED) denotes the various preferential agreements between the EU and SMCs. In addition, differences in languages are also measured by a dummy variable, which is equal to 1 when a country pair speaks the same language, and e otherwise in a log-log specification.

[6] For additional details, refer to Nitsch (2000), Helliwell and Verdier (2001) or Head and Mayer (2002).

A time dimension is finally added in the model as a specific time dummy. This corresponds to the business cycle and changes in openness across all countries. Thus, the final estimable gravity equation becomes:

$$\begin{aligned}\ln X_{ij} &= a_0 + a_1 \ln Y_{it} + a_2 \ln Y_{jt} + a_3 \ln d_{ij} + a_4 \ln EU_{ijt} \\ &\quad + a_5 \ln EAST_{ijt} + a_6 \ln MED_{ijt} + a_7 \ln l_{ij} + a_8 \ln b_{ij} + \varepsilon_{ijt} \qquad (11) \\ \varepsilon_{ijt} &= \eta_{ij} + \beta_i + \mu_j + \omega_t + \upsilon_{ijt}\end{aligned}$$

where υ_{ijt} is a white noise disturbance term.

In this equation, the world income is assumed to be captured by the constant term, whereas P_i and P_j are reflected in the country-specific effects β_i and μ_j as discussed above. These effects, as well as the bilateral specific effect η_{ij} may be considered as fixed or random depending on the econometric specification of the model. This will be described in detail in the next section.

Equation (11) has been estimated for 65 EU partners as exporters. These partners cover more than 95% of EU's imports[7]. 18 EU importers are selected, including the EU-15 member states[8] as well as the main new Eastern European members, namely, Poland, Hungary, the Czech and the Slovak Republic. The time period spans from 1993 to 2003. Overall, the data sample covers 1170 bilateral trade flows, and accounts for 12870 observations.

The sources for exports are OECD (Monthly Statistics of International Trade, vol.1, 2004), as well as the United Nations Statistics Division (National Accounts, Main Aggregates Database, 2004). GDP levels are selected from CEPII: CHELEM (Harmonized accounts of the World Economy, vol.5.2, 2003). Finally, bilateral international distances are calculated from www.indo.com/distance.

[7] These are the EU-15 member states, EFTA and ALENA members, Poland, Hungary, the Czech Republic, the Slovak Republic, NNCs (including South Caucasian countries), Japan, Australia, New-Zealand, South Africa, Brazil, Argentina, Chile, China, Hong-Kong, Taiwan, India, Singapore, Thailand, Philippines as well as Gulf countries.
[8] Belgium and Luxembourg are considered as a single country.

4. Estimation and results

4.1 Model specification and estimation

The estimation of equation (11) is aimed at calculating the trade potential between the EU and NNCs. This may be achieved through an estimation of the residuals. The choice between the in-sample or out-of-sample exports' prediction is presently motivated by the fact that as a rule, NNCs have not yet fully achieved their integration into the world economy (especially Russia, WNIS and South Caucasian countries). Therefore, an out-of-sample prediction seems more appropriate, as it makes it possible to compare what NNCs' trade would be if they behaved like the countries which have fully integrated the world economy.

In order to take into account zero trade values, we estimate equation (11) with a transformed export variable:

$$\ln X^*_{ijt} = \ln\left(X_{ijt} + 1\right)$$

Indeed, when X_{ijt}=0, $\ln X^*_{ijt}$=1 and as X_{ijt} increases, $\ln X^*_{ijt} \rightarrow \ln X_{ijt}$. This technique has been increasingly used in the recent literature, as for instance in Chen (2004).

Although equation (11) may be estimated with traditional panel data econometric methods, these methods seem to be inappropriate in the present paper. This is due to several reasons. In the first place, the traditional fixed-effects estimator (Within estimator) cannot provide estimates of time-invariant variables, such as distance, border effects or language. Secondly, calculating trade potential from an out-of-sample prediction conceptually contradicts the idea of the Within estimator. Moreover, the traditional random effect estimator (GLS) cannot be considered as an alternative if there is a correlation between the unobserved effects and certain explanatory variables.

In order to address these major shortcomings, Egger (2004) suggests using the Haussman and Taylor (1981) specification. This is a 2SLS random effect model which makes it possible to deal with potential correlation between the unobserved bilateral effects and some of the regressors. Moreover, it provides an estimation of time-invariant parameters and is suitable for out-of-sample prediction.

This model has been computed following Greene (2004) procedure, where basically, all variables (Z) in model (11) are transformed as follows:

$$Z^*_{ijt} = Z_{ijt} - \theta_{ij} Z^m_{ijt}$$
$$\theta_{ij} = 1 - \frac{\sigma_v}{\sigma_s}$$
$$\sigma_s = \left(T_{ij}\sigma^2_u + \sigma^2_v\right)^{0.5} \qquad (12)$$

where Z^*_{ijt} denotes any variables in equation (11), Z^m_{ijt} reflects the group means of these variables and T_{ij} is the number of bilateral observations; σ_v^2 and σ_μ^2 corresponds to the Within and Between variance respectively.

This model has been computed as follows: deviations from group means are firstly used in order to consistently estimate the parameters of the time-varying independent variables. This has been carried out through LSDV, which provides an a consistent estimator of σ_v. As a second step, we used group means residuals as the dependent variable, regressed on the time-invariant variables, to provide a consistent estimator of the parameters of the latter. This has been implemented through 2SLS. As instruments, we selected the variables which are assumed to be uncorrelated with the bilateral residuals. The choice of these variables is discussed below. The residual variance estimator is a consistent estimator of σ_s.

As a next step, the estimation of σ_s and σ_v leads us to deduce an estimator of σ_μ^2. This makes it possible to calculate the Hausman and Taylor estimators, through Weighted IV regression applied to the whole model with the transformed variables. In order to overcome the endogeneity bias, we use a feasible set of instruments, namely the deviation from group means of the time-varying variables, the time-invariant uncorrelated variables, as well as the time-varying uncorrelated variables group means (see detailed computation procedure in Greene, 2003, p.303-306; Greene, 2004, p.E8-27 or Egger, 2004, p.185). The model is only identified if the number of uncorrelated time-varying variables is at least as large as the number of correlated time-invariant variables.

Table 5 firstly reports the parameter estimates calculated with the Within and the GLS estimators[9]. In both cases, country i and j's GDP parameter estimates are significantly different from one, as highlighted by the F-test. These non unitary income elasticities tend to support the introduction of non tradables in the theoretical model. The other variables are also generally significant and exhibit the expected sign. In particular, distance, border and differences in languages are

[9] The OLS specification is not reported here, as it is rejected by the LM test.

all negative and significant. The EU and EAST dummies are also significant at a 1% level, but only in the GLS specification. This may be due to the fact that these variables are almost time-invariant[10], so that the Within estimator fails to correctly account for their effects. Finally, the MED dummy is barely significant (at a 10% level only) in the Within estimation. One reason for this may be that the free access for Mediterranean manufactures into the EU has been opposed to a restricted access for agricultural products, especially in the 90s.

Table 5 : Estimation Results

	Within	GLS	HT-1	HT-2	HT-3	HT-4
GDP i	1.282***	1.246***	1.239***	1.261***	1.256***	1.204***
GDP j	1.169***	1.420***	1.413***	1.143***	1.183***	1.372***
distance	-	-0.945***	-0.953***	-2.262***	-2.290***	-1.773***
border	-	-4.289***	-4.263***	-1.288***	-1.178***	-6.048***
EU	0.035	0.269***	0.229***	0.251***	0.190***	0.021
EAST	0.169	0.159*	0.153	0.539***	0.445***	0.041
MED	0.133	0.161*	0.074	0.124*	0.126*	0.056
Language	-	-0.855***	-1.042***	-1.016***	-1.810*	-1.216***
Constant		-15.566***	-15.160***	-13.903***	-13.076***	-5.711***
R2 (adjusted)	*0.95*	*0.95*	*0.95*	*0.95*	*0.94*	*0.94*
number of observations	*12870*	*12870*	*12870*	*12870*	*12870*	*12870*
number of bilateral relations	*1170*	*1170*	*1170*	*1170*	*1170*	*1170*
F-test: a1=a2=1 [F(2,11695)]	20.6***	-	-	-	-	-
LM test	-	45091.6***	-	-	-	-
Hausman test	-	228.3***	-	-	-	-
Hausman and Taylor estimates:	-		-	-	-	-
Estimated θij	-	0.79	0.79	0.98	0.98	0.94
Estimated σv	-	0.7	0.7	0.7	0.7	0.7
Estimated σμ	-	0.29	0.34	0.26	0.12	0.12
Wald tests:						
country i specific effect (βi)	322.2***	-	-	-	-	-
country j's specific effect (μj)	15544.3***	-	-	-	-	-
bilateral specific effect (vij)	25731,1***	-	-	-	-	-
time effect (ωt)	25863,5***	-	-	-	-	-

***) significant at a 1% level; **) significant at a 5% level; *) significant at a 10% level.

The Hausman test reveals a correlation between the unobserved bilateral effects and the regressors. This is also reflected by differences in the GDP parameter estimates in the Within and GLS specification. This difference justifies the estimation of Hausman and Taylor (HT) models. For this purpose, several HT specifications have been implemented in order to select the appropriate correlated

[10] For example, the EU dummy varies for Austria, Sweden and Finland only, which joined the EU in 1995.

and instrumental variables. One constraint is the presence of a large number of time-invariant variables in the model, as compared with time-varying variables. For identification purposes, we therefore assume that GDP and the country specific effects are uncorrelated with the bilateral residual. This may be justified because GDP does not vary in the bilateral dimension but only in the country dimension.

In a first specification (HT-1), all bilateral time-variant variables (EU, EAST, MED) are selected as potential sources of correlation. However, as shown in Table 5 (column 3), GDP parameter estimates remain far from the Within estimates. In addition, the estimated θ_{ij} is similar to that calculated for GLS. This suggests that there are other sources of correlation.

In a second specification (HT-2), Distance is added as a time-invariant correlated variable. As this reduces deviations from the Within GDP parameters to a large extent, this specification will be preferred to the previous one. In addition, the estimated θ_{ij} sharply increases and gets very close to one. This confirms the fact that the HT-2 parameter estimates are very close to the Within ones[11].

In a third specification, we extend the set of singly exogenous variables to border effects and differences in languages (HT-3). This however does not improve the results as the GDP parameter estimate do not move closer to the Within estimates. In addition, the estimated θ_{ij} no longer increases.

A final specification takes countries i's and j's GDP instead of UE, EAST and MED as potential time-variant correlated variables (in addition to distance). In line with the above expectations, this final specification does not make it possible to reduce the gap with the Within GDP parameters as much as the HT-2 model does. This indicates that GDP is not very correlated, as it does not vary in the bilateral dimension.

[11] Another advantage in HT-2 is that it very much narrows the border effect parameter as compared to the GLS or HT-1 specification: for example, in the GLS, this parameter is equal to -4.289. Its exponent indicates that trade across countries is 72 times lower than trade within countries. This magnitude is much higher than that found in the recent literature (Anderson and van Wincoop [2003], Chen [2004], Fontagné et al. [2004]). It is even higher than in the much debated McCallum (1995)'s article. This suggests a potential bias in our GLS estimation. However, when taking HT-2 or HT-3, the border parameter is reduced to -1.288 and -1.178 respectively. This magnitude seems to be more reasonable. It suggests that trade across countries is only 4 times lower than trade within countries.

To sum up, the HT-2 specification will be kept as the reference estimation in order to calculate trade potential between the EU and NNCs.

4.2 An Estimation of trade potential between the EU and NNCs

As already stated, trade potential has been calculated from the residuals of equation (11) while keeping NNCs out-of-sample. More precisely, we estimate export potentials as the difference between fitted and actual exports as a percentage of fitted exports[12].

Several calculations are carried out, depending on the choice of the reference countries used to estimate NNCs fitted exports. In column (1) of Table 6, the country sample is confined to EU countries only as exporters (and importers). Estimating equation (11) and calculating from this the fitted NNCs' exports to the EU gives an idea about what NNCs' exports to the EU would be in the event of the implementation of the WEI (the acquis communautaire). In other words, NNC's export potential is calculated assuming that these countries' export behavior to the EU market is identical to any EU country.

Results unequivocally show that NNCs' trade potential with the EU is substantial. The only exception is Israel. This is due to the fact that this is the only NNC which has actually implemented a FTA with the EU. As a consequence, Israel has already reached its export potential with the EU and the implementation of the WEI would not introduce much change in trade for this country.

Nevertheless, there are certain differences between the other NNCs regarding the magnitude of the trade potential these countries could obtain provided there is an implementation of the WEI. The highest trade potential is found for Southern Caucasian countries, WNIS, as well as Lebanon and Jordan. Conversely, the export potential is more limited for Maghreb countries and Russia. In fact, as shown above, Maghreb countries have already enjoyed a preferential access to the EU market, at least for manufactured products. As a consequence, the magnitude of their trade potential -albeit significant- is not as large as for the other NNCs. The export potential seems also limited in percentage for Russia (14.2%).

[12] One issue concerns the choice of taking total exports or non-oil exports only as the dependent variable. Since oil products are part of a country's comparative advantages like any other natural or primary resource (agriculture, fisheries, beverages, metals, etc.), it seems useful to include them in the exports variable.

However, given the huge amount of exports in value, the Russian export potential to the EU is actually important[13].

Table 6 : NNCs' export potential to the EU (*)

	Actual exports to the EU-15 million US$ (2003)	Export Pot. (1) out-sample WEI-1 (%)	Export Pot. (2) out-sample WEI-2 (%)	Export Pot. (3) out-sample No WEI (%)	Export Pot. (4) *in-sample* %
Russia	48038.3	14.2	11.7	4.7	*7.5*
Belarus	957.2	50.1	50.9	45.5	*40.6*
Ukraine	3314,0	37.1	36.3	30.2	*28,0*
Moldova	265.8	61,0	62.6	57.9	*43.6*
Israel	7269.1	-0.8	-0.9	-5,0	*-26.2*
Algeria	13483.2	24.4	23.6	18.1	*8.2*
Morocco	6153.5	17.6	17.3	12.1	*-3,0*
Tunisia	6169.2	17.3	17.6	11.5	*-7.6*
Syria	2631.4	28.3	29.2	26.4	*4.5*
Egypt	2977.9	27.8	27.1	24.2	*13.3*
Jordan	144.2	54.1	55.6	53.8	*30.6*
Lebanon	197.3	48.9	50.8	47.9	*23.2*
Libya	10118.1	5,0	6.9	-2.7	*-24.6*
Azerbaijan	980.4	60.8	62.2	59.3	*46.1*
Armenia	319.9	68.9	70.8	68.4	*52.4*
Georgia	168.3	66.3	67.8	65.2	*51.9*

(*) Difference between fitted and actual exports as a percentage of fitted exports.

An alternative way of calculating NNC's trade potential assuming the implementation of the WEI is the following: we first extended the country sample to all exporters to the EU (excluding NNCs). Secondly, equation (11) is estimated. From this estimation, we then calculated the fitted NNCs' exports while applying the EU dummy coefficient to these countries. This amounts to assuming that NNCs benefit from the acquis communautaire as any EU countries. The corresponding results are presented in column (2) and are very close to that reported in column one.

A third specification consists in assessing what NNC's exports to the EU would be without the implementation of the WEI. To this end, we select non-EU countries only as exporters. The country sample is thus restricted to all countries which do not enjoy the acquis communautaire with regards to the EU market. One striking result (column 3) is that trade potential without WEI is not very much smaller than that calculated previously (assuming the WEI has been

[13] The Libyan case is very particular, given that Libya's exports to the EU include petroleum products only, which depend on specific trade agreements.

implemented). This could be because most NNCs have not completely liberalized their own economies, notably South Caucasian countries, WNIS as well as most Mashrek countries[14]. As a consequence, the high trade potential with the EU may be explained less by the restricted market access to the EU than by the lack of trade liberalization process within NNCs. Another explanation may come from the fact that natural trade costs - such as geographical distance with the EU core - remains high whatever the regional integration with the EU. As a consequence, implementing the WEI is not expected to increase NNCs exports as much as if they were closer to the EU core.

Finally, as a control specification, we estimate the model in-sample, i.e., with all countries selected, including NNCs (column 4). Fitted NNCs' exports to the EU are directly calculated from the residuals of equation (11). As expected, the magnitude of trade potential is much smaller than in the other specification. The reason for this is that if the model is correctly specified, the sum of the residuals must be equal to zero. As a result, including NNCs (which are at early stages of transformation) with all countries in the sample shifts their trade potential downward. Although trade potential remains still significant (though reduced) for Russia and the other Eastern NNCs, it becomes close to zero or even negative for Algeria, Tunisia, Morocco and Israel[15]. Again, this may be explained by the EU trade preferences for these countries. Although the in-sample approach appears to be less appropriate in the present study, these results further highlight that trade potential is more limited for Israel and Maghreb countries than for Eastern NNCs.

Finally, Table 7 provides similar estimations for Middle-East and Gulf countries. The justification for these estimations is that there are questions remaining about the opportunity of initiating a FTA between the EU and these countries. This issue is also important because the USA has already launched a free trade initiative with them, with the objective of completing a FTA within a decade[16].

As for most NNCs, trade potential with the EU is significant. In particular, Yemen, Qatar, Oman and Iraq report very high export potentials. Significant

[14] This is not exact concerning Jordan, since this country is more open to international trade, but traditionally trades very few with the EU: as an example, the latter accounts for 7.5% of Jordan overall exports only.

[15] In addition to Lybia.

[16] For further information about the US-Middle-East FTA, consult http://usinfo.state.gov/regional/nea/summit/text2003/0509bushfta.html and http://www.ustr.gov/new/fta/middleeast.html.

potentials are also identified for Iran, Bahrein and Kuwait, albeit to a lesser extent. Again, the magnitude of trade potentials does not differ very much whatever the reference countries used in the out-of-sample prediction. This suggests that these countries are at very early stages of trade liberalization. Consequently, their trade potential with the EU is high with or without a FTA. In addition, it is striking to observe that even if these countries' exports heavily rely on petroleum products - which are mainly duty-free - their current export level fall far short of their potential. This supports the assumption that these countries do not fully use their comparative advantages. In the particular case of Iraq and Kuwait, the high trade potential may also been explained by the Gulf War effects on petroleum exports to Western countries. In fact, Saudi Arabia only presents a limited export potential. This indicates that this is the only Gulf country with "normal" trade with the EU, once all trade determinants are controlled (distance, border, GDP, etc.).

Table 7 : Middle East and Gulf countries' export potential to the EU (*)

	Actual exports to the EU-15 million US$ (2003)	Export Pot. (1) out-sample WEI-1 (%)	Export Pot. (2) out-sample WEI-2 (%)	Export Pot. (3) out-sample No WEI (%)	Export Pot. (4) *in-sample* %
Saudi Arabia	11040.6	8.1	7.5	2.7	*-5.2*
Kuwait	1788.5	30.7	32.9	29,0	*8.1*
Yemen	70,0	59.9	61.2	58.4	*38.3*
Bahrein	357,0	26.9	30.2	24.5	*-17.1*
Qatar	416.8	61.5	63.2	60.9	*43.2*
Oman	225.1	65.1	66.6	65,0	*55.7*
United Arab Emirates	3416.1	14.4	16.3	12.4	*-8.1*
Iran	5372.1	25.2	24.3	19.8	*16.2*
Iraq	1241.3	56.3	57.8	54.9	*41.3*

(*) Difference between fitted and actual exports as a percentage of fitted exports.

5. Concluding remarks

This paper develops an estimable bilateral trade equation from new developments in gravity models. This equation is subsequently used to calculate NNCs' export potential towards the EU. For this reason, fitted exports are calculated from the residuals, using an out-of-sample approach. In addition, several Hausman and Taylor models are estimated in order to take into account the potential correlation between the residuals and some of the dependent variables.

Results firstly outline that the NNCs' export potential is generally significant, especially for the new Eastern neighbors. However, it seems that this potential is limited for Mediterranean countries, as they have already enjoyed preferential market access with regards to the EU. As a second result, there is not much difference regarding the magnitude of the NNCs' export potential whether we assume or not the implementation of the WEI. This has been checked through the choice of the reference exporting countries included in the sample. Such a result tends to suggest that NNCs will be in a position to boost their exports to the EU even if the WEI is not implemented. A necessary condition for this is that NNCs get more involved in the world economy, through more trade liberalization. For this reason, all NNCs must first join the WTO and extensively reduce their multilateral trade barriers. As a second step, they may implement a FTA with the EU in order to obtain additional - though limited - export potential.

Finally, an extension of the analysis to Middle-East and Gulf countries also reveals a substantial trade potential with the EU. However, like the NNCs and for the same reasons, the magnitude of the trade potential is not very different whether assumed or not an extension of the WEI to these Middle-East and Gulf countries.

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