

Towards a New Trade Policy Between the USA and Middle-East Countries: Estimating Trade Resistance and Export Potential

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1. INTRODUCTION

In the past decade, US policy makers have been increasingly concerned with regional trade policy : A free trade agreement was first concluded with Canada,² before its extension to Mexico (NAFTA). Negotiations subsequently included Central and South America, with the prospect of creating the free trade area of the Americas (FTAA) by 2005.

The US administration is now negotiating or achieving trans-ocean free trade areas. In this connection, a first agreement was reached with Jordan (2002) and Singapore (2003),³ whereas an additional agreement was recently concluded with Morocco (March 2004). Negotiations have also been carried out with Australia (2002), the Southern African Customs Union (SACU) in June 2003, as well as with Bahrain (January 2004). In addition, Egypt, Tunisia, Algeria and Saudi Arabia have implemented Trade and Investment Framework Actions, as a first step towards FTAs with the USA.

As we can see, the new US regional policy particularly focuses on Middle-East and North African (MENA) countries. As a matter of fact, the US administration recently called for a

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² In fact, the first US free trade agreement has been concluded with Israel in 1985. However, this agreement was fully implemented in 1995.

³ In addition to Chile.

USA-MENA free trade area within a decade.⁴ In addition to its political motivation, the main US objective is to enhance MENA countries' efforts to attract new trade and investment, and thus to foster economic growth and increase living standards. A second objective is to address the comparative disadvantage for US exporters resulting from the conclusion of the Euro-Mediterranean Agreement (Euromed) in 1995, which intends to complete a FTA between the EU and MENA countries by 2010.⁵

This paper deals with the following key issues : Does the USA face a trade integration deficit with regards to MENA countries? If so, is this deficit caused by the implementation of the Euromed agreement (trade diversion)? What is the US export potential in this area? Since no study has been specifically devoted to these issues,⁶ with the exception of partial and preliminary results in Péridy (2004), this paper is intended to fill this lack of literature for six selected MENA countries: Jordan, Egypt, Saudi Arabia, Morocco, Tunisia and Algeria.

In section 2, a short descriptive analysis of US-MENA trade relationships is presented, comparatively to other OECD countries. The investigation of export levels, market shares, and the calculation of several indexes of export position highlight an unfavourable US export performance towards MENA countries, as compared with most other OECD countries.

Section 3 is devoted to the derivation of a model, based on news developments of the gravity equation. In particular, this model simultaneously takes into account various trade

⁴ For additional details, consult <http://usinfo.state.gov/regional/nea/summit/text2003/0509bushfta.html> and <http://www.ustr.gov/new/fta/middleeast.html>.

⁵ See for example the interim review of United States-Morocco free trade agreement, Office of the U.S. Trade representative, September 2003.

⁶ See the preliminary notes by Deblock, Jaïdi, and Regnault, presented at the Moroccan Parliament on 1 March, 2003. More extensive studies deal with the development of trade policy in MENA countries (Hoekman and Kheir-El-Din, 2000 ; Dessus et al. (eds), 2001; Blavy, 2001). However, these studies do not focus on US-MENA trade relationships.

resistance variables, namely: border effects, multilateral trade resistance, as well as bilateral interaction effects.

The model is then tested in Section 4. Preliminary results are first provided through standard fixed and random effects models. After this, Hausman and Taylor (HT) models are estimated in order to scrutinise trade resistance between the USA and MENA countries, as well as the US export potential in this area. In the present paper, HT models offer several advantages: first, unlike traditional random effect models, they account for the correlation between the residuals and certain independent variables; second, unlike fixed effects models, they provide an estimation of time-invariant parameter estimates. Finally, they are particularly appropriate for the calculation of out-sample trade potentials. In a last subsection, the dynamic counterpart of HT models is also estimated, through the computation of Arellano, Bond and Bover's model. The static and dynamic calculations of trade potential are also compared.

Section 5 finally outlines certain conclusions and policy recommendations.

2. THE US EXPORT POSITION WITH REGARDS TO MENA COUNTRIES

In 2002, US exports to MENA countries amounted to 8 billion US\$, of which 5.6 billion to Saudi Arabia and Egypt. However, exports to each Maghreb country or Jordan were below 1 billion (Figure 1: Table 1a). Roughly speaking, MENA countries represent marginal US trade partners: Ranked by decreasing order of US export destination, Saudi Arabia is placed at rank 24, Egypt at rank 33, whereas Jordan and Tunisia obtain the rank 73 and 88 respectively (Figure 1: Table 1b). As a result, most MENA countries are placed after comparable developing or emerging African or Asian countries.

The sectoral composition of US exports to MENA countries is presented in Figure 1a. We observe that the great bulk of exports concern aircraft and other transport vehicles (33 per

cent), mechanical and electrical appliances (24 per cent) and cereals (11 per cent). As compared with other supplying countries, the USA exports four time less to MENA countries than the EU does (Table 1a). In the same way, the share of MENA countries in total US exports reaches 1,6 per cent, against 4,5 per cent for the EU. Though this export share seems very small for the US, it is comparable to Japan or the other OECD countries. The difference with the EU may be at least partially explained by the large distance - and thus transport and other transaction costs - between the USA and MENA markets. However, the US situation has dramatically deteriorated since 1995: indeed, US exports towards MENA annually fell by 2,5 per cent on average, and the US trade balance sharply decreased (from equilibrium in 1995 to 6,6 billion US\$ deficit in 2002). This detrimental trade balance tendency is still valid if we exclude oil trade.

The decline in the US position is also confirmed by the calculation of relative market shares, i.e. the share of MENA countries in US exports relative to competing OECD countries. This ratio may be interpreted as an index of export position (IEP).⁷ As indicated in Figure 1b and 1c, MENA countries' share in US exports remained below half of their share in EU exports, and dramatically decreased in recent years. In contrast, the USA preserved an advantaging position as compared to other OECD countries. However, this position has also been deteriorating in recent years.

A symmetric insight is provided by the analysis of MENA countries' import shares (Figure 1: Table 1a). Unsurprisingly, the UE is the first supplier in the MENA region, with almost 2/3 of total MENA countries' imports from OECD countries. Within the EU, France is the first partner, which covers almost 20 per cent of total MENA countries' import needs. The USA is the second partner after the EU. However, it is striking to observe that the share of the USA in MENA countries' imports declined in recent years (from 22 per cent in 1997 to 15 per cent in 2002), whereas the share of the EU rose from 60 to 64 per cent. The other

⁷ This index is defined as:

$$IEP = \frac{\frac{X_{USA \rightarrow MENA}}{X_{USA \rightarrow RoW}}}{\frac{X_{competingOECD \rightarrow MENA}}{X_{competingOECD \rightarrow RoW}}}$$

trading partners are of lesser importance, since Japan and the other OECD countries account for 7 and 13 per cent of MENA imports respectively.

A final statistical information is provided by the calculation of an original index of US relative export variation (IREV) with regards to MENA countries:

$$IREV = \left(\frac{\Delta X_{USA \rightarrow MENA}}{X_{USA \rightarrow MENA}} - \frac{\Delta X_{competingOECD \rightarrow MENA}}{X_{competingOECD \rightarrow MENA}} \right) - \left(\frac{\Delta X_{USA \rightarrow RoW}}{X_{USA \rightarrow RoW}} - \frac{\Delta X_{competingOECD \rightarrow RoW}}{X_{competingOECD \rightarrow RoW}} \right) \quad (1)$$

The first term in brackets captures the relative variation of US exports to MENA countries as compared to other OECD countries. In the same way, the second term reflects changes in US exports to non-MENA countries (RoW) relatively to other OECD countries. A positive index indicates that in comparison to non MENA countries, US exports to MENA countries increase more than competing other OECD countries. Thus, this index highlights changes in the relative access of the USA to MENA countries.⁸ It neutralises the influence of distance, because it only refers to export variations. It also neutralises the influence of the variation of MENA countries' import demand, as well as changes in US competitiveness, since it is calculated in relative terms. Therefore, any deviation from zero depends on other factors, notably preferential or detrimental commercial policies, but also common languages and other border effects. All these issues will be investigated in detail in the next section.

As shown in Figure 1d,⁹ the US export variation with regards to MENA countries was initially above other OECD countries' average. However, it has progressively declined,

RoW: Rest of the World (non-MENA countries).

⁸ A comparable index, called index of export performance, is calculated as a ratio, and not as a difference (see for instance Fontagné and Péridy (1997)). However, if some of the export variations are negative, the ratio of these variations may be misleading. The original formula presented in equation (1) allows to correct this potential bias.

⁹ Since this index is sensitive to the choice of the starting and final year used to calculate export variations, we preferred to use export moving averages to even out inter-annual export variations.

especially in recent years, to reach below average levels. This indicates that the USA lost some market shares in MENA countries. Unsurprisingly, the highest export performance concerned the EU, even if the gap between the EU and competing OECD countries was reduced to a certain extent. In contrast, the other OECD countries started with a detrimental export performance, but progressively reduced this unfavourable position towards MENA countries.

To sum up, the above statistical analysis highlights rather small amounts of US exports towards MENA countries, relatively to other competing OECD countries, especially the EU. Does this mean that US exports are below their potential level? Furthermore, may the declining US export position in recent years be correlated to the implementation of the FTA between the EU and MENA countries in 1995 ? The model developed in the next section is aimed at addressing these questions.

3. THE MODEL

The model proposed here is based on new developments of the gravity equation. From a theoretical point of view, much progress has been made in the theoretical foundation of this equation since Anderson (1979). In particular, it has been increasingly recognised that the gravity equation may be derived from several theories, including mainly Ricardian, Heckscher-Ohlin and monopolistic competition models (Helpman and Krugman 1985, Bergstrand 1989, Markusen and Wigle 1990, Deardorff 1998, Evenett and Keller 2002), but also the reciprocal-dumping model (Feenstra, Markusen and Rose, 2001).

Additional improvement has been made by Anderson and van Wincoop (2003). They explicitly introduce multilateral resistance, which accounts for the average trade barriers a country faces vis-à-vis all its trading partners. They also take into account bilateral trade resistance, through distance and border effects. This improvement in the derivation of the gravity equation has two advantages : First, it avoids biases due to omitted variables. These

biases are commonly found in gravity equations, which generally include bilateral distance or remoteness only as a trade barrier. A second advantage is to provide a better understanding of trade barriers, and thus trade policies, since the model explicitly includes them through the border effect and multilateral resistance variables. It must also be observed that the gravity equation derived by Anderson and van Wincoop is close to that obtained in Baier and Bergstrand (2001), although the latter do not specifically refer to the border effect.

Given these crucial improvements, we start with the theoretical gravity equation proposed by Anderson and van Wincoop (2003):

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \left(\frac{T_{ij}}{P_i P_j} \right)^{1-\sigma} \quad (2)$$

where Y_i , Y_j and Y_w reflect the aggregate income in country i , j , and the world income respectively; T_{ij} accounts for transport costs and other trade barriers; P_i and P_j denote the implicit aggregate equilibrium prices assuming trade barriers to be symmetric. Finally, σ is the CES elasticity of substitution between all goods in the consumer utility function.¹⁰

The key point here is the presence of the price index terms in brackets,¹¹ which accounts for multilateral trade resistance. It may be defined for country j as its average trade barriers with all trading partners, except i . For example, for a given bilateral resistance between i and j , higher barriers between the importer j and its other trading partners will reduce the relative price of the goods from i and thus raise imports from i . Similarly, for given trade barriers between i and j , an increase of the multilateral resistance faced by the exporter i lowers the demand for its good and thus the supply price P_i . This raises the level of trade with j .

¹⁰ See Anderson and van Wincoop (2003) for the complete derivation of the model.

¹¹ The derivation of a gravity equation with prices is not new, since this kind of equation is found in Bergstrand (1989). However, the latter does not interpret these prices as trade resistance variables. This, however, has crucial implications for the functional form of the empirical equation, its estimation and the interpretation of the results.

Another characteristic of Equation (2) is the unitary income elasticities. In Anderson's initial model (1979), these unity values derive from the fact that the model is specified at zero trade costs. In Anderson and van Wincoop (2003), this is no longer the case since trade costs are introduced at the beginning of the derivation of their model and also into the market clearance conditions (see p.175).

However, Equation (2) may be altered in order to introduce non unitary income elasticities. This may be achieved by taking into account non tradable goods (as in Anderson, 1979). Indeed, this equation takes Y as an estimate of tradables' output. But in reality, Y also includes non tradables. In order to take this problem into account, we assume that not all GDP is spent on tradables, but a fraction ϕ only, which in turn depends on Y . This makes it possible to write:

$$\phi_i = Y_i^{\alpha_1} \quad (3)$$

$$\phi_j = Y_j^{\alpha_2} \quad (4)$$

$$\phi_w = Y_w^\alpha \quad (5)$$

Substituting into (2) leads to the modified gravity equation:

$$X_{ij} = \frac{Y_i^{1+\alpha_1} Y_j^{1+\alpha_2}}{Y_w^{1+\alpha}} \left(\frac{T_{ij}}{P_i P_j} \right)^{1-\sigma} \quad (6)$$

It may be shown that substituting equations (3) to (5) earlier in the derivation of the model produces the same equation (6). In particular, the bilateral and multilateral trade resistance terms and elasticities are unaffected by the introduction of non unitary income elasticities, as they these terms do not depend on Y .¹² A discussion about non unitary income elasticities is also provided in Anderson and van Wincoop (2003), p. 188.

¹² To be exact, P_i and P_j are very slightly affected, as they depend on income shares θ_i and θ_j , which become respectively:

$$\theta_i = \frac{Y_i^{1+\alpha_i}}{Y_w^{1+\alpha}}$$

and

Since the opportunity of introducing or not unitary income elasticities is still debated in the theoretical literature (Haveman and Hummels, 2004), Equation (6) is selected as the reference and we will return to this point in the empirical model, through F -tests for unitary income elasticities.

A second modification concerns the specification of the bilateral trade resistance variable (T_{ij}). We assume that the latter may be decomposed into distance (d_{ij}) as a proxy for transport costs, tariffs and non tariff barriers (NTBs) (t_{ij}), common language (L_{ij}) other border effects (B_{ij}) and specific bilateral interaction effects (η_{ij}):¹³

$$T_{ij} = B_{ij}^{\gamma} d_{ij}^{\rho} t_{ij}^{\theta} L_{ij}^{\psi} \eta_{ij} \quad (7)$$

The two latter effects are of crucial importance: Indeed, border effects reflect the trade resistance across countries as compared to trade within countries. In the same way, η_{ij} reflects any time-invariant influence (cultural, political) which leads to a deviation of normal propensity to trade for any bilateral flow (Egger and Pfaffermayr, 2003). The latter effect thus captures any remaining unobserved bilateral trade resistance effect. It may be considered as fixed or random, depending on the choice of the econometric specification.

Considering the two changes mentioned previously provides the following theoretical gravity equation:

$$\begin{aligned} \ln X_{ij} = & a_0 + a_1 \ln Y_i + a_2 \ln Y_j + a_3 \ln d_{ij} + a_4 \ln B_{ij} + a_5 \ln t_{ij} \\ & + a_6 \ln L_{ij} + (\sigma - 1)(\ln P_i + \ln P_j) + (1 - \sigma)\eta_{ij} \end{aligned} \quad (8)$$

$$\theta_j = \frac{Y_j^{1+\alpha_j}}{Y_w^{1+\alpha}}$$

However, this does not introduce any change in Equation (6).

¹³ Some authors also include exchange rate volatility (Egger and Pfaffermayr, 2003). However, Péridy (2003) shows that the trade impact of exchange rate volatility must be calculated at a sectoral level, because sectors may react in an opposite way to exchange rate variations. Since we are working here at an aggregated level, there is an aggregation bias, which is likely to make the exchange rate parameter insignificant and biased.

where $a_0 = (1+\alpha)Y_w$ accounts for the world income as the constant term and :

$$\sigma = \text{CES} > 1$$

$$a_1 = 1 + \alpha_1 > 0$$

$$a_2 = 1 + \alpha_2 > 0$$

$$a_3 = (1 - \sigma)\rho < 0$$

$$a_4 = (1 - \sigma)\gamma < 0$$

$$a_5 = (1 - \sigma)\theta < 0$$

$$a_6 = (1 - \sigma)\psi > 0$$

This equation cannot be estimated directly, given the presence of unobserved variables, namely: Implicit prices, internal distance, internal exports, border effects as well as tariff and non-tariff barriers. Therefore, further modifications of equation (8) are needed in order to render it estimable.

With regards to prices, Baier and Bergstrand (2001) use published aggregated price indexes. However, as suggested by Feenstra (2002), published price indexes do not necessarily reflect theoretical implicit prices, which represent multilateral resistance, including nonpecuniary trade costs (home market preferences, time and currency risks involved in international trade, etc...). Alternatively, Anderson and van Wincoop (2003) directly estimate price equations and minimise the sum of the squared residuals in (8). The main problem with this method is that it does not ensure that the residuals are uncorrelated with any of the independent variables, and especially the trade barrier variables (T_{ij}). This would therefore introduce a bias in the estimates. Another alternative consists in estimating the price variables through country fixed effects, as in Feenstra (2002), and Rose and van Wincoop (2001). The advantage of this method is to capture the unobserved price effects, but also potential omitted trade resistance variables (not included in the trade cost function). Another advantage is that unlike statistical price indexes, which cannot reflect price

differences across countries, the country fixed effects concentrate on these country differences. As suggested by Matyas (1997), these effects thus reflect to what extent a country is open or closed vis-à-vis other countries, once all the other effects have been controlled. Since it allows to avoid some misspecification biases, this method will be adopted here, by using the specific effects β_i and λ_j as proxies for implicit prices. Like Feenstra (2002) and Rose and van Wincoop (2001), we initially assume that these effects are time-invariant in equation (8). However, this may be justified only if the aggregate prices do not vary too greatly during the time period under consideration. This assumption will be tested in the next section through the calculation of alternative - time varying- proxies, i.e., β_{it} and λ_{jt} .

The measurement of internal distance (d_{ij}) has been of great interest in the past few years. Wei (1996) first proposed to use one-half of the distance from the economic centre of one country to the border of its nearest neighbour. Instead, Wolff (1997) uses one-fourth of the distance between the two main cities within a country. However, both measures suffer from the problem of geographical inconsistency across countries. This problem is addressed by Nitsch (2000) and Head and Mayer (2002), who stress that the distance within a country also depends on the size of this country. Thus, assuming that economic activity is evenly distributed within a country, Head and Mayer (2002) propose the following internal distance measurement:

$$d_{ii} = \frac{2}{3\pi^{1/2}} S_i^{1/2} \quad (9)$$

where S_i denotes the size of country i .

To account for the spatial distribution of the economic activity, these authors calculate the sum of inter-regional distances, weighted by the population share of the regions.¹⁴

¹⁴ This weight is used as follows:

$$d_{ij} = \sum_{a \in i} \left(\sum_{b \in j} w_b d_{ab} \right) w_a$$

However, given the lack of regional data for large country samples (especially developing countries), this method cannot be implemented here. We will thus use equation (9) to measure unweighted internal distance, and the great circle distance between capitals for international trade flows.¹⁵

The measurement of the remaining unobserved variables is more standardised: Following Wei (1996), internal trade flows are calculated by subtracting a country's exports from its production. Similarly, as in existing studies, the border effect is measured by a dummy variable, which is equal to 1 for trade within a country and e for trade across countries. Similarly, as complete bilateral tariff and NTBs time series are not available for developing countries, we will use R_{ij} as a dummy variable for regional trading arrangements (EU, NAFTA and EFTA). Consequently, we replace t_{ij} by R_{ij} in equation (8) where the sign of a_5 is expected to be positive.

We finally include a time dimension "t", as well as time specific effects (φ_t) The latter account for the business cycle and changes in openness across all countries. The final estimable equation is a triple-indexes panel data gravity equation :

$$\begin{aligned} \ln X_{ijt} = & a_0 + a_1 \ln Y_{it} + a_2 \ln Y_{jt} + a_3 \ln d_{ij} + a_4 \ln B_{ij} + a_5 \ln R_{ijt} \\ & + a_6 \ln L_{ij} + \beta_i + \lambda_j + \varphi_t + \eta_{ij} + \mu_{ijt} \end{aligned} \quad (10)$$

With:

$$\sum_i \beta_i = 0; \sum_j \lambda_j = 0; \sum_{i,j} \eta_{ij} = 0; \sum_t \varphi_t = 0$$

and μ_{ijt} is a white noise disturbance term.

where w_a (w_b) denotes the share of region a (b)'s population with regards to the overall population of country i (j). The use of population as a weight is also adopted by Helliwell and Verdier (2001), in order to calculate internal distances.

¹⁵ One alternative would be to use the share of the main cities' population (within a country) as the population weight. However, this would introduce a bias, since the sum of these cities' population is not equal to the population of the whole country. Consequently, distance would be under-estimated.

We can observe that in addition to the standard trade barrier variables (distance, language and regional integration), this equation includes simultaneously various trade resistance variables, namely: Multilateral resistance variables (β_i and λ_j), border effects (B_{ij}) as well as the bilateral interaction effects (η_{ij}). The economic and econometric relevance of these variables will be discussed in the next section.

4. ESTIMATIONS AND RESULTS

Equation (10) is estimated for 20 OECD countries' exports¹⁶ to their main partners,¹⁷ from 1975 to 2001. This wide sample of countries and time period allows to arrive at a large number of observations (23220), which includes 860 reference bilateral trading relations.¹⁸

The estimation of equation (10) is aimed at investigating trade resistance between the USA and MENA countries and calculating trade potential between them. Trade resistance may be first highlighted by the analysis of the information embodied in the bilateral interaction effects (η_{ij}), as a proxy for specific bilateral trade resistance. Indeed, the sign of the US-MENA fixed effects gives an indication about the US relative export position vis-à-vis these countries. Comparing these effects with other OECD countries provides a first insight about the degree of trade integration between the USA and MENA countries, relative to other OECD countries. Additional information about bilateral trade resistance may be captured by the estimation of the US border effects with MENA countries.

¹⁶ These are: the USA, Canada, Mexico, Japan, South Korea, Australia, New Zealand, France, Germany, the UK, Italy, the Netherlands, Denmark, Norway, Sweden, Finland, Austria, Switzerland, Spain and Turkey.

¹⁷ 43 partners are included. They account for more than 90% of US exports in the period 1975-2001. These are the 20 above selected OECD exporting countries, plus Belgium-Luxembourg, Ireland, Greece, Portugal, Israel, South Africa, Brazil, Argentina, Chile, India, Hong-Kong, Singapore, Taiwan, Malaysia, Philippines, Thailand, China, as well as the six MENA countries denoted in section 1.

¹⁸ The sources for exports and GDP are OECD: Monthly Statistics of International Trade, vol.1 (2004), as well as CEPII: CHELEM (Harmonised accounts of the World Economy, vol.5.2 (2003). Bilateral international distance is calculated from www.indo.com/distance.

Regarding the calculation of the US export potential to MENA countries, this may be achieved from the estimation of the residuals in equation (10). This technique has been applied for instance to estimate the effects of Eastern European countries' integration into the EU, and is still used in gravity trade or FDI models, as in Buch et al. (2003). The choice between the in-sample or out-of sample prediction is presently motivated by the fact that MENA countries have generally not yet fully achieved their integration into the world economy (especially Algeria and Mashrek countries). Therefore, an out-of-sample prediction seems more appropriate, as it makes it possible to calculate what MENA countries' exports would be if they behaved like the countries which are fully integrated into the world economy. In addition, the out-of-sample approach may avoid a misleading interpretation of the residuals, as suggested by Egger (2002).

a) Preliminary Results from Fixed and Random Effects Models

Table 2 firstly reports the parameter estimates calculated with the Within and the GLS estimators. These models are presented with an autocorrelated error structure given the high values of the ρ coefficient. The latter has been estimated as in Greene (2003), p.325:

$$\mu_{ijt} = \rho\mu_{ijt-1} + \omega_{it}$$

Heteroskedasticity is also controlled with the estimation of the models with the White Heteroskedasticity-corrected variance-covariance matrix. All parameter estimates are significant and display the expected sign. In addition, the F -tests clearly reject the unitary income elasticity hypothesis. This justifies the inclusion of non tradables in the theoretical model.

Since the Hausman test clearly favours the Within estimator rather than the GLS, additional information may be drawn from the former. In particular, the Within model highlights

significant fixed-effects, as exhibited by Wald tests. Amongst them, the bilateral effects are very important since they explain the largest part of the variation of bilateral exports (the highest percentage of the total sum of squares). This result supports our theoretical expectations about the role of these bilateral interaction effects in explaining trade resistance. This also supports Egger and Pfaffermayr (2003) empirical findings concerning the significance of these effects estimated separately, i.e. without other trade resistance variables. In addition, the Akaike Information Criteria (AIC) and the LM test indicate that this generalised form is superior to the traditional Within model (without bilateral effects).

To go further in the analysis of the fixed-effects, Table 3 reports their estimated values. Among OECD countries, the exporter effects (β_i) differ widely: On the one hand, most European small open economies and South Korea present above average export propensities. On the other hand, most other OECD countries rank below average. In particular, the US export propensity is much below the average of OECD countries. These results are close to those already found in Matyas (1997).

Turning to the importer effects (λ_j), which reflect the openness of an economy, results indicate that Hong-Kong, Singapore and more surprisingly Jordan, are the countries with the highest propensity to import, whereas India and China present the lowest propensity. With the exception of Jordan, which has achieved a high level of trade liberalisation, the other MENA countries are close to the average import propensity.

Given that the country effects are assumed to capture implicit aggregate prices, it may be considered that these effects vary over time. To this end, we have estimated β_{it} and λ_{jt} instead of β_i and λ_j . Nevertheless, results show that these country effects do not vary very much over time.¹⁹ This is also confirmed by the fact that the specific time effect ϕ_t , though significant, exhibits a much lower F -value than country specific effects (Table 2). As a result, the time-invariant specific effects β_i and λ_j are conserved and we assume that any remaining time effect is captured by the time dummy ϕ_t .

¹⁹ In order to save space, the corresponding values are not described here but are available upon request.

The bilateral effects of US exports to each partner ($\eta_{ij,i=USA}$) are mostly negative. This confirms the fact that the USA presents a below average propensity to export. The only exception is US exports to Singapore, which are slightly above average. In particular, US exports to all MENA countries are much below average, especially with Maghreb countries, and Egypt to a lesser extent. Interestingly, within the top-10 countries for which the US export propensity is the lowest, we find the three Maghreb countries as well as three other European Mediterranean countries : Turkey, Italy and Greece. Of course, since this model does not include time-invariant variables, the bilateral coefficient partly reflects the impact of distance. However, it seems evident that this is not the only factor at stake, as some above average bilateral effects concern countries far away from the USA (Singapore) whereas some below average effects concern countries closer to the USA (Brazil, Argentina).

This analysis suggests that the USA faces a substantial bilateral trade resistance with MENA countries, especially Maghreb countries. Though few other OECD countries are in a similar situation, notably Japan and UK, the US bilateral effects with MENA countries remain much below the OECD average.

Although the fixed effects model must be preferred to the GLS according to the Hausman test, the Within model suffers the major drawback that it cannot provide any parameter estimates for time-invariant parameters. Secondly, calculating trade potential from an out-of sample prediction conceptually contradicts the idea of the Within estimator. It is thus inappropriate in the present paper. However, as stated above, the GLS is not an alternative, as the Hausman tests indicates that the residuals are correlated with certain independent variables. This leads to significant differences in the time-varying parameter estimates (Y_{it} , Y_{jt} and R_{iji}) between the Within and the GLS specifications.

In order to address these major shortcomings, Egger (2004) suggests using the Hausman and Taylor (1981) specification (HT). 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. In addition, it allows to estimate time-invariant parameters and is appropriate for out-of-sample prediction, as it amounts to a modified random effect model.

b) Results from Hausman and Taylor models

i) The Estimation Procedure

This model has been computed following Greene (2003; 2004) procedure: basically, all variables in model (10) are transformed as follows:

$$\begin{aligned}
 Z_{ijt}^* &= Z_{ijt} - \theta_{ij} Z_{ijt}^m \\
 \theta_{ij} &= 1 - \frac{\sigma_v}{\sigma_s} \\
 \sigma_s &= (T_{ij} \sigma_\mu^2 + \sigma_v^2)^{0.5}
 \end{aligned} \tag{11}$$

where Z_{ijt}^* denotes any variables in equation (10) and Z_{ijt}^m reflects the group means of these variables.

As a first step, deviations from group means are used to consistently estimate the parameters of the time-varying independent variables. This has been carried out through LSDV. The residual variance estimator is a consistent estimator of σ_v .

As a next step, σ_s is estimated from a 2SLS regression of the bilateral averages of the Within residuals on the time-invariant variables. The instruments used for this step are the variables which are assumed to be uncorrelated with the residuals. The choice of these variables is discussed further on. This provides a consistent estimator of the time-invariant variables. Following this, an estimator of σ_μ^2 (between variance) is deduced from the estimation of σ_s and σ_v ,

The final step is a weighted instrumental variable estimator for the whole model with the transformed variables. In order to overcome the endogeneity bias, a feasible set of instrument is used, 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 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.

An important point in HT models is the choice of the variables correlated with the residuals. The main constraint is the presence of a large number of time-invariant variables in our model, as compared with time-varying variables. Several HT model have thus been estimated in order to choose the appropriate specification. The final choice depends on the remaining deviations of the time-varying parameter estimates from their Within counterpart: the higher the gap with the Within estimates, the higher the correlation of the independent variables with the residuals. As a control test, an estimation of θ is used: the closer θ to unity, the closer the total variance to the Within variance, and thus, the closer the resulting parameter estimates to the Within model.

As a first attempt (HT-1), it is initially assumed that country i 's and country j 's GDP only are correlated with the residuals. This considerably boosts the value of θ (0.88) as compared with the GLS specification, and thus shifts time-varying parameter estimates closer to their Within counterpart. This confirms that GDPs are actual sources of correlation with the residuals.

In a second specification (HT-2), distance is also added as a potentially correlated time-invariant variable. This further increases the value of θ (0.91) and moves time-varying parameter estimates further closer to the Within estimates (especially Y_{it} and R_{ijt}). This specification is thus preferred to the previous one since it suggests a correlation of both GDPs and distance with the residuals. This model is just identified, as the number of

uncorrelated time-varying variable (R_{ijt}) is just equal to the number of correlated time-invariant variables (d_{ij}).

Other specifications have also been tested. For example, instead of d_{ij} , the correlation of other time-invariant variables is tested, especially border effects (HT-3). However, results no longer improve (Table 2). In addition, variable R_{ijt} is also tested as the correlated time-varying variable instead of country i 's and country j 's GDP (HT-4). Results are again inconclusive, given that the value of θ is smaller and the gap between the corresponding time-invariant parameter estimates and the Within estimates does not narrow as much as in the other specifications. Consequently, country i 's and country j 's GDP as well as distance were finally conserved as sources of correlation with the residuals (HT-2). This final specification (Table 2) has been used to further investigate both trade resistance and trade potential between the USA and MENA countries.²⁰

ii) An Insight of Trade Resistance Through the Analysis of Border Effects.

As regards first trade resistance, it may be highlighted by the calculation of border effects : For OECD countries, the corresponding parameter estimate equals 2.24. Using this estimation, the impact of border effects on exports is commonly calculated through the exponent (in absolute value) of this parameter. From this calculation, trade across countries would be 9.39 time lower than trade within countries (or trade within countries would be 838 per cent higher than trade across countries). Although this way of calculating the impact of border effect is to be found in all recent articles which specifically deal with border effects,²¹ criticism may be levelled at this procedure. In particular, since the border effect is measured by a dummy, the model amounts to a semi-logarithmic equation where the dummy takes the value 0 or 1. In this case, the derivative of the dependent variable with respect to the dummy variable does not exist. The equation must thus be transformed. In

²⁰ In this specification, the autocorrelation coefficient has been calculated in the same way as in the previous section.

²¹ See for example Evans (2003), Anderson and van Wincoop (2003) or Chen (2004),

this respect, Kennedy (1981) shows that the percentage change g of the dependent variable following a change in the dummy may be calculated as:

$$g = e^{\left(\hat{c} - \frac{1}{2}\hat{V}(\hat{c})\right)} - 1 \quad (12)$$

where c and $V(c)$ correspond to the consistent parameter estimates of the dummy and its variance respectively. Garderen and Shah (2002) introduce a certain refinement in the estimation of this percentage. However, they demonstrate that when the number of observations is large - which is the case in the present paper-, their estimator asymptotically tends towards Kennedy (1981)'s estimator. As a consequence, Equation (12) can be used to estimate g .

Table 4 reports the border effect parameter estimates calculated for each exporting country for all partners (Column 1), as well as the corresponding percentage effect (g) on trade (Column 4). From these columns, countries may be classified into three groups : EC founder members (Germany, France, Italy, the Netherlands) and Spain have low border effects; a tentative explanation may be found in the EU tradition of trade preferences vis-à-vis third countries (for example during the periods of pre-accession of countries in the UE, or vis-à-vis European non EU countries, including Turkey and Israel). Since these preferences are not included in the regional integration variable (which only accounts for free trade areas or higher stages of integration), they may reduce the overall border effect. The other EU countries and North American countries have much higher border effects, for symmetric reasons. The third group consists of Japan, Korea, Australia and New Zealand. These countries have no significant border effects (other than distance and absence of common language). The reasons for this may be found in the export traditions of these countries, which all have high export rates, and thus low border effects. Most of these results are original. The only exception is the calculation of border effects for Canada, the USA, and the EU taken as a whole, also estimated by Feenstra (2002), Anderson and Wincoop (2003), and Nitsch (2000) respectively. They provide similar results to ours.

Looking at border effects calculated specifically for MENA countries, we observe that for most OECD countries, the corresponding parameter estimates are higher than for non-MENA countries (Table 4, column 2). This reflects a deficit of trade integration between OECD and MENA countries. However, there are some differences between OECD countries. The largest deficit is found for the USA, some Northern European countries, and the UK, whereas the EU founder members, Turkey, and surprisingly Canada present lower deficits. These results reach further than those obtained in the Within model, since distance, regional integration and common languages are controlled in this model. In particular, it is interesting to observe that MENA traditional partners, including France, also suffer from some export deficit with these countries. However, the US detrimental export position with regards to MENA countries is much more important than that of the EU founders.

At this stage of the analysis, one question concerns the impact of the Euro-Mediterranean (Euromed) agreement, both on the EU and the USA. This question is first tackled with the estimation of each OECD country's border effects vis-à-vis MENA countries after the implementation of the Euromed agreement (from 1998 onwards). One would expect decreasing border effects with EU countries (trade creation) and increasing effects for non-EU countries, including the USA, in case of trade diversion. However, the results of this estimation show that border effects are not significantly different after the implementation of the FTA between the EU and MENA countries (see Table 4, column 3). The reason for this is probably due to the fact that this FTA has only been partly implemented : in 2002, only Tunisia and Morocco²² had implemented this agreement. Moreover, this agreement is only progressively implemented, since it provides for a 12 year transition period.

An alternative estimation of trade creation and trade diversion of the Euromed agreement is provided by the reestimation of the model, including a specific dummy variable. This variable equals 1 for EU exports to MENA countries from 1998 onwards, and 0 otherwise. Results (Column 4) clearly indicate that this variable is not significant at a 1 per cent level. Thus, according to these alternative estimations (border effects and dummy), there is no

²² In addition to Israel and Palestine autonomous territories, which are excluded from our sample countries.

evidence that the Euromed agreement has yet produced any significant trade creation or trade diversion effect.

iii) An Estimation of Trade Potential Between The USA And MENA Countries.

In order to calculate the US export potential with regards to MENA countries, the HT equation was estimated by taking OECD countries as exporting countries, and by excluding MENA countries as importing countries. The choice of this out-of-sample approach has been justified previously. We then used the parameter estimates of this equation to calculate the residuals of US exports to MENA countries. From these residuals, the US simulated export values to these countries were worked out. Finally, the ratio between actual and simulated exports was computed as a measure of trade potential between the USA and MENA countries.

This ratio indicates how much actual exports differ from fitted exports assuming that the USA and MENA countries behave like the other countries in the sample. Hence, if calculations show that the US actual exports to MENA countries are below their potential level, this only means that the USA export less to MENA countries than the other OECD countries do, once all the countries' characteristics in terms of GDP, distance and any other variable have been considered.

Figure 2a displays this ratio, calculated for each MENA country at different periods of time. Three key features emerge from this figure. Firstly, in recent years (1996-2001), US exports to MENA countries fall 24 per cent under their potential values (the ratio actual/simulated exports equals 0.76). Secondly, the US export deficit is greater for Maghreb countries (33-35 per cent below export potential), than for Middle-East countries, especially Saudi Arabia (9 per cent). Finally, it can be seen that the gap between current and simulated exports has increased since 1975 for all MENA countries (from 13 to 24 per cent). These findings correlate with the results previously obtained when looking at the evolution of US-MENA border effects or bilateral fixed effects.

Figure 2b provides additional information by comparing the export potential of the largest OECD countries with regards to MENA countries. Results are presented for the last period (1996-2001), and the arrow represents the evolution over time. One striking feature is that most countries' exports are below their potential. This means that on average, MENA countries import less from these OECD countries than the other importers do. However, this is not the sole explanation, since the export deficit vis-à-vis MENA countries widely differs amongst OECD countries. Indeed, after Mexico, the US is the OECD country with the greatest trade potential with regards to MENA countries. On the opposite side, Korea, Australia, and, to a lesser extent, Southern EU countries, present actual exports which are very close to their simulated levels. Thus, for these countries, trade potential vis-à-vis MENA countries is limited. In the middle range, Japan, Canada, the UK and Germany present a trade deficit from 10 per cent up to 20 per cent.

As a sensitivity analysis, Table 5 compares the US actual/potential ratio for both the out-of-sample and the in-sample approach. It may be observed that these approaches provide very similar results. This can mainly be explained by the fact that MENA countries account only for 1.6 per cent of US total exports. As a consequence, keeping or removing these countries introduces very small changes into the parameter estimates, and thus into the calculation of trade potentials.

However, it should be observed that the actual/potential export ratios from the in-sample prediction remain slightly below those calculated out-of-sample. The reason for this is that most MENA countries have not fully integrated the world economy. Therefore, the out-of-sample approach predicts what the US exports to MENA countries would be provided that these countries behave like the other - more integrated- countries. This slightly shifts the out-sample trade potential upward as compared to the in-sample prediction, since the latter predicts what the US exports would be if MENA countries behaved like all the countries in the sample, including themselves, i.e. less integrated.

As a last remark, it must be stated that the actual/potential export ratio does not directly indicate the impact of the free trade initiative between the USA and MENA countries. For example, if it is equal to 1, it is only saying that trade resistance between the USA and MENA countries is identical to the other countries' averages. It is thus expected that the implementation of a FTA will allow the USA to export more to MENA countries than the amount predicted in the present model. In order to address this issue, we should ideally select a sample of countries which have already implemented a FTA with the USA, and estimate the model with this sub-sample. Applying the corresponding parameter estimates to the USA and MENA countries should provide an idea about what US export to these countries should be, assuming that the implementation of the FTA provide effects similar to the US partners in the subsample. However, it seems hardly possible to apply this method since the USA has implemented a FTA with a very limited number of countries. Indeed, even in the late period taken into consideration (1995-2001), FTAs involving the USA were only in force with Canada, Mexico and Israel. This would therefore excessively lessen the number of observations and introduce substantial bias into the parameter estimates.

As an alternative, we started with the full country sample and calculated the US export potential vis-à-vis Canada and Mexico (Israel is excluded due to possible bias related to war and political problems). Results highlight that the US actual/potential export ratio is equal to 1.24 and 1.16 with Canada and Mexico respectively. Consequently, the USA exports more to these countries than with the other partners, as expected. This provides a first insight about what exports to MENA countries could be provided the implementation of the FTA with the USA. However it can hardly be assumed that the effects of a FTA are the same whatever the US partner. Further investigation would therefore be required through computable general equilibrium models.

c) Alternative Calculations of the US Trade Potential from an ABB Dynamic Model.

A final specification is provided by the estimation of a dynamic model. The introduction of lagged exports in equation (10) allows to account for habit persistence in export flows. Some theoretical justification may be found in Dixit (1989) and Baldwin and Krugman (1989). These authors demonstrate that hysteresis in trade flows may be due to the existence of sunk costs of market entry or exit, which prevent export flows to return immediately to an equilibrium after a shock or a policy.

From an econometric point of view, the introduction of a lagged dependent variable may introduce a bias due to the correlation of this variable with the composite disturbance term. Due to the likely existence of simultaneity bias, the most appropriate method of estimation appears to be GMM. We used here the Arellano, Bond and Bover's (ABB) Estimator (Arellano and Bond, 1998 ; Arellano and Bover, 1995).

Basically, the initial structure of the model is similar to the HT models described in the previous section. It thus distinguishes between time-varying and time-invariant variables, as well as between variables which are potentially correlated or uncorrelated with the residuals. Instrumental variable estimation without the lagged dependent variable are thus identical to an HT-model. In addition, when adding a lagged variable, the ABB approach provides additional efficiency gains through GMM, by using a larger set of moment conditions.

Specifically, it is assumed that the lagged variable and certain other regressors may be correlated with the residuals. The latter are chosen to be identical to those presented in the HT final specification (HT-2).

As in the HT model, the parameters are firstly consistently estimated by 2SLS in first differences. As instruments, the one period lagged values of the exogenous variables were used. The consistent slope estimators enable us to compute usable residuals for variance estimation. Following this, the sum of the squared residuals produces an estimator of σ_e^2 and σ_u^2 . Using these estimates, the covariance matrix of the residuals can be estimated, as:

$$\Omega = \sigma_e^2 I + \sigma_u^2 \mathbf{i}\mathbf{i}'$$

where \mathbf{i} denotes a $T \times 1$ column of ones.

Finally, from these variance components, the ABB estimator can be used. It makes it possible to exploit more information in the sample than in the instrumental variable approach. In order to save space, the reader can refer to Greene (2003), pp.307-314 for a complete description of the procedure.²³

Results are presented in Table 2 (column 4). It is striking to observe that the lagged variable is highly significant. This strongly suggests the presence of entrance and exit barriers due to sunk costs. In addition, border effects, regional agreements and common languages are no longer significant. One explanation is that the lagged variable captures the influence of these "historical" or "inert" variables. However, the key gravity parameters (local GDP, partner GDP and distance) remain significant. In order to compare these estimates to those found in the static models, we calculated the long run elasticities from the dynamic model. The latter are of similar magnitude than the static parameter estimates, especially the GLS.

Since the dynamic model captures persistence habits in trade flows in addition to the other trade determinants, it has also been used for the calculation of the US export potential to MENA countries. In this respect, Figure 2c presents the dynamic calculation of trade potential, from ABB estimator. Unsurprisingly, the global US export potential to MENA countries is reduced as compared with static (HT) simulations (12 per cent). However, this potential remains significant. This means that even if we include habit persistence in trade flows, the USA still exports less to MENA countries than they should, as compared to the other OECD countries' exports, and as compared to non-MENA countries imports. Again, Maghreb countries present the greater trade potential with the USA (17-18 per cent), whereas this potential is below 15 per cent for the other MENA countries. Finally, as in the

²³ The computation procedure is also fully described in Greene (2004, pp. E8-30-39).

HT specification, there is also a decrease in the estimated actual/potential US export ratio in the dynamic version (from 0.90 in 1976-85 to 0.88 in 1996-2001). These results correlate with those obtained with the HT-specification, although the magnitude of trade potential is reduced in the dynamic model. They are also close to the preliminary results derived by Péridy (2004).

One important issue is the choice between the HT or the ABB specification regarding the calculation of trade potentials. Indeed, although the advantage of the dynamic equation is to account for past inertia in trade flows, one drawback is that it tends to even out both levels and variations of trade potential for a particular country, as well as differences in trade potential between countries. In fact, in the present study, it is very difficult to choose between a static or a dynamic version of the model. One reason for this is that there appears to be a lack of a rigorous testing framework that encompasses the dynamic GMM estimator and its static counterpart, as it is generally recognised (Harris and Matyas, 2001).²⁴ In fact, static and dynamic REM models provides complementary results in our study. Indeed, the dynamic approach focuses on the habit persistence in trade flows, while smoothing the effects of the other variables. It thus provides useful information about the US-MENA export potential if we include this inertia. Conversely, its static counterpart, which excludes trade hysteresis, highlights with more accuracy the US trade resistance as compared to other OECD countries vis-à-vis MENA markets. Thus, both static and dynamic models may be useful to highlight the US export potential towards the Middle-East.

5. CONCLUDING REMARKS

According to recent developments of gravity models, this paper derives an estimable equation which simultaneously includes various trade resistance variables, namely: Border effects, multilateral resistance variables, as well as specific bilateral interaction effects. The model is then tested in order to scrutinise the impact of these trade resistance variables on

²⁴ Except the statistical significance of the lagged dependent variable.

US exports to Middle-East countries, and the US export potential in this area. To that end, a selection of panel data specifications is proposed, focusing mainly on Hausman and Taylor models as well as Arellano and Bond dynamic models.

The main findings are as follows : firstly, after controlling for distance, borders, regional agreements and other determinants of trade flows, it appears clear that the USA suffers from a substantial trade integration deficit with MENA countries. Although this deficit is not specific to the USA, it is stronger than for the other OECD countries. This result is firstly highlighted by the strongly negative bilateral fixed effects derived from the standard AR(1) Within model. Secondly, estimations from a HT model reveal that the US border effect with regards to MENA countries is much higher than for the other OECD countries. Finally, the US export potential was estimated with regards to MENA countries through both HT and dynamic ABB model. It was showed that the USA presents the smallest actual/potential ratio amongst the main OECD countries. Furthermore, the gap between actual and potential exports increases over time. These results are further highlighted by the calculation of trade potential from an in-sample approach. Although the precise reasons for this detrimental US export position may be debated, all these results correlate together and thus substantially reflect the lack of trade integration between the USA and these countries, especially Maghreb countries.

Another set of interesting results is that there is no evidence of trade creation for the EU's exports to MENA countries, following the implementation of the euro-mediterranean FTA. Similarly, there is no evidence of trade diversion for the US exports, due to this agreement. This may be explained by the fact that this FTA has only been partly implemented.

Given these results, it seems that the implementation of the US-MENA FTA could help the USA to progressively improve their export position with regards to Maghreb countries. Without this FTA, the USA is likely to suffer from trade diversion due to the completion of the Euromed FTA. This would further reinforce the share of the EU in MENA countries exports, and thus prevent the latter from diversifying their supplying sources.

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Figure 1 : Key indicators of the US export position towards MENA countries

Table 1a: US and other OECD countries' exports to MENA countries (2002)						Table 1b: Geographical composition of US exports to MENA countries				
	exports to MENA billion US\$	% annual var 1995-2002	share of MENA in total exports (%)	share in MENA imports from OECD(%)	trade balance billion US\$		exports 2002 billion US\$	country rank for US exports	trade balance (2001)	
									all products	oil excluded
USA	8.1	-2.5	1.6	15.2	-6.6	Saudi Arabia	3.39	24	-6.4	4.5
EU	34.5	1.6	4.5	64.4	4.9	Egypt	2.39	33	2.9	3.0
of which France	9.5	1.6	9.4	17.8	1.4	Algeria	0.82	55	-1.5	0.7
Japan	4.0	1.8	1.1	7.5	-6.2	Morocco	0.47	67	-0.2	-0.1
other OECD	6.9	2.6	1.0	12.9	-4.3	Jordan	0.33	73	0.1	0.0
total OECD	53.5	1.8	2.8	100.0	-12.2	Tunisia	0.16	88	0.2	0.2

Figure 1b - IEP: US relatively to the EU

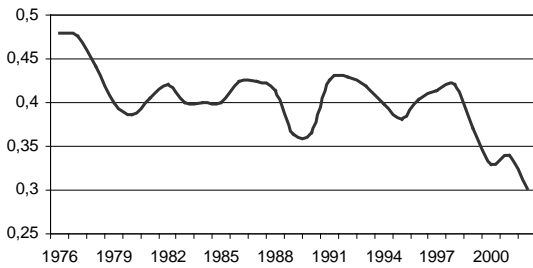


Figure 1a : sectoral composition of US exports to MENA countries (2001)

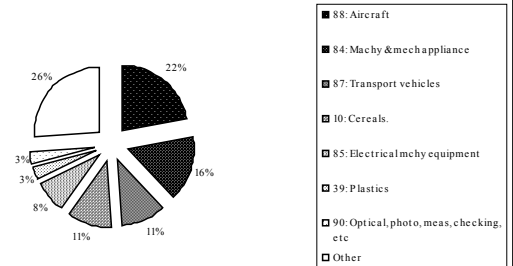


Figure 1c: IEP: US relatively to other (non EU) OECD countries

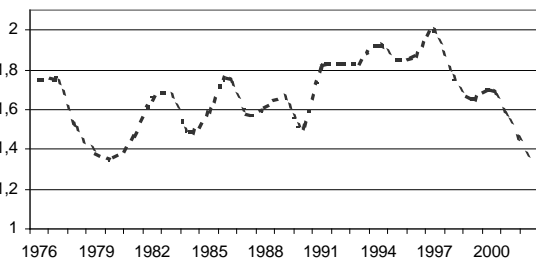
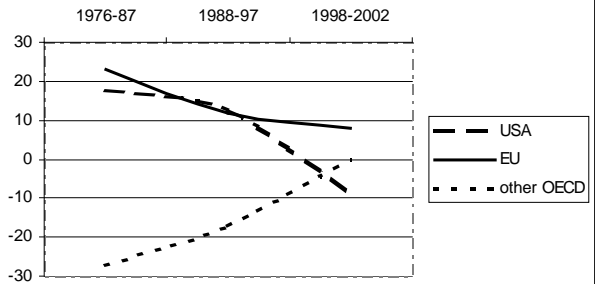


Figure 1d: IREV viv-a-vis MENA countries



sources : own calculations from : OECD: Monthly statistics of international trade, vol. 2004(1) ; OECD International Trade by Commodity, vol.2002(1); CEPII: CHELEM (Harmonised Accounts on the World Economy), vol.2003 (5.2)

Table 2 : Estimation results for a selection of panel data model

	Within (AR[1])	GLS (AR[1])	Hausman-Taylor (HT-2) (a)	ABB	
				parameter estimates	Long-Run elasticities
Exporter GDP (Yi)	1.568***	1.068***	1.654***	0.170***	0.905
Importer GDP (Yj)	1.041***	1.072***	1.118***	0.183***	0.968
Regional agreements (Rij)	0.339***	0.292***	0.341***	0.051	0.270
Distance (Dij)	-	-0.929***	-0.842***	-0.299***	-1.580
Border (Bij)	-	-2.173***	-2.240***	-0.519	-2.746
Common Language (Lij)	-	0.565***	0.487***	0.081	0.429
Constant	-	-11.209***	-20.046***	-2.350***	-12.434
lagged exports (Xij-1)	-	-	-	0.811***	-
<i>number of observations</i>	23220	23220	23220	22360	-
<i>number of bilateral relations</i>	860	860	860	860	-
<i>adjusted r-squared</i>	0.953	0.782	0.951	0.793	-
F-test: a1=a2=1 [F(2,22331)]	128.01***				
F-test: a1=1 [F(1,22331)]	253.31***				
F-test: a2=1 [F(1,22331)]	3.42**				
Wald tests:					
exporter effects (β_i) ; F(19,23197)	67.8***	-	-	-	-
importer effects (λ_j) F(42,23155)	97.1***	-	-	-	-
bilateral effects (η_{ij}) ; F(859,23357)	190.1***	-	-	-	-
time effects (ϕ_t) ; F(26,22330)	47.6***	-	-	-	-
Hausman and Taylor estimates:	-				
Estimated θ_{ij}	-	0.78	0.91		
Estimated σ_v	-	0.28	0.28		
Estimated σ_μ	-	0.16	0.32		
AIC	-1.274	-2.004	-1.722	-1.905	-
LM test	1731.11***	50354***	-	-	-
Hausman χ^2 test	-	754.35***	-	-	-
Estimated autocorrelation (rho)	0.699***	0.699***	0.987***	-	-

*** significant at 1%

** significant at 5%

* significant at 10%

(a) HT-1: $\theta_{ij}=0.88$; $\sigma_v=0.28$; $\sigma_\mu=0.23$; Yi's parameter=1.684; Yj's parameter=1.153; Rij's parameter=0.368

HT-2: $\theta_{ij}=0.91$; $\sigma_v=0.28$; $\sigma_\mu=0.32$; Yi's parameter=1.654; Yj's parameter=1.118; Rij's parameter=0.341

HT-3: $\theta_{ij}=0.88$; $\sigma_v=0.28$; $\sigma_\mu=0.23$; Yi's parameter=1.676; Yj's parameter=1.148; Rij's parameter=0.360

HT-4: $\theta_{ij}=0.86$; $\sigma_v=0.28$; $\sigma_\mu=0.21$; Yi's parameter=1.694; Yj's parameter=1.163; Rij's parameter=0.371

Table 3 : Estimated fixed effects from the Generalized AR(1) FEM

Mexico	-2.18981	India	-2.08173	India	-4.233
Turkey	-1.27194	China	-1.72969	China	-3.72208
USA	-1.22287	Brazil	-1.70738	Greece	-3.10215
Spain	-0.63063	Argentina	-1.45705	Turkey	-3.09517
Japan	-0.4936	Mexico	-1.18519	Argentina	-3.01506
Italy	-0.45277	Philippines	-0.95889	Algeria	-2.99711
Canada	-0.41707	South Africa	-0.93614	Italy	-2.99523
France	-0.25963	Japan	-0.70669	Morocco	-2.97956
Australia	-0.18524	USA	-0.60345	Tunisia	-2.97217
UK	-0.12914	Italy	-0.53321	Brazil	-2.94139
Germany	0.01381	Spain	-0.29069	South Africa	-2.87133
South Korea	0.11062	Thailand	-0.28309	Austria	-2.82718
Austria	0.35901	Greece	-0.24668	Portugal	-2.70881
Denmark	0.72844	France	-0.23316	Spain	-2.64043
New Zealand	0.77481	Algeria	-0.23277	France	-2.47026
The Netherlands	0.82751	Morocco	-0.22318	Germany	-2.45991
Norway	0.84066	Turkey	-0.21156	Denmark	-2.39407
Finland	0.99203	Chile	-0.07562	Thailand	-2.38665
Sweden	1.2185	South Korea	-0.01954	Finland	-2.35379
Switzerland	1.38731	Germany	0.021	Philippines	-2.218
		Portugal	0.04224	Japan	-2.2068
		Canada	0.06946	UK	-1.99775
		Austria	0.10343	Norway	-1.99481
		UK	0.12432	Sweden	-1.98287
		Tunisia	0.13619	Egypt	-1.82283
		Egypt	0.28945	Switzerland	-1.72687
		Australia	0.36397	Australia	-1.69711
		Finland	0.4103	New Zealand	-1.68277
		Ireland	0.43919	Chile	-1.61163
		Malaysia	0.47102	South Korea	-1.46628
		Taiwan	0.51879	BLEU	-1.46014
		Saudi Arabia	0.52823	Saudi Arabia	-1.42097
		Denmark	0.54042	Jordan	-1.41241
		New Zealand	0.63776	The Netherlar	-1.32698
		Sweden	0.65668	Hong-Kong	-1.26328
		The Netherlar	0.67207	Malaysia	-1.25744
		Norway	0.73292	Mexico	-1.19503
		BLEU	0.74153	Israel	-1.05826
		Israel	0.85943	Taiwan	-1.05373
		Switzerland	0.86198	Ireland	-1.0309
		Hong-Kong	1.18999	Canada	-0.19202
		Jordan	1.30334	Singapore	0.21093
		Singapore	2.00198	USA	1.4227

Table 4 : Estimated border effects from the Hausman and Taylor model (HTM)

	Border Effects' parameter estimates			Border effect's trade impact (g) (4)	Euromed dummy (5)
	overall (1)	with MENA (2)	with MENA (1998-2001) (3)		
Norway	-3.305***	-11.572***	-11.662***	1449%	0.079
USA	-2.729***	-10.981***	-10.310***	1158%	-0.115
UK	-2.674***	-10.830***	-10.065***	821%	0.122
Sweden	-3.366***	-10.150***	-10.343***	2089%	-0.052
Switzerland	-2.818***	-9.210***	-9.758***	822%	-0.058
Austria	-3.297***	-7.870***	-8.862***	1836%	-0.165
The Netherlands	-1.242**	-7.281***	-8.404***	175%	-0.094
Denmark	-2.982***	-7.011***	-9.036***	1191%	-0.259**
Germany	-1.517***	-5.314***	-6.906***	278%	-0.036
Spain	-1.418**	-4.267***	-4.283***	231%	-0.018
Finland	-3.742***	-4.150*	-5.030***	3096%	-0.084
Canada	-4.270***	-3.722***	-3.602**	5023%	-0.145
France	-1.648***	-3.595***	-4.696***	334%	-0.181**
Italy	-1.947***	-3.465***	-3.818***	467%	-0.164*
Turkey	-3.813***	-2.610**	-3.942***	2567%	-0.046
New Zealand	-1.524	0.254	-0.177	-	-0.361*
Australia	-0.417	0.274	0.239	-	0.048
Japan	-0.97	0.308	0.259	-	-0.082
Korea	-2.109	0.401	0.188	-	0.436
all OECD	-2.240***	-2.675***	-3.088***	838%	-

*** significant at 1%

** significant at 5%

* significant at 10%

Figure 2 : Estimated U.S. and other OECD's export potential to MENA countries

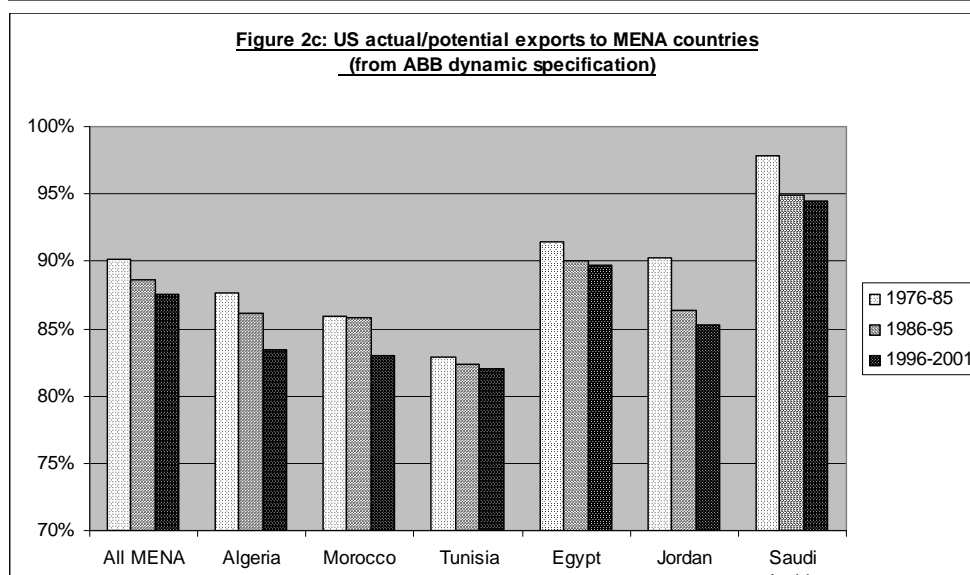
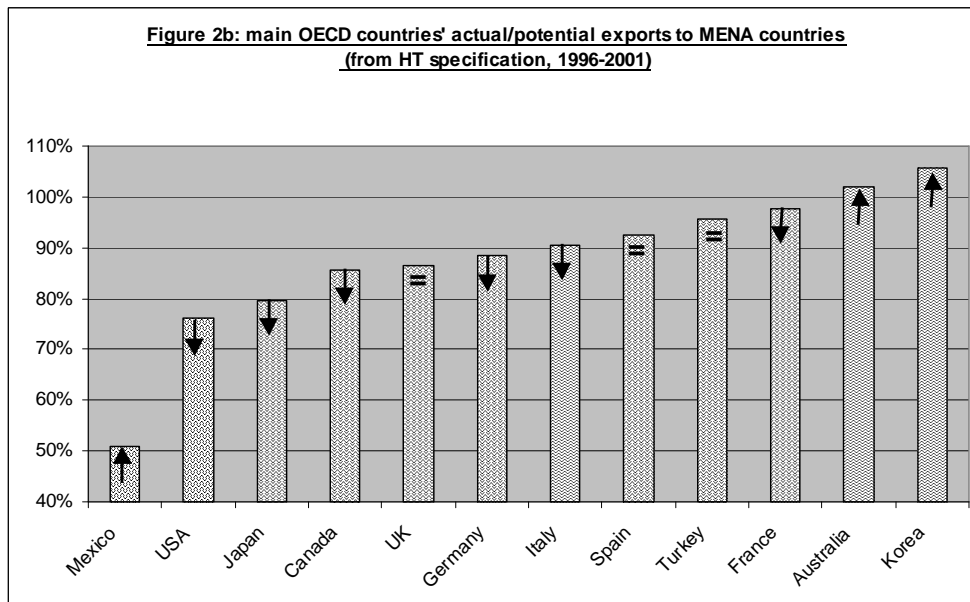
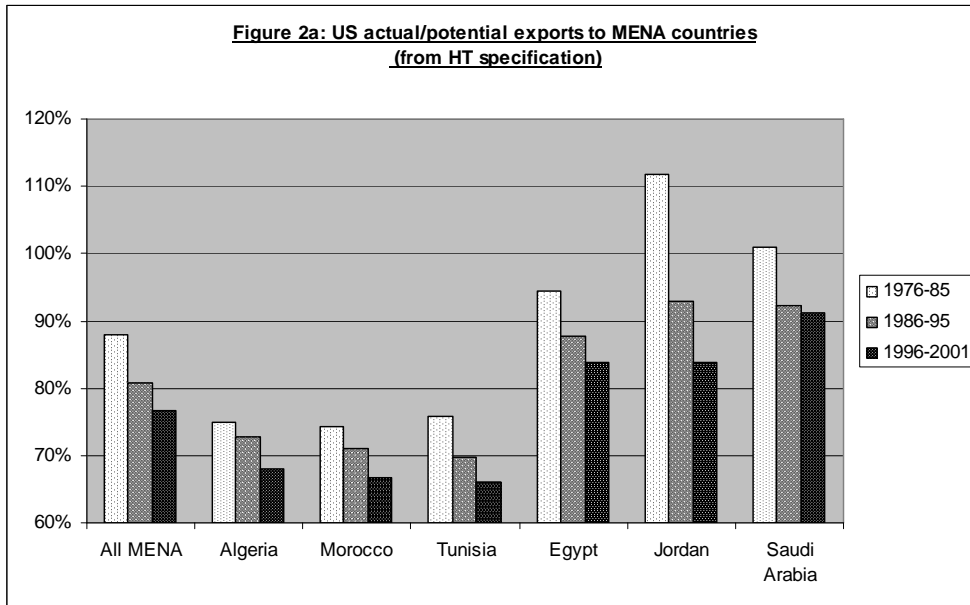


Table 5 : A comparison of the actual/potential US export ratio in-sample and out-sample

	1976-85		1986-95		1996-2001	
	out-sample	in-sample	out-sample	in-sample	out-sample	in-sample
All MENA	0.879	0.869	0.808	0.802	0.766	0.762
Algeria	0.749	0.745	0.728	0.726	0.681	0.68
Morocco	0.743	0.736	0.71	0.706	0.667	0.665
Tunisia	0.759	0.746	0.698	0.689	0.661	0.655
Egypt	0.945	0.938	0.878	0.875	0.838	0.837
Jordan	1.117	1.098	0.93	0.906	0.834	0.819
Saudi Arabia	1.009	1.005	0.925	0.922	0.913	0.913