

# The new U.S. trans–ocean free trade initiatives: estimating export and FDI potentials from dynamic panel data models

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## *Abstract*

The USA has recently launched new trans–ocean free trade initiatives with Australia, the ASEAN, the Southern African Customs Union (SACU), as well as Middle–East and North African (MENA) countries. This paper provides the first comparative estimation of trade and FDI potentials between the USA and these new partner countries. We first derive a dynamic two–equation trade and FDI model, which is afterwards estimated with GMM. Trade and FDI potentials are then calculated from these models' residuals with an out–of–sample technique. Results highlight significant US trade and FDI potential regarding Maghreb countries, Indonesia, as well as SACU. However, the free trade initiative with most ASEAN countries is expected to have limited effects, given that these countries have already outstripped their potential trade and FDI flows with the USA.

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# 1 Introduction

Given that recent multilateral trade negotiations stalled at Cancun, the U.S. administration is now rapidly gearing its trade policy towards greater regionalism. Hence, after the completion of the Northern American Free Trade Area (NAFTA), the USA is increasingly extending free trade arrangements to its neighbors, with the prospect of achieving the Free Trade Area of the Americas (FTAA). In this connection, the first agreement was concluded with Chile in 2003, and negotiations were undertaken with Central American Nations (CAFTA) at the same time.

More surprisingly, the U.S. administration also initiated very quick negotiations with countries further away from the USA. Hence, free trade agreements were successively concluded with Jordan (2002), Singapore (2003), as well as Australia and Morocco (2004). Three other groups of countries are now negotiating a FTA with the USA: the first is the Southern African Customs Union (SACU)<sup>1</sup>, which started negotiating the FTA in June 2003. Built on the success of the African Growth and Opportunity Act (AGOA), this move towards a FTA is the first of this kind which involves sub-saharian African countries. Although these countries account for less than 1% of overall U.S. trade and FDI, the FTA prospect is expected to rapidly boost trade and investment flows with the USA.

A second group of countries concerns the ASEAN. These countries concluded the Enterprise for ASEAN Initiative (EAI) with the USA in 2002. This offers the prospect of bilateral FTAs to be in force within a decade, after several steps: the WTO's accession for the remaining non signatory countries (Cambodia, Laos and Vietnam); the conclusion of Trade and Investment Framework Agreements (TIFAs), which intend to progressively reduce discriminating trade and FDI barriers<sup>2</sup>. The final step is the implementation of bilateral FTAs, as it was the case with Singapore<sup>3</sup>.

The last group includes Middle-East and North-African (MENA) countries. Indeed, The U.S.-Middle-East free trade initiative, launched in 2003, currently includes Egypt, Tunisia, Algeria, Saudi Arabia, Kuwait, Yemen, as well as Bahrein. All these countries have carried out TIFAs, as a first step towards a FTA with the USA. The FTA process is thus similar to that of the ASEAN.

Overall, these U.S. trans-ocean free trade initiatives include 26 U.S. partner countries, which together account for 8% and 11% of U.S. outward investment and exports respectively (Table 1). The contents of these agreements are far-reaching, since they include not only trade provisions, but also FDI and services. In addition, all products are generally covered within the trade provisions, including textile and agriculture.

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<sup>1</sup>It includes: Bostwana, Lesotho, Namibia, South Africa and Swaziland.

<sup>2</sup>TIFAs have recently been concluded with Indonesia, Philippines, and Thailand.

<sup>3</sup>See <http://www.ustr.gov/new/fta> for a detailed description of these agreements.

The US economic motivations for this « new age » regional policy are numerous : firstly, it makes possible to avoid slow and painful multilateral negotiations for further trade liberalization; A second objective is to enhance the U.S. developing partners' efforts to attract new trade and investment, and thus to foster economic growth and living standards, especially in the Middle-East. A third motivation may also be found in the need for the USA to reach additional preferential market access as a means of cutting the huge U.S. trade deficit. Finally, as the EU has already concluded free trade agreements with MENA countries (in addition to negotiations with South Africa), the new US regional initiative aims at reducing the potential trade diversion caused by these EU arrangements.

All these motivations lead to a key question, i.e. what is the U.S. export and FDI potential vis-a-vis these countries, within the framework of this new regional initiative? Until now, there has been no comprehensive study which deals with these effects for all the countries involved in the new U.S. regional policy. Instead, the existing studies focus on a few countries, and do not always provide a quantitative analysis. Moreover, they are limited to the trade aspects and disregard FDI potential<sup>4</sup>. The paper proposed here aims at filling this lack of literature. It provides an extensive comparative analysis of US trade and FDI potentials with most of its new partners.

Based on new developments of the gravity equation, section 2 provides a two-equation model for US bilateral trade and FDI. This model is estimated in section 3, within a dynamic panel data framework, using the Arellano, Bond and Bover's (1995, 1998) estimator. Afterwards, the U.S. export and FDI potentials are calculated from the residuals. To that end, we use an out-of-sample technique in order to avoid misspecification biases, as suggested in Egger (2002). The robustness of the results is checked out using various specifications and econometric testing.

## 2 The Model

In recent years, it has been increasingly recognized that the gravity equation could 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, Shelburne 2002), but also the reciprocal-dumping model (Feenstra, Markusen and Rose, 2001). It may also be derived from both complete or incomplete specialization frameworks (Haveman and Hummel 2004). Additional improvement has been made by Anderson and van Wincoop (2003), and Deardorff (2004), who particularly focus on the effects of trade costs. Finally, the recent theoretical literature on multinational firms indicates that FDI and trade may be

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<sup>4</sup>See Rajan, Sen and Siregar (2003), Tongzong (2003) as well as Brown, Deardorff and Stern (2003) for the US-Singapore FTA, and Péridy (2004) for the agreement between the USA and some MENA countries.

determined by the same factors (Egger, 2001). This justifies that the gravity equation may simultaneously be applied to FDI and export flows (Dee and Gali, 2003).

The model described here is based on the product differentiation framework. The advantage of this model is that it explains both inter and intra-industry trade. This particularly fits our country sample, which includes both North-North and North-South trade flows. Another advantage is that it applies both to trade and FDI, with the same explaining factors<sup>5</sup>. Since this model has been widely used in the literature since Helpman and Krugman (1985), we do not formally derive the whole model here. However, we slightly amend the basic monopolistic competition model in order to take into account the interdependence between exports and FDI, as well as persistence habits in trade and investment flows<sup>6</sup> (through the addition of a lagged dependent variable). Hence, the two-equation gravity model used here is as follows:

$$\begin{aligned} \ln EXP_{jt} &= \alpha_0 + \alpha_1 \ln EXP_{jt-1} + \alpha_2 \ln FDI_{jt} + \alpha_3 \ln SGDP_{jt} + \alpha_4 \ln DGDP_{jt} \\ &\quad + \alpha_5 \ln SIMI_{jt} + \alpha_6 \ln DIST_j + \alpha_7 \ln REG_{jt} + \alpha_8 \ln LANG_j \\ &\quad + \gamma_j + \delta_t + \varepsilon_{jt} \end{aligned} \quad (1)$$

$$\begin{aligned} \ln FDI_{jt} &= \beta_0 + \beta_1 \ln FDI_{jt-1} + \beta_2 \ln EXP_{jt} + \beta_3 \ln SGDP_{jt} + \beta_4 \ln DGDP_{jt} \\ &\quad + \beta_5 \ln SIMI_{jt} + \beta_6 \ln DIST_j + \beta_7 \ln REG_{jt} + \beta_8 \ln LANG_j \\ &\quad + \gamma'_j + \delta'_t + \varepsilon'_{jt} \end{aligned} \quad (2)$$

where  $EXP_{jt}$  and  $FDI_{jt}$  denote exports and FDI stocks from the USA to country  $j$  at year  $t$ . 56 U.S. import partners were selected, which cover about 95% of U.S. exports and outward FDI<sup>7</sup>. The selected time period is from 1982 to 2001.  $SGDP_{jt}$  reflects the sum of the U.S' and each partner's GDP;  $DGDP_{jt}$  corresponds to the absolute difference in GDP per capita between the USA and country  $j$ . It is used as a proxy for the difference in relative factor endowment;  $SIMI_{jt}$  accounts for the similarity in country size between the USA and country  $j$  in terms of aggregate GDP<sup>8</sup>;  $DIST_j$  is the geographical distance between the USA and country  $j$ 's economic center, as a proxy for transport costs;  $REG_{jt}$  represents the regional agreements in force with the USA, namely: NAFTA and the US-Israel FTA;  $LANG_j$  reflects the common language with the USA; Finally,  $\gamma_j$ ,  $\delta_t$ ,  $\gamma'_j$  and  $\delta'_t$  capture the unobserved country and time effects.

<sup>5</sup>See Egger (2001) for a detailed theoretical survey.

<sup>6</sup>See Baldwin and Krugman (1989) for a detailed theoretical analysis of hysteresis in trade flows.

<sup>7</sup>These are the OECD countries (except Eastern European countries), Hong Kong, Taiwan, India, China, Brazil, Argentina, Chile, in addition to the 26 partners which have negotiated or concluded a FTA with the USA.

<sup>8</sup>Following Helpman (1987), it may be define as follows:

$$SIMI_{jt} = \ln \left[ 1 - \left( \frac{GDP_t}{GDP_t + GDP_{jt}} \right)^2 - \left( \frac{GDP_{jt}}{GDP_t + GDP_{jt}} \right)^2 \right]$$

with  $0 < SIMI < 0.5$ .

The main data sources are as follows: OECD Monthly Statistics of International Trade (Trade by country, annual, vol.1, 2004); OECD International Direct Investment Yearbook (vol.2, 2002), as well as CEPII (CHELEM: Harmonized Accounts on the World Economy, vol. 5.2, 2003).

From an econometric point of view, the introduction of the lagged dependent variables may introduce a bias due to the correlation of these variables with the composite disturbance terms. Due to the likely existence of a simultaneity bias, the most appropriate method of estimation appears to be GMM. We thus performed the Arellano, Bond and Bover's (ABB) estimator (Arellano and Bond, 1998; Arellano and Bover, 1995). Specifically, the model parameters have been firstly and consistently estimated by 2SLS in first differences. As instruments, we used the one period lagged values of the exogenous variables. Following on from this, the consistent slope estimators were taken to compute usable residuals for variance estimation. Finally, these estimates were applied to the ABB (two-stage GMM) estimator.

Despite some interdependence between equations (1) and (2), these equations do not provide the complete linkage between exports and FDI, in the absence of the remaining elements in the balance of payment. Moreover, there is no cross-equation restriction which may be used to estimate these equations together. Finally, our aim is to keep all the specific information embodied in the export and FDI equations separately, as exporters and investors do not necessarily behave in the same way. For all these reasons, the export and FDI equations are estimated separately.

### 3 Estimation results

Table 2 describes the model's estimation results. Most parameters are significant at a 1% level. As theoretically expected, the lagged endogenous variables' parameters are significant and positive. This very much points to the existence of habit persistence in trade and FDI, which may be explained by sunk costs due to market entry or exit. Similarly, countries' size and similarity have a positive influence on bilateral exports and FDI, in line with both the traditional and the new trade (FDI) theory. In addition, cross-effects between FDI and exports are positive, which suggests a complementarity between these variables.

Differences in GDP per capita, which capture bilateral economic distance, are not significant in the export specification. This may be due to the fact that as our country sample includes both developed and developing partners, an increase in economic distance increases inter-industry trade but curbs intra-industry-trade, leaving overall trade unchanged (Krugman, 1995). However, the sign of this variable is significant and negative for FDI. This result is borne out by horizontal FDI models (Markusen and Venables, 2000).

Regarding regional arrangements, they expectedly exert a positive influence on trade. However, the corresponding parameter is insignificant for FDI. This again may be explained by two opposite theoretical forces: on the one hand, a regional arrangement makes exporting from the home country more attractive than FDI as a means to serving the regional market. On the other hand, this agreement may motivate firms to operate vertically in the FTA, which stimulates intra-FDI flows within this region. Thus, as stressed by Dee and Gali (2003), the FDI impact caused by FTAs continues to be an empirical issue.

The final parameters are distance and common language, which both present the expected sign, although the latter is insignificant in the export specification.

The robustness of the results is checked out through the estimation of the static counterpart of equations (1) and (2). To this end, we estimate an AR(1) Hausman and Taylor random effect model. It accounts for the correlation between the independent variables and the random effects, which is suggested by the Hausman test. The static parameters are then compared with the dynamic model's long run estimates. As shown in Table 2, both models provide very similar long run parameter values, with comparable significance levels. Other sensitivity tests have been undertaken by using various proxies for GDP and differences in GDP per capita. Again, the parameter magnitudes were very similar<sup>9</sup>.

The final step consists in the calculation of trade and FDI potentials for each bilateral flow involving the USA and its new partner countries. This may be carried out with the residuals of equations (1) and (2). Such a method has already been applied to estimate the effects of Eastern European countries' integration into the EU, and is still used in other gravity models, as in Buch et al. (2003). However, if the model is correctly specified, we should expect white noise residuals. Consequently, the systematic variation of the residuals cannot be interpreted as reflecting trade potential, but rather a misspecification of the model, due for example to serial correlation. In order to circumvent this problem, out-of-sample simulations are implemented, by excluding each reference partner from the estimation (Egger, 2002).

Results are described in Table 3. Trade and FDI potentials have been derived from the "residuals/actual exports" ratio, calculated for the average period 1997/2001. This ratio indicates whether the USA exports or invests less (or more) with a particular partner country than with all countries on average. Calculations have been implemented from the dynamic model, in order to account for the hysteresis commonly observed in trade and FDI flows. Comparisons are also provided with the static model. We observe that the magnitude of trade and FDI potentials is very similar in both specifications. The only difference is that the dynamic model tends to reduce the gap between actual and fitted flows, as it accounts for past inertia. As a consequence, export and FDI potentials are generally smaller in the dynamic version, albeit to a limited extent.

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<sup>9</sup>These last tests are not presented here in order to save space. They are available upon request.

Broadly speaking, there is only a limited trade and FDI potential for the USA with its new partner countries: This potential is estimated to be 5% (7%) of additional exports (FDI) for the SACU, and 0.5% for MENA countries (taking the dynamic estimations). Moreover, ASEAN and Australia are already above their potential level, once the influence of all the variables in the model has been taken into account. Such a limited potential for ASEAN may be due to the openness of most ASEAN countries a long time before the free trade initiative with the USA<sup>10</sup>. It may also be due to firms' and consumers' anticipations regarding the conclusion of FTAs with the USA, especially for Singapore and the other most advanced ASEAN countries (Thailand and Malaysia). An additional reason for Australia is the traditional tight cultural and economic links with the USA, which are captured by the common language. This further reduces the prospect of additional potential flows with the USA.<sup>11</sup>

Despite a limited overall trade and FDI potential, there are however substantial differences between countries, even inside the same group. The most striking example is MENA countries. The overall 0.5% estimated potential is somewhat misleading, since we include Israël, which has already been implementing a FTA with the USA since 1995. Consequently, this country has outstripped its trade and FDI potential by about 4%. Contrary to this, we find Maghreb countries as well as Jordan and Kuwait, which all present very high export and FDI potentials: for example, trade potential is estimated to be as much as 25% (Tunisia), whereas FDI potential is estimated to be 54% (Morocco) in the dynamic model, and even more in the static version. This indicates that the US trade integration is very much differentiated within the MENA region, as Maghreb countries currently trade very little with the USA, given their size, similarity and distance, as opposed to Israel. Consequently, the prospect of the FTA's completion offers significant trade potential with most MENA countries.

In the same way, differences in the trade and FDI potential very much depend on the country taken into consideration within the ASEAN region. As already mentioned, the USA have outstripped their potential with Singapore. However, there is still a significant trade potential with Indonesia (13%), as well as a positive FDI potential with Philippines.

The final remark concerns the specific impact of the FTA with the US. This issue goes far beyond the scope of this paper, since the estimations described above indicate the trade and FDI potentials of each country as compared to *all* the other countries, not only the countries which have concluded a FTA with the US. However, a first insight about the potential impact of the FTA may be provided by looking at the situation of Canada, Mexico and Israël, which all have already implemented a FTA with the USA.

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<sup>10</sup>Péridy (2004) calculated the border effects between the USA and its main partners. He finds that among all the US partners, the most developed ASEAN countries have the lowest border effects. This suggests that these countries have the lowest trade barriers with the USA. This may explain the fact that they have reached or even outstripped their export and FDI potential as compared with the other partners.

<sup>11</sup>Although the parameter which the common language reflects is not significant in the export model, it is nevertheless positive and used in the calculation of the Australian export potential with the USA.

Results outline that all these countries have outstripped their trade (FDI) potentials by about 4-9% (2-4%) respectively in the dynamic model. This provides a preliminary ex-ante information about the potential impact of a FTA with the other partners, assuming that its completion would lead these partners to exceed their potential by a similar percentage: the greatest trade and FDI effects would concern SACU, Maghreb countries, Jordan, Kuwait and Indonesia. Conversely, there is *a priori* little expected effect for the other ASEAN countries, which have already outpaced their potential by the same amount as Mexico. However, further investigation would be needed in order to calculate more accurately the specific ex-ante effects of a FTA with the USA. This would require the estimation of a computable general equilibrium model. Such a model should account for the specificities of each country regarding the CES and the other elasticities needed for the estimation. It would also require an imperfect competition framework in order to account for product differentiation and terms of trade effects.

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Figure 1: U.S. outward FDI and exports to its new partner countries (2001).

from the USA to:	FDI		EXPORTS	
	mio US\$	country share	mio US\$	country share
<b>Australia</b>	<b>32574</b>	<b>2,4%</b>	<b>10437</b>	<b>1,61%</b>
<b>ASEAN, of which:</b>	<b>56150</b>	<b>4,1%</b>	<b>37157</b>	<b>5,75%</b>
Singapore	26749	1,9%	12244	1,89%
Malaysia	7748	0,6%	8623	1,33%
Thailand	6444	0,5%	5770	0,89%
Philippines	3279	0,2%	7482	1,16%
Indonesia	8227	0,6%	2083	0,32%
Brunei	n.a.	n.a.	87	0,01%
Vietnam	n.a.	n.a.	384	0,06%
Laos	n.a.	n.a.	3	0,00%
Myomnar	n.a.	n.a.	9	0,00%
Cambodia	n.a.	n.a.	25	0,00%
<b>SACU, of which:</b>	<b>5100</b>	<b>0,4%</b>	<b>5728</b>	<b>0,89%</b>
South Africa	3088	0,2%	3132	0,48%
Bostwana	n.a.	n.a.	360	0,06%
Lesotho	n.a.	n.a.	7	0,00%
Namibia	n.a.	n.a.	2130	0,33%
Swaziland	n.a.	n.a.	99	0,02%
<b>MENA, of which:</b>	<b>20900</b>	<b>1,5%</b>	<b>17975</b>	<b>2,78%</b>
Israel	4864	0,4%	5886	0,91%
Algeria	4000	0,3%	1005	0,16%
Morocco	55	0,0%	285	0,04%
Tunisia	1722	0,1%	275	0,04%
Egypt	2537	0,2%	3759	0,58%
Jordan	815	0,1%	264	0,04%
Saudi Arabia	5500	0,4%	4975	0,77%
Kuwait	190	0,0%	755	0,12%
Yemen	n.a.	n.a.	410	0,06%
Bahreïn	n.a.	n.a.	361	0,06%
<b>Total 26</b>	<b>114724</b>	<b>8,3%</b>	<b>71297</b>	<b>11,0%</b>
<b>World</b>	<b>1381674</b>	<b>100,0%</b>	<b>646567</b>	<b>100,0%</b>

Figure 2: Estimation Results.

	<b>EXPORTS</b>		
	Dynamic		static
	parameter estimates	lon run parameters	parameter estimates
Exports	-	-	-
Lagged exports	0,240***	-	-
FDI	0,095***	0,125	0,105***
Lagged FDI	-	-	-
Sum of GDPs	1,318***	1,734	1,574***
Differences in GDP per cap.	-0,002	-0,003	-0,055
GDP similarity	0,486***	0,639	0,821***
Distance	-0,181**	-0,238	-0,243***
Regional arrangements	0,193***	0,254	0,272***
Common language	0,163	0,214	0,186
Constant	-12,368***	-16,274	-13,55***
<i>number of observations</i>	893	-	893
<i>adjusted r-squared</i>	0,973	-	0,971
<i>AIC</i>	-2,918	-	-2,787
<i>LM</i>	205,56***	-	5877,6***
<i>Hausman</i>	-	-	753,25***
<i>Serial corr (rho)</i>	-	-	0,666
	<b>FDI</b>		
	dynamic		static
	parameter estimates	lon run parameters	
Exports	0,256***	0,357	0,328***
Lagged exports	-	-	-
FDI	-	-	-
Lagged FDI	0,283***	-	-
Sum of GDPs	2,710***	3,780	3,371***
Differences in GDP per cap.	-0,227***	-0,317	-0,270***
GDP similarity	0,176***	0,245	0,239***
Distance	-0,306***	-0,427	-0,453***
Regional arrangements	-0,144	-0,201	-0,095
Common language	0,426**	0,594	0,617**
Constant	-33,839***	-47,195	-44,108***
<i>number of observations</i>	893	-	893
<i>adjusted r-squared</i>	0,962	-	0,952
<i>AIC</i>	-2,025	-	-1,797
<i>LM</i>	338,46***	-	5762,1***
<i>Hausman</i>	-	-	997,65***
<i>Serial corr (rho)</i>	0,638	-	0,821

\*\*\* significant at 1%

\*\* significant at 5%

\* significant at 10%

Figure 3: U.S. outward FDI and exports to its new partner countries (2001).

	FDI potential (%)		Export potential (%)	
	Dynamic	Static	Dynamic	Static
<b>Australia</b>	<b>-4,1</b>	<b>-7,2</b>	<b>-1,3</b>	<b>-2,6</b>
<b>ASEAN, of which:</b>	<b>-3,4</b>	<b>-5,9</b>	<b>-4,4</b>	<b>-5,2</b>
Singapore	-10,3	-16,9	-12,4	-19,6
Malaysia	-3,4	-6,3	-7,6	-11,2
Thailand	-0,9	-1,9	0,0	0,2
Philippines	2,7	2,4	-4,0	-5,2
Indonesia	-5,9	-8,0	13,0	18,0
<b>SACU, of which:</b>	<b>6,6</b>	<b>9,6</b>	<b>4,7</b>	<b>6,8</b>
South Africa	8,5	12,6	8,1	10,8
<b>MENA, of which:</b>	<b>0,5</b>	<b>0,9</b>	<b>0,5</b>	<b>0,7</b>
Israel	-2,5	-1,9	-3,7	-6,9
Algeria	-3,7	-3,7	18,6	23,2
Morocco	54,2	75,0	17,0	20,2
Tunisia	-2,7	-3,6	25,8	29,3
Egypt	5,6	7,7	1,4	1,4
Jordan	0,4	0,8	13,0	9,0
Saudi Arabia	0,0	0,7	-0,8	-2,3
Kuwait	48,3	49,8	7,0	10,0
<i>Canada</i>	<i>-3,2</i>	<i>-3,9</i>	<i>-6,4</i>	<i>-8,3</i>
<i>Mexico</i>	<i>-2,1</i>	<i>-4,2</i>	<i>-9,0</i>	<i>-10,5</i>