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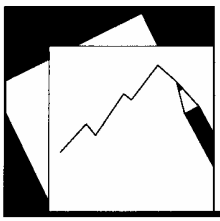

IMF Working Paper

Is the Middle East and North Africa Region Achieving Its Trade Potential?

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Abstract

This paper analyzes export performance in the Middle East and North Africa (MENA) using a gravity model applied to panel data. It addresses two questions: (i) are there significant unexploited export markets for the MENA region?; and (ii) have integration efforts with the EU since the mid-1990s yielded positive results? The results suggest that several MENA countries are substantially underexploiting the United States as an export market. Moreover, the impact of integration efforts with the European Union has been moderate overall but significant in individual cases.

JEL Classification Numbers: C33, F15, O24

Keywords: Middle East and North Africa, Association Agreement, trade, trade potential, gravity model, Algeria, Egypt, Jordan, Morocco, Syria, Tunisia

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I. INTRODUCTION

Improving growth and tackling high unemployment rates are among the greatest challenges for Middle East and North African (MENA) countries. These challenges will no doubt need to be addressed by a broad mix of macroeconomic and structural reforms. This paper studies one important aspect of this challenge, namely the scope for enhancing international trade. Further trade liberalization and trade facilitation in the MENA region is important for at least three broad reasons. First, to improve economic performance in a durable manner, it is crucial to accelerate productivity growth. Increased trade openness can contribute to productivity growth by means of a more efficient allocation of resources, technology transfers, access to a wider range of inputs, competitive pressure, and scale effects. Second, to ensure external sustainability and sufficient demand, growth needs to be largely export-driven. Several MENA countries are exposed to external vulnerabilities that would be substantially mitigated by strong export growth. In addition, given the small size of local markets, it is questionable whether domestic demand could constitute viable engines of growth. Finally, most MENA countries are in need of economic diversification, since they are often dependent on either commodity or agricultural export. Increased diversification would protect MENA countries against terms of trade shocks or climatic vagaries. In addition, increased diversification is directly associated with improved productivity (see, e.g., Feenstra and others, 1999 and Berthélemy and Söderling, 2001). In this regard, international trade can be an important factor in encouraging product diversification.

This study attempts to quantify the scope for increasing MENA countries' external trade in the near-to-medium term. The analysis uses a gravity model of bilateral trade, incorporating important recent theoretical developments by Anderson and van Wincoop (2003). The model is applied to a panel dataset covering some 90 countries and about 90 percent of total world trade. The gravity model predicts a global benchmark level of bilateral trade based on a number of characteristics of the countries involved. Deviations from the benchmark provide a measure of the potential to increase trade between particular countries. While the exact magnitude of such estimates should be treated with a degree of caution, they can provide guidance as to (a) what the prospects are of significantly increasing trade over the near-to-medium term; and (b) which countries present the greatest untapped potential for increasing trade.

Particular attention will be given to the impact of integration efforts between the (pre-2004 accession) European Union (EU) and a number of Southern and Eastern Mediterranean countries (hereinafter referred to as Mediterranean countries), which began in earnest in the mid-1990s with the Barcelona process. The Barcelona process aims at an eventual Euro-Mediterranean free trade zone. In this context, the main instruments used are bilateral association agreements with the European Union (AAEUs), supported by grants under the MEDA program, and complemented by loans from the European Investment Bank (EIB). An AAEU came into force first with the Palestinian Authority (1997), followed by agreements with Tunisia[2] (1998), Morocco (2000), Israel (2000), Jordan (2002), and Egypt (2004). Lebanon and

[2] Tunisia signed the AAEU in 1995 and began implementing its provisions in 1996, i.e. two years ahead of ratification by all parties.

Algeria signed their agreements in 2002 (both await ratification by all EU member states). Negotiations were concluded with Syria in 2003. This study focuses on six MENA countries: Algeria, Egypt, Jordan, Morocco, Syria, and Tunisia. In particular, Morocco and Tunisia will be analyzed in some detail in view of their further advances within the Barcelona process and given their export composition, which makes them more likely to benefit from trade integration than other countries in the sample. The Palestinian Authority and Lebanon were excluded owing to data limitations.

The relevant questions are whether the Barcelona process has resulted in a closer integration between Mediterranean countries and the EU and, if so, whether this has been achieved at the cost of undue concentration of trade toward the EU. We will suggest that the result of the Barcelona process has been uneven and that there is still room for most countries in the sample to enhance their integration with the EU . Nevertheless, the analysis will also point to significant underexploited export markets outside the EU (notably the United States) with which MENA countries could increase trade.[3]

II. Analytical Framework

A. The Model

The underlying model is based on Anderson and van Wincoop (2003). Each country is assumed to produce a fixed quantity of a unique bundle of goods. On the demand side, consumers around the world choose between goods from different countries, which are imperfectly substitutable following a constant elasticity of substitution (CES) function. Accordingly, the consumer in country *j* maximizes the utility function

$$U_j(c) = \left(\sum_i \beta_i^{(1-\sigma)/\sigma} c_{ij}^{(\sigma-1)/\sigma} \right)^{\sigma/(\sigma-1)} \qquad (1)$$

subject to the budget constraint

$$\sum_i p_{ij} c_{ij} = y_j \qquad (2)$$

where c_{ij} is consumption by country *j* of goods from country *i*, i.e. country *j's* real imports from country *i* (including country *j*'s "imports" to itself, see below), β_i is a positive distribution parameter,[4] σ is the elasticity of substitution between goods from different countries (assumed

[3] This paper will not address the important issue of regional integration, since the potential benefits of the latter likely go beyond the direct impact on trade. For example, regional integration could mitigate so called hub-and-spoke effects deriving from closer integration with the EU, and might induce accelerated structural reforms in participating countries. The analytical framework used here can not be used to study these aspects of regional integration.

[4] $\beta_i^{(1-\sigma)/\sigma}$ can be interpreted as the number of goods within the bundle produced by country *i*.

greater than 1), p_{ij} is the price of the good from country *i* in country *j*, and y_j is nominal income in country *j*. The bilateral import price p_{ij} depends on the producer price and on trade costs (including transportation costs, tariffs, and other trade barriers broadly defined) so that $p_{ij} = p_i t_{ij}$, ($t_{ij} > 1$), with p_i and t_{ij}-1 denoting producer prices and trade costs, respectively.

Denoting nominal imports from country *i* to country *j* by $x_{ij} = p_i c_{ij}$, the solution to the optimization problem is

$$x_{ij} = \left(\frac{\beta_i p_i t_{ij}}{P_j} \right)^{(1-\sigma)} y_j \tag{3}$$

where P_j is a consumer price index of country *j* given by

$$P_j = \left(\sum_i \left(\beta_i p_i t_{ij} \right)^{(1-\sigma)} \right)^{1/(1-\sigma)} \tag{4}$$

Imposing market clearance (i.e. $y_i = \sum_j x_{ij}$), Anderson and van Wincoop (2003) show that the gravity equation can be expressed as

$$x_{ij} = \frac{y_i y_j}{y_w} \left(\frac{t_{ij}}{\Pi_i P_j} \right)^{(1-\sigma)} \tag{5}$$

where y_w is global income and Π_i is a price index for the exporting country, similar to the one for the importing country, the P_j. The presence of Π_i and P_j in the denominator of equation (5) implies that what matters for trade is not the *absolute* level of bilateral trade barriers (t_{ij}), it is bilateral barriers *relative* to the overall price indices. This has major consequences for the estimation and interpretation of gravity equations, generally overlooked in empirical applications prior to the publication of Anderson and van Wincoop's paper. Interpretation issues will be discussed below. From an estimation point of view, the presence of Π_i and P_j implies that exporter and importer dummies should be included in the regression.[5] Unlike Anderson and van Wincoop (2003) we are not imposing the restriction that trade barriers are symmetric (i.e. $t_{ij} = t_{ji}$). This implies that two dummies need to be estimated for each country—one exporter and one importer dummy.[6]

[5] It is also possible to explicitly account for the price indices as in Anderson and van Wincoop (2003). However, the procedure is rather involved, since the Πs and *P*s are unobservable, and σ is unknown.

[6] Under the assumption of symmetric trade costs, the gravity equation becomes $x_{ij} = \frac{y_i y_j}{y_w} \left(\frac{t_{ij}}{P_i P_j} \right)^{(1-\sigma)}$ in which case only one dummy per country is needed, since the relevant index is assumed to be the same whether the country imports or exports.

In logs, and adding a time dimension, the gravity model to be estimated is thus

$$\ln x_{itj} = \text{constant} + a_1 \ln y_{it} y_{jt} + a_2 \ln t_{ijt} + \gamma_i + \lambda_j + \tau_t + \varepsilon_{ijt} \quad (6)$$

where γ_i and λ_j are exporter and importer fixed effects, controlling for Π_i and P_j, respectively, τ_t is a time dummy, and ε_{ijt} is a white noise disturbance term. Following Coe and Hoffmaister (1998) and Coe, Subramanian, and Tamirisa (2004) the time dummy is included to control for time specific events, including global shocks and changes in global income, price levels, and exchange rates over time.[7] Nominal income y_{it} is approximated by nominal GDP. Equation (5) would imply that a_1 is equal to 1, but this can be relaxed by allowing for nontradable goods in the model (as in Anderson, 1979).[8] Hence, the approach taken here is to estimate a_1 rather than restricting it to unity. The coefficient a_2 is equal to $(1-\sigma)$.

The bilateral trade resistance term is of particular interest and can be further developed. The following specification is used

$$\ln t_{ijt} = \delta \ln d_{ij} + \mu Landl_{ij} + \phi Adj_{ij} + \varphi Col_{ij} + \nu Lang_{ij} + \pi PrimX_{it} + \theta Border_{ij} + \eta_{ij} \quad (7)$$

where *d* is distance, *Landl* is the number of landlocked countries in the pair (i.e. 0,1, or 2), *Adj, Col, Lang,* and *Border* are dummies for, respectively, adjacent countries, countries with colonial ties, countries sharing a common language, and trade across borders, as opposed to trade within the same country (i.e. $i \neq j$). *PrimX* is a dummy for commodity exporters interacted with a commodity price index (i.e. equal to zero for noncommodity exporters and the log of the commodity price index for commodity exporters). η_{ij} is a country pair-specific effect, fixed or random. The latter is a measure of remaining bilateral trade resistance, deriving from tariff and nontariff barriers and any unobservable factors that could have an impact on bilateral trade. These bilateral effects will be the focus of this study.

The *Border* dummy, used in several studies to measure the home bias or border effect, is not of particular interest for the present study, and is included in the specification for the moment simply to acknowledge its existence. Estimating the border effect requires *intra* national trade (i.e. production sold on the domestic market) to be included in the regressions. However, under the assumption that within-country trade is not structurally different from international trade, once account has been taken of the border effect, there is no reason why excluding these observations from the analysis would introduce any particular bias in the estimations. Indeed, excluding intra-national trade avoids potential biases related to problems measuring within-country trade and within-country distance. Therefore, in what follows, only international trade will be included in the regressions. This implies that the border effect can not be discerned from any other effect captured by the constant in the regression. For this paper this is not a concern, given the definition of trade potential used here (see below).

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[7] Ideally, in a panel setting, trade and income should be measured in real terms but bilateral trade deflators are not available.

[8] Moreover, trade in the model would refer to all trade while bilateral trade data include trade in goods only.

B. Estimating Trade Potentials

Estimations of trade potentials are associated with a weakness, emphasized by Egger (2002), who criticizes the method of estimating trade potentials as the difference (or ratio) between predicted and actual trade. In a correctly specified cross country (or pooled panel) regression any comparison between predicted and actual trade would be pointless, since residuals should be white noise. Any systematic deviation of actual trade from predicted trade should be interpreted as deriving from omitted variables, which could introduce a bias in the estimation results, if such variables are correlated with the other explanatory variables. Egger (2002) suggested using out-of-sample estimates of trade potentials. Another possibility is to use panel data and introduce country-pair specific effects, thereby explicitly taking account of omitted unobservable effects. Both approaches will be applied here.

For our purposes, bilateral trade potentials (exports or imports) are defined as the difference between actual trade and the level of trade that would prevail if the particular country pair-specific effects η_{ij} had been equal to the global average. As η_{ij}s are normalized to average zero, the trade potential is calculated as

$$\text{“}\textit{predicted” trade – actual trade} = \left(e^{-\eta_{ij}} - 1\right) * x_{ijt} . \qquad (8)$$

Equation (8) does not allow for a study of the evolution of trade potentials over time, since by construction η_{ij} is time-invariant. To address this issue, we shall complement the analysis by using out-of-sample calculations of trade potentials. More specifically, when studying the change in Mediterranean countries' trade performance vis-à-vis the EU over time, the gravity equation is estimated excluding EU-Mediterranean trade. The results from this equation are subsequently fitted to EU-Mediterranean data and compared with actual trade levels. Without denying the importance of openness to imports, the analysis will focus on the export side, to avoid repetition and to save space.

The interpretation of the estimated trade potentials warrants some discussion. Π_i and P_j in the denominator of equation (5) can be expressed as (see Anderson and van Wincoop, 2003, for details)

$$\Pi_i = \left(\sum_j \left(\frac{t_{ij}}{P_j} \right)^{1-\sigma} \theta_j \right)^{1/(1-\sigma)} \qquad (9)$$

and

$$P_j = \left(\sum_i \left(\frac{t_{ij}}{\Pi_i} \right)^{1-\sigma} \theta_i \right)^{1/(1-\sigma)} \qquad (10)$$

where θ_i is country i's share in global income. Equation (9) expresses Π_i as an average of the exporting country's bilateral trade costs relative to its trading partners' overall price levels, weighted by the economic size of those partners. Hence, Π_i can be considered as a measure of

the exporting country's access to global export markets. Similarly, P_i can be seen as a measure of the importing country's openness to imports. In other words, the inclusion of importer and exporter dummies implies that the unobserved bilateral trade costs terms (η_{ij}) are estimated after controlling for both the exporter's and the importer's overall degree of global trade integration. Hence, the trade potential can be interpreted as the gain (or loss) in trade between two countries that would occur if their bilateral trade barriers (after controlling for distance etc.) were brought to the global integration-adjusted average. This allows for a realistic interpretation of trade potentials, controlling for different countries' progress in trade liberalization, their institutional and human capacities, country size etc. The absolute value of the *P*s can not be interpreted, and the model therefore does not provide any information about the impact on bilateral trade by a general improvement in a country's overall trade capacity or degree of openness.[9] Hence, the gravity model presented here is useful to study trade patterns, rather than absolute global volumes. In view of this, an alternative interpretation is to consider the trade potentials as a measure of bilateral trade discrimination. The bilateral trade potential between Country A and Country B is the difference between the actual level of trade and the level that would prevail if neither country discriminated (broadly defined) against the other.[10]

There is a caveat associated with the way trade potentials are calculated here. Equations (9) and (10) imply that the effect on trade of a decrease in bilateral trade costs (e.g. by the creation of a free trade area) can not be analyzed in isolation, given the general equilibrium effects such measures have on all multilateral resistance terms. For example, a sharp reduction in t_{ij} will have a direct impact on Π_i and P_j and an indirect impact on all *P*s around the world. This impact will be greater, the greater are the shares of country *i* and *j*'s income in total world income. This consideration is somewhat complicated to deal with, since it would imply explicitly estimating all global price indices and making assumptions on the elasticity of substitution σ, which is unknown. However, in the present application, where we will consider limited reductions in bilateral trade costs between a number of small countries and a few of their trade partners, the general equilibrium effects are likely to be small and will hence be ignored.[11] It should, however, be recognized that doing so will slightly exaggerate potentials to increase bilateral trade with a given country (although not necessarily trade overall).

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[9] The ratio of *international* trade costs to *intranational* trade costs could provide a measure of a country's level of global trade integration. However, this is beyond the scope of this study, which excludes intranational trade for reasons mentioned above.

[10] In this context, supply constraints are not considered as binding, an assumption that appears plausible in view of the high unemployment rates in conjunction with the fact that the countries in question have access to international capital markets and/or have high levels of reserves. One caveat, however, concerns the supply of specialized skilled labor: as trade becomes more diversified, the labor force's skill set will also need to be increasingly diversified.

[11] Such general equilibrium effects turned out to be substantial in Anderson and van Wincoop (2003), but they simulated the impact of a *total elimination* of borders between the United States, Canada, and other member countries of the Organization for Economic Cooperation and Development (OECD).

III. EMPIRICAL RESULTS

A. Estimation Issues

When estimating gravity models, a solution must be found to deal with zero-value observations. Using linear estimation techniques requires taking logs of the data, which obviously is not possible for zero-value observations. Gravity model applications often deal with this issue by omitting zero-value observations. However, this truncates the joint distribution of the data, which introduces an estimation bias. This bias can potentially be sizeable, given that bilateral trade data typically include a large number of zero observations, particularly when developing countries are included (see e.g. Helpman, Melitz, and Rubinstein, 2004). Other methods include replacing zero-value observations by an arbitrary small number (see e.g. Wang and Winters, 1992), or using nonlinear estimation techniques. Coe, Subramanian, and Tamirisa (2004) advocate the latter and show that dropping zero observations can have a significant impact on estimation results. We take two alternative approaches. The first uses a random effects (RE) Tobit model, which is a maximum likelihood method that includes zero-value observations. Estimating the RE Tobit model using the full dataset turned out somewhat impractical from a computational point of view and three year averages were used instead, to reduce the size of the database.[12]

To complement the first method, an alternative approach was also taken, consisting of two steps. First, the full panel was fitted to a RE Tobit model, excluding exporter and importer dummies. The fitted values from this regression were then used to replace zero-value observations. In the second step, standard linear techniques were used. This approach resembles the method of replacing zero-value observations by small numbers, but takes away the arbitrariness in the exact value of these small numbers. In addition to RE, fixed effects (FE) and Hausman and Taylor (HT) estimates are also reported.[13]

B. Results

Table 1 displays the results from the RE Tobit model, in additions to the linear RE, FE, and HT regressions. Equation 2 is a RE Tobit regression excluding trade between Mediterranean countries and EU countries, to be used for out-of-sample predictions of trade potentials with the EU. All variables, except the primary exporter dummy interacted with commodity prices are

[12] A shortcoming of the random effects model is that it requires η_{ij} to be uncorrelated with the explanatory variables in the model, or else estimation results will be inconsistent. Estimating a fixed effects Tobit model was not attempted, as (in this nonlinear Tobit environment) it would require introducing dummies for all country pairs, which would be unfeasible. Hence, it was not possible to test the appropriateness of random effects against fixed effects.

[13] As mentioned, RE has the weakness of requiring η_{ij} to be uncorrelated with the regressors. FE, on the other hand, is equivalent to introducing country-pair specific dummies, which wipes out the effect from any time-invariant variables, such as distance and all the dummies. The Hausman-Taylor method accommodates both these concerns. It is a multi-step procedure that allows for correlation between η_{ij} and some of the explanatory variables (see Hausman and Taylor, 1981 for details).

significant at the one percent level, with the expected sign and reasonable magnitudes. The coefficient on economic mass (0.51) is substantially lower than the unity value implied by the bare-bone Anderson and van Wincoop (2003) model in equation (5). However, it is in line with Coe, Subramanian, and Tamirisa (2004), who find that the coefficient for economic mass declined from about 0.8 in the late 1970s to around 0.5 in the 1990s, using nonlinear techniques on panel data. In regressions 3–5, the coefficient on economic mass increases to 0.66, confirming Coe, Subramanian, and Tamirisa's (2004) findings that regression results are somewhat sensitive to the method used to deal with zero observations. It turns out, however, that trade potentials are not. We will consider the RE Tobit model the preferred model to be used for calculations of trade potentials, but all relevant tables and figures are reproduced in the Appendix using regression 5 as the basis for calculations.[14] Regression 5 uses the two-step method with the HT regression in the second step, allowing for any potential correlation between the country-pair effects and economic mass and distance. While the magnitudes of the estimated trade potentials vary somewhat between the different methods, the overall findings do not.

Table 1. Estimations of the Gravity Equation

	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5
Economic mass: ln(GDPi*GDPj)	0.51 ***	0.51 ***	0.66 ***	0.66 ***	0.66 ***
Distance	-1.37 ***	-1.36 ***	...	-1.31 ***	-1.52 ***
Common language	0.66 ***	0.69 ***	...	0.71 ***	0.58 ***
Adjacent	0.37 ***	0.43 ***	...	0.23 ***	-0.11
Landlocked	-4.39 ***	-4.22 ***	...	-4.81 ***	-2.31 ***
Primary exporter*commodity price	0.03	-0.06	0.07	0.07	0.07
Colony	0.73 ***	0.69 ***	...	0.62 ***	0.73 ***
Constant	14.79 ***	14.7 ***	-2.76 ***	11.65 ***	11.65 ***
Estimation technique	RE Tobit	RE Tobit	FE	RE	HT
Number of observations	28,363	27,692	92,995	92,995	92,995
Number of groups	7,455	7,287	7,521	7,521	7,521
Sigma U (pooled v/s RE)	1.28 ***	1.29 ***			
Hausman test FE v/s RE	...	...	...	$\chi 2(14) = 0.2$	...
Time dummies	yes	yes	yes	yes	yes
Importer and exporter dummies	yes	yes	...	yes	yes
Includes EU-Med. trade	yes	no	yes	yes	yes

Source: Author's calculations.

Notes: The dependent variable is nominal bilateral imports

Equation 3 is estimated with heteroskedasticity consistent error terms

*, **, and *** indicates significance at the 10, 5, and 1 percent levels, respectively.

Time, country, and bilateral effects are not reported.

[14] The equivalent regression excluding EU-Mediterranean trade (unreported) is used for out-of-sample estimates in Appendix Figure 1. Basing the calculations on regression 4 instead of regression 5 produces very similar results

Overview of Mediterranean countries' export performance

In-sample estimates (using equation (8)) of the most important export potentials and cases of over-exporting are reported for each Mediterranean country in Table 2. Export potentials are expressed in percent of GDP of the relevant Mediterranean country, unless otherwise indicated. This is a more relevant measure than actual trade as a percentage of predicted trade when it comes to identify large untapped markets. However, the latter measure would be more appropriate in analyzing the degree of integration among a particular group of countries, since trade potentials in absolute terms are dependent on the size of the countries involved. For this reason, trade will in some cases also be analyzed as a percentage of predicted trade. Negative export potentials indicate export beyond model predictions.

For the moment, the EU is presented only as a group. The first line in Table 2 presents the total amount of over or under-exports to the EU as a share of GDP. This is conceptually different from the second line, which shows the unweighted average of Mediterranean countries' actual to predicted export ratio with each individual EU country. The latter is a more relevant measure of integration with the EU.

Table 2. Estimated Trade Potentials (percent of GDP unless otherwise indicated)

	Algeria		Egypt		Jordan		Morocco		Syria		Tunisia	
	Country	Export potential	Country	Export potential	Country	Export potential	Country	Export potential	Country	Export potential	Country	Export potential
EU												
Total export potential		-21.6		-0.1		3.5		4.5		-12.3		-13.8
Actual/predicted exports												
Unweighted average		495.7		169.1		47.7		103.0		276.0		167.4
Non-EU												
Top 5 export potentials												
	Saudi Arabia	0.3	Israel	0.2	Israel	5.0	United States	0.9	Iran	0.3	United States	0.8
	Australia	0.1	Iran	0.1	United States	3.3	Switzerland	0.2	Japan	0.2	Japan	0.2
	Colombia	0.0	China	0.1	Estonia	0.5	Egypt	0.1	United States	0.2	Switzerland	0.1
	Malaysia	0.0	Japan	0.1	Canada	0.2	Hong Kong	0.1	China	0.1	Hong Kong	0.1
	Syria	0.0	Switzerland	0.0	Egypt	0.1	Korea	0.1	Korea	0.1	Korea	0.1
Top 5 over-export destinations												
	United States	-4.5	India	-0.2	India	-2.6	India	-0.9	UAE	-1.7	Libya	-1.5
	Brazil	-2.4	Saudi Arabia	-0.1	Saudi Arabia	-1.2	Japan	-0.5	Turkey	-1.2	India	-0.5
	Turkey	-1.9	United States	-0.1	UAE	-1.2	Mexico	-0.2	Saudi Arabia	-0.8	Turkey	-0.3
	Canada	-1.7	Turkey	-0.1	China	-0.4	Libya	-0.2	Kuwait	-0.4	Algeria	-0.2
	Indonesia	-0.3	Singapore	-0.1	Pakistan	-0.4	New Zealand	-0.2	Algeria	-0.3	Iran	-0.2

Source: Author's calculations.

Note: Export potentials are calculated based on average data for 2000–02.

Table 2 shows most Mediterranean countries' total export to the EU surpassing model predictions. Jordan is a notable exception, with exports attaining only one half of the benchmark for the EU on average. Egypt's total over-export to the EU is relatively small despite a high average ratio of actual to predicted exports. This is due to the fact that Egypt tends to over-export to smaller countries while under-exporting to most large EU countries. As we will show below, Egypt has seen a relative decline in its exports to the EU over the 1990s. Algeria and

Syria, both predominantly hydrocarbon exporters, over-export significantly to the EU. Morocco exports broadly at par with model predictions, while Tunisia overtrades on average. Trade with the EU will be analyzed more in detail below.

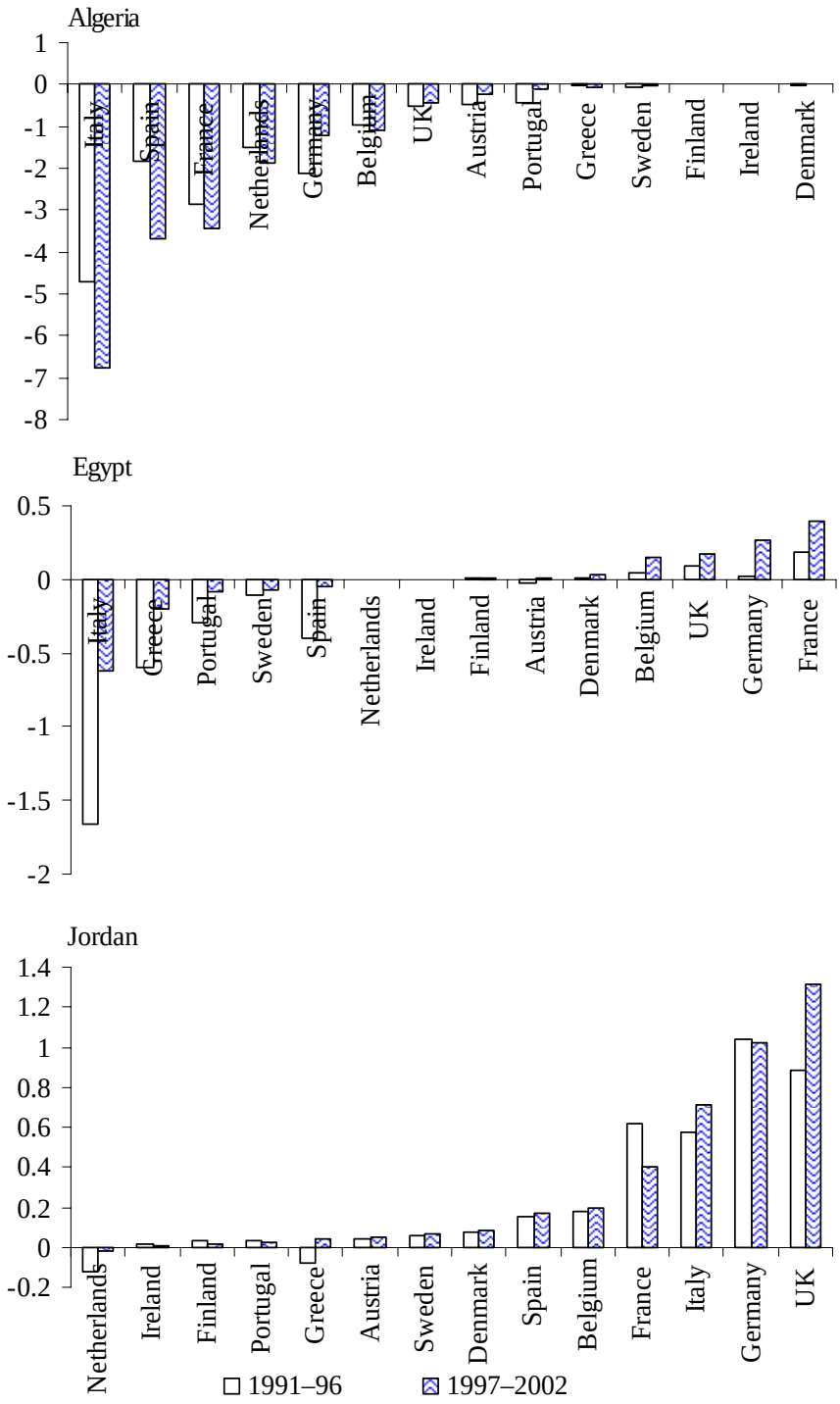
The US figures prominently as a major untapped export market for Jordan, Morocco, Syria, and Tunisia, while Algeria and Egypt over-export to the United States. The apparent weak integration of most Mediterranean countries with the United States is in line with Péridy (2004), who found MENA countries' trade with the United States far below potential, especially in the Maghreb. In the case of Jordan, the estimated trade potential is likely exaggerated since trade with the United States has increased sharply in the last few years of the studied period, which is not taken into account by the in-sample estimates of export potentials in equation (8). Given the significant untapped export market in the United States, the recent US-Middle East free trade initiative is encouraging. The initiative involves Egypt, Tunisia, Algeria, Saudi Arabia, Kuwait, Yemen, and Bahrain, all of which have concluded Trade and Investment Framework Agreements (TIFAs) as a first step toward a free trade agreement (FTA) with the United States. Jordan concluded an FTA with the United States in 2002, as the first Middle Eastern country, followed by Morocco in 2004. Other important untapped non-EU markets include Japan and a number of other Asian countries. Regarding countries in the region, Israel unsurprisingly presents a significant untapped market, in particular for Jordan but also for Egypt. Egypt, Israel, and the Unite States recently signed an agreement allowing certain Egyptian exports with a minimum level of Israeli contents tariff-free entry into the United States. This agreement is expected to significantly increase trade between Egypt and Israel, and support Egyptian textiles exports to the United States. Syria's trade potential vis-à-vis Israel could not be evaluated for lack of data, but is likely to be substantial. On the over-export side, India and Turkey emerge as major trading partners for most Mediterranean countries.

Mediterranean countries' integration with the EU

Despite the fact that the EU's trade policies are uniform across member states, Mediterranean countries' export performances vary significantly across the EU. Furthermore, there is no clear pattern regarding which EU countries tend to be more or less integrated with the MENA region. A case in point is the difference between Morocco's and Tunisia's trading patterns, where the former under-exports significantly to France and over-exports to the United Kingdom, while the opposite is true for the latter. Evidently, conventional tariff and nontariff barriers only explain part of the Mediterranean countries' trade performance with the EU. Further analysis is therefore warranted. In this regard, trade composition may matter, and will be analyzed based on disaggregate data from the UN's COMTRADE database. In addition, given the ongoing integration efforts within the Barcelona process, the analysis should include a time dimension. Hence, we calculate out-of-sample estimates of EU-Mediterranean trade potentials, which are allowed to vary over time.

Figure 1 suggests that the Mediterranean-EU integration process has yielded mixed results. Tunisia, the first country within the sample to have implemented an AAEU, appears to have benefited on balance. In particular, its export performance to France, Italy, Belgium, and Spain improved substantially during 1991–2002, more than making up for a loss vis-à-vis Germany. In the same period, the United Kingdom changed from Tunisia's largest EU export potential to

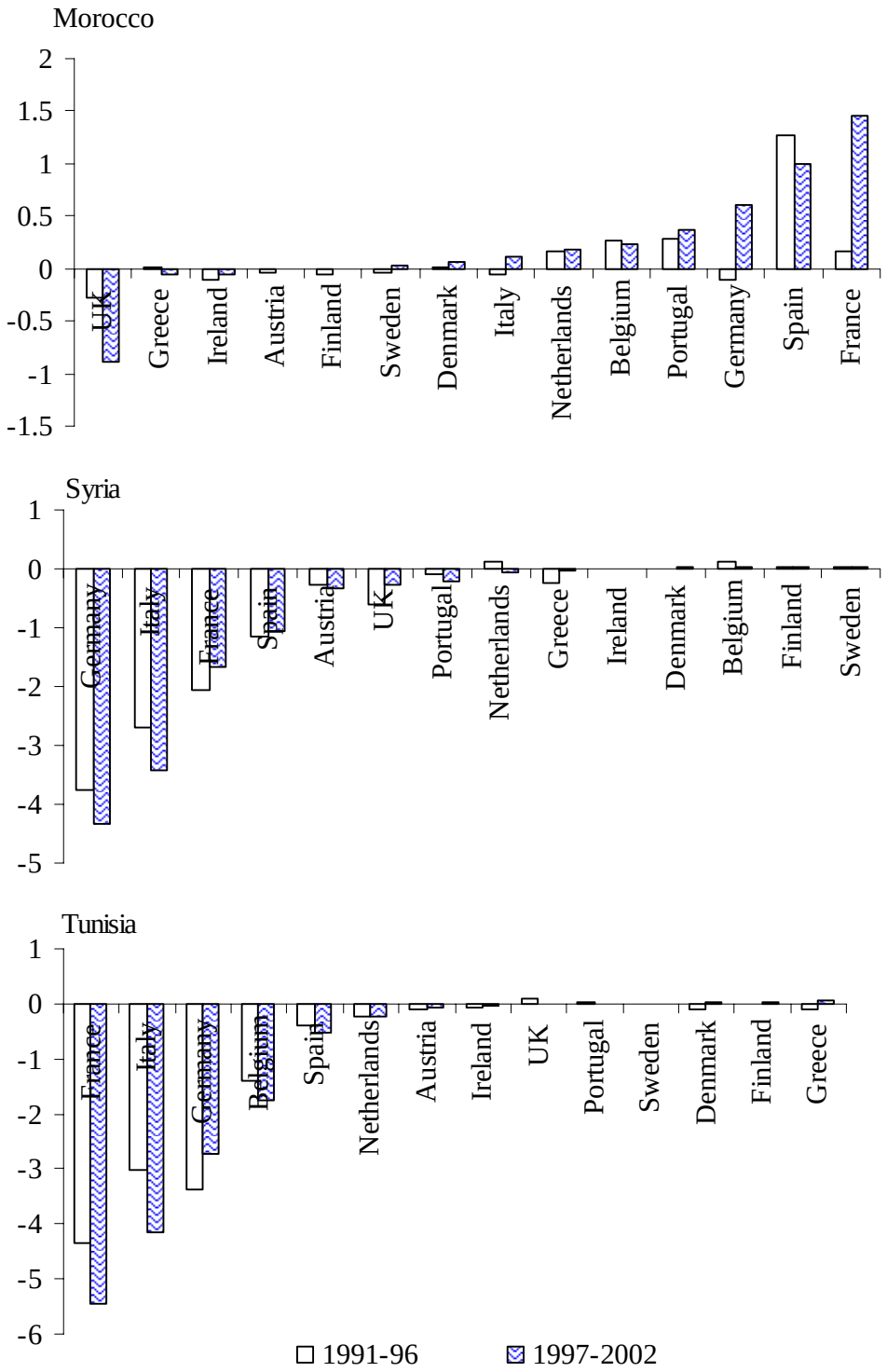
Figure 1. Export Potentials to the European Union (percent of GDP)



Source: Author's calculations

Note: Negative export potentials indicate exports beyond model predictions.

Figure 1 (continued). Export Potentials to the European Union (percent of GDP)



Source: Author's calculations

Note: Negative export potentials indicate exports beyond model predictions.

being in line with model predictions. Morocco, the only other sample country to implement an AAEU within the studied period, has seen a surge in exports vis-à-vis the United Kingdom and Spain, while losing ground with most other EU countries. The latter may to an extent be attributed to repeated droughts, which could have skewed results by suppressing agricultural exports to the EU for reasons unrelated to trade policy. The export performance has been generally favorable for Algeria and, to a lesser extent, Syria. However, it is difficult to attribute this to any integration efforts, in view of the fact that both countries' exports are still completely dominated by oil and gas. Jordan continues to export very little to the EU (a total of just over $170 million in 2002 according to the IMF's *Direction of Trade Statistics, DOTS).* Meanwhile Egypt has clearly become less integrated with the EU during the 1990s.

While the difference in export performance to the EU could be partly explained by varying degrees of commitment to the Barcelona process, it is also likely that the economic structure matters. Table 3 exposes stark differences in the Mediterranean countries' export composition. Commodities play a less central role in Morocco and Tunisia, whose exports are concentrated in reasonably high value-added manufacturing. Electronics have emerged as a major export category in both countries, attaining around 15 percent of total exports in 2002 in both cases. However, it is textiles that stick out as a major determinant for Tunisia's and Morocco's export performance to the EU. As Figure 2 shows, both countries' textiles trade is characterized by substantial imports of intermediate goods from a few countries and export of finished goods to those same countries. This suggests that outsourcing and/or intra-firm trade has played an important role in explaining Morocco's and Tunisia's trade performance. This type of intra-firm trade is particularly pronounced in Tunisia's trade with France, Italy, Germany, and Belgium, which also are the countries to which Tunisia over-exports by far the most. Similarly, Morocco's improved export performance to the United Kingdom and Spain reflect a sharp increase in intra-textiles trade: exports of finished textile goods to the United Kingdom and Spain were multiplied by 18 and 26 respectively in nominal terms between 1995 and 2002. However, although France is Morocco's largest trading partner in textiles, it is also the most underexploited export market. This is not as contradictory as it may seem, in light of the fact that Morocco's textiles exports to France are still lower than Tunisia's despite the latter country's much smaller size. The dominant role of intra-firm trade is important; Berthélemy (forthcoming) shows that international fragmentation of production is an important determinant of increased economic diversification.

The central role of textiles for Tunisia's and Morocco's exports is a cause of concern for the medium term, given the recent expiration of the Multifiber Agreement (MFA), which will inevitably expose the sector to increasing competition, especially from China.[15] At the same time, the importance of intra-textiles sector trade points to the existence of well established ties with a number of EU countries, possibly including direct ownership of Tunisian and Moroccan textiles firms. Such ties are unlikely to unravel overnight, giving these countries additional time to adjust.

[15] Until January 1, 2005, the MFA gave several MENA and other countries' textile exports preferential access to the EU.

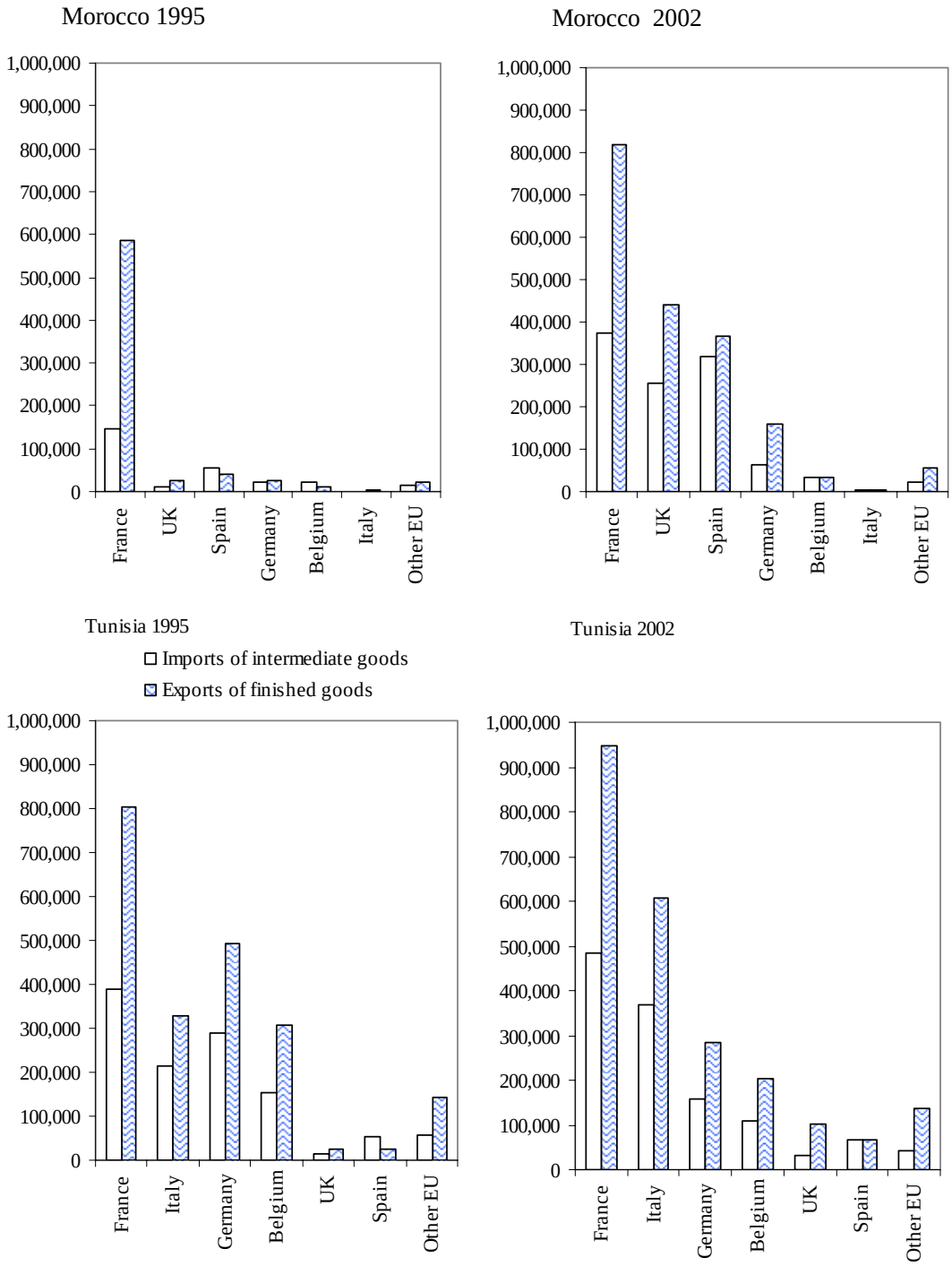
Table 3. Composition of Mediterranean Countries' Exports to the European Union

		Share of commodity exports (percent)		
	Sector	1995	2002	Contribution to Export Growth, 1995–2002 (percent of total growth)
Major net oil exporters				
Algeria	Hydrocarbons	96	97	98
	Other	4	3	2
Syria	Hydrocarbons	...	93	...
	Other	...	7	...
Net oil importers/marginal oil exporters				
Egypt, Arab Rep.	Hydrocarbons	37	39	-21
	Textiles	27	16	-117
	Metal goods	15	15	-10
	Agriculture	9	8	-21
	Cotton	4	7	21
	Other	8	16	48
Jordan	Salts	56	43	-104
	Pharmaceuticals	1	22	81
	Metal goods	0	9	33
	Textiles	12	7	-30
	Agriculture	14	6	-46
	Other	17	12	-34
Morocco	Textiles	31	40	50
	Agriculture	32	20	7
	Electronics	3	17	32
	Fertilizer	9	3	-4
	Chemicals	5	3	2
	Footwear	2	3	5
	Other	19	14	8
Tunisia	Textiles	50	50	52
	Electronics	9	15	34
	Hydrocarbons	10	10	8
	Footwear	5	6	11
	Fertilizer	5	3	-3
	Agriculture	4	3	2
	Other	18	12	-3
Memorandum items				
Finished goods as share of textile exports (percent)				
Egypt		22	30	
Jordan		61	95	
Morocco		86	94	
Tunisia		95	93	

Sources: COMTRADE; and author's calculations

Notes: The signs on contributions to export growth are inversed for Egypt and Jordan, since COMTRADE shows a decline in exports to the EU by these countries between 1995 and 2002.

Figure 2. Morocco and Tunisia: Textiles Trade with the EU ($US thousands)



Sources: COMTRADE; and author's calculations.

The question remains why Morocco's and Tunisia's geographical pattern of integration with the EU is so different. Migration comes to mind as a potentially important factor that could facilitate the formation of business networks and other ties likely to enhance trade. Migration could not be included in the model due to data limitations but descriptive data could provide a basis for qualitative evidence. Tunisia's largest "over-traders" in the EU also tend to be the countries with the largest Tunisian immigrant population, although in Morocco's case, the correlation is less clear. Further research could be useful in this area.

Egypt's trade pattern with the EU is entirely different from Morocco's and Tunisia's. Overall, Egypt's current export composition appears less susceptible to trade creation with the EU than that of Morocco and Tunisia. Although Egypt is a slight net oil importer, hydrocarbons still represents a major share of exports. Egypt's textiles exports to the EU have fallen dramatically since the mid-1990s and manufactured goods are in relatively low value-added sectors, such as metal goods.

None of the intra-textile sector trade described above is evident in Egypt. In fact, Egypt's textiles exports to the EU are predominantly intermediate inputs, in addition to raw cotton. About ¾ of textile exports to the EU are directed to Italy, France, Germany, and the United Kingdom, i.e. the same countries that export intermediate textile inputs to Tunisia and Morocco. Although the data does not permit tracing the exact flows of commodities, one might speculate that hub-and-spoke effects are present. A possible example would be a European firm which imports intermediate inputs from Egypt, provides a design, and outsources to Tunisian and Moroccan firms for assembly of the final product, rather than locating the entire production chain within Mediterranean countries. However, the scope of such hub-and-spoke effects is likely limited by virtue of the fact that Egyptian textile exports to the EU are relatively small (some $200 million in 2002, compared with a combined $2.5 billion imports of intermediate textile goods by Tunisia and Morocco).

IV. Conclusions and Discussion

The preceding analysis points to the existence of significant untapped export markets for the Mediterranean countries, both within and outside the EU. The United States emerges as possibly the most important untapped market. In this regard, Algeria and Egypt are exceptions, since they both over-export to the Unite States. In any case, the success of recent integration efforts with the United States, including Jordan's and Morocco's free trade agreements, could prove crucial for Mediterranean countries' future trade performance.

Mediterranean integration efforts with the EU have yielded mixed results. Algeria and Syria both over-export to the EU, but given the still-complete dominance of oil and gas exports, this can hardly be attributed to trade policy. In fact, the lack of growth in nontraditional exports from these countries suggests considerable scope for further integration. Meanwhile, Jordan's exports to the EU remain far below model predictions, and Egypt has seen its degree of integration with the EU fall significantly over the past decade. Morocco's exports to the EU are broadly at par with predicted levels, while, on average, Tunisia over-exports to the EU. Nevertheless, although the impact of the Barcelona process since its inception in the mid-1990s

seems to have been modest in general, it appears to have had a significant effect in individual cases. This is most clearly observed for Tunisia, which has significantly improved its export performance vis-à-vis France, Italy, Belgium, and Spain. Similarly, Morocco's export record to the United Kingdom and Spain has improved substantially since the beginning of the Barcelona process.

This outcome is not entirely surprising. Only Tunisia and (later) Morocco implemented AAEUs during the period under study, which likely explains their relative progress in integration with the EU. However, it does not explain the wide difference in the two countries' trade performance among EU countries. A plausible explanation for this disparity is that a reduction in trade barriers first induces trade with countries where networks have already been established, and hence a certain amount of fixed costs have already been covered. This explanation appears particularly relevant for Tunisia, where trade has expanded most with countries with which intra-textile trade relations had already been established before the trade liberalization began. Nevertheless, Morocco's experience shows that it is feasible to also build new trade relations to increase exports.

Substantial export potentials remain within the EU for all countries except Algeria and Syria, and only small potentials remain for Tunisia. For Algeria and Syria, the near-to-medium term challenge has less to do with trade patterns than with diversifying their export bases. As long as virtually all exports consist of oil and gas, trade policy can only do so much to increase exports. More important seems to be broad-based structural reforms—including trade liberalization—aimed at improving overall productivity and flexibility, thereby providing an environment conducive to private business initiatives. Jordan, in contrast, under-exports to virtually all EU countries, suggesting the importance of stepped-up integration efforts across the board. The other Mediterranean countries could benefit from targeting selected EU countries: Morocco could significantly increase its exports by targeting France and Germany. The results also suggest that Morocco's increasing integration with Spain is appropriate given its significant remaining export potential to that country. Egypt could make gains by targeting France, Germany, and the United Kingdom.

Morocco's and Tunisia's experiences suggest that the Barcelona process and the AAEUs have not created any serious distortions, in view of the fact that both countries over-export to a large number of non-EU countries while under-exporting to several EU countries (about one-third for Tunisia, most for Morocco). In Tunisia's case, however, there are signs that its focus on the EU is beginning to reach its limits, and recent efforts to liberalize trade on a multilateral basis are thus welcome. In both countries, market diversification and product diversification will likely become increasingly important as the full effects of the elimination of the MFA are felt.

APPENDIX

I. Estimated Trade Potentials and Export Potentials to the European Union

The following results are obtained using equation 5 in Table 1. They should be compared to the results in Table 2 and Figure 1.

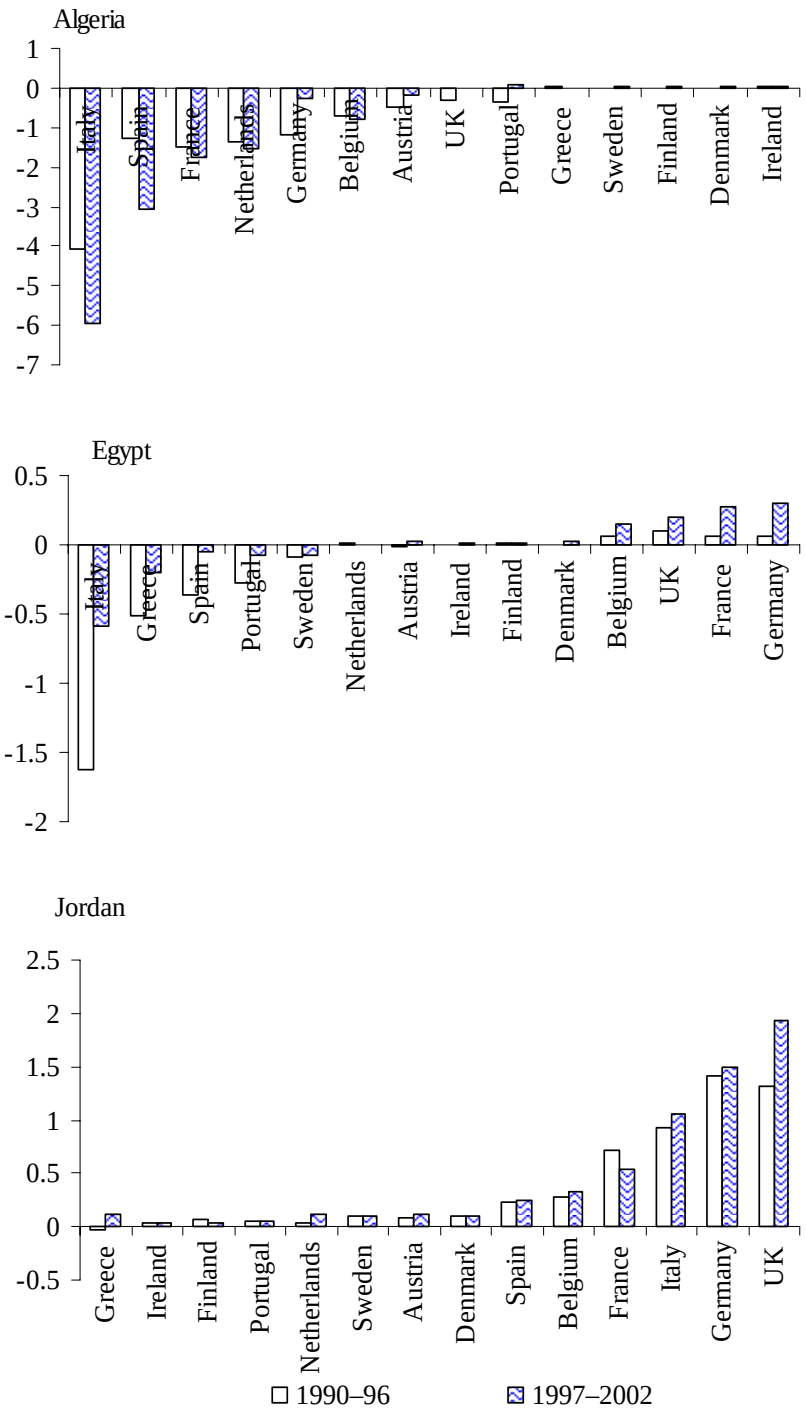
Table A-1. Estimated Trade Potentials (percent of GDP unless otherwise indicated)

	Algeria		Egypt		Jordan		Morocco		Syria		Tunisia	
	Country	Export potential	Country	Export potential	Country	Export potential	Country	Export potential	Country	Export potential	Country	Export potential
EU												
Total export potential		-15.4		-0.5		4.7		3.9		-11.9		-8.0
Actual/predicted exports												
Unweighted average		187.8		155.3		34.8		85.1		231.7		107.6
Non-EU												
Top 5 export potentials												
	Egypt	0.2	Israel	0.2	Israel	11.2	United States	1.1	United States	0.2	United States	1.2
	India	0.2	China	0.1	United States	5.0	Switzerland	0.3	Japan	0.2	Japan	0.3
	China	0.1	Switzerland	0.0	Egypt	0.6	Egypt	0.1	Iran	0.2	Switzerland	0.2
	Saudi Arabia	0.1	Japan	0.0	Canada	0.2	Hong Kong	0.1	China	0.1	Canada	0.1
	Australia	0.1	Canada	0.0	Turkey	0.2	Korea	0.1	Norway	0.1	Czech Rep	0.0
Top 5 over-export destinations												
	United States	-3.9	United States	-0.3	India	-2.5	India	-0.9	UAE	-1.5	Libya	-1.4
	Brazil	-2.3	India	-0.2	UAE	-1.1	Japan	-0.5	Turkey	-1.0	India	-0.4
	Turkey	-1.7	Korea	-0.1	Saudi Arabia	-0.9	Libya	-0.2	Saudi Arabia	-0.7	Turkey	-0.2
	Canada	-1.5	Saudi Arabia	-0.1	China	-0.4	New Zealand	-0.2	Kuwait	-0.3	Iran	-0.1
	Korea	-0.1	Singapore	-0.1	Pakistan	-0.4	Mexico	-0.2	Algeria	-0.3	Algeria	-0.1

Source: Author's calculations.

Note: Export potentials are calculated based on average data for 2000–02.

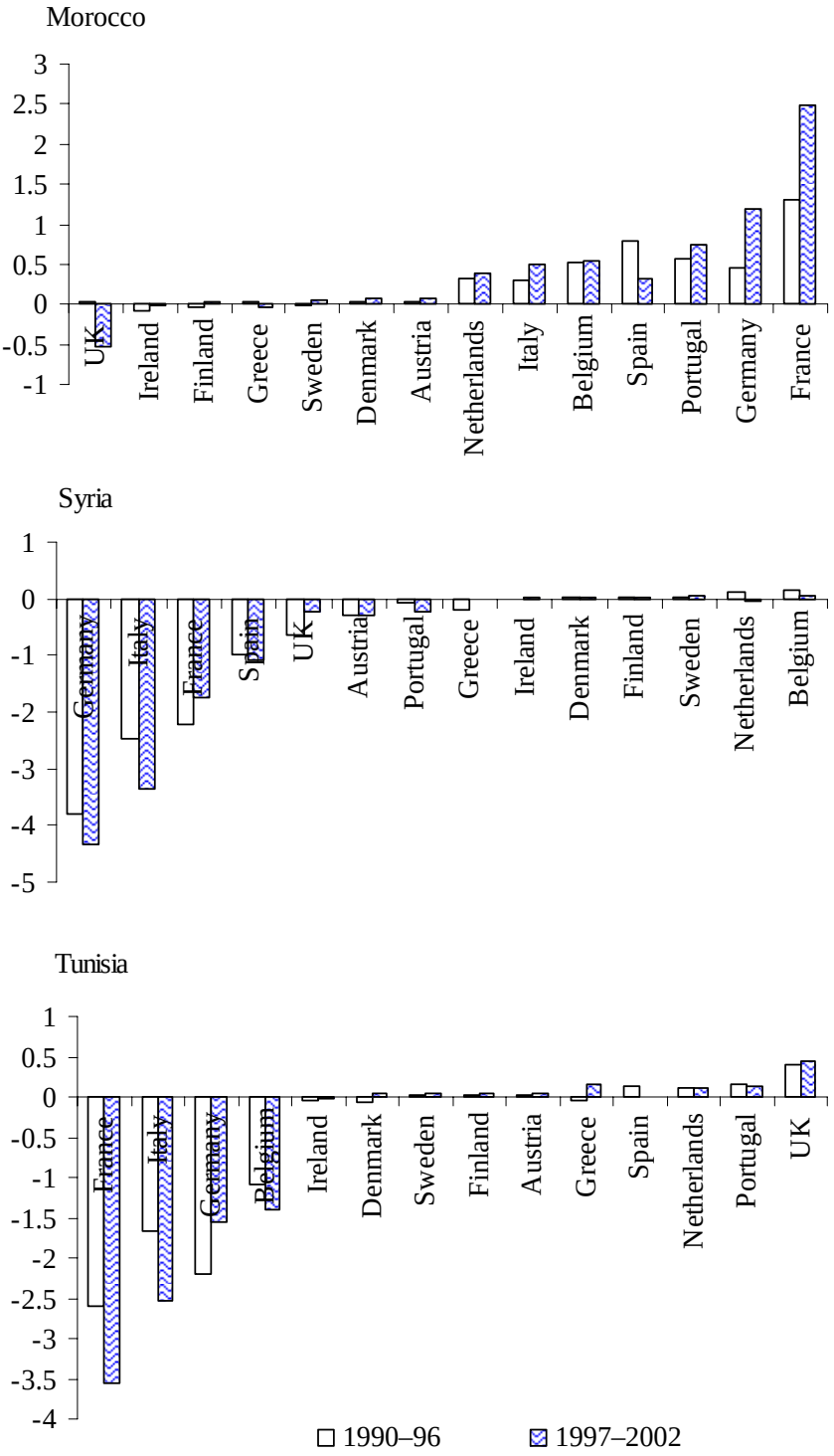
Figure A1. Export Potentials to the European Union (percent of GDP)



Source: Author's calculations.

Note: Negative export potentials indicate exports beyond model preductions.

Figure A1 (continued). Export Potentials to the European Union (percent of GDP)



Source:Author's calculations.

Note: Negative export potentials indicate exports beyond model preductions.

REFERENCES

Anderson, James, 1979, "A Theoretical Foundation for the Gravity Equation," *American Economic Review,* Vol. 69, pp. 106–16.

———and Eric van Wincoop, 2003. "Gravity with Gravitas: A Solution to the Border Puzzle," *American Economic Review,* Vol. 93, No. 1., pp

Berthélemy, Jean-Claude, *forthcoming*, "Commerce International et Diversification Economique", *forthcoming in Revue d'Economie Politique.*

Berthélemy, Jean-Claude, and Ludvig Söderling, 2001, "The Role of Capital Accumulation, Adjustment and Structural Change for Economic Take-off: Empirical Evidence from African Growth Episodes," *World Development*, Vol. 29 (February), pp. 323–43.

Coe, David, Arvind, Subramanian and Natalia, Tamirisa 2004 "The Missing Globalization Puzzle", unpublished; [spondoring International Monetary Fund Institution].

Coe, David, and Alexander Hoffmaister, 1998, "North-South Trade: Is Africa Unusual?" IMF Working Paper 98/94 (Washington: International Monetary Fund).

Egger, Peter, 2002, "An Econometric View on the Estimation of Gravity Models and the Calculation of Trade Potentials," *World Economy,* Vol. 25, pp. 297–312.

Feenstra, R.C., and others 1999, "Testing Endogenous Growth in South Korea and Taiwan," *Journal of Development Economics,* Vol. 60 (December), pp. 317–41.

Hausman, J. and W. Taylor, 1981, "Panel Data and Unobservable Individual Effects," *Econometrica,* Vol. 49, No. 6, pp. 1377–98.

Helpman, Elhanan, Marc Melitz, and Yona Rubenstein, 2004, "Trading Partners and Trading Volumes", available on the web at *http://post.economics.harvard.edu/faculty/helpman/papers.html.*

Péridy, Nicolas, 2004, "The New U.S. Trans-Ocean Free Trade Initiatives: Estimating Export and FDI Potentials from Two Dynamic Panel data Models," paper presented at European Trade Study Group Conference, September 2004, University of Nottingham, United Kingdom.

Wang, Zhen Kun and Alan Winters, 1992, "The Trading Potential of Eastern Europe," *Journal of Economic Integration*, Vol. 7 (Autumn), pp. 113–36.