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Abstract: This paper uses a new methodology and dataset to assess trade costs in the Maghreb region over the period 2000-2009. It compares intra- and extra-regional trade costs with those of other regions, such as the Mashreq (including Egypt), the Gulf Cooperation Council, and the European Union. The data show that trade costs in the Maghreb are very high by world standards, particularly in agriculture, although there is some evidence of a positive trend in recent years. A variance decomposition shows that logistics accounts for more than 15% of the observed variation in trade costs, a figure that is far larger than the corresponding one for tariffs. Based on these results, a number of policy priorities are identified for the short- to medium-term.

JEL Codes: F13; F15.

Keywords: Trade policy; Trade costs; Middle East and North Africa; Maghreb.

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1 Introduction

Previous efforts at promoting regional integration in the Maghreb[2] have run into significant obstacles in terms of implementation (World Bank, 2006; Hufbauer and Brunel, 2008). The level of intra-regional trade remains very low by international standards, and most of the region is still highly dependent on energy as a source of export earnings. Although there are many factors that contribute to the relative lack of intra-regional trade—including economic similarities between countries and close relations with large trading partners such as the EU—the case of the Maghreb stands out as a region that is particularly fragmented compared with others around the world. Closer integration with regional and international markets, as well as diversification into manufactured exports, remain important policy challenges for Maghreb governments.

More broadly, firms in the Middle East and North Africa (MENA) region are clear about the important role trade costs play in determining the pattern of international and regional integration. According to Hoekman and Zarrouk (2009), for example, there is widespread agreement that the Pan-Arab Free Trade Area (PAFTA)—which includes all of the Maghreb countries except Libya—has contributed to lower intra-regional tariff rates. However, substantial barriers to increased integration remain, largely in the form of administrative and "red tape" barriers. Non-tariff trade costs thus appear to be substantial in the region, and policies aimed at reducing them—trade facilitation in the broad sense of that term—are likely to be an increasingly important part of future efforts at enhancing regional trade performance.

Against this background, this paper examines the evolution of trade costs in the Maghreb countries over the 2000-2009 period with the aim of identifying some of the impediments that have held back integration with regional and global markets over the last decade, focusing on trade facilitation and logistics. To do

[2] For the purposes of this paper, the Maghreb is considered to include Algeria, Libya, Mauritania, Morocco, and Tunisia.

so, it uses a new methodology and dataset to compute a comprehensive measure of trade costs, covering all factors—observable and unobservable—influencing the gap between export and import prices. Results indicate that trade costs in the Maghreb are very high by world standards, and are even high relative to regional comparator groups such as the Mashreq, Egypt, Gulf Cooperation Council (GCC), and Mediterranean EU countries. Trade costs are especially high in agriculture, but are also significant in manufacturing. The level of trade costs observed in the region is certainly high enough to act as a major drag on ongoing international goods market integration efforts, and can go part of the way towards explaining the relatively fragmented nature of markets in the region.

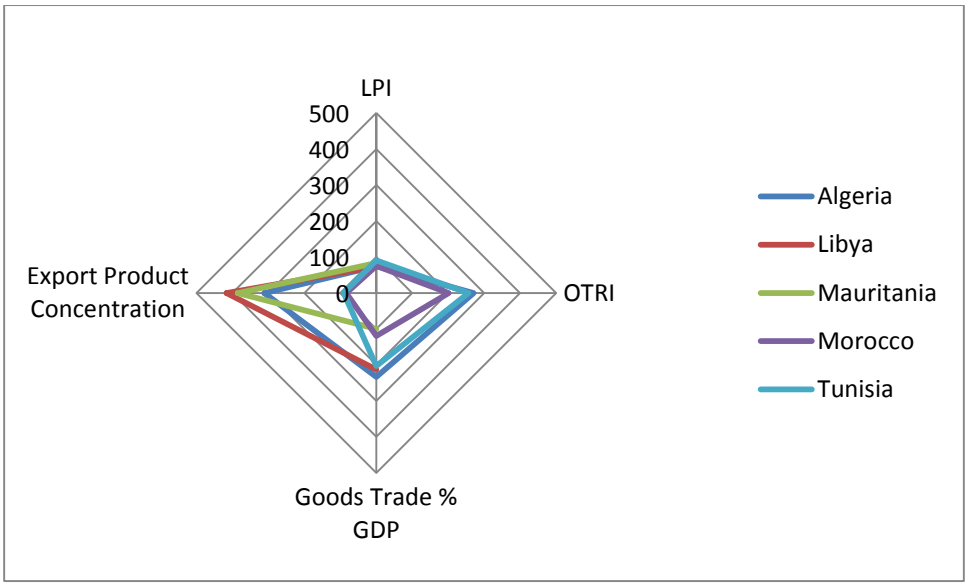
Consistent with other evidence, such as the World Bank's trade restrictiveness indices, this paper finds that non-tariff measures make a significant contribution to the overall level of trade costs in the region. For example, econometric estimates suggest that logistics accounts for more than 15% of the observed variation in trade costs across countries. Although this "back of the envelope" calculation should be interpreted cautiously, it suggests that reform of logistics and trade facilitation—and non-tariff measures more broadly—should be policy priorities going forward. Drawing on recent operational work at the World Bank, a number of detailed policy actions can be identified for implementation over the short- to medium-term in this area.

The paper proceeds as follows. Section 2 provides some brief background on the trading environment in the Maghreb, focusing on basic indicators of trade policies and outcomes. Section 3 introduces the methodology and dataset, and presents results in comparative perspective. Section 4 uses econometric methods to decompose the overall measure of trade costs into its component parts, separating out tariff from non-tariff components, and focusing in particular on the role of logistics and trade facilitation. Section 5 concludes, discusses policy implications, and highlights areas for further research.

2 The Maghreb Trading Environment

This section provides some brief background on the trading environment in the Maghreb region. It focuses on two sets of indicators: trade policies, and trade outcomes. Results are summarized in Figure 1, which presents data for two indicators in each area, normalized so that the lower middle income (LMI) group GDP-weighted average is equal to 100.

Figure 1: Basic trade policy and outcome indicators for the Maghreb countries. (Lower middle income group GDP-weighted average = 100; latest year.)



Source: World Trade Indicators.

2.1 Trade Policies

One general indicator of the state of trade policy is the World Bank's Overall Trade Restrictiveness Index (OTRI). The OTRI represents the uniform ad valorem tariff equivalent which, if applied, would produce the same level of imports as currently observed. It covers all goods sectors, and takes account of tariffs and some non-tariff measures. The OTRI is only available for three Maghreb countries: Algeria (36%), Morocco (27%), and Tunisia (34%). Nonetheless, results are striking in the sense that in each case the OTRI is at

least double the LMI average. This suggests that trade costs—at least to the extent they are captured by the OTRI—are relatively high in the Maghreb region.

The OTRI database also makes it possible to obtain a preliminary idea of the importance of tariffs and non-tariff measures as components of overall trade costs. The tariff-only component of the OTRI (TTRI) amounts to 12% in Algeria, 7% in Mauritania, 18% in Morocco, and 20% in Tunisia. According to Hoekman and Zarrouk (2009), the highest levels of tariff protection within PAFTA are indeed found in the Maghreb countries. To keep the numbers in perspective, however, it is important to note that tariffs represent between one- and two-thirds of the total level of trade costs captured by the OTRI. This suggests that non-tariff measures play an important role in determining the overall high level of trade policy restrictiveness observed in the Maghreb region (Hufbauer and Brunel, 2008). This evidence is consistent with the findings of Hoekman and Zarrouk (2009) for PAFTA, where there have been real reductions in tariff-related trade costs, but non-tariff costs remain substantial.

Another important component of the trade policy environment is logistics. The data used to create the OTRI do not cover logistics-related trade costs, so it is important to consider them separately. The most comprehensive available indicator is the World Bank's Logistics Performance Index (LPI). Figure 1 shows that logistics performance in the Maghreb is noticeably weaker than the LMI average. Libya is the weakest performer with an LPI score of 2.33 (LMI average = 3.16), and Tunisia is the strongest (2.84). The fact that oil producing countries tend to have relatively poor logistics performance has been noted elsewhere (e.g., Arvis et al., 2010). Given that logistics performance is correlated with outcomes such as trade integration and export diversification, it may be that the relatively poor LPI standing of the Maghreb countries is one significant factor holding back their broader international integration efforts.

World Bank (2010) puts the logistics performance of the Maghreb countries in comparative perspective. Performance in the Gulf states is stronger than elsewhere in the MENA region, although it still tends to

lag behind the level that would be expected based on their per capita income. The leading MENA performer is the UAE, with a 2010 LPI rank of 24th, approximately the same as Korea. Performance in the Mashreq countries is weaker than in the Gulf, but approximately in line with their income group average. By contrast, as noted above, performance in the Maghreb tends to lag behind the relevant income group average. Broad evidence from the LPI tends to suggest, therefore, that the logistics environment is most challenging in the Maghreb countries.

To further investigate the logistics and trade facilitation environment, Tables 1 and 2 present data on the time, cost, and formalities associated with export and import transactions. All data are sourced from the Doing Business dataset. Three important stylized facts emerge from the tables. First, Algeria and Mauritania have very high export and import costs compared with the LMI average, and also subject their traders to a relatively high number of documentary formalities. Performance in Morocco and Tunisia is more comparable with the LMI average, although import formalities also appear quite high in Morocco.

Second, performance on time is better than on the other metrics in all countries except Mauritania. Even though the number of import and export formalities is high, and so is cost in some cases, goods generally move more quickly than the LMI average. This pattern is observed on both the export and import sides. Because the Doing Business data include the time taken to draft documents in the total trade time calculation, the performance difference between the time and document metrics suggests that the performance of border agencies such as customs might in fact be relatively strong, given the constraints under which they are operating. Loosening those constraints by reducing the number of documents required for exports and imports could help boost performance, and thus speed, further.

Third, all countries exhibit a significant difference in performance between exports and imports. In all cases, for example, imports take up to 40% more time to cross borders than exports. Costs are also uniformly higher for import transactions than for export transactions, even though the number of

documentary formalities is often comparable. This finding suggests that trade facilitation regimes in the Maghreb still exhibit considerable de facto discrimination against imports, a factor which might be important in explaining the relatively low levels of trade observed in the region. Moreover, cumbersome import procedures hinder domestic manufacturers looking to access intermediate inputs on the world market, which in turn hurts their productivity and export potential (World Bank, 2010).

Table 1: Export documents, time, and cost in the Maghreb (2009).

	Documents		Days		Cost	
	No.	% LMI	No.	% LMI	$US	% LMI
Algeria	8	112.20	17	82.60	$1,248	168.99
Mauritania	11	154.28	39	189.50	$1,520	205.82
Morocco	7	98.18	14	68.03	$700	94.79
Tunisia	5	70.13	15	72.89	$783	106.03

Source: World Trade Indicators based on Doing Business data. Data for Libya are unavailable. LMI refers to the GDP weighted average for lower middle income countries.

Table 2: Import documents, time, and cost in the Maghreb (2009).

	Documents		Days		Cost	
	No.	% LMI	No.	% LMI	No.	% LMI
Algeria	9	139.32	23	95.12	1,428	171.06
Mauritania	11	170.28	42	173.70	1,523	182.44
Morocco	10	154.80	17	70.31	1,000	119.79
Tunisia	7	108.36	21	86.85	858	102.78

Source: World Trade Indicators based on Doing Business data. Data for Libya are unavailable. LMI refers to the GDP weighted average for lower middle income countries.

Although these data are suggestive of significant impediments in the region's trade facilitation environment, it is important to keep them in context. All of the Maghreb countries have taken steps to improve their trade facilitation performance, with Tunisia and Morocco leading the way. World Bank (2010) highlights that from the 2007 to 2010 LPI surveys, there is significant evidence of progress in some areas, and little evidence of backsliding. Hoekman and Zarrouk (2009) similarly show that significant improvements have in fact taken place in recent years. Export and import costs have declined substantially

in some cases. Algeria, for example, reduced them by around 25% between 2006 and 2008. Morocco and Tunisia both substantially reduced export and import times, by up to one-third. The only area in which there has been relatively little, if any, movement is on documentary formalities: the numbers reported by Hoekman and Zarrouk (2009) based on Doing Business data disclose few differences between 2006 and 2008. Clearly, reducing the documentary impediments and accompanying costs facing exporters and importers will be an important part of the trade facilitation agenda in the Maghreb going forward.

2.2 Trade Outcomes

On the trade outcome side, the data are heavily skewed by the region's reliance on the energy sector. Goods trade integration—exports and imports as a percentage of GDP—is at a minimum in line with the LMI average (Mauritania), and substantially exceeds it for all other countries (Figure 1). Despite this relatively encouraging result, exports are much more concentrated in terms of products than the LMI average in Algeria, Libya, and Mauritania. Only Morocco and Tunisia have export bundles that are more diversified than the LMI average. The energy sector clearly plays an important role in explaining both the relatively high level of trade integration observed in most countries in the region, but the significant contribution made by just a few products to overall trade values. When the energy sector is taken out of the data, the picture that emerges is one of more limited integration with international goods markets (World Bank, 2006).

2.3 Consolidation

This brief overview of the Maghreb trading environment suggests that there is considerable potential to boost trade integration and diversification by lowering various types of trade costs. Intra-regional trade remains low, accounting for only 1% of total trade in 2004 (World Bank, 2006). Although some have questioned the long-term potential of intra-regional trade in light of strong economic similarities within the region (World Bank, 2006), there nonetheless appears to be scope to boost intra-regional trade from

its exceptionally low level in the short- to medium-term. There is probably also scope to boost integration with international goods markets more generally, including with significant trade partners such as the EU.

Tariffs are one part of the equation, but non-tariff measures are also important. Simulation studies suggest that the gains from reform in the region could be significant. Bchir et al. (2006), for instance, suggest that liberalizing tariff and non-tariff barriers in goods sectors could increase regional welfare by $350m. Hufbauer and Brunel (2008) use a gravity model to show that a free trade area among the Maghreb countries would almost double intra-regional trade. Looking more broadly at economic integration in the Arab world—i.e., not limited to the Maghreb—Harb (2008) finds that improved trade facilitation could indeed result in a significant boost to regional trade. Similarly, Dennis (2006) finds that significant welfare gains could be brought about by increased intra- and inter-regional integration. Moreover, the economic gains from additional regional agreements could be tripled by including appropriate trade facilitation measures. These are points that are addressed further in the concluding section of the paper, where I address the policy issues facing the Maghreb countries going forward, based on the analysis of trade costs conducted in the next section.

3 Intra- and Extra-Regional Trade Costs in Comparative Perspective

Against the general background set out in the previous section, this section analyzes intra- and extra-regional trade costs in the Maghreb from a comparative perspective. It first presents a new methodology and dataset for calculating trade costs. It then presents results for the Maghreb and a set of comparator regions, before using econometric methods to decompose trade costs into their tariff and non-tariff components, focusing in particular on the role played by logistics and trade facilitation.

3.1 Methodology

The gravity model is the workhorse of empirical international trade. Typically, it is used to obtain econometric estimates of the sensitivity of trade flows with respect to particular trade cost factors, and to run counterfactual simulations based on those estimates (see, for example, Anderson and Van Wincoop, 2003). Novy (2010) turns the gravity model on its head to develop a methodology for inferring trade costs based on the observed pattern of trade and production. He starts from a variety of theory-based gravity models such as those due to Anderson and Van Wincoop (2003) and Chaney (2008), and uses simple algebra to derive a theory-consistent expression for bilateral trade costs between two countries. His approach has been applied in a number of recent papers, such as: Jacks et al. (2008) on trade costs over the 1870-2000 period; Shepherd (2010), who uses the methodology to assess the effectiveness of trade facilitation programs in APEC and ASEAN; Brooks and Ferrarini (2010) on trade costs between India and China; Duval and Utoktham (2010) on trade costs in the Asia-Pacific; Miroudot et al. (2010) on trade costs in international services markets; and Olper and Raimondi (2009) on trade costs in food industries.

There are three main advantages to the Novy (2010) methodology. First, it is "top down", in the sense that it provides an all-inclusive measure of trade costs, covering all factors—even unobservables—affecting exports and imports. Second, its data requirements are limited to the value of domestic and international shipments, which can be approximated using commonly available data from national accounts and standard trade databases. It is not necessary to have policy data on the full range of trade costs in order to properly account for them using this approach. Third, the methodology is theory-based, and relies on an identity relationship rather than econometric estimation. There is thus no risk of omitted variable bias, or other problems that typically plague econometric estimates of gravity models. Of course, the cost of relying heavily on theory is that if it is incorrect, then the decomposition might also be erroneous. However, Novy (2010) shows that the approach used here can be applied successfully to a

variety of theoretical models of trade; it obviously captures a deep regularity in the relationship between trade costs, production, and trade flows. He also shows that it is highly robust to the possibility of measurement error.

In ad valorem equivalent terms, Novy's (2010) measure takes the following form:

$$(1)\quad \bar{t}_{ijt}^{k} = \left(\frac{t_{ijt}^{k} t_{jit}^{k}}{t_{iit}^{k} t_{jjt}^{k}}\right)^{\frac{1}{2}} - 1 = \left(\frac{x_{iit}^{k} x_{jjt}^{k}}{x_{ijt}^{k} x_{jit}^{k}}\right)^{\frac{1}{2(s-1)}} - 1$$

where: $\bar{t}_{ijt}^{k}$ is the geometric average of trade costs facing exports from country *i* to country *j* and those facing exports from country *j* to country *i*; *k* and *t* index sectors and time periods respectively; $\frac{t_{ijt}^{k}}{t_{iit}^{k}}$ is the cost of shipping goods from country *i* to country *j* relative to the cost of shipping them within country *i*; $\frac{x_{iit}^{k}}{x_{ijt}^{k}}$ is the value of goods shipped within country *i* relative to the value of those shipped from country *i* to country *j*; and *s* is a model parameter, usually the elasticity of substitution among product varieties within a sector.[3]

The basic interpretation of equation (1) is straightforward: as the ratio of international trade relative to domestic shipments ($\frac{x_{ijt}^{k} x_{jit}^{k}}{x_{iit}^{k} x_{jjt}^{k}}$) increases, trade costs fall. In other words, trade costs must be lower when countries exhibit a greater tendency to trade with each other rather than with themselves. The precise relationship between trade costs and the ratio of trade to domestic shipments depends on how

[3] Novy (2010) shows that the exponent in the trade costs expression can have a variety of interpretations depending on the underlying theoretical model used. If the starting point is the Anderson and Van Wincoop (2003) model, then the exponent depends on the degree of product differentiation. Under Chaney (2008) assumptions, it depends on the extent of firm heterogeneity in productivity. Alternatively, in the Eaton and Kortum (2002) framework, it depends on heterogeneity in countries' relative productivities. From an empirical point of view, it is largely immaterial which one of these starting points is used. Novy (2010) shows that reasonable assumptions as to the relevant parameters are consistent with approximately the same value of the exponent.

substitutable the goods in question are: in more homogeneous sectors, the effect on trade costs of a given change in the ratio is dampened.

However, it is important to be clear on a number of other aspects of the interpretation of $\bar{t}_{ijt}^{k}$. First, it represents average trade costs in both directions between *i* and *j*. The structure of the model is such that it is not possible to derive expressions for unidirectional trade costs in terms of observables. From a policy perspective, it is therefore important to interpret changes in $\bar{t}_{ijt}^{k}$ cautiously: they might be caused by policy changes in country *i*, in country *j*, or in both simultaneously.

Second, as the first part of equation (1) indicates, $\bar{t}_{ijt}^{k}$ depends on the ratio of international trade costs to domestic trade costs ($\frac{t_{ijt}^{k}}{t_{iit}^{k}}$ and $\frac{t_{jit}^{k}}{t_{jjt}^{k}}$). One aspect of this connection is that some kinds of "behind-the-border" trade costs are effectively cancelled out in the final measure of average trade costs, namely those that affect domestic and foreign producers in exactly the same way. However, many behind-the-border measures discriminate in fact, if not in law, in the sense that it is more costly for foreign producers to obtain information on procedures, or navigate a path through domestic regulations and institutions. These kinds of differences are captured in $\bar{t}_{ijt}^{k}$. However, when comparing trade costs across countries, it is impossible to separately identify international versus domestic trade costs.

Third, $\bar{t}_{ijt}^{k}$ is an all-inclusive measure of trade costs, in the sense that it takes account of the full range of transaction costs affecting exports and imports. It is not a measure of protection, like the OTRI discussed above. It takes account of tariff and non-tariff barriers to trade, but also includes a wide range of other trade cost factors typically captured in gravity models. Examples include geographical distance, and cultural or historical links. As a result, $\bar{t}_{ijt}^{k}$ is generally much larger in magnitude than the rates of protection trade economists are used to dealing with in measures such as the OTRI or average applied tariffs. As the discussion below shows, it is also much larger than the survey-based estimates of trade

costs reported by Hoekman and Zarrouk (2009), which identify only a restricted set of factors to be taken into account in measuring overall costs.

3.2 Data

As noted above, one of the advantages of the Novy (2010) methodology is that its data requirements are relatively limited. Data on the value of international shipments by sector (x_{ijt}^k and x_{jit}^k) are taken from the UN-Comtrade database, accessed via WITS. They are disaggregated into three sectors: agriculture (ISIC Rev. 3 sectors 1-5), manufacturing (ISIC Rev. 3 sectors 15-37), and energy (ISIC Rev. 3 sectors 10-14, and 40). Since it is important in calculating $\bar{t}_{ijt}^k$ that the trade data exclude trade costs to the extent possible, all calculations presented here use unidirectional FOB export data rather than CIF import (mirror) data.

Data on domestic shipments (x_{iit}^k and x_{jjt}^k) in terms of gross production, however, are not readily available in standardized format for most countries.[4] It is therefore necessary to find an approximation. One approach that has been used in the literature is to work with GDP data less total exports, as a proxy for domestic production consumed domestically (Jacks et al., 2008; Brooks and Ferrarini, 2010; Duval and Utoktham, 2010). There are two drawbacks to this approach, however. First, GDP data include both goods and services, whereas trade data include only goods, thereby making the comparison of the two suspect. Jacks et al. (2008) use an ad hoc adjustment to account for this problem, whereas Duval and Utoktham (2010) directly net out the share of services in value added. Second, GDP data are measured on a value added basis, whereas exports are measured in terms of gross shipments, not value added. Without further adjustment, using the ratio of value added to gross export shipments in equation (1) produces a value of $\frac{x_{iit}^k x_{jjt}^k}{x_{ijt}^k x_{jit}^k}$ that is too low, and thus a value of $\bar{t}_{ijt}^k$ that is also too low.

[4] The OECD STAN database is an exception: Miroudot et al . (2010) use it to directly calculate measures of trade costs in services markets, based on production data.

To deal with these two problems, the following approach is adopted. First, GDP data are sourced from the World Development Indicators database. For agriculture and manufacturing, the same sectoral classification as for the trade data is used. For energy, the available value added data include ISIC Rev. 3 sectors 41 and 45 (water and construction) in addition to what is captured in the trade data. There is no way to net out these additional sectors, however, so the WDI data are used as the closest available proxy. All results involving the energy sector should be interpreted with caution due to this lack of perfect correspondence between the trade and GDP data.

The second step in treating the GDP data is to apply an approximate conversion factor for value added to gross shipments. The OECD's STAN database provides data on value added and gross production using the same ISIC sectors as the WDI GDP data. It is therefore possible to obtain an OECD average ratio of production to value added in each sector over the 2000-2009 period. This conversion factor is then used to scale up the value added data taken from the WDI to give a first approximation of the value of domestic production in each sector. Proceeding in this way gives value added to gross production conversion factors of 2.2 (agriculture), 3.5 (manufacturing), and 2.5 (energy). Of these, the input-output relationship is likely to be most different between the OECD and the Maghreb for the energy sector, which suggests that results for that sector should be treated cautiously for this reason, in addition to the trade-GDP correspondence issue highlighted above.

The main limitation of this approach is that it assumes the same relationship between production and value added—that is, approximately the same use of intermediate inputs—in the Maghreb as in the OECD. Given the different development levels involved, this assumption is obviously a strong one. Nonetheless, it represents the best approach that can be taken based on the data that are currently available.

The third step is to subtract total exports from the value of domestic production, so as to obtain a proxy for domestic shipments. Total exports are sourced from the UN-Comtrade database via WITS, using the

same sectoral classifications as above. "Total" in this case means exports to all other countries in the world, again on a unidirectional FOB basis.

Having obtained trade data and proxies for the value of domestic shipments, the only additional element required to apply equation (1) to the data is the parameter *s*. As noted above, the interpretation of the exponent in equation (1) changes depending on the theoretical model used to derive the expression for trade costs. In the most common derivation, s is the intra-sectoral elasticity of substitution (across varieties within a sector). Novy (2010) argues that a reasonable value based on the previous literature is $s = 8$. He also shows that the corresponding value of the exponent in the expression for trade costs ($\frac{1}{14}$) is reasonable based on alternative derivations of the model, and thus on different interpretations of the relevant parameter. This paper therefore assumes $s = 8$ throughout. Although ad valorem equivalent trade costs are quite sensitive to the value of *s*, the pattern of trade costs across countries and through time is not.

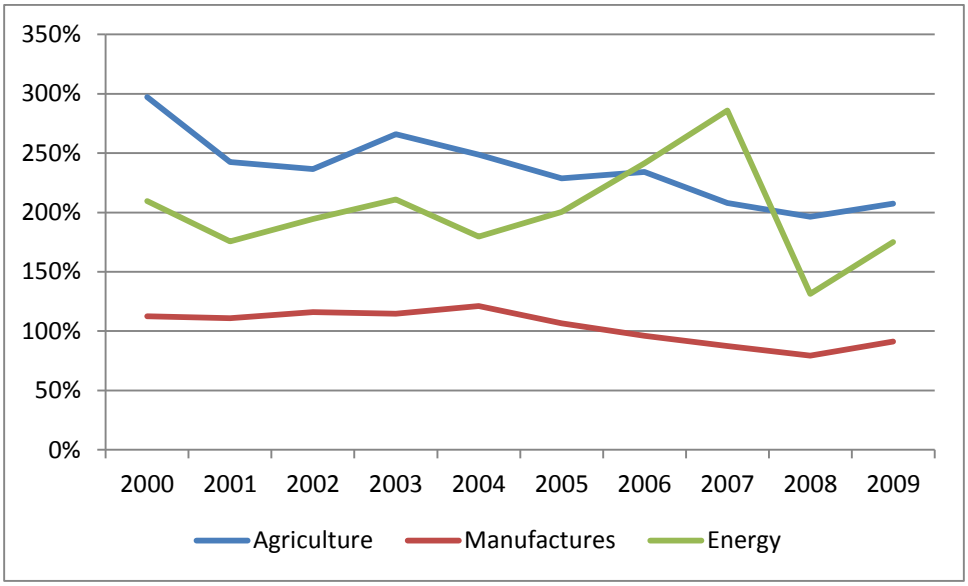
Using data constructed as above, it is a simple matter to calculate $\bar{t}_{ijt}^{k}$ for each exporter-importer-sector-year combination. To present results by aggregate region, the data are first summed across all countries in the region, and $\bar{t}_{ijt}^{k}$ is calculated treating *i* and *j* as regions rather than individual countries. The advantage of this approach is that it does not rely on an ad hoc assumption to generate regional aggregates, such as the use of simple or GDP-weighted averages (cf. Duval and Utoktham, 2010).

3.3 Intra-Regional Trade Costs

Trade costs within the Maghreb are very high, particularly in agriculture (Figure 2). In terms of absolute levels, intra-Maghreb trade costs are around 100% ad valorem for manufactured goods, and over 200% for agriculture. They are higher than trade costs within the Mashreq and GCC regions (Figures 3-4), and are 1.5 to 2 times higher than those within the EU (Figure 5). Nonetheless, the trend is moving in an

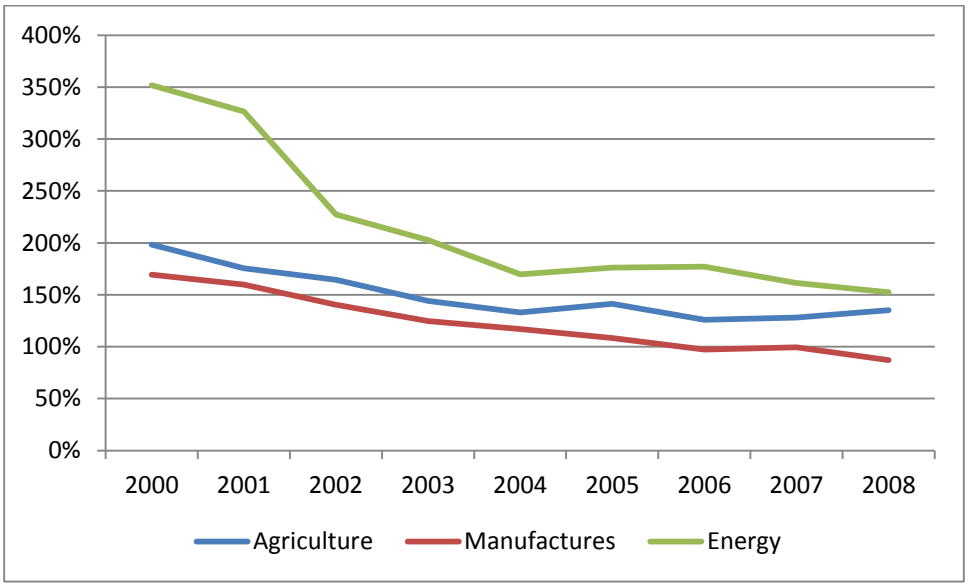
encouraging direction: intra-regional trade costs in agriculture fell by 30% between 2000 and 2009, while those in manufacturing fell by just under 20%. Much remains to be done, however.

Figure 2: Intra-Maghreb trade costs, % ad valorem equivalent, 2000-2009.



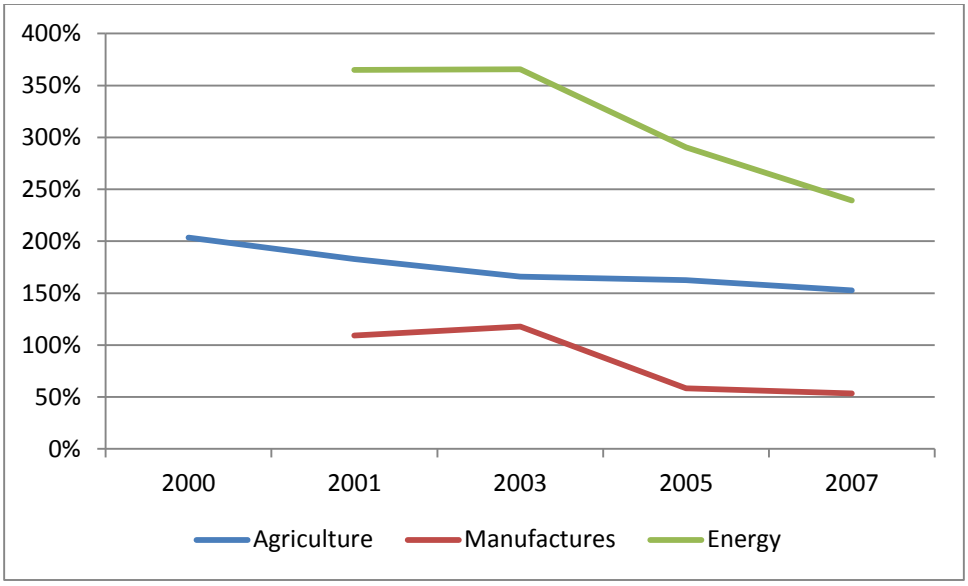
Source: Author's calculations.

Figure 3: Intra-Mashreq trade costs, % ad valorem equivalent, 2000-2008.



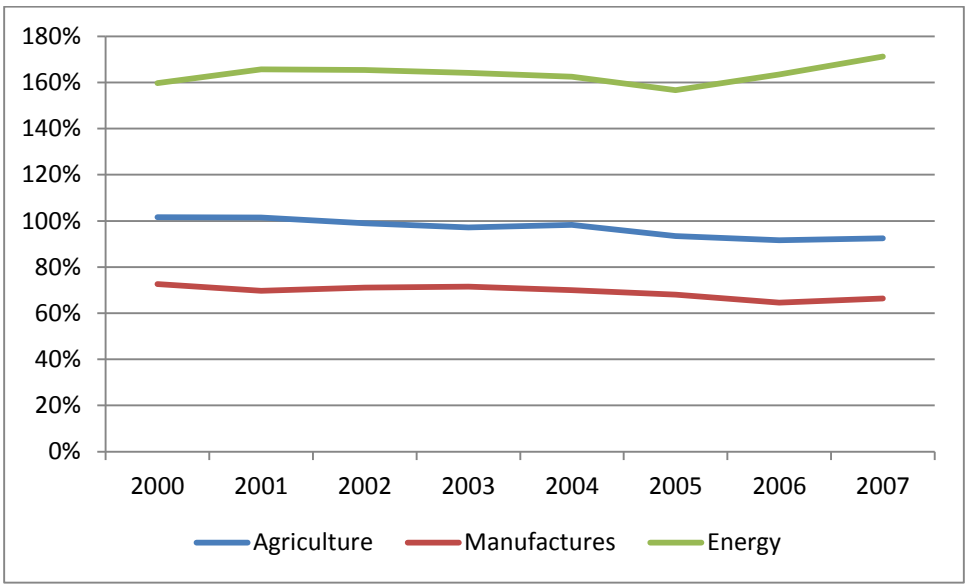
Source: Author's calculations.

Figure 4: Intra-GCC trade costs, % ad valorem equivalent, 2000-2007.[5]



Source: Author's calculations.

Figure 5: Intra-EU trade costs, % ad valorem equivalent, 2000-2007.



Source: Author's calculations.

[5] Results for the GCC are presented to give a point of comparison only. Due to limited data availability, they should be interpreted with caution.

It is difficult to compare the estimates presented here with those from the previous literature due to differences in data and parameter assumptions. For instance, Duval and Utoktham (2010) use GDP data apparently without adjusting for the difference between value added and gross shipments. Brooks and Ferrarini (2010) do not apply that adjustment either, and moreover use $s = 11$ rather than $s = 8$. Both factors lead to trade cost estimates that are lower than those presented here. Nonetheless, the results reported in Table 3 reinforce the view that trade costs in the Maghreb are very high by global standards. The only Asian regions with comparable levels of trade costs are South Asia and Central Asia. Trade costs in East Asia are much lower, and are closer to the level observed within the EU than that observed in the Maghreb.

Table 3: Trade costs for selected Asian countries, all sectors, latest available year.

Region	Estimated Trade Costs	Year	Source
APEC-Rest of World	56%	2006	Shepherd (2010)
ASEAN (intra)	61%	2007	Duval and Utoktham (2010)
ASEAN-China	27%	2008	Brooks and Ferrarini (2010)
ASEAN-EU	127%	2007	Duval and Utoktham (2010)
ASEAN-India	42%	2008	Brooks and Ferrarini (2010)
ASEAN-Rest of World	53%	2007	Shepherd (2010)
China-EU	31%	2008	Brooks and Ferrarini (2010)
East and North-East Asia (intra)	155%	2007	Duval and Utoktham (2010)
India-EU	40%	2008	Brooks and Ferrarini (2010)
North and Central Asia (intra)	300%	2007	Duval and Utoktham (2010)
SAARC (intra)	151%	2007	Duval and Utoktham (2010)

Note: East and North-East Asia is defined as China, Japan, Korea, Macao, and Mongolia. North and Central Asia is defined as Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, and the Russian Federation.

A comparison of bilateral trade costs highlights the immense differences between the Maghreb countries and the Mediterranean members of the EU (Tables 4-5). Bilateral trade costs between Maghreb countries are frequently over 100% or even 200% percent, and are over 500% in the case of agricultural trade between Morocco and Mauritania. Only Greece appears to have levels of trade costs that are at all comparable to those of the Maghreb countries. On other bilateral routes, trade costs in the Mediterranean EU are a small fraction of those in the Maghreb. These results suggest that there is major

scope for the Maghreb countries to reduce intra-regional trade costs, and thereby boost the currently very low level of intra-regional trade.

Table 4: Bilateral trade costs in the Maghreb, % ad valorem equivalent, latest available year.

	Agriculture	Manufacturing	Energy
Algeria-Morocco	307%	98%	257%
Algeria-Mauritania	424%	381%	165%
Algeria-Tunisia	221%	76%	184%
Morocco-Mauritania	538%	202%	na
Morocco-Tunisia	198%	107%	322%
Mauritania-Tunisia	na	181%	330%

Source: Author's calculations.

Table 5: Bilateral trade costs in the EU (Mediterranean countries only), % ad valorem equivalent, latest available year.

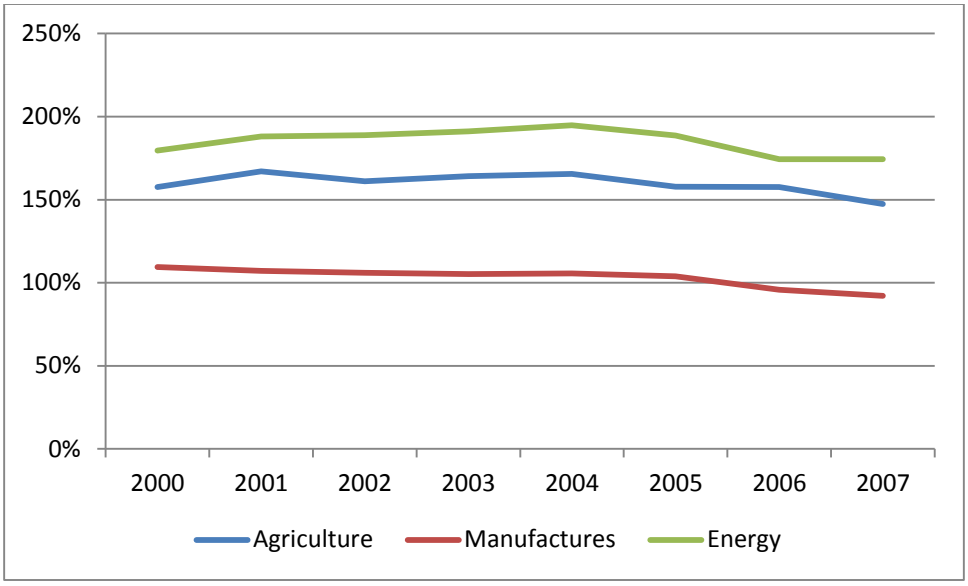
	Agriculture	Manufacturing	Energy
France-Greece	139%	98%	325%
France-Italy	81%	48%	149%
France-Spain	67%	44%	178%
Greece-Italy	104%	242%	81%
Greece-Spain	139%	108%	331%
Italy-Spain	96%	58%	203%

Source: Author's calculations.

3.4 Trade Costs with Major Partners

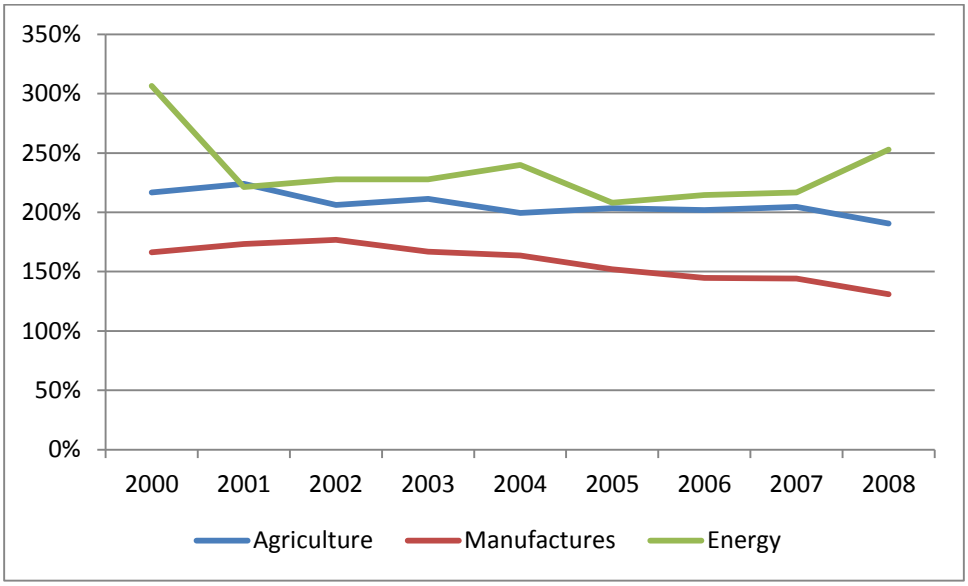
Trade costs between the Maghreb and the EU are relatively high by global standards (Figure 6). The absolute level is around 100% ad valorem in manufacturing, and around 150% in agriculture. However, the trend is again moving in the right direction: trade costs fell by 6% in agriculture and by 16% in manufacturing over the 2000-2007 period. Moreover, trade costs between the Maghreb and the EU are lower than those between the EU and neighboring regions such as the Mashreq (Figure 7), Egypt (Figure 8) and the GCC countries (Figure 9). This difference could represent an advantage for the Maghreb in developing its trade relations with the EU, and suggests that recent efforts at integration among the Mediterranean countries may be starting to bear fruit.

Figure 6: Maghreb-EU trade costs, % ad valorem equivalent, 2000-2007.



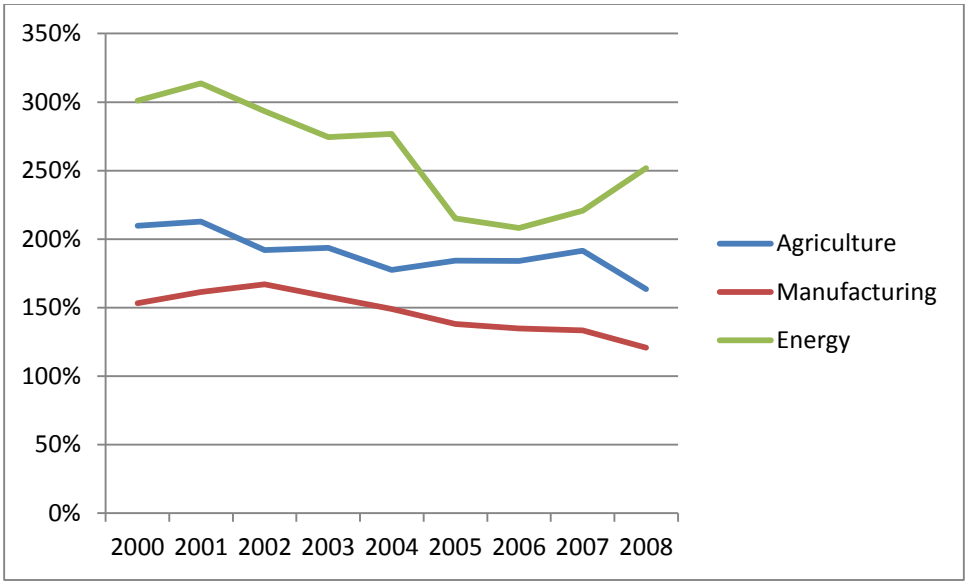
Source: Author's calculations.

Figure 7: Mashreq-EU trade costs, % ad valorem equivalent, 2000-2008.



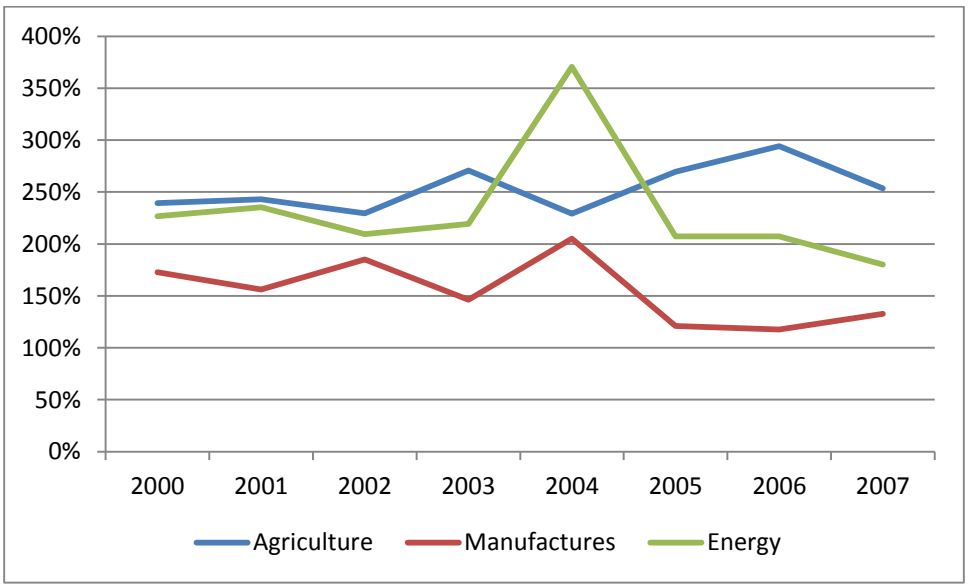
Source: Author's calculations.

Figure 8: Egypt-EU trade costs, % ad valorem equivalent, 2000-2008.



Source: Author's calculations.

Figure 9: GCC-EU trade costs, % ad valorem equivalent, 2000-2007.[6]

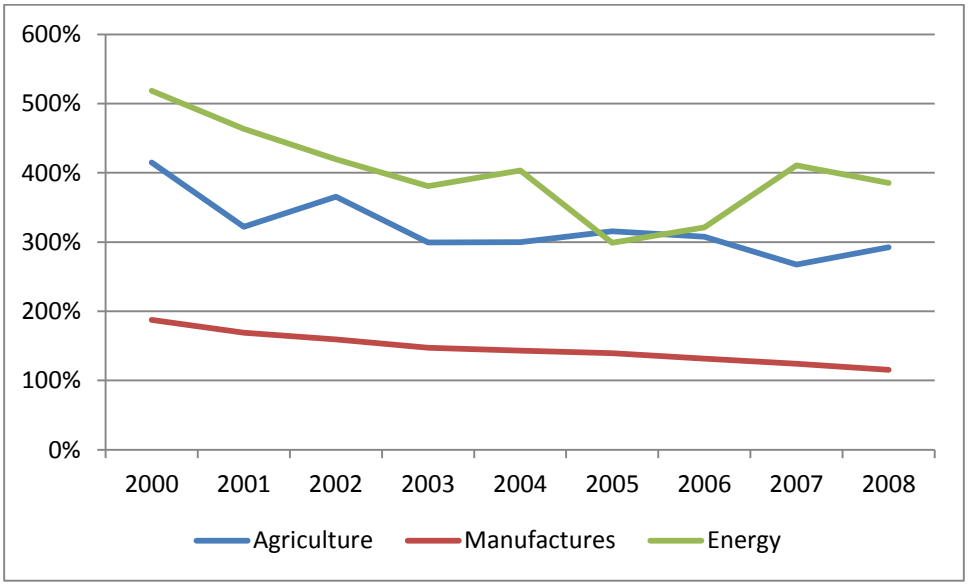


Source: Author's calculations.

[6] Results for the GCC are presented to give a point of comparison only. Due to limited data availability, they should be interpreted with caution.

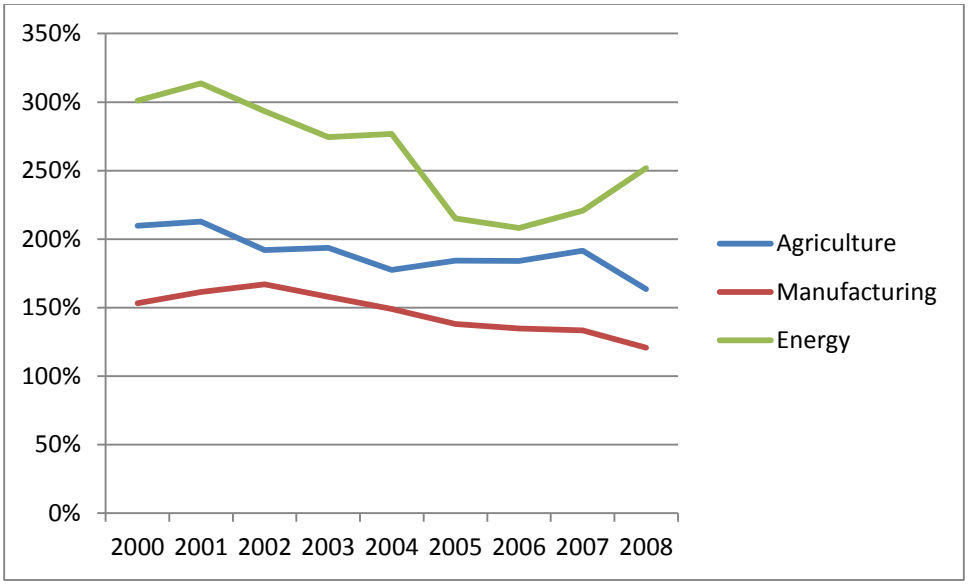
Trade costs between the Maghreb and its neighbors are considerably higher than those between the Maghreb and the EU. For example, trade costs in manufactures are over 100% between the Maghreb and Mashreq countries, compared with under 100% for Maghreb-EU trade. In agriculture, the situation is even more striking: Maghreb-Mashreq trade costs amount to around 300%, compared with 150% for Maghreb-EU trade (Figure 10). Noticeable reductions have taken place with respect to the Mashreq countries, however: trade costs in agriculture fell by nearly 30% and those in manufacturing by nearly 40% between 2000 and 2008. Taking Egypt as an important example of a neighboring Mashreq country, the same basic pattern is apparent (Figure 11). However, the level of trade costs between the Maghreb and the Mashreq as a whole is generally higher than with Egypt alone, which suggests that the other Mashreq countries exhibit higher trade costs vis-à-vis the Maghreb than does Egypt.

Figure 10: Maghreb-Mashreq trade costs, % ad valorem equivalent, 2000-2008.



Source: Author's calculations.

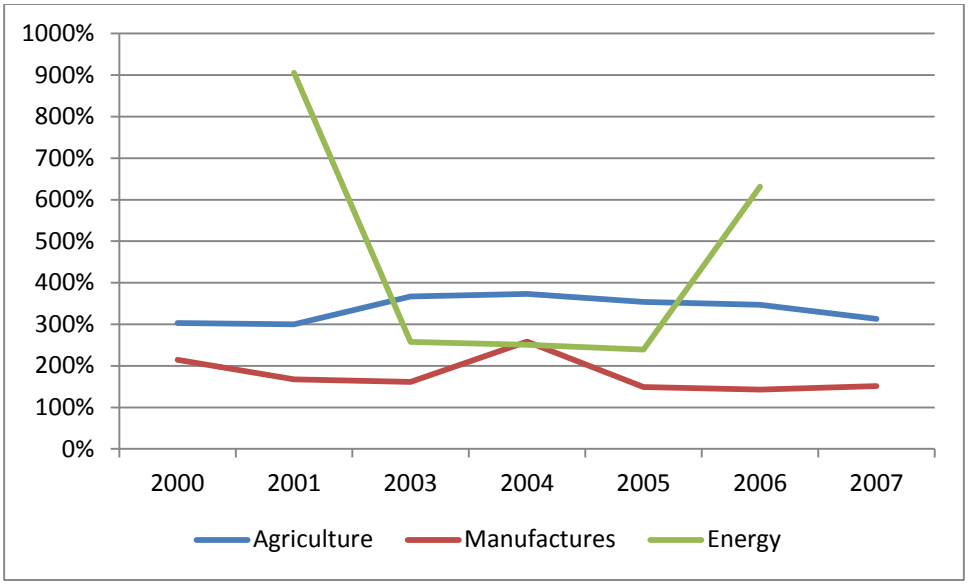
Figure 11: Maghreb-Egypt trade costs, % ad valorem equivalent, 2000-2008.



Source: Author's calculations.

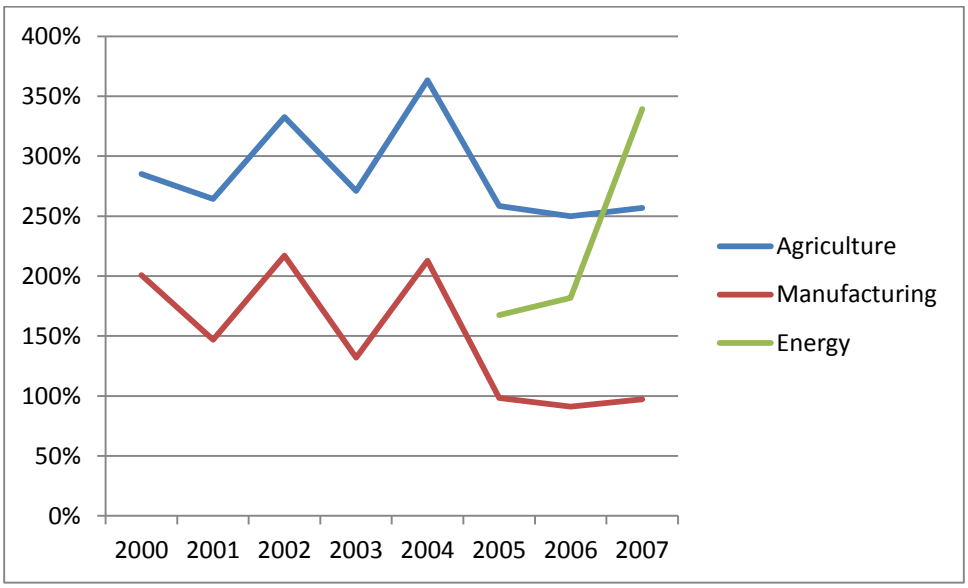
Data involving the GCC countries are difficult to interpret due to their volatility. However, the general picture that emerges is in line with what has been found for the other examples of inter-regional trade considered in this paper. Trade costs between the Maghreb and the GCC countries are high in absolute terms (Figure 12). There is also some evidence that they may be higher than costs between an important regional comparator country (Egypt) and the GCC (Figure 13); however, the volatility of these data make it difficult to draw any firm conclusions on that point.

Figure 12: Maghreb-GCC trade costs, % ad valorem equivalent, 2000-2007.[7]



Source: Author's calculations.

Figure 13: Egypt-GCC trade costs, % ad valorem equivalent, 2000-2007.[8]



[7] Results for the GCC are presented to give a point of comparison only. Due to limited data availability, they should be interpreted with caution.

[8] Results for the GCC are presented to give a point of comparison only. Due to limited data availability, they should be interpreted with caution.

3.5 Consolidation

The data clearly show that trade costs in the Maghreb are high by world standards, particularly in agriculture. Intra-regional trade costs are noticeably higher than in comparator regions, such as the Mashreq or the Mediterranean EU countries. They are well in excess of the levels observed elsewhere in the world, for instance in the rapidly globalizing economies of East Asia. This fact helps explain the very low level of intra-regional trade observed in the Maghreb. In addition, extra-regional trade costs are also high, although trade costs with respect to the EU are somewhat lower than those with respect to the neighboring Mashreq countries.

Despite starting from a high level of trade costs in 2000, and thus a very low level of regional and international integration, there is evidence that the Maghreb countries have been moving in the right direction over the last decade. Trade costs have fallen in both agriculture and manufactures, in some cases by significant amounts. The results presented here therefore line up well with those from the LPI (World Bank, 2010) and the firm-level survey of Hoekman and Zarrouk (2009). It is important to know more about the sources of these changes going forward, so that policymakers can leverage the work that has already been done.

4 Decomposing the Sources of Trade Costs: The Role of Logistics

In addition to providing an estimate of the overall level of trade costs on individual bilateral routes, the methodology applied in the previous section can also be used to decompose trade costs into their component parts. Following Chen and Novy (2010), the decomposition proceeds using econometric estimation. In this approach, trade costs are used as the dependent variable, and a series of common trade cost indicators are used as the independent variables. Parameter estimates provide an indication of the sensitivity of trade costs to the particular factors identified. They can also be used to provide a

quantitative assessment of the contribution of particular factors to the observed variance in trade costs, which gives an indication of their relative policy importance.

The regression-based decomposition of trade costs uses the following model, estimated separately for each of the three sectors identified above, namely manufacturing, agriculture, and energy:

$$(2)\ \log\left(\bar{t}_{ij}^{k}\right) = c + b_1 \log\left(\overline{Logistics}_{ij}\right) + b_2 \log\left(1 + \overline{\text{tariff}}_{\text{ij}}^{\text{k}}\right) + \text{b}_3\log\left(Distance_{ij}\right) + b_4 NoBorder_{ij} + b_5 NoLanguage_{ij} + b_6 NoColony_{ij} + b_7 NoComCol_{ij} + e_{ij}^{k}$$

As above, *i* and *j* index countries, and *k* indexes sectors. Due to data availability limitations, the model is estimated for a single time period only (2007). The *Logistics* variable is the geometric average of the LPI scores of the importing and exporting countries, rescaled so as to be an indicator of cost rather than performance (i.e., a higher score indicates a higher level of cost, with one being the lowest level of cost and five the highest). The remaining variables are common trade cost proxies from the gravity model literature (see Anderson and Van Wincoop 2004 for a review). Again, they are rescaled so as to represent cost factors. *Tariff* is the simple average effectively applied tariff, again based on a geometric average of the importer and exporter figures in order to take account of the bilateral nature of the trade costs measure. *Distance* is the great circle distance between the importing and exporting countries. *NoBorder*, *NoLanguage*, *NoColony*, and *NoComCol* are all dummy variables respectively equal to unity for countries that are not geographically contiguous, do not share a common language, were never in a colonial relationship, and did not have a common colonizer. Given the way in which the various trade cost variables are defined, we expect all *b* parameters to be positive. Finally, e_{ij}^{k} is a white noise error term, which satisfies standard assumptions. For full details of data and sources, see Table 7.

Table 6: Data and sources for the trade costs regressions.

Variable	Definition	Source
Trade Costs	Bilateral trade costs between the exporting and importing countries, being the geometric average of trade costs in either direction.	Author's calculations.
Logistics Costs	Geometric average of the LPI scores of the importing and exporting countries, rescaled to run from one (low cost, high performance) to five (high cost, low performance).	LPI.
Tariffs	Geometric average of effectively applied tariffs imposed by the exporting and importing countries.	WITS-TRAINS.
Distance	Geodesic distance between the main cities of the exporting and importing countries.	CEPII.
No Common Border	Dummy variable equal to unity when the exporting and importing countries do not share a common land border.	CEPII.
No Common Language	Dummy variable equal to unity when the exporting and importing countries do not share a common language (ethnographic basis).	CEPII.
No Colony	Dummy variable equal to unity if the exporting and importing countries were never in a colonial relationship.	CEPII.
No Common Colonizer	Dummy variable equal to unity if the exporting and importing countries were not colonized by the same power.	CEPII.

Note: All data are for 2007.

OLS estimates of equation (2) using the full sample of countries—the Maghreb, the Mashreq, the GCC, and the EU—are in Table 8. For all three sectors, the logarithm of international distance has the expected positive and statistically significant coefficient: increasing the distance between two countries by 1% is associated with an increase in trade costs of 0.4-0.5 percent. Results for the other control variables are more mixed. Not having a common border increases trade costs significantly in all sectors. The same is true in the manufacturing sector only for countries that lack a common language, or have never had a colonial relationship. Not having been colonized by the same power does not have an impact on trade costs in any of the three sectors. Tariffs have the expected positive sign in the manufacturing sector equation, but the coefficient is not statistically significant. In the other two sectors, tariffs have an unexpected negative and statistically significant coefficient. In agriculture, the reason is probably that tariffs are not the main trade policy measures in place, with non-tariff barriers playing a much larger relative role. In energy, the estimated coefficient on tariffs is far too large in magnitude, probably due to the fact that there is very little variation in the underlying data for that sector: nearly all tariffs are zero.

Of most interest from a policy point of view is the coefficient on logisitics costs as captured by the LPI. In both manufacturing and agriculture, the coefficient is positive and statistically significant (1%), which indicates that there is a strong link between logistics and trade costs in those sectors. The coefficient for the energy sector carries an unexpected negative sign, but is not statistically significant. In quantitative terms, increasing the LPI score by 1% is associated with a decrease in trade costs of nearly 0.7% in manufacturing and 0.8% in agriculture. Improving logistics performance clearly has the potential to greatly reduce trade costs.

Table 7: Regression results using log(trade costs) as the dependent variable, 2007 only.

	(1) Manufacturing	(2) Agriculture	(3) Energy
Log(Logistics Costs)	**0.653*** **	**0.808*** **	**-0.061**
	(0.000)	**(0.000)**	**(0.668)**
Log(Tariff)	1.943	-2.786*	-115.840***
	(0.415)	(0.100)	(0.002)
Log(Distance)	0.397***	0.467***	0.372***
	(0.000)	(0.000)	(0.000)
No Common Border	0.207**	0.282**	0.225*
	(0.037)	(0.011)	(0.057)
No Common Language	0.190**	0.126	-0.038
	(0.011)	(0.228)	(0.704)
No Colonial Relationship	0.426***	0.050	0.192
	(0.001)	(0.652)	(0.278)
No Common Colonizer	0.055	-0.186	-0.344
	(0.564)	(0.312)	(0.191)
Constant	-3.961***	-3.476***	-1.582***
	(0.000)	(0.000)	(0.002)
R2	0.620	0.579	0.357
Observations	336	448	322

*Source: Author's calculations. Note: P-values based on robust standard errors corrected for clustering by country pair are included in parentheses below the parameter estimates. Statistical significance is indicated by * (10%), ** (5%), and *** (1%).*

To illustrate the relative importance of the various factors as determinants of overall trade costs, Chen and Novy (2010) suggest a variance decomposition approach.[9] The percentage of the observed variance in trade costs accounted for by logistics, for example, is given by the following expression:

$$(3)\ Variance\ \% = \beta_1 \frac{cov\left[\log\left(\tilde{t}_{ij}^{k}\right), \log\left(\overline{Logistics}_{ij}\right)\right]}{var\left[\log\left(\tilde{t}_{ij}^{k}\right)\right]}$$

where β_1 is the relevant partial regression coefficient. Applying this approach to the model for manufacturing (Table 8, column 1) shows that logistics accounts for just over 15% of the observed

[9] Due to the small number of available observations for the Maghreb, the full country sample is used for this analysis. It is not possible at this stage to obtain separate results for the Maghreb countries.

variation in total trade costs. Tariffs, by comparison, account for only 0.6% of the variation in trade costs, but distance accounts for over one-third of the total. Although these are little more than "back of the envelope" calculations, it is clear that as far as policy-related impediments to trade are concerned, logistics is an issue of major quantitative importance. This result lines up well with the existing literature, which tends to suggest that the gains from reforming non-tariff measures—and in particular trade facilitation and logistics—outweigh the gains from comparable tariff reductions (Hoekman and Nicita, 2009). Among previous contributions, Dennis (2006) stands out in this regard: his computable general equilibrium model suggests that the economic gains from additional regional integration could be tripled if accompanied by significant trade facilitation reforms.

5 Conclusion, Policy Implications, and Further Research

This paper has used a new methodology and dataset to assess trade costs in the Maghreb region over the 2000-2009 period. The major finding is that intra- and extra-regional trade costs are both high by world standards, and in particular when compared with rapidly globalizing regions such as the EU and East Asia. Trade costs in the agricultural sector stand out as particularly high. Interestingly, trade costs between the Maghreb and its major developed country trading partner—the EU—appear to be lower than with the neighboring Mashreq countries, including Egypt. This finding suggests that trade costs in the broader MENA region remain high, which tends to hold back intra-regional trade and encourage a search for alternative sources of demand. Nonetheless, the potential for greater integration with the European market is an attractive one, given the important spillovers—investment, technology transfer, etc.—which could take place.

Although the level of trade costs in the region remains high, the data also suggest that there has been some movement in the right direction over recent years. Intra-regional trade costs have fallen noticeably,

as have extra-regional trade costs on some routes. Going forward, it will be important to identify particular policy actions that have helped produce these outcomes, and to intensify efforts in those areas.

In terms of the components of trade costs, the analysis presented here suggests that non-tariff measures remain particularly important. Logistics and trade facilitation is one area that stands out. A "back of the envelope" calculation suggests that logistics costs account for over 15% of the observed variation in trade costs, a proportion that is far greater than that accounted for by tariffs. Logistics performance in the region is generally weak compared with comparator groups, so this result suggests that there is major scope for boosting trade performance through targeted interventions designed to improve the functioning of logistics markets. Importantly, improvements to trade facilitation and logistics generally benefit all trading companies and partner countries, and can therefore be a non-discriminatory way of promoting increased regional and international integration.

Recent policy analysis—the results of which sit well with the findings of this paper—is suggestive of a number of priorities for the Maghreb countries going forward. World Bank (2010) concludes that there is a broad trend of catch up between the Maghreb and the rest of the MENA region, particularly in the area of information and telecommunications infrastructure, where significant improvements have been made. On the other hand, continued attention is required in relation to customs and border procedures, as well as the prevalence of trade-related corruption. Indeed, LPI survey respondents indicate that solicitation of informal payments is a significant cause of delays at export and import, in addition to factors such as maritime transshipment and compulsory warehousing and transloading. Hoekman and Zarrouk (2009) report that informal payments in import and export transactions remain commonplace in some Maghreb countries, such as Morocco and Tunisia. Similarly, the survey results reported by Hoekman and Zarrouk (2009) suggest that customs documentation, particularly on the import side, represents a significant burden on traders. Even on the export side, the same authors report that firms encounter significant

delays in the operation of duty drawback schemes, for example, which increase their effective operating costs.

In addition to reducing the time and cost of exporting and importing, it is also important for the Maghreb countries to focus on supply chain reliability. LPI survey results suggest that the proportion of shipments that do not meet firms' internal quality criteria is 2.5 to three times higher than in the Gulf countries (World Bank, 2010). In a context of regional and international production networks, reliability looms large as a key determinant of overall performance.

Modernizing trade and transport infrastructure should also be a key priority going forward (World Bank, 2010). As in other regions, rail transport lags significantly behind other modes. In addition, maritime and air transport performance tends to be inferior to the income group average. The key from a policy point of view is not so much a "big push" of major projects, but the identification of incremental improvements with a strong return on investment. Increased regional coordination is also important, with a view to developing efficient trade corridors. Dedicated corridor management agencies can assist in this regard, in particular by building on best practice examples from other regions. Policymakers will need to take care to address bottlenecks primarily affecting intra-regional trade—such as road transport—in addition to those that impact inter-regional trade (air and maritime transport).

A closely related area that also needs policy attention is services (World Bank, 2010). Improving "hard" infrastructure like ports and roads only has limited economic impacts if key services markets, such as transport and logistics, remain under-performing. Some service providers are highly rated: air and maritime transport, and freight forwarding are examples. However, performance tends to lag in other key sectors such as rail transport, warehousing, transloading, and distribution. Putting in place appropriate "soft" (regulatory) infrastructure to boost service sector competitiveness, as well as building private sector capacity, should be key trade facilitation objectives going forward. Examples of appropriate measures

could include harmonization of trucking standards, financial incentives for fleet upgrades, and sectoral liberalization programs. More broadly, initiatives to increase integration of trucking markets across national borders could bring important benefits in terms of higher rates of intra-regional trade.

In terms of border management, the LPI survey discloses two interesting findings for the Maghreb countries (World Bank, 2010). First, and in contrast with other regions, customs agencies perform relatively poorly compared with other border management agencies. This unusual result suggests that there is still considerable work to do in upgrading customs through initiatives such as the use of information technology, and reductions in red tape. Although other border agencies score more highly than customs, an integrated approach to border management would obviously be beneficial, so that bottlenecks do not develop in the future. Particular attention should also be paid to health/SPS agencies.

Second, the rate of physical inspection of goods is relatively high in the Maghreb—close to 45% of all shipments—and is therefore a significant source of delay, since physical inspection more than doubles border clearance times. As noted above, there continues to be differential treatment of exports and imports, which has important implications for the competitiveness of domestic manufacturing. Although 80% of LPI respondents indicate that exports are often or nearly always cleared on time, the same is only true in relation to imports for 37% of respondents.

In addition to these policy priorities, there are a number of ways in which future research could expand on the results presented here. First, the data used for the present analysis are drawn from standard global sources such as the World Development Indicators. The advantage of this approach is that data are readily available for a wide variety of countries. However, it is not possible to use a detailed sectoral disaggregation—results here only distinguish between agriculture, manufacturing, and energy. Future research could leverage national accounts data to develop finer sectoral measures of trade costs, although care would need to be taken to ensure comparability across countries.

A second way in which future research could build on these results is by expanding the range of trade cost variables included in the econometric decomposition. Such an approach would help identify and prioritize policy interventions going forward, based on the extent to which each factor is linked to observed variations in trade costs. Inclusion of a time series dimension, as well as variables capturing implementation of various regional integration efforts, could also help in this regard.

References

Anderson, J., and E. Van Wincoop. 2003. "Gravity with Gravitas: A Solution to the Border Puzzle." *American Economic Review* 93 (1): 170-192.

Anderson, J., and E. Van Wincoop. 2004. "Trade Costs." *Journal of Economic Literature* 42(3): 691-751.

Arvis, J.-F., M. Mustra, L. Ojala, B. Shepherd, and D. Saslavsky. 2010. *Connecting to Compete 2010: Trade Logistics in the Global Economy*. Washington, D.C.: World Bank.

Bchir, M., H. Hammouda, N. Oulman, and M. Jallab. 2006. "The Cost of Non-Maghreb: Achieving the Gains from Economic Integration." Work in Progress 44, African Trade Policy Center, Addis Ababa.

Brooks, D., and B. Ferrarini. 2010. "Changing Trade Costs Between the People's Republic of China and India." Economics Working Paper 203, Asian Development Bank, Manila.

Chaney, T. 2008. "Distorted Gravity: The Intensive and Extensive Margins of International Trade." *American Economic Review* 98 (4): 1707-1721.

Chen, N., and D. Novy. 2010. "Gravity, Trade Integration, and Heterogeneity across Industries." Working Paper, University of Warwick, http://www2.warwick.ac.uk/fac/soc/economics/staff/academic/novy/heterogeneity.pdf.

Dennis, A. 2006. “The Impact of Regional Trade Agreements and Trade Facilitation in the Middle East North Africa Region.” Policy Research Working Paper 3837, World Bank.

Duval, Y., and C. Utoktham. 2010. “Intraregional Trade Costs in Asia: A Primer.” Staff Working Paper 01/10, Trade and Investment Division, ESCAP, Bangkok, http://www.unescap.org/tid/publication/swp110.pdf.

Eaton, J., and S. Kortum. 2002. “Technology, Geography, and Trade.” *Econometrica* 70 (5): 1741-1779.

Harb, G. 2008. “Trade Facilitation and Intra-Arab Trade (1996-2002): An Empirical Assessment.” *Journal of International Trade and Diplomacy* 2 (2): 135-170.

Hoekman, B., and A. Nicita. 2009. “Assessing the Doha Round: Market Access, Transactions Costs, and Aid for Trade Facilitation.” *Journal of International Trade and Economic Development* 19 (1): 65-79.

Hoekman, B., and J. Zarrouk. 2009. “Changes in Cross-Border Trade Costs in the Pan-Arab Free Trade Area, 2001–2008.” Policy Research Working Paper 5031, World Bank.

Hufbauer, G., and C. Brunel. 2008. *Maghreb Regional and Global Integration: A Dream to be Fulfilled*. Washington, D.C.: Peterson Institute for International Economics.

Jacks, D., C. Meissner, and D. Novy. 2008. “Trade Costs, 1870-2000.” *American Economic Review* 98 (2): 529-534.

Ministry of Economy and Finance of Morocco. 2008. “Issues of the Maghreb Integration: The Cost of Non-Maghreb.” Study, Department of Financial Studies and Economic Forecasts, Rabat.

Miroudot, S., J. Sauvage, and B. Shepherd. 2010. “Measuring the Cost of International Trade in Services.” Working Paper, GEM Sciences Po, Paris, http://gem.sciences-po.fr/content/publications/pdf/Miroudot_Sauvage_Shepherd_costofservices04102010.pdf.

Novy, D. 2010. "Gravity Redux." Working Paper, University of Warwick, http://www2.warwick.ac.uk/fac/soc/economics/staff/academic/novy/redux.pdf.

Olper, A., and V. Raimondi. 2009. "Patterns and Determinants of International Trade Costs in the Food Industry." *Journal of Agricultural Economics* 60 (2): 273-297.

Shepherd, B. 2010. "Trade Costs and Facilitation in APEC and ASEAN: Delivering the Goods?" Working Paper, Developing Trade Consultants Ltd., New York, http://sites.google.com/a/developing-trade.com/home/publications/files/ShepherdTradeCostsandFacilitationinAPECandASEANRevised19Jan10.pdf?attredirects=0.

World Bank. 2006. *Is There a New Vision for Maghreb Economic Integration?* Washington, D.C.: World Bank.

World Bank. 2010. *Logistics Performance Index 2010: Arab World.* Washington, D.C.: World Bank.