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Preferential Trade Liberalization and the Range of Exported Products: The Case of the Euro-Mediterranean FTA

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The paper investigates how Preferential Trade Agreements (PTAs) affect the range of goods exported by a nation. We use the Melitz model and highly dis-aggregated data on Euro-Mediterranean trade to measure the effect of preferential trade liberalization on the range of traded products. By focusing on the zeros in the trade matrix, the paper finds evidence that at the time when the Euro-Mediterranean FTA started there was an expansion in the range of products traded by its members.

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Keywords: economic integration, trade policy, country and industry studies of trade.

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1 Introduction

The hypothesis that Preferential Trade Agreements (PTAs) force developing countries to specialize in some goods is widespread among policy makers. Since most developing countries are interested in expanding the range of goods that they export, the possibility that such hypothesis could be true may be preventing some developing nations from signing Free Trade Agreements (FTAs).

But, is it true that preferential liberalization constrains the range of exported products? Early trade models such as those by Helpman and Krugman (1987) imply that big markets produce lots of varieties and all of them are sold to all markets. Countries, however, do not export all goods that they produce. Only a handful of goods are traded internationally because most firms are not engaged in international trade; they sell only in their local markets. In the old days, trade theory used to ignore the fact that trade barriers could affect the number of goods exported by a nation. It was thought that the basic determinants of the zeros and the trade flows were the same. This means that we cannot use the "new trade theory" to explain changes in the number of traded varieties.

One influential paper that helps us address this question is Melitz (2003). The model has much in common with earlier trade models, but there are some key innovations that allow us to deal with heterogeneous firms – some export and some do not. The two new elements in the "new-new trade theory" are fixed cost of entering a new market, and differences in firm's marginal production costs. The "new goods hypothesis" has been the subject of work by Baldwin and Taglioni (2004) in the context of currency unions.

The purpose of the paper is twofold. We present a generic framework based on the Melitz model that uses highly disaggregated data to look for a new range of exported products in a preferential trade liberalization process between developed and developing nations (e.g. North-South). We then turn to look for empirical evidence in the Euro-Mediterranean FTA. We investigate whether the Euro-Mediterranean agreements (Euro-Med, for short) have expanded the range of products traded among its members. This is an important issue for the Mediterranean countries because they may be hoping the trade agreements will expand the range of goods that they trade.

We organized the paper as follows: section 2 presents the theoreti-

cal framework used to investigate whether Preferential Trade Agreements (PTAs) generate trade in new products. In section 3 we introduce the data set; we present some prima facie evidence of the Euro-Med generating trade in new goods. In section 4 we turn to the formal empirical analysis. We use gravity equations to estimate trade flows. Section 5 deals with some of the puzzles. We conclude in section 6 summarizing the main findings of the paper and providing some avenues for future research.

2 Theory

We propose a framework based on Melitz (2003).[1] In this setting, firms try to have large enough sales to make it profitable to cover the sunk costs of entering foreign markets. The range of firms that export is endogenously determined and related to native firm-level productivity; as a result large firms export while small firms do not.

The equilibrium in nation-o (origin) is characterized by one cut-off condition for each market, including its own. The domestic cut-off condition defines the highest marginal cost for which nation-o firms still find it worthwhile to produce; firms with marginal costs above the threshold do not find it worthwhile to produce. The domestic cut-off condition is:

$$F_o^D = \frac{B_o}{\sigma}\left(\frac{a_{oo}^*}{1-\sigma^{-1}}\right)^{1-\sigma} \tag{1}$$

where F_o^D stands for the cost of entering the domestic market, B_o is the demand shifter in nation-o, σ is the elasticity of substitution, which we assume to be constant and higher than one, and a_{oo}^* is the threshold marginal cost for local sales.

Only firms with sufficiently low marginal costs are able to sell to foreign markets, since only they are able to cover the fixed market-entry costs.[2] Thus, we get a second threshold – the export threshold – that determines which domestically produced goods are exported. The export cut-off condition is:

[1] This section provides a theoretical background that motivates our empirical work. Interested readers not familiar with the Melitz model can read the original article, and Baldwin (2005) Helpman, Melitz, and Rubinstein (2006) Helpman, Melitz, and Yeaple (2004).

[2] Due to the fixed mark-up rule, they fully pass on the per-unit trade costs to foreign customers; the price of their good is higher in foreign markets.

$$F_d^X = \frac{B_d}{\sigma}\left(\frac{a_{od}^* \tau_{od}}{1-\sigma^{-1}}\right)^{1-\sigma} \tag{2}$$

where F_x is the fixed cost of entering the market in nation-d (destination), a_{od}^* is the pair-specific threshold-marginal-cost (a stands for unit labour input), τ_{od} is the bilateral trade cost, B_d is the demand shifter in nation-d, namely $\frac{E_d}{P_d{}^{1-\sigma}}$ where E_d is the total expenditure of the destination nation on all varieties, P_d is the usual CES price index, and a_{od} is the threshold marginal cost for sales abroad.

The bilateral exports from nation-o to nation-d are endogenously determined by the domestic and the export cut-off conditions. It is an export decision with a threshold. The economic model consists in determining simultaneously whether to sell and how much.

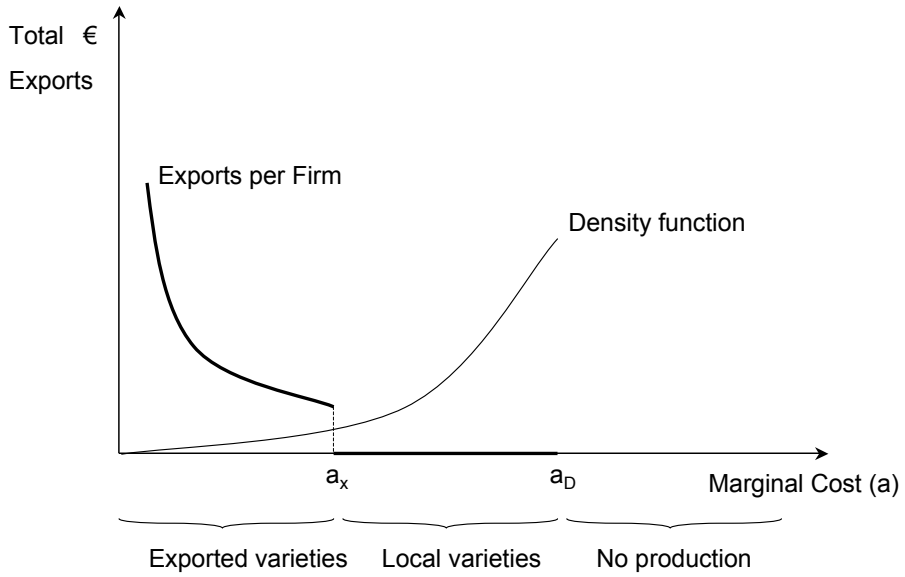

Figure 1: Determining the number of goods in a "new new trade" model.

The second threshold implies that the model's predictions are in line with the common observation that big, efficient firms are more likely to export than small firms. Moreover, the further away is the market, the higher will be the price (due to passed-through trade costs) and so the lower will be the operating profit earned.

The value of per-firm bilateral exports measured in terms of the numeraire is:

$$V_{od} = \begin{cases} (\frac{a\tau_{od}}{1-\sigma^{-1}})^{1-\sigma} B_d & \text{, If } a \leqslant a^*_{od}; \\ 0 & \text{, otherwise.} \end{cases} \tag{3}$$

where we have denoted by V_{od} the volume of bilateral exports between the origin and the destination nations. Note that, as the threshold marginal cost rises, smaller firms will export their goods, so the range of exported goods will widen. Substituting, we have that the total bilateral exports are:

$$V_{od} = \begin{cases} \int_0^{a^*_{od}} n_o (\frac{a\tau_{od}}{1-\sigma^{-1}})^{1-\sigma} B_d dG[a|a^*_{oo}] & \text{, If } a \leqslant a^*_{od}; \\ 0 & \text{, otherwise.} \end{cases} \tag{4}$$

where $G[a|a^*_{oo}]$ is the conditional density function that describes the distribution of marginal costs in nation-o (conditional on the domestic threshold marginal cost a^*_{oo} since firms that do not produce cannot, obviously, export).

Re-arranging the variables we have that:

$$V_{od} = \begin{cases} \tau_{od}^{1-\sigma} B_d (n_o \int_0^{a^*_{od}} a^{1-\sigma} dG[a|a^*_{oo}])(1 - \frac{1}{\sigma}) & \text{, If } a \leqslant a^*_{od}; \\ 0 & \text{, otherwise.} \end{cases} \tag{5}$$

The expression for the bilateral trade volume, Equation 5, suggests a gravity estimation. Noting that B_d equals $\frac{E_d}{P_d^{1-\sigma}}$, we can use the GDP of the importing nation to proxy for E_d, and the GDP of the exporting nation to proxy for n_o; n_o is related to the endowment of the exporting nation.[3] The remaining terms, including bilateral trade costs, $P_d^{1-\sigma}$, and additional nation-o specific factors affecting n_o can be controlled for using time-invariant pair dummies.

The final step is to connect the export threshold and the number of goods exported in a FTA. Our claim is that the FTA somehow lowers the fixed market entry cost for all firms exporting to the destination market, so the number of zeros in export vectors should fall.[4] We will refer to this as the "new-varieties hypothesis." A drop in bilateral trade costs, or the

[3] See Helpman, Melitz, and Yeaple (2004) for details.

[4] One concrete story would be that the "red tape" associated with exporting to a market could be reduced by the FTA. Higher transparency in the rules for exporting to FTA members lower information costs for exporters which translates to a fall in the fixed cost of entering the FTA.

fixed market entry costs not only stimulates bilateral exports, but it can also induce firms to start exporting new categories of goods.

Assume that the FTA lowers the fixed market entry costs for its members. If the fixed cost of entering the FTA markets falls, then a wider range of firms will find selling to the FTA to be worthwhile. As a consequence, the number of goods exported to the FTA will increase. More goods, in turn, mean a higher trade volume. The fundamental difference between this result and the standard gravity model is that censoring here is an issue. We have endogenized the firm's export decision. When trading is not profitable, we find a censored data (zero export values) in that category.

Our empirical strategy is to focus on the bilateral trade flows that switch from zero to a positive number, although we also look at the change in existing trade flows. With this aim, we undertake three types of estimations – Tobit which views the trade flows as censored data, Logit which seeks to identify the determinants of the switches, and OLS which automatically drops any pair-product section that has a zero in it for any year.

3 The Euro-Mediterranean FTA: A glance at the data

The Euro-Mediterranean partnership started with the Euro-Mediterranean Conference of Ministers of Foreign Affairs, held in Barcelona at the end of November 1995. It comprises 35 members; 25 EU Member States and 10 Mediterranean Partners (Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestinian Authority, Syria, Tunisia and Turkey).[5]

Euro-Med consists in a wide framework of political, economic and social relations between the EU and its partners of the southern Mediterranean. Preferential trade liberalization is the main feature of Euro-Med; the aim is to implement free trade with the EU through Association Agreements (e.g. North-South).[6] The Mediterranean countries are also committed to implement free trade among themselves (South-South). To date, only two of such initiatives have started; the Arab Maghreb Union (Morocco, Algeria, Tunisia, Mauritania, and Libya) and the Agadir Agreement signed in

[5]In addition Libya has had observer status since 1999.

[6]The Barcelona Declaration called for the gradual establishment of a Euro-Mediterranean free trade area by 2010.

February 2004 by Morocco, Tunisia, Egypt and Jordan.

Negotiations for Association Agreements already concluded include: Tunisia (1995), Israel (1995), Morocco (1996), Jordan (1997), Egypt (2001), Algeria (2002), Lebanon (2002) and Syria (2004). Those with Tunisia (1998), Morocco (2000), Israel (2000), Jordan (2002) and Egypt (2004) have been ratified and are in force. Turkey signed in 1995 an Association Agreement establishing the definite phase of a customs union with the EU.

3.1 The Data

We use the highest level of internationally comparable dis-aggregated trade data that is publicly available, namely the 6-digit level of the Harmonised System (HS) from Comtrade database.[7] We have the data for the 1990-2004 period. The set of countries encompasses the EU,[8] the Mediterranean partners (Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestinian Authority, Syria, Tunisia, and Turkey), three other African countries (Mauritania, Libya, and Nigeria), the EFTA countries (Switzerland, Norway, and Island), USA, Canada, and Japan.

As Baldwin (2006) notes, the 6-digit classification is not fine enough to pick up individual products. As a consequence, looking for changes in the number of zeros will systematically underestimate the importance of new goods. That is, there may be many new goods traded that we cannot identify since they occur in categories where some trade is already taking place. The only new goods we can observe directly are those in categories that switch from zero value to some positive value within our data period (there are very few switches from positive values to zero, so we work with the total number of zeros).

We use Gross Domestic Product (GDP), and Distance (DIST) as our control variables. The GDP is expressed in current US dollars and it is extracted from the World Development Indicators.[9] Distance data were obtained from Jon Haveman's website.[10] It provides the Great Circle distance between capital cities. The variable is defined as the distance between the

[7]:20 (2006b) The ideal data set would be to have partner-specific export data by firm. Unfortunately such data is not available to researchers.

[8]We consider the EU 15 due to the fact that data-set ends in 2004, the year of the last enlargement.

[9]:20 (2006a)

[10]See www.macalester.edu/research/economics/PAGE/HAVEMAN/Trade.Resources

economic center of one country to another. We have selected Brussels as the economic center of the EU. The effect of distance together with other standard control variables in gravity estimations will in some specific cases already be accounted for by the partner dummies.

The data set is very large. For each of our 10 exporters there are 5,019 product categories for each of the 19 potential partners. This adds up to about 95,000 data points per year per exporter. Since we are looking for changes around the beginning of the Barcelona process we use 1990-1995 and the "before" period and 1995-2004 as the after period. This means 13 years in all, so the data-set is on the order of 1,200,000 data points for each exporting nation. Pooling all 10 exporters together would create a panel of about 12 million data points, a number which defies our computational capacity. To get around this computation problem we are going to use only one exporter's data at a time.

Before turning to more formal statistical tests, we look for prima facie evidence on the new-varieties hypothesis.

3.2 Evolution of the number of zeros in the EU

The 6-digit HS system listed 5,019 products in 1988, but the number has increased over the years as new 6-digit categories have been created to clasify new products. There are very few HS-6 categories that the EU has never exported, these are included in our data set. Thus, the total universe of products in our data set includes all products for which any of the countries could have exported something during the period 1990-2004.

Figure 2 shows the evolution of the number of categories that are zero for any given bilateral relationship between the EU and its Mediterranean partners.

We can observe how the difference in the number of zeros varies both by partner, and over time. The cross-sectional variation (e.g. by partner) for the EU shows that there may be a rough correlation between the level of zeros by partner and the distance between the exporting and importing market. Syria, Algeria and Jordan are the top three countries for zeros; the lowest number of zeros are with Turkey, and Israel. By inspection of the time-series variation we realize that the number of zeros has been decreasing over time for all Euro-Med partners. The paper will investigate farther the responsibility of the Euro-Med agreements in the change.

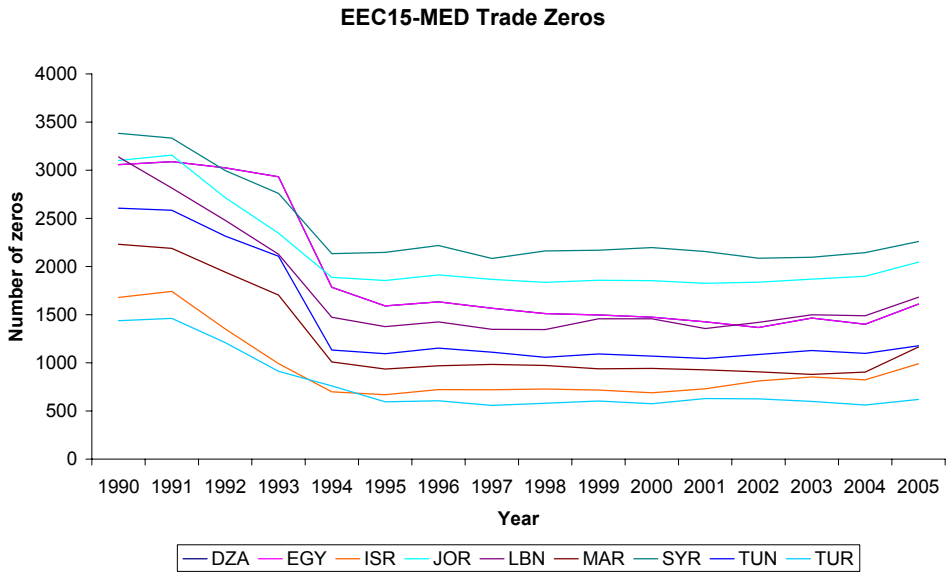

Figure 2: Evolution over time of the number of zero-trade categories between the EU and each of the Mediterranean partners.

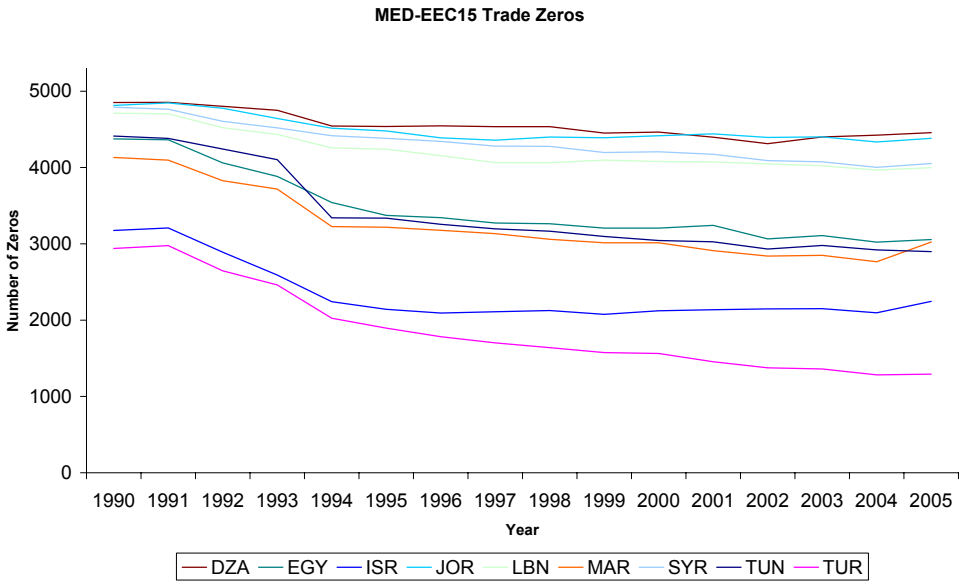

Figure 3: Evolution over time of the number of zero-trade categories between the Mediterranean partners and the EU.

Figure 3 shows the evolution of the number of categories that are zero for any given bilateral relationship between the Mediterranean countries and the EU.[11] It is clear that the impact for the Mediterranean countries has been much more gradual.

Using our method of (under)estimating the impact of Euro-Med on the zeros.We find that the impact is clear although asymmetric; there is a sharp decrease in the number of zeros for European exports to the Mediterranean partners, and a gradual decrease in the number of zeros in the exports vector of the Mediterranean countries. Furthermore, both changes happened around the dates when the agreements were signed.

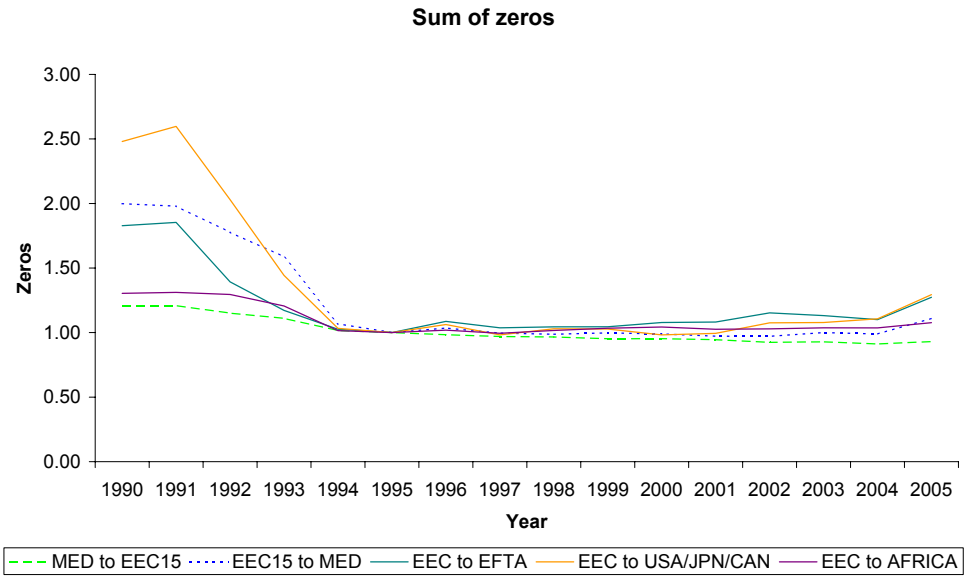

Figure 4: Sum of zeros for different groups of nations; base year 1995.

The next figure, Figure 4, shows one more way to study the evolution of the zeros. We have ploted an index (base year 1995=1.00) of the zeros for the Euro-Med nations, and three other groups of nations. The first thing to note is that all groups experienced a sharp decrease in zeros before 1995.

In the post-1995 period, the number of zeros on trade has remained approximately flat until 2004. The number of zeros seems to be picking up during the last two years for which we have data; it will be interesting to

[11]Reproducing here Figure 2 for the other 9 partners in our sample would take up too much space.

follow the evolution of this point in the next years as new data becomes available.

Figure 5 shows the evolution of the zeros by group averages. We calculated the simple average number of zeros with the destination group for each year. For example, the average for the three African countries (Lybia, Mauritania, and Nigeria) in 1995 is the average number of zeros in Lybian, Mauriatanian, and Nigerian exports to the EU; the average is roughly 3056 zeros to all 10 markets.

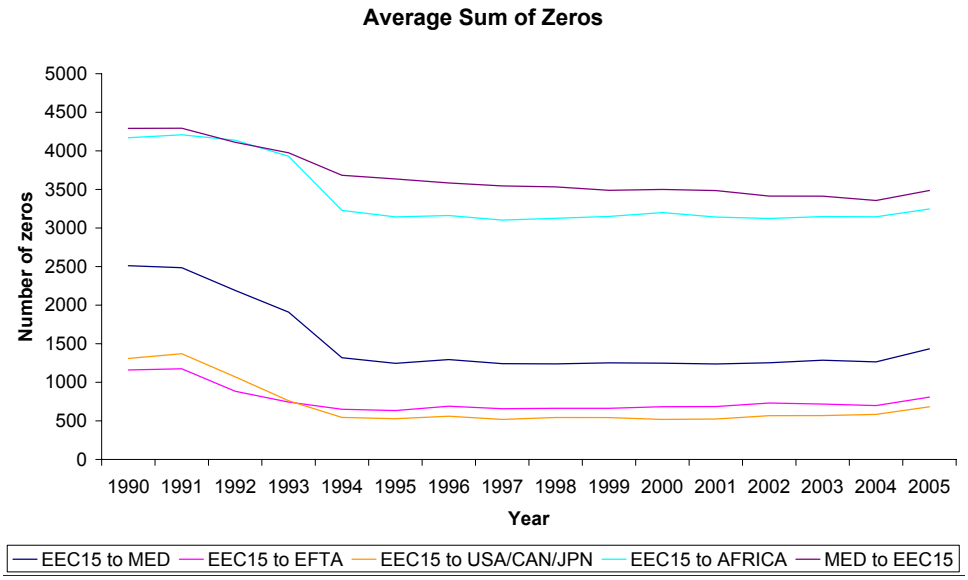

Figure 5: Sum of zeros for different groups of exporters.

The average number of zeros between the EU and its Mediterranean partners (marked EEC15 to MED) decreased sharply around the beginning of the Barcelona process. The dotted line (marked MED to EEC15) shows the average number of zeros for the nine Mediterranean partners' exports to the EU. Starting around the date of the agreements there is a gradual drop in the average number of zeros.

We provide some more examples for comparison. Interestingly, the evolution of the average number of zeros of the EU with the other African countries experienced a decrease at the beginning of the period, and a gradual increase thereafter. The thin solid line (marked EEC15 to EFTA) shows the average number of zeros in the exports to the EFTA. After an initial

decrease, possibly motivated by the signature of the agreement creating the European Economic Area (EEA), the average has remained flat after 1995. Similarly, the other thin solid line (marked EEC15 to USA/JPN/CAN) shows that the average number of zeros has remained constant for the past ten years.

In order to isolate the impact of Euro-Med on the exports of new goods, we want to see if the number of zeros dropped more for exports to the Euro-Med zone markets than it did to non-Euro-Med zone markets. A generous observer could detect a larger decrease in the number of zeros in Euro-Med trade than in exports to other countries. This issue will be confirmed by more formal statistical analysis below.

So far we have focused the analysis on the evolution of the number of zeros, but it would also be interesting to see the value of trade generated by the switches. We turn now to showing how much trade is due to the new goods.

Table 1 shows the evolution of exports to Euro-Med nations for each of its Mediterranean partners after 1995. The first column shows the growth in "quasi-intensive" trade (quasi since there is some mixing of new goods and more of old goods), e.g. the growth of trade in categories that were already traded before 1995; the second column shows the growth of exports in categories that were not exported in 1995. We call this the "quasi-extensive" margin (again, quasi since we cannot pick of new goods in categories that were already traded) because it captures trade in those categories were there was no trade to begin with. The overall growth in exports from the EU to its Mediterranean partners is presented in the third column.

As we can see, the most important share corresponds to "quasi-intensive" trade. The "quasi-extensive" margin accounts, on average, for 7 per cent of the overall growth, although the number varies widely across nations.

Table 2 shows the evolution of EU exports for each of the Euro-Med nations during the 1995-2004 sample period. As before, the first column shows the "quasi-intensive" trade; the second column shows the growth in exports in categories that were not exported before 1995; and the overall growth in exports is presented in the third column.

A couple of simple statistics provide testimony to the importance of the extensive margin in Euro-Mediterranean trade. The EU is Euro-Med's largest trading partner, and given that it sells almost everything, it is also

Table 1: Growth in EU exports to Euro-Med in new and old products.

Partner	Quasi-intensive trade (1)	Quasi-extensive trade (2)	Overall change (3)	Percentage (2)/(3)
DZA	78.44%	4.71%	83.15%	0.06
EGY	24.32%	10.90%	35.22%	0.31
ISR	18.89%	0.61%	19.50%	0.03
JOR	65.35%	4.87%	70.21%	0.07
LBN	26.61%	1.81%	28.43%	0.06
MAR	72.32%	1.64%	73.96%	0.02
SYR	56.93%	3.59%	60.52%	0.06
TUN	70.07%	2.29%	72.37%	0.03
TUR	168.84%	2.05%	170.89%	0.01

Source: World Integrated Trade Solutions. Author's calculations.

the member for which one might think that the agreements had the least impact. In the EU, international trade increased by 82.5% between 1995 and 2004, 3.03% of this was due to trade in "new goods" (the "quasi-extensive" margin) and a remaining 79.47% is the "quasi-intensive" margin. As noted, this measure of new goods is probably an underestimate since we can only pick up new goods where no goods were traded before.

The "quasi-extensive" margin accounts, on average, for 10 per cent of the overall growth, although also here the number varies widely across nations. Note that the figures for Algeria are highly influenced by the fact that it is the most important oil exporter in the region.

3.3 Where are the switches?

Before turning to the formal empirical analysis, we explore the sectoral distribution of the switches. We have converted the HS-6 categories to the two-digit NACE classification system.[12] After the conversion we are left with roughly thirty categories which we have aggregated for expositional simplicity. The aggregation details are provided in Appendix A. We try to

[12]The conversion was done using the correspondence between the HS-6 and the NACE rev.1 at the NACE two-digit level of aggregation.

Table 2: Growth in exports to Euro-Med in new and old products.

Country	Quasi-intensive trade (1)	Quasi-extensive trade (2)	Overall change (3)	Percentage (2)/(3)
EU	79.47%	3.03%	82.50%	0.04
DZA[a]	222.31%	22.16%	244.16%	0.09
EGY	64.14%	0.00%	64.14%	0.00
ISR	73.67%	0.00%	73.67%	0.00
JOR	49.21%	0.00%	49.21%	0.00
LBN	75.23%	73.47%	148.70%	0.49
MAR	51.53%	6.89%	58.42%	0.12
SYR	31.37%	9.68%	41.05%	0.24
TUN	71.30%	11.18%	82.48%	0.14
TUR	148.30%	45.14%	193.45%	0.23

Source: World Integrated Trade Solutions. Author's calculations.

[a]Note that excluding oil and fuel products the "quasi-intensive" trade is 10.55%, the "quasi-extensive" 66.40%, and the overall growth is 76.99%

answer two questions: what sectors concentrate the switches? and, what is the value of the new trade generated by the switches? As we will see, the answers to both questions are very similar. The results are presented in the following pie-graphs:

Several features emerge clearly from these graphs. First, the sectoral distribution of switches does not change significantly regardless of whether we look at the number of switches or its equivalent in volume of trade.

We can observe that roughly half of the value of the new exports from the EU to its Mediterranean partners is concentrated on machinery. Chemicals, and agricultural products are the following main categories. Services are not a very important item, possibly due to the fact that there are few categories left in services that the EU is not exporting to the region. Agriculture, however, accounts for 8% of the value of the new trade.

Around two thirds of the new products that the Mediterranean countries export to the EU are concentrated on chemicals, and machinery alone. No new services are exported to the EU. This is not surprising if we consider that services are excluded from the agreements. The figures for mining

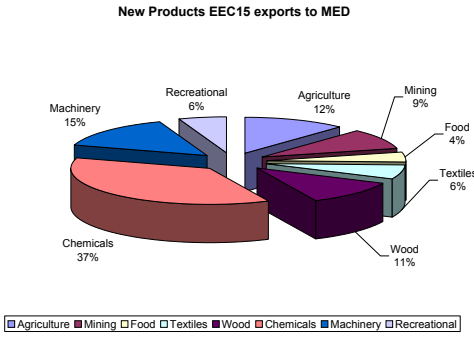

Figure 6: New products by sector.

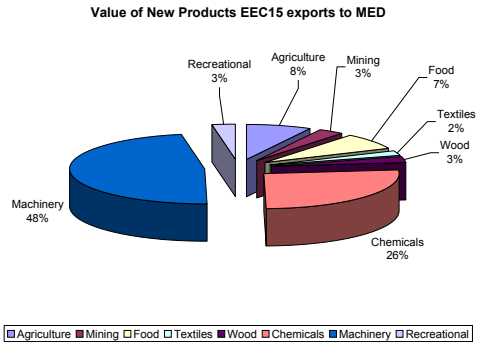

Figure 7: Value of the new products by sector.

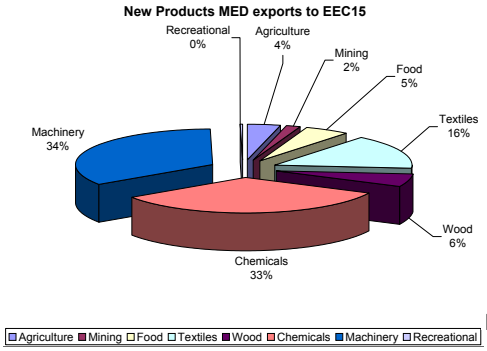

Figure 8: New products by sector.

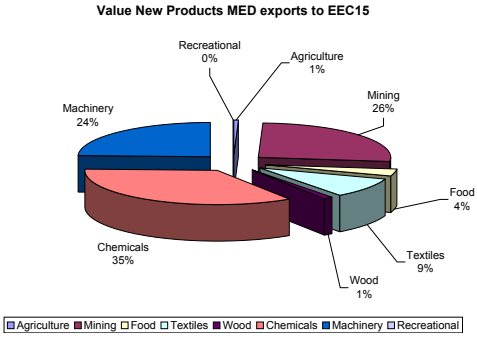

Figure 9: Value of the new products by sector.

suggest that new export products account for a quarter of the value of the "quasi extensive" trade. Interestingly, agriculture accounts for a modest 4% of the number of new goods, which shrinks to a 1% of the total value of new exports.

Another interesting way to look at the sectoral distribution of switches is taking into account the depth of the liberalization introduced by the agreements in each sector. In other words, Euro-Med does not cover all sectors in the same way; since some sectors are more restrictive than others, it would be interesting to know whether the drop in zeros happened mostly in the sectors where the FTA has been most liberal.

Breaking down the degree of liberalization by sectors is not an easy task. Researchers have identified agriculture, textiles, and fisheries as the least liberalized sectors in Euro-Med. As Muller-Jentsch (2005) reports, the Euro-Med "free trade area is for goods only and excludes the two-thirds

of total value added that is being generated in the services sectors and in agriculture." In fact, according to the World Bank entire sectors such as agricultural products have been excluded from the Euro-Mediterranean agreements.[13] The way these sectors were left off varies. Agriculture has simply been excluded from the agreements. But textiles on the parallel have been subjected to all kinds of Rules of Origin (RoO) and restrictions.[14] Technical Barriers to Trade (TBTs) and phytosanitary rules have been commonly used to exclude processed food.

We have classified the different sectors according to the available information on the degree of liberalization introduced by the Euro-Med agreements. Table 3 shows the results:

Table 3: Distribution of the "quasi-extensive" trade by sectoral liberalization.

		EEC to MED	**MED to EEC**
By Number	Liberalized	67.77%	68.99%
	Not Liberalized	32.23%	30.82%
By Value	Liberalized	77.08%	85.22%
	Not Liberalized	22.92%	14.78%

Source: World Integrated Trade Solutions. Author's calculations.

As expected, about three quarters of the switches happened in the sectors that have been most liberalized. The drop in zeros happened mostly in the sectors where the FTA has been most liberal. The biggest drop in zeros is found in those sectors were the biggest liberalization occurred. We find evidence that there were fewer switches where there was less liberalization. This finding increases our ability to associate the drop in zeros with the liberalization.[15]

These charts are not a definite proof by any means. Many things must have affected the drop in number of zeros and these other confounding factors

[13] See Muller-Jentsch (2005), page 83, first paragraph.

[14] See Augier, Gasiorek, and Lai-Tong (2004).

[15] When we assert that there has been a correlation between the FTA and the zeros one bit of evidence comes from the time series behaviour of the zeros and of course we want to control for sector specific things that is what is happening. The other bit of evidence comes from cross section information.

are not controlled for in the chart. What the charts do suggest is that the "new-varieties hypothesis" cannot be rejected out of hand. We must control for other factors; undertaking these controls requires more formal statistical procedures.

4 Statistical estimates

In order to control for other factors it is useful to work with the standard gravity regression on panel data.

Our data consist of uni-directional product-pairs among all of the 20 nations in our sample. The standard panel gravity regression takes the bilateral trade as the sections (the "columns") and the yearly observations as the time-series (the "rows"). Since we have 2019 uni-directional country pairs for each product category, and there are 5019 categories, we have about 1.9 million sections. This exceeds our computational capacities, so we were forced to estimate the model with a single nation as the reporter and the other 19 nations as partners. The use of a single reporter with multiple partners rules out some of the standard gravity model procedures. For example, there is no difference between pair dummies and partner dummies.

Remember from Section 2 that countries are trying to have sales that are large enough to make it profitable to cover the sunk cost of entering a market. This means that Tunisia into the EU is a totally separate from the EU into Tunisia.

We have created two sets of data sets. The first set views each of the 20 nations as exporters with the other nations as importers, e.g. the EU as the exporter and 19 other nations as importers. For the EU, this implies about 100,000 panels (19 nations each of which imports on average 5000 EU product categories). For small and less diverse nations such as Lebanon, the number of panels is much smaller. The second set of data sets involves a given nation as the importer and the other 19 nations as exporters, e.g. the EU as the importer and 19 other nations as exporters. This yields about 40,000 panels since the 19 other nations export about 2000 product lines to the EU on average.

On these two sets of data sets, we undertake three types of estimations – Tobit which views the trade flows as censored data, Logit which seeks to identify the determinants of the zeros, and OLS which automatically drops

any pair-product section that has a zero in it for any year. But before doing this, let's investigate the impact of Euro-Med using aggregated data.

4.1 Aggregate panel

In order to provide a general overview of the impact of the Euro-Med agreements on trade, we aggregate our export data across industries and build a panel of bilateral export flows industry by industry. We are left with 39,399 observations, a number that can be handled by commercial statistical packages. The estimating equation is the basic gravity model.

We include time dummies to deal with the conversion of all the current valued dollars to a common base year. Since we have a single exporting nation in each data set (there are 20 data sets). To adjust for the nation-d we included distance in the regression.

Specifically, we estimate the impact of Euro-Med membership on exports controlling for economic mass with the GDPs of the origin and destination countries, we use distance for all time-invariant pair-specific factors, and controlling for unobserved period-specific factors with time dummies, the Euro-Med membership dummy is used to capture the impact of the FTA on the aggregated trade volume.

Table 4: Estimation results : panel

Variable	**Coefficient**	**(Std. Err.)**
Euro-Med	0.305***	(0.029)
$ln(GDP_o)$	1.179***	(0.006)
$ln(GDP_d)$	0.694***	(0.006)

Note:***significant at 1%; **significant at 5%; *significant at 10%

Table 4 shows that the estimated effect on industry aggregated data. The overall pro-trade effect of the Euro-Med agreements is around 30%. The coefficients on GDP are positive and close to unity, consistent with the literature on gravity equations. And we manage to explain around 60% of the variation in trade flows (R-squared is 0.58). The number of observations is 39401. The robustness of these results to dropping individual nations has been checked. The results are reported in Appendix B.

To conclude, we find some empirical evidence on the sectoral distribution of switches controlling for the degree of liberalization. In Table 5 we report

the the estimated effect on industry aggregated data taking into account the asymmetric degree of liberalization by sector. The dummy variable LIB takes the value of one when the sector has experienced Euro-Med liberalization, and it takes the value of zero for the sectors that were excluded from the agreements.

Table 5: Estimation results: Switches per degree of liberalization.

Variable	**Coefficient**	**(Std. Err.)**
Euro-Med	0.309***	(0.034)
LIB	0.371***	(0.030)
$ln(GDP_o)$	0.991***	(0.006)
$ln(GDP_d)$	0.611***	(0.007)

Note:***significant at 1%; **significant at 5%; *significant at 10%

If we turn to the dummy capturing the liberalization per sector we can see that it is positive and statistically significant at the one per cent level. As expected, the effect of the FTA considering the most liberalized sectors is higher than before. In fact, the results suggest that the overall effect on the aggregate trade of Euro-Med would be, again around 30%, and the impact on the liberalized sectors around 37%. Adding both dummies we obtain a 67% impact. Very much in line with the results presented in Table 3.

4.2 Measuring the overall effect: Tobit estimations

We use our highly dis-aggregated data sets to estimate the overall effect of the FTA on trade and the two margins of adjustment.

When dealing with highly dis-aggregated data, the issue of zero trade flows cannot be ignored. Indeed, the fact that many product categories switch from zero to positive values is an important part of our stories. In our data set censorship is an important issue since many observations have zero trade. This suggests that Tobit is the appropriate estimation method.[16]

[16]The Tobit approach differs from that of Helpman, Melitz, and Rubinstein (2006). They aim to test the importance of firm heterogeneity using aggregated export volumes and a two-step Heckman procedure. We are interested in testing for the overall trade effect of the FTA.

The Tobit regressions pick up the total impact of the FTA on trade, both expansion of trade in existing categories and the change in the number of categories traded. As we shall see, it allows to disentangle the two margins using the Tobit model. Our findings are not too different from our previous results using aggregate trade flows. The estimated equation is the basic gravity model. Namely:

$$lnV_{od,i} = \beta_0 + \beta_1(EuroMed) + \beta_2 ln(GDP_d) + \beta_3 T + \beta_4 P + u_i \qquad (6)$$

where V_{od} is the dollar value of exports from nation-o to nation-d, and i is the product category index for each 6-digit category. We measure E_d (expenditure in the importing nation) with the dollar value nation-d's GDP.

The partners in all data sets are the Euro-Med nations, EFTA, Japan, Canada, USA, Mauritania, Nigeria, and Libya; the exporting nation is dropped from the list of partners in each regression. The bilateral trade data is taken from the exporting nation (called the "reporter" nation in ComTrade).

We include time dummies to deal with the conversion of all the current valued dollars to a common base year. We have a single exporting nation in each of the 20 data sets. To adjust for the nation-d price index, P_d, we included a Partner dummy in each regression. Since there is a single exporting nation, the Partner dummies act exactly like pair dummies. The Euro-Med dummy is unity from 1995 onward for destination nation in Euro-Med.

One final remark concerning the data set has to do with the presence of zeros. The specification of the estimating equation, formally derived from the underlying gravity theory, implies the use of logarithms. On the one hand this turns very convenient since it allows elasticities to be estimated directly; but on the other hand we cannot use a logarithmic specification for the dependent variable without considering the presence of zero trade values. We have solved this issue shifting all trade values by one unit.[17]

We run two sets of regressions for each of the Euro-Med members – on the exporter data sets with all 19 partners, and on the importer data sets again for the 19 partners.[18] The results are summarized in Tables 6 and 7.

[17]This does not affect the variance but increasing the mean of the distribution of trade values by one unit.

[18]The marginal effects are obtained running the dtobit command in Stata after the

On the interpretation of the estimation results, we should note that the estimated raw coefficients do not have a particularly interesting economic meaning. These are simply the effect of the independent variables on the "latent" variable that underlies the Tobit model.[19] In order to provide a simple economic interpretation of the parameters we have computed the marginal effects.

The "unconditional expected value" shows the effect of a one-unit change in the independent variable on the expected trade volume.[20] This is different from the impact on the latent variable provided by the raw coefficient. The unconditional expected value estimates the overall impact of Euro-Med on trade, taking into account that for some categories there is zero trade.

The "conditional marginal effect" is the effect of the independent variables on the level of exports conditional on the exports being positive, e.g. uncensored. This is the only non biased estimate of the "quasi-intensive" margin when using highly dis-aggregated data.

The "probability uncensored" is the last marginal effect computed using the Tobit model. It is the effect of a change in the independent variable on the probability of observing a positive trade value in a given category (provided the category is uncensored). Thus, it allows us to deal with the "new-varieties hypothesis." The coefficients should be similar to the results of the Logit model.

Table 6 shows the corresponding results for the exporter's data set. When the Euro-Med dummy coefficient is near zero, the marginal effect gives a good approximation of the percentage change in trade.[21] The estimates of the overall effect (column marked Uncond.) have the expected signs and are significant at conventional statistical confidence levels. The unweighted average of the coefficients implies an effect of 24%. There is a big dispersion in the size of the coefficients but the results are in line with what has been found in the aggregate estimation. This should not be surprising since aggregate trade data is simply the sum of our dis-aggregated data.

The conditional marginal effect (conditional on the explained variable taking positive values) provides the best approximation to the "quasi-intensive"

corresponding Tobit estimation.

[19] See Greene (2003) for a more detailed formal explanation of the Tobit model.

[20] Here it is the discrete change of the dummy from 0 to 1.

[21] Note that $exp(X) - 1 = X$ when X is near zero.

margin of trade. The coefficients (column marked Cond.) have the expected signs and are significant at the 1% level. The unweighed average of the conditional effect of the Euro-Med dummy on trade is 30%.

The last column (marked Prob.Uncens.) contains the Tobit estimates on the change in the probability of the explained variable being uncensored. The unweighed average is 6%. The results provide an indication of the impact of Euro-Med in creating trade in new varieties.

Table 6: Tobit estimations: The overall effect on Exports.

EXPORTS				
	Euro-Med	**Marginal Effects**		
		Uncond.	**Cond.**	**Prob. Uncens.**
EU	**1.183*****	**0.934*****	**0.678*****	**0.091*****
	(0.032)	(0.025)	(0.018)	(0.002)
DZA	**0.153*****	**0.150*****	**0.137*****	**0.019*****
	(0.003)	(0.002)	(0.002)	(0.000)
EGY	**0.385*****	**0.344*****	**0.271*****	**0.110*****
	(0.005)	(0.004)	(0.003)	(0.001)
ISR	**0.897*****	**0.057*****	**0.132*****	**0.017*****
	(0.040)	(0.002)	(0.005)	(0.000)
JOR	**4.629*****	**0.010*****	**0.346*****	**0.004*****
	(0.813)	(0.001)	(0.059)	(0.000)
LBN	**0.371*****	**0.004*****	**0.037*****	**0.002*****
	(0.092)	(0.001)	(0.009)	(0.000)
MAR	**1.154*****	**0.042*****	**0.147*****	**0.104*****
	(0.075)	(0.002)	(0.009)	(0.000)
SYR	**3.090*****	**0.026*****	**0.287*****	**0.011*****
	(0.190)	(0.001)	(0.016)	(0.001)
TUN	**0.437*****	**0.372*****	**0.282*****	**0.122*****
	(0.006)	(0.005)	(0.004)	(0.001)
TUR	**4.017*****	**0.497*****	**0.726*****	**0.144*****
	(0.092)	(0.010)	(0.016)	(0.003)

Note:***significant at 1%; **significant at 5%; *significant at 10%

Table 7 shows the results for the importer's data set. The results show

that Euro-Med had a positive impact on overall imports. The unweighted average of the coefficients for the overall effect (column marked Uncond.) implies an effect of 6%. The coefficients have the expected signs and are statistically significant at the 1% level. From the table we can immediately see that there are substantial differences across the different members. The largest effects on imports correspond to Turkey, Israel, and Jordan. The smallest coefficients are for Egypt and Lebanon. We find that Egypt's coefficient is negative and significant.

Table 7: Tobit estimations: The overall effect on Imports.

IMPORTS				
	Euro-Med	**Marginal Effects**		
		Uncond.	**Cond.**	**Prob. Uncens.**
EU	**0.524*****	**0.189*****	**0.153*****	**0.043*****
	(0.069)	(0.024)	(0.020)	(0.005)
DZA	**0.107*****	**0.088*****	**0.065*****	**0.024*****
	(0.009)	(0.008)	(0.005)	(0.002)
EGY	**-0.520*****	**-0.421*****	**-0.309*****	**-0.124*****
	(0.028)	(0.023)	(0.017)	(0.006)
ISR	**1.594*****	**0.150*****	**0.264*****	**0.050*****
	(0.030)	(0.002)	(0.004)	(0.001)
JOR	**4.183*****	**0.118*****	**0.493*****	**0.049*****
	(0.070)	(0.000)	(0.006)	(0.000)
LBN	**1.237*****	**0.056*****	**0.166*****	**0.025*****
	(0.046)	(0.001)	(0.005)	(0.000)
MAR	**1.452*****	**0.059*****	**0.189*****	**0.026*****
	(0.047)	(0.001)	(0.005)	(0.000)
SYR	**5.201*****	**0.168*****	**0.628*****	**0.068*****
	(0.026)	(0.000)	(0.002)	(0.000)
TUN	**0.114*****	**0.097*****	**0.073*****	**0.026*****
	(0.008)	(0.007)	(0.005)	(0.002)
TUR	**1.709*****	**0.083*****	**0.233*****	**0.035*****
	(0.258)	(0.012)	(0.035)	(0.005)

Note:***significant at 1%; **significant at 5%; *significant at 10%

The conditional marginal effect (conditional on the explained variable taking positive values) provides a non biased estimation of the "quasi-intensive" margin of trade. The coefficients (column marked Cond.) have the expected signs and are significant at the 1% level. The unweighed average of the conditional effect of the Euro-Med dummy on trade is 20%.

The last column (marked Prob.Uncens.) contains the Tobit estimates on the probability of the volume of imports being uncensored. The unweighed average is 2%. Interestingly, the change in the probability of being uncensored takes higher values for those countries for which Euro-Med has had the highest impact on the "quasi-extensive" margin.

The results for the GDP coefficients for the two sets of regressions are included in Appendix B. The number of observations varies according to the exporting nation, but is over 900000 in all cases.

We believe that these results provide reasonable evidence on the positive impact of Euro-Med on trade in new and old varieties. This noted we now turn our attention to estimate the "quasi-extensive" margin of adjustment using the Logit model.

4.3 Probability of exporting: Logit estimations

We turn now to trace the determinants of zero trade in a given category; this is what we have been referring to as the "quasi-extensive" margin. The basic question is, how does the probability that a particular product category is traded among nations change as a result of the FTA?

To investigate the role of the Euro-Med agreements in creating trade in new categories, we estimate the probability of observing a positive trade flow in a particular category. The Logit model is the appropriate estimation method.[22] The estimated equation is similar to the previous one, namely:

$$D_{od,i} = \beta_0 + \beta_1(EuroMed) + \beta_2 ln(GDP_d) + \beta_3 T + \beta_4 P + u_i \qquad (7)$$

where $D_{od,i}$ is the zero-one indicator of whether there is a positive value of bilateral trade in the given category in the given year. Since we are estimating the probability of positive trade, the left-hand side variable is a zero-one variable that takes the value of one when there was some trade in the 6-digit category in a given year and zero otherwise.

The Euro-Med dummy is unity from 1995 onward for destination nation within Euro-Med. As before, we include year and partner dummies. Since there is a single exporter in each data set, the partner dummies wipe out all time-invariant cross-section variation. This means that we are estimating the impact of the FTA on the likelihood of trade appearing in a new category.[23]

The partner nations in all data sets are the Euro-Med nations, EFTA, Japan, Canada, USA, Mauritania, Nigeria, and Libya; the exporting nation is dropped from the list of partners in each regression. The bilateral trade data is taken from the exporting nation ("reporter" in ComTrade). The number of observations varies according to the exporting nation, but it is over 900,000 in all cases.

In order to interpret the estimated coefficients correctly we compute the marginal effects.[24] When the marginal effect of the FTA dummy coefficient

[22]The relation between the Logit estimates and the probability of being uncensored calculated using the Tobit specification is not clear in the literature.

[23]As discussed above, this is an underestimate of the role of new-varieties since we cannot pick up the entry of new goods in categories where some trade is already going on.

[24]The marginal effects are computed using the *m*fx command in Stata after the corresponding Logit estimation.

is near zero, the marginal coefficient gives a good approximation of the % boost in trade.[25]

Since the left-hand side variable is the zero-one variable indicating positive trade, the marginal effect of the FTA dummy variable can be thought of as the change in the probability of observing positive trade in a given category. Of course, there may be many new goods appearing in previously traded categories that the regression does not pick up. We can be sure, however, that a switch from zero to positive involves new goods. Thus the positive coefficients indicate that being a member of Euro-Med increases the likelihood of new categories being traded.

Table 8 summarizes the main results of the Logit estimation. More specifically, all the point estimates are positive except those for Israel and Morocco exports. Seven of the of the eight positive coefficients are statistically significant at the 1% level or better; the remaining one is significant at the 10% level.

We list the nations, so the the Euro-Med dummy indicates bilateral trade flows where both partners belong to Euro-Med. The unweighed average for the Logit marginal effect on exports (including the negative estimates) is close to 2%; suggesting that Euro-Med raises the probability of a category switching from zero to a positive flow by 2%. The figure, however, ranges from about 12% for the EU to -1% for the Israel. These statistical results confirm the prima facie evidence presented in Section 2. The main difference is that Table 8 results control for fluctuations in the destination nation's GDP, and idiosyncratic, partner, year and industry-specific factors.

The estimates are higher for the two largest nations (the EU and Turkey). The coefficient for Egypt is not statistically different from zero. The results weakly suggest that Euro-Med makes a bigger difference for more firms in the biggest nations.

The unweighted average (including the negative estimates) for imports is close to 1%. As argued above, these results are in line of our estimation using the Tobit model.[26]

On the whole, the results presented in Table 8 are supportive of the "new-varieties hypothesis." We take this as supportive but not conclusive evidence that Euro-Med promotes the exports of new goods.

[25]Note that $exp(X) - 1 = X$ when X is near zero.

[26]The Logit model is probably underestimating the change in the probability of exporting a new variety.

Table 8: Logit estimations: The impact of Euro-Med on promoting trade in new categories.

	EXPORTS		**IMPORTS**	
	Euro-Med	**Marginal effects**	**Euro-Med**	**Marginal effects**
EU	**0.518*****	**0.128*****	**0.246*****	**0.039*****
	(0.018)	(0.004)	(0.033)	(0.005)
DZA	**0.451*****	**0.001*****	**0.079*****	**0.003*****
	(0.056)	(0.000)	(0.023)	(0.000)
EGY	**0.009**	**0.000**	**-0.210*****	**0.000*****
	(0.047)	(0.001)	(0.036)	(0.000)
ISR	**-3.121*****	**-0.088*****	**0.964*****	**0.028*****
	(0.181)	(0.007)	(0.087)	(0.003)
JOR	**2.127*****	**0.008*****	**0.541***	**0.003***
	(0.381)	(0.002)	(0.300)	(0.002)
LBN	**0.134****	**0.002***	**0.863****	**0.012****
	(0.068)	(0.001)	(0.354)	(0.005)
MAR	**-1.394*****	**-0.029*****	**-1.242*****	**-0.008*****
	(0.047)	(0.001)	(0.082)	(0.001)
SYR	**1.170*****	**0.008*****	**1.157****	**0.005***
	(0.070)	(0.001)	(0.524)	(0.002)
TUN	**0.792*****	**0.006*****	**1.798*****	**0.009*****
	(0.009)	(0.000)	(0.008)	(0.000)
TUR	**1.539*****	**0.105*****	**1.485*****	**0.018*****
	(0.037)	(0.003)	(0.194)	(0.003)

Note:***significant at 1%; **significant at 5%; *significant at 10%

4.4 Intensive margin:OLS

To conclude our empirical study, we turn to estimating the impact of the Euro-Med agreements on the "quasi-intensive" margin using the standard methodology of Ordinary Least Squares (OLS). Given that censoring is an important issue in our stories, this estimation method provides a biased estimation of the impact of Euro-Med on the trade flows that were positive before and after the agreements.[27]

The aim is to provide a rough estimate of the intensive margin, noting as always that the HS 6-digit is too aggregated to capture individual varieties, so our regressions confuse some adjustment in the number of varieties with the growth in already-traded varieties. To this end, we perform a standard panel-data gravity model estimation dropping all pair-product combinations that include a zero in their time series. The number of observations varies according to the exporting nation, but it is over 9000 in all cases.

The partner nations in all data sets are the same as before, namely the EU, EFTA, the Mediterranean partners, the USA, Japan, Canada, Mauritania, Libya, and Nigeria. The exporting nation is dropped from the list of partners in each regression. As in the previous models, the bilateral trade data is taken from the exporting nation.[28] The estimated equation is:

$$lnV_{od,i} = \beta_0 + \beta_1(EuroMed) + \beta_2 ln(GDP_d) + \beta_3 T + \beta_4 P + u_i \qquad (8)$$

where $V_{od,i}$ is the bilateral trade flow. This differs from the Table 6 results only in the data set used; here all categories that contain a zero in the bilateral flow for any year are dropped, thus the list of included categories is partner and direction specific (e.g. EU exports to Algeria will have a different list than Algeria's exports to the EU).

Table 9 summarizes the results for Euro-Med members. The regression results show that the traditional gravity variables have a statistically significant impact on trade. Countries' GDPs have positive and statistically significant impact on trade.[29] The effect of the Euro-Med FTA was positive in most the exports' estimations and statistically significant. The unweighed

[27] We report this results because OLS has been the standard methodology to date to estimate trade flows disregarding censoring issues.

[28] Export data for some of the countries where the available data was poor has been computed using Comtrade import data from other countries.

[29] The estimates for the GDP coefficients are given in table 13 in appendix B.

Table 9: OLS estimations: The impact of Euro-Med on the existing trade flows.

	EXPORTS		**IMPORTS**	
COUNTRY	FTA	Std. Err.	FTA	Std. Err.
EU	0.134***	(0.025)	-0.412***	(0.079)
DZA	0.397***	(0.056)	0.122***	(0.034)
EGY	0.341***	(0.107)	-0.906**	(0.444)
ISR	0.734***	(0.195)	-0.470*	(0.249)
JOR	-0.296***	(0.074)	-0.073***	(0.032)
LBN	0.139***	(0.050)	0.306***	(0.029)
MAR	0.381***	(0.039)	0.425**	(0.214)
SYR	0.231***	(0.076)	0.605***	(0.033)
TUN	0.135***	(0.047)	0.485***	(0.127)
TUR	0.449***	(0.032)	0.516***	(0.024)

Note:***significant at 1%; **significant at 5%; *significant at 10%

average of the impact on exports is around 26%, suggesting a lower impact than our Tobit estimations. The results on the import data sets are statistically significant. For half of the countries, however, the impact of the FTA is found to be negative. This is probably a result of OLS being a biased method that (under)estimates the impact on trade. The unweighed average of the impact on the imports is 6%, clearly below what we have previously found using the Tobit model.

5 Puzzles and counterfactuals

Before concluding the paper it is worthwhile discussing a couple of points related to the empirical estimation.

As we have pointed out in section 3, the sequence of the events is not clear. Figure 2 shows that the reduction in the number of zeros actually happened before the agreements were signed or came into force. In other words, it is not clear whether the Euro-Med agreements caused the reduction in the number of zeros or it was the other way around.

We see at least two possibilities here. First, that the agreements were anticipated. As European multinationals started to export to the area, they may have pushed the EU to sign the agreements. In other words, it was the new trade what caused the agreements.

Another explanation is that, as a precondition to the agreement, the EU asked the Mediterranean countries to remove some relatively detailed rules or TBTs that could have been reducing the sales.

The two events happened at the same time, and it is impossible to completely sort out what happened. But the fact that it happened is interesting. And it is especially interesting for these developing countries that have signed the Association Agreements with the EU hoping that they would expand the range of goods that were traded.

6 Concluding remarks

To the best of our knowledge this is the first paper to look at the zeros in the trade matrix during a preferential trade liberalization process. The paper has contributed to the literature dealing with trade effects on two fronts: on the theoretical front, by providing a logical framework to deal with the zeros in preferential liberalization including developed and developing nations. And on the empirical front, shedding light on the impact of the Euro-Mediterranean free trade agreements on expanding the range of exported products of its members.

The proposed theoretical framework rests on the Melitz model where countries try to have large enough sales to make it profitable to cover the sunk cost of entering foreign markets. Basically it is an export decision with a threshold. The economic model deals with the economic decision of whether to sell and how much, both decisions are linked and done simulta-

neously. We claim that free trade agreements somehow lower the fixed cost of entering a market for firms exporting to the destination market. If this is true, we should expect the number of zeros in export vectors to fall. This is what we have called "the new-varieties hypothesis."

The empirical analysis presents the econometric tools that we use to test "the new-varieties hypothesis" – these are the Tobit, Logit and OLS models. We find empirical evidence suggesting that around the time when the Barcelona process started there was an increase in the number of traded varieties between the EU and its Mediterranean partners. Not surprisingly, we find the most important drop in zeros (switches) in the most liberalized sectors. Using highly dis-aggregated trade data we estimated that in aggregate Euro-Med increased exports among its members by 24% per cent. We believe that these results are not conclusive but increase our ability to associate the zeros with the liberalization.

Unfortunately, we are not in a position to confirm whether the Euro-Med agreements caused the reduction in the number of zeros or it was the other way around. Our claim is that both things happened around the same time and, given the empirical evidence presented, they could be related. But it is impossible to completely sort out what happened. The fact that the reduction in the number os zeros happened is what it is interesting; and it is especially interesting for this group of Mediterranean developing nations that signed the FTA with the EU with the hope that it would expand the range of goods that they traded.

On the theoretical front, more work is needed to establish the formal link between the Melitz model and the standard gravity theory.

The Euro-Mediterranean experience with preferential liberalization raises some questions regarding the range of exported products in other FTAs. In future research it would be interesting to apply the methodology presented here to investigate the impact of other FTAs on expanding the range of exported products of its members. Specifically, future work on other FTAs should investigate whether the switches also anticipate the agreements on trade in new varieties. As new data becomes available, it would be interesting to see the impact of the South-South Euro-Med agreements, particularly Agadir, and the Arab Maghreb Union.

References

(2006a): "World Development Indicators," .

(2006b): "World Integrated Trade Solution (WITS)," .

Augier, P., M. Gasiorek, and C. Lai-Tong (2004): "Rules of Origin and the EU-Med Partnership: The Case of Textiles," *The World Economy*, 27(9), 1449–1473.

Baldwin, R. E. (2005): "Heterogeneous Firms and Trade: Testable and Untestable Properties of the Melitz Model," NBER Working Papers 11471, National Bureau of Economic Research, Inc.

——— (2006): *Trade effects of the Euro*. CEPR.

Baldwin, R. E., and D. Taglioni (2004): "Positive OCA criteria: Microfoundations for the Rose Effect," Discussion paper, Graduate Institute of International Studies.

Galal, A., and B. Hoeckman (eds.) (2003): *Arab Economic Integration: Between Hope and Reality*. Brookinngs Institution Press.

Greene, W. H. (2003): *Econometric Analysis*. Prentice Hall, fifth edition edn.

Helpman, E., and P. Krugman (1987): *Market Structure and Foreign Trade*. MIT Press.

Helpman, E., M. Melitz, and Y. Rubinstein (2006): "Trading Partners and Trading volumes," Discussion paper, Harvard University.

Helpman, E., M. J. Melitz, and S. R. Yeaple (2004): "Export versus FDI with Heterogeneous Firms," *American Economic Review*, 94(1), 300–316.

Melitz, M. J. (2003): "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity," *Econometrica*, 71(6), 1695–1725.

Muller-Jentsch, D. (2005): *Deeper Integration and Trade in Services in the Euro-Mediterranean Region: Southern Dimensions of the European*

Neighborhood, Europe, Central Asia and the World Bank. The International Bank for Reconstruction and Development and The World Bank.

A Appendix

Details of the aggregation process:

- AGRICULTURE
  Agriculture, hunting and related service activities;
  Forestry, logging and related service activities;
  Fishing, operation of fish hatcheries and fish farms; service activities;

- MINING
  Mining of coal and lignite; extraction of peat;
  Extraction of crude petroleum and natural gas; service activities;
  Mining of uranium and thorium ores;
  Mining of metal ores;
  Other mining and quarrying;

- FOOD
  Manufacture of food products and beverages;
  Manufacture of tobacco products;

- TEXTILES
  Manufacture of textiles;
  Manufacture of wearing apparel; dressing and dyeing of fur;
  Tanning and dressing of leather; manufacture of luggage, handbags;

- WOOD
  Manufacture of wood and of products of wood and cork, except furniture;
  Manufacture of pulp, paper and paper products;
  Publishing, printing and reproduction of recorded media;

- CHEMICALS
  Manufacture of coke, refined petroleum products and nuclear fuel;
  Manufacture of chemicals and chemical products;
  Manufacture of rubber and plastic products;

Manufacture of other non-metallic mineral products;
Manufacture of basic metals;

- MACHINERY
  Manufacture of fabricated metal products, except machinery and equipment;
  Manufacture of machinery and equipment n.e.c.
  Manufacture of office machinery and computers;
  Manufacture of electrical machinery and apparatus n.e.c.
  Manufacture of radio, television and communication equipment;
  Manufacture of medical, precision and optical instruments, watches and clocks;
  Manufacture of motor vehicles, trailers and semi-trailers;
  Manufacture of other transport equipment;
  Manufacture of furniture; manufacturing n.e.c.

- SERVICES RECREATIONAL
  Electricity, gas, steam and hot water supply;
  Computer and related activities;
  Other business activities;
  Recreational, cultural and sporting activities;
  Other service activities.

B Appendix

Table 10: Robustness check.

Excluded Country	**FTA**		**lngdpo**		**lngdpd**		**Obs.**	R^2
EEC15	**0.224*****	(0.031)	**1.165*****	(0.007)	**0.612*****	(0.008)	36038	0,58
DZA	**0.310*****	(0.030)	**1.189*****	(0.007)	**0.695*****	(0.006)	37201	0,58
EGY	**0.361*****	(0.030)	**1.179*****	(0.007)	**0.692*****	(0.006)	37169	0,58
ISR	**0.307*****	(0.029)	**1.177*****	(0.006)	**0.692*****	(0.006)	38538	0,58
JOR	**0.297*****	(0.030)	**1.177*****	(0.006)	**0.694*****	(0.006)	37786	0,58
LBN	**0.272*****	(0.030)	**1.188*****	(0.007)	**0.701*****	(0.006)	37804	0,58
MAR	**0.309*****	(0.030)	**1.183*****	(0.007)	**0.693*****	(0.006)	37624	0,58
SYR	**0.326*****	(0.030)	**1.193*****	(0.006)	**0.692*****	(0.006)	37932	0,58
TUN	**0.306*****	(0.030)	**1.184*****	(0.007)	**0.696*****	(0.006)	37205	0,58
TUR	**0.389*****	(0.030)	**1.170*****	(0.006)	**0.705*****	(0.006)	37173	0,58

Note:***significant at 1%; **significant at 5%; *significant at 10%

Table 11: Estimates of the GDP coefficients from the Tobit estimations.

	EXPORTS		**IMPORTS**	
	GDP	**Std. Err.**	**GDP**	**Std. Err.**
EU	**0.523*****	(0.020)	**0.469*****	(0.034)
DZA	**-0.007*****	(0.002)	**-0.172*****	(0.006)
EGY	**0.037*****	(0.003)	**-0.103*****	(0.006)
ISR	**1.458*****	(0.006)	**2.043*****	(0.006)
JOR	**0.880*****	(0.175)	**1.655*****	(0.086)
LBN	**2.902*****	(0.144)	**1.287*****	(0.087)
MAR	**1.020*****	(0.132)	**1.881*****	(0.097)
SYR	**-0.678*****	(0.178)	**1.827*****	(0.007)
TUN	**-0.061*****	(0.004)	**-0.062*****	(0.005)
TUR	**1.288*****	(0.045)	**1.271*****	(0.059)

Note:***significant at 1%; **significant at 5%; *significant at 10%

Table 12: Estimates of the GDP coefficients from the Logit estimations.

	EXPORTS		**IMPORTS**	
	GDP	**Std. Err.**	**GDP**	**Std. Err.**
EU	**0.210*****	(0.012)	**0.120*****	(0.015)
DZA	**-0.668*****	(0.118)	**-0.039**	(0.033)
EGY	**0.306*****	(0.047)	**0.712*****	(0.040)
ISR	**0.734*****	(0.036)	**0.582*****	(0.033)
JOR	**0.184*****	(0.058)	**0.250*****	(0.031)
LBN	**1.150*****	(0.056)	**0.416*****	(0.037)
MAR	**0.280*****	(0.045)	**0.754*****	(0.044)
SYR	**-0.319*****	(0.067)	**0.510*****	(0.043)
TUN	**0.271*****	(0.001)	**0.778*****	(0.001)
TUR	**0.434*****	(0.015)	**0.685*****	(0.025)

Note:***significant at 1%; **significant at 5%; *significant at 10%

Table 13: Estimates of the GDP coefficients from the OLS estimations.

	EXPORTS		**IMPORTS**	
	GDP	**Std. Err.**	**GDP**	**Std. Err.**
EU	**0.216*****	(0.014)	**0.032**	(0.026)
DZA	**0.041*****	(0.008)	**-0.056**	(0.063)
EGY	**0.262*****	(0.091)	**0.184*****	(0.070)
ISR	**0.502*****	(0.076)	**0.092***	(0.056)
JOR	**0.190***	(0.105)	**0.006**	(0.059)
LBN	**0.659**	(0.107)	**-0.116***	(0.064)
MAR	**0.118**	(0.104)	**-0.503*****	(0.084)
SYR	**0.683*****	(0.145)	**-0.003**	(0.080)
TUN	**0.115***	(0.071)	**-0.061**	(0.065)
TUR	**0.216*****	(0.028)	**-0.134*****	(0.049)

Note:***significant at 1%; **significant at 5%; *significant at 10%