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Quantitative Restrictions on Clothing Imports: Impact and Determinants of the Common Trade Policy Towards Developing Countries

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RESUMEN

El objetivo de este estudio es cuantificar el impacto de la eliminación gradual de las cuotas sobre las importaciones de prendas de vestir europeas dentro del marco de desmantelamiento del Acuerdo Multi Fibra y de la adhesión de los países del centro y este de Europa a la Unión. Se realiza un estudio econométrico con datos de corte transversal para 1996, que con un conjunto de datos originales acerca de barreras, tanto arancelarias como no arancelarias, cuyo tratamiento presenta tanto un interés de economía política como un reto metodológico. El impacto negativo de las barreras arancelarias es evidente, siendo el de las no arancelarias positivo, debido a un sesgo endógeno controlado con el uso de variables instrumentales. La política comercial común en este sector, por lo tanto, parece ser del todo discriminatoria para los países socios. El modelo que se deriva de nuestro estudio, permite simular el impacto de la supresión de las cuotas al crecimiento de las importaciones de prendas de vestir de los países miembros.

Palabras Clave: Política comercial, Acuerdo Multi-Fibra, restricciones cuantitativas, sesgo endógeno, modelo de gravedad.

ABSTRACT

This study aims to assess the impact of the phasing out of quotas on European clothing imports within the framework of dismantling the Multi-Fibre Agreement and the adhesion of the CEEC. An econometric study is carried out on cross-sectional data for 1996 thanks to an original gathering of data on tariff and non-tariff barriers, which treatment presents an economic policy interest as well as a methodological challenge. The negative impact of tariff barriers is quite evident, whereas the impact of non-tariff barriers is considered positive, due to an endogeneity bias which is controlled by instrumental variables. The common trade policy in this sector thus seems to be quite discriminating among the partner countries. The model of our study is meant to simulate the impact of the suppression of quotas on the growth of the member countries' imports of articles of the garment industry.

Keywords: MFA, Trade policy, quantitative restrictions, endogeneity bias, gravity model.

Jel Classification: F13, F17

1 Introduction

The aim of this study is to assess the impact of the phasing out of the quantitative restrictions on European clothing imports within the framework of the phase-out of the Multi-Fibre Agreement (MFA) and the adhesion of the Central and East-European Countries (CEEC). Towards this end, we estimate a gravity equation by means of which an exploration at a very disaggregated level can be performed. The use of these models to evaluate the impact of trade protectionist measures and their dismantling opens a vast field of research. Indeed, if at the aggregate level their effectiveness has already been largely proven, assessing the impact of these trade barriers on finer sectorial levels raises methodological questions which still have not been completely resolved.

In most cases, methodological predictions have to grapple with the difficulty of gathering detailed and reliable information on tariff and non-tariff barriers. Building such a data base[1] is one of the original aspects of this study, a data base which enables us to approach interesting problems of methodology and economic policy. The estimates of a standard gravity equation do not lead to the anticipated results (as one can see in other studies of this type). The impact of *tariff barriers* is considered negative (the expected result, but seldom corroborated in the literature). The impact of *non-tariff barriers* is considered positive and reflects a problem of endogeneity. When the variables that determine the presence of Non-tariff Barriers (NTB) are controlled by instrumental variables, their negative impact is clear. A simulation of the impact of the suppression of these quantitative restrictions on the growth of imports of clothing articles by the member countries is then performed.

This study is structured as follows. The next section presents the theoretical framework of the empirical model tested further on. Section 3 briefly describes the dimensions and the scope of tariff and non-tariff barriers on EU imports of clothing. Section 4 presents the empirical model and the econometric results. Section 5 presents the results of the simulation process. Finally, the last section summarises the main conclusions.

2 Methodological framework

The generic use of the gravity model

The gravity equation of trade states that the bilateral trade volume is positively correlated with the product of the GDP of the partners and negatively correlated with the trade barriers that may exist among them (such as, for example, the transportation costs represented by the geographical distance). The great capability of these models to explain bilateral flows was pointed out at a very early date by the works of Linnemann (1966) and Leamer and Stern (1970). The absence of a theoretical justification which prevailed in the Seventies gave way to an abundance of studies which evidenced the compatibility of the gravity models with a whole array of theoretical frameworks.

Bergstrand (1989) proposes a formulation which reconciles the factorial model and the gravity equation. More recently, Deardorff (1998) shows again that the forces of gravity also apply to a Hecksher-Ohlin (H-O) type model. The key hypothesis is still that of complete specialization i.e., that each good is exported by only one country. This

[1] Our estimates are based on cross-sectional data for the year 1996, and relate to imports by EU member countries coming from the 22 largest exporters of articles of clothing to the EU.

assumes that the differences in factorial endowments between partners are sufficiently important to lead to a complete specialization[2].

Anderson (1979) deduced the gravity equation from a model in which the preferences are supposed to be homothetic and identical among the countries, while the goods are regarded as differentiated according to their origin. When the differentiation of the products is carried out by enterprises,[3] the resulting consequence is that each country produces a limited number of varieties but that it remains the sole exporter. The consumer's preference for variety then justifies the importance of the exchanges.

More recently, empirical validations of the gravity equations deriving from various theoretical models, such as those carried out by Helpman (1987), Hummels and Levinsohn (1995), Fontagné, Freudenberg and Péridy (1998) and Evenett and Keller (1998), conclude that a more eclectic vision of trade determinants, in which the H-O model and the models of increasing returns complement each other to a certain extent, can lead to a reconciliation between the gravity model and the theoretical ones. Indeed, the H-O model would better explain the success of the gravity equation when the partners have very different factorial endowments, while the other models would better explain the exchanges between similar countries precisely because the exchanges of differentiated goods represent a significant share of their trade. Trade flows are best explained through a combination of several models. It is therefore only natural that the

[2] This specialization is at the source of the force of gravity in trade and explains why the imports of a country i are positively correlated with this country's income and with the exporting country's production. This hypothesis is thus common to most other works, with the exception of Feenstra, Markusen and Rose (2001), who develop a gravity model deriving from a « reciprocal dumping » model with homogeneous goods.

[3] Helpman, Krugman (1985) chap. 8 and Leamer (1990).

exchanges be explained by an equation which can be justified in the context of various theoretical frameworks[4].

The use of the gravity model was refined by the introduction of supplementary variables[5] or variants concerning the explained variable[6]. Factors of a rather political, historical and cultural character were also integrated into these models. Eichengreen and Irwin (1998) argue that past trade relationships influence current flows by integrating delayed flows in the equation. These factors are often represented by dummy variables indicating the existence of common languages or common borders. Grossman (1998) and Rauch (1999) suggest that the lack of adequate information leads consumers to use distribution networks they already feel acquainted with, thereby demanding goods produced in regions that are historically, linguistically or geographically close to them. When the price of the goods is not the only, or even the main, issue in question (differentiated goods), the presence of these networks promotes trade[7]. Various ways of taking distance into account[8] were also implemented in order to highlight a "border effect". Indeed, according to McCallum (1995), Trefler (1995) and Leamer (1993)

[4] The dichotomy between these theoretical frameworks has been largely mitigated since the work of Helpman and Krugman (1985).

[5] As the various problems arose: variables of price - Bergstrand (1985 and 1989) -, real exchange rate - Bayoumi and Eichengreen (1995) -, variability in the real exchange rate - Frankel and Wei (1993) -, Foreign Direct Investment (FDI) - Eaton and Tamura (1994), Fontagné, Freudenberg and Péridy (1998) -.

[6] It is no longer the volume of trade, *stricto sensu*, which is used, but more often the flows of imports or exports, or even the share of a bilateral flow in the total trade - Haveman and Hummels (1996) -, the nature of the trade - Bergstrand (1990), Fontagné, Freudenberg and Péridy (1998) -, the bilateral intensity of trade - Freudenberg, Gaulier, Ünal-Kesenci (1998) or the share of imports in GDP - Harrigan (1993).

[7] In a more general way, trans-national or national networks facilitate the exchanges by circumventing many informal obstacles to trade. Rauch (2001) mentions many studies that highlight the importance of commercial relations which are established with the mediation of immigrants. He also mentions strategies of firms whose aim is to consolidate lasting trans-national relations.

[8] This is the case of the studies by Wei (1996), Leamer (1997) and Head and Mayer (1999).

different areas inside the same country trade more among each other than they do with areas of different countries separated by the same distance[9].

Some considerations on tariff and non-tariff barriers

Gravity estimates have tried to isolate the impact of trade policies on trade flows. A first generation of models was interested in the influence of regional agreements on trade flows. Their presence is generally integrated by means of dummy variables representing the regions' affiliation to some kind of agreement. Such is the case of the works of Frankel, Stein and Wei (1996)[10]. The authors study the possibility of an intra-regional bias which would lead the members of the same geographical area to conduct a more intensive trade than their geographical proximity would warrant (a zone described as "supra-natural"). However, the use of dummy variables can lead to an overestimation of the impact of such agreements, if they reflect other elements not specified in the model.

Only a few recent studies propose integrating finer estimates of the trade barriers, opening the way to completely innovating and highly promising research. Wall (1999), Fouquin and Gaulier (2000) have resorted to discrete qualitative variables expressing at the aggregate level the more or less restrictive character of the trade policy, determining these variables in an exogenous way. Harrigan (1993), Haveman and Hummels (1999), Hummels (1999) and Castilho (2002) explicitly took into account customs duties and the NTB.

[9] Geographical distance thus reflects "transaction costs" - Krugman (1995) - which include not only the costs of transport but also other obstacles to trade. This explains why applying other trade policy measures reduced the effect of distance on trade flows.

[10] The works of Frankel and Wei (1993), Bayoumi and Eichengreen (1995), Bikker (1987), Brada and Mendez (1993) and Sapir (1997) are other examples.

These studies have the advantage of establishing the impact of trade policies much more precisely. They also evidence two types of problems. On the one hand, estimates must be carried out at the sectorial level in consideration of the heterogeneity of the barriers[11]. On the other hand, the tariff and NTB coefficients do not always display the expected sign - Harrigan (1993) and Castilho (2002).

These results, which may be surprising at first sight, can often be explained within the framework of the theory of endogenous protection, which, relying on arguments of political economy, postulates that high levels of import penetration result in a more intensive mobilization of private interests, who tend to organize in lobbies in support of protectionism - Baldwin (1985), Magee, Brock and Black (1989), Grossman and Helpman (1994). In this sense, when the NTB are postulated as exogenous, their impact on imports is necessarily underestimated.

The study of Trefler (1993) demonstrates this result by treating the NTB as an endogenous factor[12]. The author concludes that the endogeneisation of the NTB by the two-stage least squares (2SLS) method evidences a significant sensitivity of imports to the NTB, ten times higher than that obtained with a traditional estimation. In a similar fashion, Lee and Swagel (1997) simultaneously estimate a gravity equation and an equation that explains the presence of NTB through a series of variables which include

[11] Actually, in the partial equilibrium framework, what should be used as representative of the exporter's supply is the sector's production, and the domestic consumption of the importer as representing its demand. But since these data are more difficult to obtain (in particular when the studies relate to developing countries), it is the GDP that is traditionally used. This explains in part why the explanatory power of the gravity model is often lower at the disaggregated level. The specificity of the sectorial effects also justifies this result.

[12] The study deals with the US manufacturing sector in 1983. The author considers several explanatory NTB variables. Some of these reflect the comparative advantage (such as the rate of penetration of the imports, or import growth, or export trends), others may help detect how intensively the interests of the private sectors favour protectionism and their propensity to implement them (an increase in the number of purchasers and sellers, geographical concentration, the importance of employment, trade unions, unemployment, etc...).

the rate of penetration of imports. They also include country and sector fixed-effects[13]. Their conclusions confirm those of Trefler. The non-endogeneisation of the NTB could lead to an undervaluation of their effects and even, in certain cases, to a change in the coefficients' signs.

3 Scope of the study

The countries which export clothing articles to the EU are confronted with the well-known double problem of the European trade policy. Indeed, these articles belong to the product group classified as "very sensitive", and therefore the customs duties imposed by the EU are higher than those for other categories. Moreover, as final consumer goods, they are subject to "tariff escalation" which consists in applying lower tariffs to raw or primary materials than to more elaborated products. The Most Favoured Nation (MFN) tariff applied to these products is thus the highest of all industrial products: the average customs duty of the EU for industrial products was 6 % in 1995 and 4.9 % in 1997 against 13 % and 12 % for garments[14]. The common trade policy for "sensitive products" is also characterized by the presence of NTB.

The main exporting countries of clothing to the EU are the members of the EU themselves and the newly industrialised countries (NIC) of Asia (the share of these two groups is decreasing as they are progressively disengaging from this type of specialization). As far as these more highly developed Asian countries are concerned, they must face MFN tariffs, and as signatories of the MFA, quantitative restrictions are imposed on them - to see Table 1. The poorer Asian countries in general enjoy the

[13] In the gravity equation, the rate of penetration of the imports is explained by an indicator of the geographical distance between the importer and its main trade partners, the share of the sector's production in the total production, the customs duty and an indicator of NTB. The study involves 43 countries and 27 sectors for the year 1988.

[14] OECD (1997) p.46.

benefit of a preferential status (lower customs duty and a higher quota) as LLDC (least developed countries)[15]. However, China, India and Vietnam, in spite of their low per capita incomes, do not benefit from any preference. Exports from these latter partners have been, together with of those of the CEEC, the most dynamic in recent years. Customs duties on EU imported clothing articles originating in the CEEC have been gradually reduced. By 1996, only a few quotas remained.

Table 1: Main exporters of clothing to the EU: characteristics.

Exporters	Simple customs duty (1996)	Average quota utilization rate	Number of quotas (on 21 categ.)	Per capita GDP in ECUS	Share of EU imports *
Turkey	0.0		0	2,290	13.4
China	12.2	89.2	20	530	13.3
Hong Kong	12.2	64.7	16	19,060	9.8
Tunisia	0.0		0	1,696	7.1
Morocco	0.0		0	1,032	6.6
Poland	0.0	41.9	6	2,749	6.4
India	12.2	87.0	11	299	6.1
Bangladesh	0.0		0	257	5.0
Romania	0.0	41.4	9	1,231	4.6
Indonesia	10.4	73.8	7	868	4.0
Hungary	0.0	25.2	9	3,440	3.1
Thailand	12.2	56.6	10	2,431	2.1
Macao	0.0		0	13,701	1.8
Sri Lanka	10.3	57.5	5	592	1.7
Croatia	0.0		0	3,226	1.6
Czech Rep.	0.0	33.6	12	4,318	1.5
Pakistan	12.2	63.0	8	367	1.5
Vietnam	10.4	88.0	21	248	1.5
Slovenia	12.4		0	7,534	1.4
Malaysia	10.4	57.8	6	3,905	1.4
Slovakia	0.0	34.9	10	2,754	1.4
Korea	12.2	16.9	20	8,402	1.3
Bulgaria	0.0	60.5	6	929	1.2
The Philippines	10.3	40.6	12	877	1.0
Taiwan	12.2	28.7	18	9,978	1.0
					100.0

Source: Calculations by the author from: TRAINS data base of the UNCTAD (1996), COMEXT (1997), World Development Indicators, World Bank, 1997, OJ EU L 275 of 8.11.93 and OJ EU L 307 of 28.11.96. * These are the sum of imports by the EU coming from selected partners, amounting to approximately one half of the total EU imports and more than 80 % of the imports coming from third countries.

Among the most significant exporters of clothing articles[16], we also find Turkey, Morocco and Tunisia. These three Mediterranean countries are important suppliers to

[15] Tariff concessions granted to developing countries which are favourable to them compared to other recipients of the general system of preferences (GSP).

[16] We analyze here the exports of the 25 third-party countries with the greatest EU market shares.

the EU under the terms of privileged access that was granted to them. In fact, their industrial products already enjoyed free access to the EU since the 1976 Cooperation Agreements for the North African countries and within the framework of the Customs Union for Turkey.

The progressive phase-out of the MFA foresees the suppression of these NTB[17]. In addition, the implementation of the European Agreements with the CEEC resulted in an almost immediate tariff reduction, while the quantitative restrictions are being dismantled only gradually. The EU trade policy in the textile and clothing sector has thus been completely in shambles for several years for these reasons. It is likely to affect negatively closely related EU partners such as Turkey, Tunisia and Morocco, since these changes will mean a reduction in their margin of preference. Benefiting from the favourable treatment which was granted to them by the EU, these Mediterranean countries had increased the volume of their textile and clothing exports in their foreign exchanges, as well as the weight of the European market as recipient of their exports.

4 Econometric results

Standard gravity equation

It is very widely accepted that the exchange of clothing products between the developed and the developing countries is explained by a Heckscher-Ohlin type model. We study here the EU countries' imports coming from the Mediterranean countries, the

[17] The products in the annex to the Agreement on Textiles and Clothing (ATC) are to be included in 4 stages in the following manner: 1) On January 1st, 1995, those products which in 1990 represented at least 16 % of the total volume of UE imports of these products. 2) On January 1st, 1998, the products which in 1990 represented at least 17 % of the total volume of UE imports of these products. 3) On January 1st, 2002, the products which in 1990 represented at least 18 % of the total volume of UE imports of these products. 4) At the end of the transitional period (between 2003 and 2005), all remaining products (49 % of the total volume of the imports), will be included. Clothing products, however, are among the import items which will be liberalized during the latest period.

CEEC and Asia. The endowments of the countries of our sampling are sufficiently different for a considerable degree of specialization to take place. The gravity model specified by Bergstrand (1989) is therefore suitable to the framework of our study. The most general specification is described by the equation:

$$M_{ij} = Y_i^{\alpha_1} Y_j^{\alpha_2} y_i^{\alpha_3} y_j^{\alpha_4} dist_{ij}^{\alpha_5} t_{.j}^{\alpha_6} NTB_{.j}^{\alpha_7} \quad (1)$$

where i represents the importing EU member country (i=1... 14); j, the exporter (j=1... 22, the 22 main exporters of garment articles towards the EU); M, the bilateral imports of the various clothing products; Y, GDP; y, the per capita GDP; dist, the geographical distance (in km) between the capitals of countries i and j; t, the average duty[18] and NTB, an indicator of the incidence of the NTB[19]. The indicators of the trade barriers at accessing the EU are calculated at the level of 20 categories of clothing products.

According to gravity principles, the *per capita GDP of the exporting countries* is a proxy of capital intensity. It is thus negatively correlated with its exports when the sector is labour intensive as it is in the present case. Likewise, countries relatively abundant in capital tend to import labour intensive products. The *per capita GDP of the importing countries* is thus supposed to have a positive impact on the imports of these products. With regard to the GDP, *the GDP of the exporter* represents the measure of its supply, and hence it must have a positive impact on exports. Finally, imports are

[18] The simple average customs duty is calculated at the level of the 21 categories of clothing products as a simple average of the rates applied to 8 digit products.

[19] In relation to the NTB, we tested two indicators: 1) QR: a dummy indicating the presence of quotas; 2) UR: A discrete variable taking on the values of 0 (no quota), 1 (quota utilisation rate lower than 50 %), 2 (quota utilisation rate higher than 50 % and lower than 90 %), the 3 (quota utilisation rate higher than 90 %). As the results obtained were virtually identical no matter which indicator was used, we retained the first indicator (QR), which eliminates the risk of correlation with the explained variable since it is not calculated using the imports as the basis.

supposed to grow with the income of the importer, i.e. the *importer's GDP*. *Obstacles to trade* should obviously have a negative coefficient. This is the case of geographical distance, and also of tariff and non-tariff barriers.

The standard model is tested in its logarithmic form. One specification without a fixed effect (specification 1.a) and another one with a fixed effect (specification 1.b) were considered:

$$\ln M^{C}_{ij} = \alpha_0 + \alpha_1 \ln Y_i + \alpha_2 \ln Y_j + \alpha_3 \ln y_i + \alpha_4 \ln y_j + \alpha_5 \ln dist_{ij} + \alpha_6 \ln(1 + t^{C}_{.j}) + \alpha_7 NTB^{C}_{.j} + \varepsilon_{ij} \quad (1.a)$$

where C represents the product categories (c = 1...,21). The NTB variables indicating the presence of quotas or the rate of use of the quota are available only at the level of the member countries and by product categories, which combine many products defined at the 8 digits level of the combined nomenclature.

$$\ln M^{C}_{ij} = \alpha_0 + \alpha_1 \ln Y_i + \alpha_2 \ln Y_j + \alpha_3 \ln y_i + \alpha_4 \ln y_j + \alpha_5 \ln dist_{ij} + \alpha_6 \ln(1 + t^{C}_{.j}) + \alpha_7 NTB^{C}_{.j} + \sum_{C=1}^{20} \beta_C D_C + \varepsilon_{ij} \quad (1.b)$$

where D_C represents a dummy category[20].

For each of the two specifications tested, all variables are significant, at the 1 % level (Table 2). The explanatory capacity is of 30% when one uses the method of ordinary least squares (OLS) (specification a), and of 38% when following the fixed-effects method (specification 1.b). It should be noted that these coefficients are relatively high when dealing with such a disaggregated estimate.

[20] In fact, the macro-economic variables such as the GDP provide, at the sectorial level, only a vague approximation of the volume of production of the exporting country and of the consumption in the importing country. However, the volume of these offers and demands also varies from one product

The standard variables of the gravity models show the expected signs, since the exporters' and the importers' GDP, as well as the per capita GDP of the importer show a positive coefficient, whereas the exporter's per capita GDP coefficient is negative. Moreover, distance has a negative impact on imports, as one would expect.

The variables of trade policy are particularly deserving of our attention and will constitute the most original part of this study[21].

Customs duty has the foreseen negative sign, which is not always the case when estimates are carried out at the sectorial level - see for example Castilho (2002). The coefficient of this variable, which represents the demand elasticity in relation to one of the price components such as the customs duty, is, in fact, rather high (between –3 and –4,5 according to the specifications). It is true, however, that empirical studies often obtain inferior values which lead one to believe that the price effects have been underestimated with regard to theoretical forecasts[22]. On the one hand, there may be certain factors that influence both the prices and the amounts in demand (as when quality and technical progress are involved, for example, in which, if they are not included in the model, will produce an underestimation of the elasticities. On the other hand, estimating the price elasticity is often carried out at aggregate levels (geographically and sectorially) and thus often requires the use of inadequate price measurements (indices, average unit values). Erkel-Rousse and Mirza (2002) propose instrumentalising the price variables and carrying out estimates on sectorial data in order to control these two types of bias. In so doing they obtain elasticities which are

category to another, independently of the country. It is this sectorial effect which we intend to determine through the introduction of dummies for each category.

[21] Let us not forget that these variables (tariffs and QR) are identical for each EU importer but vary according to category and to exporting country.

[22] Blonigen and Wilson (1999), Head and Mayer (2000), Anderton (1999), Ioannidis and Shreyer (1997) obtain elasticities close to the unit.

more in keeping with those envisaged by the theoretical literature (between 1 and 7 depending on the sector).

The coefficients obtained in our study are thus in harmony with the theoretical forecasts (strong price elasticity) since we are dealing with relatively homogeneous goods and with exports from countries which can be regarded as "price-takers" towards a "large importer". They confirm that the disaggregated estimates and the adequacy of the price measurement (we are dealing here with the customs duty, which is a component of the price but does not entail a quality effect) make it possible to improve elasticity estimates. Integrating the tariff data in this type of estimates thus opens up a highly promising research field.

Table 2: Results concerning EU member countries' bilateral imports of clothing articles, 1996

Explained Vble: Bilateral imports of EU countries , 1996				
Specification:	1.a	1.b	1.c	1.d
Exporter's GDP	0.488 ***	0.566 ***	0.526 ***	0.547 ***
	(15.72)	(19.13)	(18.16)	(18.73)
Exporter's per capita GDP	-0.199 ***	-0.187 ***	-0.133 ***	-0.202 ***
	(-7.05)	(-6.98)	(-5.23)	(-7.64)
Importer's GDP	1.125 ***	1.17 ***	1.165 ***	1.171 ***
	(36.53)	(40.1)	(39.81)	(40.07)
Importer's per capita GDP	1.413 ***	1.484 ***	1.54 ***	1.471 ***
	(12.84	(14.25	(14.78	(14.12
Distance	-0.211 ***	-0.292 ***		-0.413 ***
	(-4.28)	(-6.18)		(-11.81)
Customs duty	-4.506 ***	-3.178 ***	-6.653 ***	
	(-5.24)	(-3.81)	(-10.74)	
QR	0.803 ***	0.306 ***	0.34 ***	0.241 ***
	(12)	(4.23)	(4.7)	(3.43)
Constant	-24.455 ***	-25.457 ***	-28.103 ***	-24.229 ***
	(-19.85)	(-21.69)	(-25.62)	(-21.44)
Fixed effect by category		X	X	X
Num. of observations	4634	4634	4634	4634
R^2	0.308	0.385	0.38	0.383

Source: calculations by the author using data from Comext (for imports), TRAINS for customs duties, Chelem (for the GDP data), the European Commission (1994) (for the NTB). Note: ***: significant at 1 %, **: significant at 5 %, *: significant at 10 %. t of Student in parentheses. No indications of heteroscedaticity were verified after performing the Cook-Weisberg test nor of multicolinearity when using the inflation factors of the variance.

The variable indicating the presence of quantitative restriction (*QR*) does not show the expected negative sign. This problem also appears in other studies that take into account NTB indicators - Castilho (2002), Hummels (1998), Haveman and Hummels (1999). The variable is, however, very significant. Since they are cross-sectional data, this result suggests that on average, those countries whose exports are subject to quotas are the largest exporters, in spite of the fact that the size effect is taken into account by the GDP variable. This paradox could be explained by the presence of an *endogeneity bias*[23] which would lead to an erroneous estimation of the parameters. Indeed, one would tend to think that the quotas are imposed precisely on those countries whose garment industry exports are already very significant, in order to prevent a further increase in EU imports.

Lastly, in the case of our study, *distance is shown as correlated with the customs duty at 67 %*, which is explained by the fact that countries close to the EU profit from a preferential access. *Since this correlation could lead to a skewed estimate of the parameters, we tested two other specifications without including the distance (specification 1.c) or the tariff (specification 1.d).* The explanatory character of the model is unquestionable (the R^2 decreases only slightly) and the variables are very significant. In the same way, the signs and values of the coefficients of the other variables are not altered, and the coefficient of variable *QR* is not affected. Since the relative correlation between distance and tariff do not affect the results of the other variables, we can affirm that estimates 1.a and 1.b. are not skewed. As the fixed-effects method (1.b) offers a better explanatory capacity, we retained this specification to carry

[23] Another explanation would consist in supposing that *the quotas are not really restrictive*, i.e.: those countries whose exports of clothing products are more important generally enjoy more generous quotas. As we have shown above, this is certainly the case of the CEEC, for which, in 1996, the quotas were not unduly restrictive as a whole (in spite of the strong increase in their exports). On the other hand, this is

out other estimates which attempt to detect and to correct any possible endogeneity bias which would lead to an incorrect estimate of the *QR* variable coefficient.

Endogeneisation of the NTB

The two-stage least squares (2SLS) method employed by Trefler (1993) and Lee and Swagel (1997) to control endogeneity bias is very useful in solving problems such as the one outlined above. Since our objective is not to explain the presence of NTB *in fine*, the main and most adequate issue here is the instrumentation of the NTB variable, and not the evaluation of two simultaneous equations[24].

The difficulty consists in choosing instrumental variables which are clearly correlated with our *QR* indicator (thereby explaining the presence of QR for various sectors and partners) but not correlated with the residues of the main equation (gravity equation). However, we are interested in the NTB imposed by the EU in *only one* sector, and in their mean effect on *various products and partners*[25].

Several solutions were considered here. Because of the loss of competitiveness of the EU with respect to developing countries, the most competitive partners (those whose real labour costs are low) undoubtedly are more severely affected by the QR. One option would be to take into account the difference in labour costs between the

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not the case of the Asian developing countries (in particular China, India and Vietnam). Moreover, if this were true, the variable QR would not be significant, which is not the case.

[24] The estimator of the instrumental variables method can actually be interpreted as the estimator of the 2SLS, a method used to estimate simultaneous equation models. In a first regression, the instrumentalized variable is estimated by a series of exogenous variables (instruments) ("*first stage least square regression*"); thus the estimated value obtained is used as a regresor in the second stage of the estimate ("*second stage least square regression*").

[25] To follow the example of the studies mentioned above would consist in using data such as production, the differences in labour costs between importer and exporter, wages, the comparative advantage in thousandths of the GDP, etc, but at the level of the particular products and the partner countries. Such detailed production data are impossible to obtain. The most detailed existing data are those from the ISIC

importing and exporting countries, but it was not possible to gather these data. However, it is possible to use the real exchange rate as a macro-economic indicator of price competitiveness. In addition, one can include the country fixed-effects, which would take into account other competitiveness effects than those caused by exchange rates.

The lagged value of the independant variable is often used as an instrument variable[26]. According to this principle, the growth of past exports is an additional indicator of competitiveness (an indicator of the same dimensions as the explained variable) and a candidate to being a good instrument, and it is only natural that those partners whose past imports were especially dynamic will enjoy a higher protection. This is why we also used the growth rate of past imports as an instrument. Finally, all the explanatory variables used in the main equation are deemed instrumental, because, as they are not correlated with the residues, these variables are "the best candidates to be good instruments" - Kennedy P. (1999) p. 165.

The estimated equation is thus as follows:

$$\begin{aligned} \ln M_{ij}^{C} &= \alpha_0 + \alpha_1 \ln Y_i + \alpha_2 \ln Y_j + \alpha_3 \ln y_i \\ &+ \alpha_4 \ln y_j + \alpha_5 \ln(1 + t_{.j}^{C}) + \alpha_7 \hat{Q} R_{.j}^{C} + \sum_{C=1}^{20} \beta_C D_C + \varepsilon_{ij} \end{aligned} \qquad (2)$$

where QR is obtained from the estimation of :

$$\begin{aligned} \hat{Q}R_{.j}^{C} &= \beta_0 + \beta_1 \ln Y_i + \beta_2 \ln Y_j + \beta_3 \ln y_i + \beta_4 \ln y_j + \beta_5 \ln(1+t_{.j}^{C}) \\ &+ \beta_5 \ln(1+RER_{ij}) + \beta_6 \ln(1+m^{C}{}_{ij}) + \sum_{C=1}^{20} \beta_C D_C + \sum_j \beta_j D_j + \mu_j^{C} \end{aligned} \qquad \text{where} \qquad D_J$$

represents a dummy country partner; RER_{ij} is the real exchange rate between the

numbering system, with 4 digits i.e.: data for the entire clothing sector. Moreover, they are often subject to statistical confidentiality by the EU countries - see for example the Europroms or UNIDO data bases -.

[26] "It is not contemporaneously correlated with the disturbance", Kennedy (1999) p.142.

importing country i and the exporting country j[27]; m^{C}_{ij} is the growth rate of imports to country i from country j for product category C. It was calculated over three different periods: 1988-1996, 1988-1992, and 1993-1996. The exporter fixed-effects are therefore common to all the estimates. Six specifications are presented in Table 3:

- 2.a: equation 2 without the RER and without the imports growth rate
- 2.b: equation 2 with the RER and without the imports growth rate
- 2.c: equation 2 with the RER and the imports growth rate over the 1988-1996 period
- 2.d: equation 2 with the RER and the imports growth rate over the 1993-1996 period
- 2.e: equation 2 with the RER and the imports growth rate over the 1988-1992 and 1993-1996 periods
- 2.f:equation 2 with the RER and the imports growth rate over the 1988-1992 period

[27] The RER between i and j is obtained by dividing the RER of i by the RER of j, defined in relation to the EU (15 members). These have been extracted from the CHELEM and CEPII data bases.

Table 3: Results concerning the bilateral imports of clothing by member countries with endogeneisation of the NTB, 1996

Explained Vble: Bilateral imports of EU countries, 1996 Instrumentalised NTB						
Specification:	A no RER	B RER	C (RER+cce88-96)	D (RER+cce93-96)	E (RER+cce93-96 +cce88-92)	F (RER+cce88-92)
Exporter's GDP	0.606 ***	0.581 ***	0.545 ***	0.522 ***	0.511 ***	0.540 ***
	(19.96)	(18.56)	(12.58)	(14.14)	(11.95)	(12.49)
Exporter's per capita GDP	-0.181 ***	-0.159 ***	-0.120 ***	-0.154 ***	-0.120 ***	-0.122 ***
	(-6.71)	(-5.74)	(-3.52)	(-4.89)	(-3.61)	(-3.60)
Importer's GDP	1.167 ***	1.172 ***	0.922 ***	0.946 ***	0.875 ***	0.922 ***
	(39.69)	(39.24)	(23.18)	(26.23)	(21.96)	(23.21)
Importer's per capita GDP	1.490 ***	1.470 ***	1.453 ***	1.437 ***	1.247 ***	1.454 ***
	(14.19)	(13.89)	(9.32)	(11.47)	(8.06)	(9.34)
Distance	-0.322 ***	-0.417 ***	-0.543 ***	-0.402 ***	-0.549 ***	-0.534 ***
	(-6.75)	(-7.39)	(-5.79)	(-5.29)	(-5.93)	(-5.70)
Customs duty	-1.474 **	NS	NS	NS	-3.006 *	-2.845 *
	(-1.68)				(-1.81)	(-1.70)
QR	-0.317 ***	-0.521 ***	-0.514 ***	-0.560 ***	-0.320 *	-0.455 **
	(-2.74)	(-3.97)	(-2.57)	(-3.54)	(-1.64)	(-2.28)
Constant	-25.703 ***	-24.764 ***	-19.341 ***	-20.590 ***	-16.254 ***	-19.353 ***
	(-21.72)	(-20.41)	(-10.41)	(-14.44)	(-8.74)	(-10.43)
Fixed-effects categories	X	X	X	X	X	X
Num. of observations[28]	4634	4505	2458	3117	2376	2458
(1st equation) R^2	0.585	0.585	0.589	0.587	0.59	0.589

Source: the same as Table 2. Note: ***: significant at 1 %, **: significant at 5 %, *: significant at 10 %, NS: non significant. t of Student in parentheses.

The endogeneisation of variable *QR*, no matter which specification is chosen (Table 3), provides *negative coefficients* for this variable, whereas they were positive in the traditional estimate according to the OLS method and the fixed-effects method. The coefficients of determination for the first equation (estimate of the endogenous variable QR) are approximately 0,6[29] in all cases, and confirm that the instrumental variables used are strongly correlated with the QR variable.

The stability of the coefficients from one specification to the other suggests that the instrumental variables common to all the specifications (specific effects per partner country and category) are an important determiner of the restrictive character of the QR. So there are, in general, some categories that receive more protection from the EU, as

[28] The number of observations varies according to specifications, since the growth rate of the imports could not be calculated for all countries (in particular for the Czech Republic, Slovakia, Croatia and Slovenia). In addition, the RER was not available for three countries. Finally, for certain pairs of countries, all categories are not imported.

[29] The R^2 of the gravity equation (second stage) are not presented because they cease to correspond to the share of the explained variance when instrumental variables are used.

well as partners for whom the restrictions are more effective than for others, independently of their competitiveness or the growth of their exports in the past[30].

With regard to the exogenous explanatory variables, their signs are not altered in relation to the first estimates. The gravity variables remain significant at the 1 % level. On the other hand, the coefficient for customs duty is not significant in estimates B, C and D. The first specification appears to be the most satisfactory one, as far as the significance of all the parameters is concerned, and in particular for the coefficient of the QR variable, which is of particular interest to us. Specification A will be retained (without RER and without the imports growth rate) because it is the one that seems to be the most robust regarding the significance of the estimated parameters.

5 Simulations

The country effect all by itself allows us to control the impact of the quantitative restrictions. This suggests that the European trade policy discriminates to a large extent among its partners. The preference for nearby partners appears to be clearly connected to customs duties. More unexpected is the case of quantitative restrictions. This instrument has slowed down imports coming from countries with a strong export potential. The phasing out of these restrictions within the framework of the MFA is likely to upset this market in a substantial way. It is thus interesting to simulate a suppression of the quotas in order to quantify the impact of such phase-out on the European imports of clothing articles. We use the elasticities estimated in the specification 2.a.

[30] It should be noted that by including the country fixed-effects, it would have been impossible to solve the problem of the sign of variable QR in equation 1. The results are not presented in order not to overburden the discussion, and in any case, the inclusion of these effects would only improve the explanatory capacity of the model very slightly, and it does not modify in any way the scope and the significance of the results.

In the first place, we estimate the potential level of each EU member country's imports originating in the country j for category C ($\widehat{M_{ij}^{C}}$), i.e.: that predicted by the estimated equation (by omitting any error)[31].

$$\begin{aligned}\widehat{M}_{ij}^{C} = \exp(&-25,703+1,167\ln Y_i +0,606\ln Y_j +1,490\ln y_i -0,181\ln y_j \\ &-o,322\ln dist-1,474l\,\mathrm{n}(1+t_{.j}^{C})-0,317\hat{Q}R_j^{C}+\beta_C)\end{aligned} \quad (3)$$

By simulation, and thanks to equation (3), one can thus predict the level of imports in the absence of quantitative restrictions ($\overline{M_{ij}^{C}}$) from the other variables of the model[32]. Therefore, the bilateral flows subjected to quantitative restrictions (*QR* = 1) would increase by 37 % (in relation to their potential value) following the phase-out ($\overline{M_{ij}^{C}} \Big/ \widehat{M_{ij}^{C}} = e^{0,317} = 1,37$).

Table 4 presents the results for the total of European imports of the studied products and by partner country. All in all, *the phasing out of quantitative restrictions would lead to an increase of 20 % in European imports* (column b). Certain countries' exports are almost systematically subject to quantitative restrictions. The phase-out would thus lead to an increase in their exports to the European Union of close to a maximum of 37 %. This applies to Vietnam, Korea and China. All things being equal

[31] Thus, one can easily calculate the importing potential of the EU for each originating country j ($\widehat{M}_j = \sum_i \sum_C \widehat{M}_{ij}^{C}$) or for each category of products considered ($\widehat{M}^{C} = \sum_i \sum_j \widehat{M}_{ij}^{C}$).

[32] The simulated imports ($\overline{M_{ij}^{C}}$)are obtained as follows:

$$\begin{aligned}\overline{M_{ij}^{C}} = \exp(&-25,703+1,167\ln Y_i +0,606\ln Y_j +1,490\ln y_i -0,181\ln y_j \\ &-o,322\ln dist-1,474l\,\mathrm{n}(1+t_{.j}^{C})+\beta_C) = \widehat{M_{ij}^{C}} \bullet e^{0,317R\hat{Q}_j^{C}}\end{aligned}$$

elsewhere, their shares in the European market would experience a growth in the area of 14 % (column c).

Exports which are not subject to quantitative restrictions would remain constant in our scenario. Consequently, those partners profiting from a preferential treatment would find their shares in the European market reduced. This is the case not only of Turkey, Morocco and Tunisia, but also of Bangladesh and Sri Lanka, which, since they belong to the LLDCs, are allowed to export freely to the EU. As far as the six CEEC are concerned, there would be still an important potential for growth in their exports (of around 20 %).

Table 4: Impact of the phasing out of quantitative restrictions imposed by the EU depending on the partner

Exporters	EU observed Imports (1996, in 1000 ECU) has	Imports without QR (M simulated in % of the M predicted) B	Variation of of European market share C	Share increase (in % of total increase) D
Vietnam	313,404	137.32	14.7	3.1
Korea	259,092	136.63	14.1	10.1
China	2,729,520	136.06	13.6	23.2
Hong Kong	2,089,980	131.06	9.5	3.7
Philippines	207,587	127.56	6.5	4.0
Thailand	402,212	124.9	4.3	5.1
Czech Rep·	325,590	124.51	4.0	6.1
India	1,295,215	122.94	2.7	11.9
Romania	987,005	121.6	1.6	3.9
Slovakia	295,563	121.63	1.6	2.9
Hungary	658,146	121.09	1.1	4.3
Indonesia	842,833	120.88	1.0	5.8
Pakistan	326,878	120.37	0.5	3.6
Bulgaria	262,326	118.53	-1.0	1.7
Poland	1,374,523	117.91	-1.5	7.4
Malaysia	288,626	117.44	-1.9	2.4
Taiwan	364,290	110.53	-7.7	0.7
Bangladesh	1,083,555	100	-16.5	0.0
Morocco	1,370,023	100	-16.5	0.0
Sri Lanka	299,566	100	-16.5	0.0
Tunisia	1,510,693	100	-16.5	0.0
Turkey	2,837,203	100	-16.5	0.0
Total	**20,123,830**	**120**	**0.0**	**100.0**

Source: the same as Table 2.

Since exports to the EU from each of these partners are not always significant in absolute value, an increase in a partner's market share does not always imply that this country represents an important share in EU imports. We thus also present each

country's share in the increase in imports to the EU, so long as this increase amounts to the 20 % predicted - column D.

China, Korea and India combined would make up 45 % of this increase. It can also be seen that European imports coming from the Czech Republic and Poland would experience a marked growth.

Imports of certain categories of products would increase more significantly than others (see Table 5). In particular, imports of the following products would represent more than half of the increase in European imports of articles from the garment industry: sportswear, pullovers and sweaters, knitted or crocheted anoraks, T-shirts and knitted shirts, trousers, not knitted or crocheted shirts for men, and blouses.

Table 5 Impact of the phasing out of quantitative restrictions imposed by the EU by category

Categories	EU Imports observed (1996, in 1000 ECU) a	Imports without QR (M simulated in % of the M predicted) b	Share of the increase (in % of the total increase) d
Shirts for men, not knitted or crocheted	1,762,666	128.4	12.5
Trousers	2,195,109	128.3	13.2
T-shirts and knitted or crocheted shirts	2,058,302	127.8	16.5
Sportswear, sweaters, knitted or crocheted anoraks	2,629,153	127.8	21.1
Blouses	1,589,776	124.8	8.4
Raincoats and women's overcoats	1,108,014	119.3	4.1
Dresses	856,528	119.3	4.0
Pyjamas and knitted or crocheted nightdresses	591,094	117.7	2.6
Parkas and anoraks, not knitted or crocheted	1,537,359	111.9	5.8
Exterior knitted or crocheted sportswear	329,240	111.9	1.9
Jackets for men, not knitted or crocheted	463,114	111.5	0.9
Men's wear, not knitted or crocheted	280,183	111.1	0.6
Women's clothing, not knitted or crocheted	171,528	110.7	0.3
Bras	479,144	108.6	1.0
Slips and panties, knitted or crocheted	643,059	108.3	1.2
Men's raincoats and coats, not knitted or crocheted	363,498	107.6	1.0
Trousers, knitted or crocheted	676,609	107.6	1.5
Not knitted or crocheted clothing N,C,A,	1,200,057	107.3	2.1
Working clothes, not knitted or crocheted	533,476	107.0	0.5
Skirts	655,921	106.1	0.9
Total	20,123,830	119.7	100.0

Source: the same as Table 2.

6 Conclusions

This article has demonstrated that the explicit introduction of tariffs in a gravity equation estimated at a highly disaggregated level, although not an easy task, allows for a better understanding of price effects. In fact, tariff barriers seem to have an impact on imports which is on the one hand negative, as it is generally assumed, but does not always appear that clear in other sectorial studies otherwise important, since coefficients are much higher than the unit.

Our estimate of a standard gravity equation leads to the unexpected result of determining that the quotas should have a positive impact on EU clothing imports. This paradox actually derives from an endogeneity bias, which we control by the method of instrumental variables.

This second estimate obviates the fact that the quantitative restrictions imposed by the EU penalize certain exporters more than others. The suppression of the quotas will lead to a 20 % increase in EU clothing imports. China, India, Korea, the Czech Republic and Poland would be the main countries of origin of this increase. For those countries which already benefit from free-access to the EU, the new trade diversions will surely cause them to suffer the consequences, although, until now, the most detrimental effects of the sector's liberalization have been to European producers themselves.

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