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Quotas on Clothing Imports: Impact and Determinants of EU Trade Policy

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Abstract

We assess the impact of the phasing-out of quotas on European clothing imports within the framework of the phase-out of the Multi-Fiber Agreement and the accession of the CEEC. We use 1996 data on trade barriers for 20 categories of clothing products and 22 exporters. The estimation of a standard gravity equation concludes that tariffs have a large and negative impact as expected but seldom corroborated in the literature. The negative impact of non-tariff barriers also appears clearly after controlling for an endogeneity bias by the instrumental variables method. The phasing-out of quotas should increase EU imports by 20%.

1. Introduction

Trade theory has recently focused on the difficulties to assess the impact of trade barriers on imports. In most cases, the difficult part of these predictions consists in gathering detailed and reliable information on tariff and non-tariff barriers. When such data are used, the estimation of the impact of trade liberalization on imports is surprisingly low, suggesting that estimation methodology or theoretical prediction should be reviewed.

The main goal of this paper is to assess the impact of the removal of quantitative restrictions on EU clothing imports within the phase-out of the Multi-Fiber Agreement (MFA) and the accession of the Central and East European Countries (CEEC). Another goal of the paper is to focus on methodological concerns that could lead to estimates of the impact of trade protectionist measures more consistent with theoretical predictions. On the one hand, we argue that the use of tariff data at a broad disaggregation level, since it offers a more adequate measurement of prices, allows to estimate more easily demand elasticity in relation to customs duty. We also focus on the necessity to take into account that trade protection is influenced by factors of economic policy as shown by the theory of endogenous protection. Considering trade barriers as exogenous could lead to downward estimates of their impact on imports.

For this purpose, we estimate a gravity equation that uses cross-sectional data for imports of 20 different categories of clothing for the 22 largest exporters of these articles into the EU market for the year 1996 and tariff and non-tariff barriers thanks to an original gathering of data. Finally, we performed a simulation of the abolition of these quantitative restrictions in order to evaluate its impact on EU imports of clothing.

This paper is organized as follows: the next section presents the theoretical framework of the empirical model tested further on. Section 3 briefly describes the dimensions and

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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 summarizes the main conclusions.

2. Methodological Framework

Specialization is at the source of the gravity force in trade and this explains why the imports of a country are positively correlated with this country's income and with the production of the exporting country. Bilateral trade volume may also be negatively correlated with trade barriers such as transportation costs. The standard gravity equation of trade establishes these relations using the geographical distance as a proxy for transportation costs. The gravity equation is highly effective at explaining bilateral flows as proven at a very early date by the works of Linnemann (1966) and Leamer and Stern (1970). Later, the gravity equation was justified in the context of various theoretical frameworks (Bergstrand, 1989, for the factorial model; Deardorff, 1998, for the Heckscher–Ohlin (HO) model; and Anderson, 1979, for goods differentiated according to their origin).

More recently, empirical validations of the gravity equations derived from these theoretical models[1] conclude that the HO model would better explain the success of the gravity equation when the partners have very different factorial endowments, while increasing-returns models would better explain the exchanges between similar countries precisely because the exchanges of differentiated goods represent a significant share of their trade.

The specification of the gravity equation was refined in many studies in order to account for factors that could limit or strengthen trade relations and thus obtain a more complete empirical model.[2] Surprisingly, we can only find few attempts to reflect trade policies in the gravity equation. A first generation of models focus on 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.[3] But 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. Fouquin and Gaulier (1999) and Wall (1999) used a qualitative variable, determined exogenously that expresses the restrictiveness of the trade policy. Harrigan (1993), Haveman and Hummels (1998), Hummels (1999), and Castilho (2002) explicitly took into account customs duties and non-tariff barriers (NTBs). Estimates are carried out at the industry level due to the heterogeneity of the barriers and establish the impact of trade policies much more precisely.

These studies also evidence that the tariff and NTB coefficients do not always display the expected sign. We argue that these surprising results can often be explained within the framework of the theory of endogenous protection. Trefler (1993) and Lee and Swagel (1997) offer strong support for this view. Their estimations prove that the non-endogenization of the NTB could lead to an undervaluation of their effects on imports and even, in certain cases, to a change in the coefficients' signs.[4] These findings can clearly be explained in the framework of the political-economy literature. Baldwin (1985), Magee et al. (1989), and Grossman and Helpman (1994) argue 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. In this sense, when the NTBs are postulated as exogenous, their impact on imports is necessarily underestimated.

3. Scope of the Study

The countries that 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 group of products 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. An MFN tariff applied to these products is thus the highest of all the tariffs applied to 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 (OECD, 1997, p. 46). The common trade policy for "sensitive products" is also characterized by the presence of NTBs. These are established at the category level where each category is composed of similar clothing products at the eight-digit level and defined by the common external policy and the MFA.

The main exporting countries of clothing to the EU are the members of the EU themselves and the newly industrialized countries (NICs) 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 their exports—see Table 1. In general, the poorer Asian countries are granted a preferential status (lower customs duty and a higher quota) as LDCs (least developed countries).[5] However, China, India, and Vietnam, in spite of their low per capita incomes, do not benefit from any preference. Thus, exports from these latter partners have been, together with 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.

Among the most significant exporters of clothing articles,[6] we also find Turkey, Morocco, and Tunisia. These three Mediterranean countries are important suppliers of the EU. Indeed, their industrial products have already enjoyed free access to the EU since the 1976 Cooperation Agreements for the North African countries and, from 1998, within the framework of the Customs Union for Turkey.

The progressive phase-out of the MFA means the suppression of these NTBs.[7] 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 subject to considerable changes for several years for these reasons. It is likely to affect negatively nearby EU partners such as Turkey, Tunisia, and Morocco, since these changes will mean a reduction in their margin of preference. Benefiting from the favorable treatment which was granted to them by the EU, these Mediterranean countries have 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

Table 1. EU Clothing Market: Characteristics of Main Exporters

Exporters	*Simple customs duty (1996)*	*Average quota utilization rate*[a]	*Number of quotas (on 21 categories)*	*Number of quotas fully uilized*[b]	*Per capita GDP in ECUs*	*Share of EU imports*[c]
Turkey	0.0		0	0	2,290	13.4
China	12.2	89.2	20	11	530	13.3
Hong Kong	12.2	64.7	16	3	19,060	9.8
Tunisia	0.0		0	0	1,696	7.1
Morocco	0.0		0	0	1,032	6.6
Poland	0.0	41.9	6	0	2,749	6.4
India	12.2	87.0	11	6	299	6.1
Bangladesh	0.0		0	0	257	5.0
Romania	0.0	41.4	9	0	1,231	4.6
Indonesia	10.4	73.8	7	1	868	4.0
Hungary	0.0	25.2	9	0	3,440	3.1
Thailand	12.2	56.6	10	0	2,431	2.1
Macao	0.0	71.2	15	6	13,701	1.8
Sri Lanka	10.3	57.5	5	1	592	1.7
Croatia	0.0		0	0	3,226	1.6
Czech Republic	0.0	33.6	12	1	4,318	1.5
Pakistan	12.2	63.0	8	1	367	1.5
Vietnam	10.4	88.0	21	8	248	1.5
Slovenia	12.4		0	0	7,534	1.4
Malaysia	10.4	57.8	6	1	3,905	1.4
Slovakia	0.0	34.9	10	0	2,754	1.4
Korea	12.2	16.9	20	0	8,402	1.3
Bulgaria	0.0	60.5	6	1	929	1.2
Philippines	10.3	40.6	12	1	877	1.0
Taiwan	12.2	28.7	18	0	9,978	1.0
						100.0

Notes:
[a] The average quota utilization rate has been obtained as the average of the quota utilization rate (UR) of each of the 21 categories of clothing products. UR is the ratio between the quantity of EU imports and the amount of the quota. EU imports in units for each category have been obtained as the sum of EU imports in units for each eight-digit product included in the category.
[b] We consider as fully utilized a quota with a utilization rate superior to 90% as Nagarajan (1995). It is important to recall that the utilization rate can be superior to 100%. Indeed, the bilateral agreements involve always a certain percentage of flexibility which allows exporting more products of one category if the exports of another category are reduced within certain limits.
[c] These are the sum of imports of 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.
Source: Calculations by the author from: TRAINS database of UNCTAD (1996) for simple customs duty, Comext (1997) for quantities and values of EU imports, World Development Indicators, World Bank, 1997, for per capita GDP, OJ EU L 275 of 8.11.93 and OJ EU L 307 of 28.11.96 for amounts of quantitative restrictions.

CEEC, and Asia. The endowments of the importer countries (the EU members) and the exporters of our sampling are sufficiently different for a considerable degree of specialization to take place. We use the most general specification of the gravity model described by the following equation:

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

where i represents the importing EU member country ($i = 1, \ldots, 14$); j, the exporter ($j = 1, \ldots, 22$, 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 kilometers) between the capitals of countries i and j; t, the average duty,[8] and *NTB*, an indicator of the incidence of the NTBs.[9] The indicators of the trade barriers at accessing the EU are calculated at the level of 20 categories of clothing products since NTBs are established at this aggregation level.

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 labor intensive as it is in the present case. Likewise, countries relatively abundant in capital tend to import labor-intensive products. The *per capita GDP of the importing countries* is thus supposed to have a positive impact on the imports of these products. As *GDP of the exporter* is used as a measure for its potential supply, it must have a positive impact on exports. Finally, imports are supposed to grow with the import demand, which in this case means with the *importer's GDP used as a proxy for the import potential*.[10] *Obstacles to trade* should obviously have a negative coefficient. This is the case of geographical distance, but also of tariff and non-tariff barriers.

The standard model is tested in its logarithmic form. Two specifications were considered: one specification without a fixed effect (specification 1a):

$$\begin{aligned}\ln M_{ij}^{C} &= \alpha_0 + \alpha_1 \ln Y_i + \alpha_2 \ln Y_j + \alpha_3 \ln y_i + \alpha_4 \ln y_j + \alpha_5 \ln dist_{ij} \\ &\quad + \alpha_6 \ln(1 + t_j^C) + \alpha_7 NTB_j^C + \varepsilon_{ij}, \end{aligned} \tag{1a}$$

where C represents the product categories ($C = 1, \ldots, 21$). The NTB variables indicating the presence of quotas or the utilization rate of the quota are available only at the level of the member countries and by product categories, which combine many products defined at the eight-digit level of the combined nomenclature and another one with a fixed effect (specification 1b):

$$\begin{aligned}\ln M_{ij}^{C} &= \alpha_0 + \alpha_1 \ln Y_i + \alpha_2 \ln Y_j + \alpha_3 \ln y_i + \alpha_4 \ln y_j + \alpha_5 \ln dist_{ij} \\ &\quad + \alpha_6 \ln(1 + t_j^C) + \alpha_7 NTB_j^C + \sum_{C=1}^{20} \beta_C D_C + \varepsilon_{ij}, \end{aligned} \tag{1b}$$

where D_C represents a dummy category.[11]

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

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 exporters' 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.[12] Customs duty has the expected 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 customs duty, is, in fact, rather high (between −3 and −4.5 according to the specifications). It is true,

Table 2. Impact of Tariffs and NTB on EU Imports

Explained variable: bilateral imports of EU countries, 1996

	Specification			
	1a	*1b*	*1c*	*1d*
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***
	(12.0)	(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
Number of observations	4634	4634	4634	4634
R^2	0.308	0.385	0.38	0.383

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

however, that empirical studies often obtain inferior values which lead us to believe that the price effects have been underestimated with regard to theoretical forecasts.[13] On the one hand, there may be certain factors that influence both the prices and the amounts in demand (when, for example, quality and technical progress are not included in the model this will lead to 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 to instrument for 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 more in accordance 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 quality of the price measurement (we are dealing here with 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 estimate thus opens up a highly promising research field.

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—Haveman and Hummels (1998), Hummels (1999), and Castilho (2002). The variable is, however, very significant. Since we have 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*[14] 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 clothing 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 benefit from a preferential access. *Since this correlation could lead to a distorted estimate of the parameters, we tested two other specifications without including the distance (specification 1c) or the tariff (specification 1d).* 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 1a and 1b are not skewed. As the fixed-effects method (1b) offers a better explanatory capacity, we retained this specification to carry 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.

Endogenization of the NTB

Trefler (1993) and Lee and Swagel (1997) simultaneously estimate import and NTB equations. Their results are consistent with the political-economy theories of the determination of trade protection. Thus, modeling protection as endogenous also appears to be the most adequate issue here. Following political-economy literature, measures of import penetration, differences in labor costs between importer and exporter, wages, and comparative advantage in thousandths of GDP should be introduced as determinants of NTBs. Since we focus on NTBs imposed by the EU in *only one* industry, and in their average effect on *various products and partners,* we are unable to obtain these data.[15] Thus it does not make sense to estimate an NTB equation but it appears necessary to consider NTBs as endogenous in the import equation using instruments for this variable.

The difficulty consists in choosing instrumental variables which must be correlated with our *QR* indicator but not correlated with the residuals of the main equation (gravity equation). What can explain the presence of NTBs for different categories of clothing products and partners?

Several solutions were considered here. Since the EU has lost competitiveness in relation to developing countries, the most competitive partners (those whose real labor costs are low) undoubtedly are more severely affected by the *QR*. One option would be to take into account the difference in labor costs between the 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 macroeconomic indicator of price competitiveness. On the other hand, the country fixed-effects can be included, which would take into account other competitiveness effects than those caused by exchange rates.

The lagged value of the independent variable is often used as an instrument variable. In this case, 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 (not correlated to the error of the gravitational model) 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 residuals, these variables are "the best candidates to be good instruments" (Kennedy, 1999, p. 165).

In the first stage we regress the QR_j^C variable on the instruments. The predicted value of the dependent variable in that regression ($QR_j^{C,pred}$) is then used in the second-stage regression to explain imports. The estimated equations are thus as follows:

$$
\begin{aligned}
QR_j^C &= \beta_0 + \beta_1 \ln Y_i + \beta_2 \ln Y_j + \beta_3 \ln y_i + \beta_4 \ln y_j + \beta_5 \ln(1+t_j^C) \\
&\quad + \beta_6 \ln(1+RER_{ij}) + \beta_7 \ln(1+m_{ij}^C) + \sum_{C=1}^{20} \beta_C D_C + \sum_j \beta_j D_j + \mu_j^C \\
\ln M_{ij}^C &= \alpha_0 + \alpha_1 \ln Y_i + \alpha_2 \ln Y_j + \alpha_3 \ln y_i + \alpha_4 \ln y_j + \alpha_5 \ln dist_{ij} \\
&\quad + \alpha_6 \ln(1+t_j^C) + \alpha_7 QR_j^{C,pred} + \sum_{C=1}^{20} \beta_C D_C + \varepsilon_{ij},
\end{aligned}
\tag{2}
$$

where D_j represents a dummy partner country; RER_{ij} is the real exchange rate between the importing country i and the exporting country j;[16] m_{ij}^C is the growth rate of the imports of country i from country j for the product category C. It has been calculated for three different periods: 1988–96, 1988–92, and 1993–96.

The exporter fixed-effects are therefore common to all the estimates. Six specifications are presented in Table 3:

- 2a: equation (2) without the *RER* and without the imports growth rate;
- 2b: equation (2) with the *RER* and without the imports growth rate;
- 2c: equation (2) with the *RER* and the imports growth rate over the 1988–96 period;
- 2d: equation (2) with the *RER* and the imports growth rate over the 1993–96 period;
- 2e: equation (2) with the *RER* and the imports growth rate over the 1988–92 and 1993–96 periods;
- 2f: equation (2) with the *RER* and the imports growth rate over the 1988–92 period.

The endogenization 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 in all cases.

The stability of the coefficients from one specification to the other suggests that the instruments common to all the specifications (specific effects of partner country and category) are an important determinant of the restrictive character of the *QR*. In general, there are some categories that receive more protection from the EU, as 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.[17]

Table 3. Impact of Tariffs and NTB on EU Imports with Endogenization of NTB

Explained variable: bilateral imports of EU countries, 1996; 2SLS estimates with instrumented NTB

	Specification					
	A	*B*	*C*	*D*	*E*	*F*
	No RER	*RER*	*(RER + m88–96)*	*(RER + m93–96)*	*(RER + m93–96 + m88–92)*	*(RER + m88–92)*
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**	0.994	–2.576	–1.098	–3.006*	–2.845*
	(–1.68)	(0.856)	(–1.540)	(–0.750)	(–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
Number of observations[a]	4634	4505	2458	3117	2376	2458
(1st equation) R^2	0.585	0.585	0.589	0.587	0.59	0.589

Notes: ***significant at 1%, **significant at 5%, *significant at 10%. *t* of Student in parentheses.
[a]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.
Source: See Table 2.

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 strongest 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 some of its partners. The preference for nearby partners appears to be clearly connected to customs duties. More unexpected is the discrimination in 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 disrupt 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 specification 2a.

In the first place, we estimate the potential level of each EU member country's imports originating in the country j for category C ($M_{ij}^{C,pot}$):[18]

$$M_{ij}^{C,pot} = \exp(-25.703 + 1.167 \ln Y_i + 0.606 \ln Y_j + 1.490 \ln y_i - 0.181 \ln y_j - 0.322 \ln dist_{ij} - 1.474 \ln(1 + t_j^C)) - 0.317 QR_j^C + \beta_C. \tag{3}$$

By simulation, and thanks to equation (3), one can thus predict the level of imports in the absence of quantitative restrictions ($M_{ij}^{C,pred}$) from the other variables of the model.[19] Therefore, the bilateral flows subjected to quantitative restrictions ($QR = 1$) would increase by 37% (in relation to their potential value) following the phase-out ($M_{ij}^{C,pred}/M_{ij}^{C,pot} = e^{0.317} = 1.37$).

Table 4 presents the results for the total of European imports of the studied products and ordered by partner country. Results by country, however, should be interpreted carefully. Our estimations indicate that each bilateral flow subjected to quantitative restrictions ($QR = 1$) would increase by 37% (in relation to their potential value) following the phase-out. The difference between countries in the simulation comes from the number of quotas they face. 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 of their exports to the European Union by a maximum of nearly 37%. This applies to Vietnam, Korea, and China. All things being equal elsewhere, their shares in the European market would experience a growth of approximately 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 LDCs, are allowed to export freely to the EU. As far as the six CEEC are concerned, there would still be an important potential for growth in their exports (of around 20%).

Table 4. Impact of the Phasing-Out of Quantitative Restrictions on Partners' Exports

Exporters	*EU observed imports (1996, in 1000 ECU) A*	*Imports without QR (M simulated in % of the M predicted) B*	*Variation 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 Republic	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	295563	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: see 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% of the predicted imports—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 significant 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 anoraks, T-shirts and knitted shirts, trousers, not knitted shirts for men, and blouses.

6. Conclusions

Our results demonstrate 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

Table 5. Impact of the Phasing-Out of Quantitative Restrictions 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	1,762,666	128.4	12.5
Trousers	2,195,109	128.3	13.2
T-shirts and knitted shirts	2,058,302	127.8	16.5
Sportswear, sweaters, knitted 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 nightdresses	591,094	117.7	2.6
Parkas and anoraks, not knitted	1,537,359	111.9	5.8
Exterior knitted sportswear	329,240	111.9	1.9
Jackets for men, not knitted	463,114	111.5	0.9
Men's wear, not knitted	280,183	111.1	0.6
Women's clothing, not knitted	171,528	110.7	0.3
Bras	479,144	108.6	1.0
Slips and panties, knitted	643,059	108.3	1.2
Men's raincoats and coats, not knitted	363,498	107.6	1.0
Trousers, knitted	676,609	107.6	1.5
Not knitted clothing n.e.c.	1,200,057	107.3	2.1
Working clothes, not knitted	533,476	107.0	0.5
Skirts	655,921	106.1	0.9
Total	20,123,830	119.7	100.0

Source: see Table 2.

understanding of price effects. In fact, tariff barriers seem to have an impact on imports, negative as it is generally assumed, but this does not always appear that clearly in other sectorial studies. This impact is very important since coefficients are much higher than the unit. Price measurement should be considered carefully in the estimations of trade policy on imports and particularly on imports of homogeneous goods to avoid downward bias.

Our results also show that taking trade barriers as exogenous not only can lead to downward estimates but also to paradoxical results. Indeed, in this paper the estimation of a standard gravity equation indicates a positive impact of quotas on EU clothing imports. To solve this problem that actually derives from an endogeneity bias, one should control the determinants of trade barriers through the estimation of a system of simultaneous equations or by using the instrumental variables method. The first method implies to introduce variables that represent the demand for protection as determinants of trade barriers. Since it was impossible to find such data at the disaggregated level, we used the second method. The results are in harmony with theoretical forecasts since we find that phasing-out of quantitative restrictions should have a substantial effect on imports.

Not all the countries of the sample face quantitative restrictions for clothing, and only for some Asiatic countries are most parts of the quotas fully used. However, our estimation tends to demonstrate that the presence of quota restricts imports in all cases, which could be explained by the fact that the presence of quotas for a category of products acts as a disincentive to produce and export this kind of product. In these circumstances, the suppression of quotas would lead to a large increase in EU clothing imports (20% on average and 35% for each bilateral flow facing quantitative restriction). China, India, Korea, the Czech Republic, and Poland would be the main countries at the origin of this increase. For the countries which already benefit from free access to the EU, the new trade diversions will surely cause negative consequences, although, until now, the most detrimental effects of the sector's liberalization have been to European producers themselves.

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Notes

1. See, for instance, Helpman (1987), Hummels and Levinsohn (1995), Fontagné et al. (1998), and Evenett and Keller (2002).
2. Depending on the studied problems, the authors include additional variables (prices, real exchange rate, foreign direct investment (FDI)) or modify the explained variable (share of bilateral flow in total trade, nature of trade, bilateral intensity of trade, share of imports in GDP). The existence of common languages or common borders, political, historical, and cultural factors was also integrated into these models by the means of dummy variables. Various ways of taking distance into account were also considered in order to highlight a "border effect."
3. Such is the case of the works of Frankel et al. (1996) who study the possibility of an intraregional bias. The studies of Bikker (1987), Brada and Mendez (1993), Frankel and Wei (1993), Bayoumi and Eichengreen (1995), and Sapir (2001) are other examples.
4. Trefler's (1993) study deals with the US manufacturing sector in 1983. The author concludes that the endogenization of the NTB evidences a significant sensitivity of imports to the NTB, ten times higher than that obtained with a traditional estimation.
5. Tariff concessions granted to developing countries which are favorable to them compared to other recipients of the general system of preferences (GSP).

6. We analyze here the exports of the 25 countries with the greatest EU market shares.
7. The products in the annex to the Agreement on Textiles and Clothing (ATC) are to be included in four stages in the following manner: (1) On 1 January 1995, those products which in 1990 represented at least 16% of the total volume of EU imports of these products. (2) On 1 January 1998, the products which in 1990 represented at least 17% of the total volume of EU imports of these products. (3) On 1 January 2002 the products which in 1990 represented at least 18% of the total volume of EU 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.
8. 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 eight-digit products.
9. In relation to the NTB, we tested two indicators: (1) *QR*: a dummy indicating the presence of quotas which takes the value 0 if there is no quota on this category and value 1 when a quantitative restriction applies for the import of this category of goods; (2) *UR*: a discrete variable taking on the values of 0 (no quota), 1 (quota utilization rate lower than 50%), 2 (quota utilization rate higher than 50% and lower than 90%), and 3 (quota utilization 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. Since NTBs are common to all EU members, these variables have the same value for each EU importer and for a special category but differ from one trade partner to another.
10. To be completely consistent with the theoretical framework, the output of the industry should be used as representative of the exporter's supply, and the demand of the importer should be represented by domestic consumption for these goods. But since these data are more difficult to obtain at the industry or products level (in particular when the studies relate to developing countries), the exporters' and importers' total GDP are commonly used as proxies for these variables. 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.
11. In fact, the macroeconomic 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 supplies and demands also varies from one product 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.
12. Keep in mind that these variables (tariffs and *QR*) are identical for each EU importer but vary according to category and to exporting country.
13. Ioannidis and Shreyer (1997), Anderton (1999), Blonigen and Wilson (1999), and Head and Mayer (2000) obtain elasticities close to the unit.
14. There are two other possible explanations. One would consist in assuming that quantitative restrictions leads to a decrease of quantity but an increase of prices if there is a significant quality upgrading but we are unable to verify this hypothesis with our data. Another justification could be that *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 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.
15. Such detailed production data are impossible to obtain at the level of the particular products and the partner countries. The most detailed existing data are those from the ISIC numbering system, with four 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 databases.

16. The *RER* between *i* and *j* has been obtained dividing the RER of *i* by the RER of *j* defined in relation to the EU (15 members). They have been obtained from the CHELEM database (CEPII, France).
17. It should be noted that by including the country fixed-effects in the standard gravity equation (equation (1)), it would have been impossible to solve the problem of the sign of the variable *QR*. 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.
18. Thus, one can easily calculate the importing potential of the EU from each country *j* ($M_j^{pot} = \Sigma_i \Sigma_C M_{ij}^{C,pot}$) or for each category of considered products ($M^{C,pot} = \Sigma_i \Sigma_j M_{ij}^{C,pot}$).
19. The simulated imports ($M_{ij}^{C,pred}$) are obtained as follows:

$$M_{ij}^{C,pred} = \exp(-25.703 + 1.167 \ln Y_i + 0.606 \ln Y_j + 1.490 \ln y_i - 0.181 \ln y_j - 0.322 \ln dist_{ij} - 1.474 \ln(1 + t_j^C)) + \beta_C = M_{ij}^{C,pot} e^{0.317 QR_{.j}^{C,pred}}.$$