MULTINATIONAL FIRMS, MARKET INTEGRATION AND TRADE STRUCTURE: WHAT REMAINS OF THE STANDARD GOODS HYPOTHESIS?

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Abstract

In extending traditional empirical trade models with multinational firms, this paper shows the effect of transferring firm specific technology on the trade structure of host countries. For Belgium, a small open economy with a large presence of multinational firms, this effect is of crucial importance and by neglecting it previous studies appeared to have produced biased results. The results show how the large multinational presence induced by the European integration has shifted Belgium's trade structure towards differentiated products, making the standard goods hypothesis less appropriate to describe the trade composition of small open economies characterized by a large presence of multinational firms.

Key Words: Multinational firms, market integration, trade structure
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1. INTRODUCTION

In a seminal speech in 1960 entitled 'The standard goods hypothesis', Jacques Drèze stressed the importance of market size for the trade performance of (small) countries. Referring to the case of Belgium in the advent of the creation of a common European market, he argued that its small local market impeded Belgium to become an important producer/exporter of specialized consumer and producer goods. Instead small open countries like Belgium would rather exhibit a comparative advantage in standardized products of which the production process is characterized by scale economies, particularly semi-manufactured goods and producer goods. More recently, new trade theory and new economic geography have developed similar arguments and stressed the size of the home market as source of comparative advantage (Krugman (1980, 1991)). Because of their larger home market large countries typically export scale intensive differentiated products; this result that can also be linked to the hypothesis formulated by Linder (1961) which states that countries export goods that are in greater demand at home. In recent empirical work the home market effect is often used as the discriminatory element in distinguishing between prominent paradigms of international trade to explain trade performance across industries (Davis and Weinstein (1996, 1998, 1999), Trionfetti (1998)).

Thus far, however, this empirical work has neglected the impact of multinational firms on the trade structure of countries. From a theoretical perspective, the modeling of multinational firms within trade models has only recently gained due attention (Markusen (1996, 1998), Markusen and Venables (1996, 1998), Ethier and Markusen (1996)). Characterizing multinational firms as firms with specific transferable technology, these models show that multinational firms split up their value added chain according to location bound advantages of countries. By locating labor-intensive production plants in larger countries while keeping technology-intensive headquarters in their home countries, multinational firms may change the volume and direction of trade of host countries.

Combining market integration with the location behavior of multinational firms, several scholars have argued that European integration caused an increase in (vertical) multinational activity and intra-European (intra-firm) trade by removing barriers to trade and investment (Baldwin (1990), Motta and Norman (1996)). At the same time European integration has driven multinational firms to the 'core' regions within Europe in order to serve the whole European market from their centrally located subsidiaries (Krugman and Venables (1990)).

In view of these developments the standard goods hypothesis by Drèze may have lost its significance. Since multinational firms are typically active in differentiated industries and define Europe as their relevant market, this paper hypothesizes that multinational firms have shifted Belgium's comparative advantage towards differentiated consumer products[1].

2. COMPARATIVE ADVANTAGE AND FOREIGN DIRECT INVESTMENT

Trade theory based on the principle of comparative advantage[2] has basically explained the trade performance of countries by location bound advantages: differences in technology between countries in the Ricardian tradition and differences in factor endowments between countries in the Hecksher-Ohlin-Vanek (HOV) framework. Technology models of trade emphasize differences in innovativeness between countries (Posner (1961)) often combined in product life-cycle models with differences in demand conditions across countries (Vernon (1966)). Recent empirical work (Trefler (1995), Harrigan (1997)) integrates the HOV-model with international technological differences.

[1] In a post scriptum to his original paper, Drèze himself alluded to the importance of multinational firms for Belgium's foreign trade structure (Jacquemin and Sapir (1991)).

[2] A country is said to have a 'comparative advantage' in a good if the country's pre-trade relative price of that good is lower than abroad. With comparative advantage being a theoretical concept however, the concept of *revealed*

New trade theory and new economic geography emphasizing the role of scale economies and product differentiation, have stressed another location bound advantage i.e. the size of the market as source of comparative advantage (Krugman (1980, 1991), Tybout (1994)). Integration of traditional and new trade theory, however, does not always lead to equivocal results as the sources of comparative advantage following the different theoretical models may pull the trade performance of countries in opposite directions. For instance, Krugman and Venables (1990) prove that market size will cause firms to relocate to the larger market even though this goes against the direction of trade on the basis of relative factor endowments. Venables (1998) and Ricci (1998) show that by assuming Ricardian technical differences in combination with agglomeration forces, the resulting specialization of countries is not necessarily in line with Ricardian comparative advantage. Hence, empirical work is needed in order to assess the relative importance of the different sources of comparative advantage and explaining the determinants of international specialization. By using the home market effect as discriminating hypothesis between different paradigms of trade theory, recent empirical work (Davis and Weinstein (1996, 1998, 1999), Trionfetti (1998)) demonstrates the importance of traditional as well as new trade theory in explaining countries' trade performance.

Results of traditional and new trade theory are further challenged by the incidence of multinational firms. The distinctive features of multinational firms, and more in particular their transferable competitive advantages relax the (restrictive) assumptions of immobile production factors and technology. Recent trade models increasingly endogenize the localization of multinational firms in the Ownership-Location-Internalization framework (Dunning (1993)). These models show that horizontal multinationals arise when countries are similar in endowments and in market size, while vertical multinationals emerge to exploit relative endowment differences between countries (Helpman (1984, 1985), Markusen (1984, 1995, 1998), Brainard (1993), Horstman and Markusen (1992), Markusen and Venables (1996, 1998), Ethier

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comparative advantage (based on observable data derived from the *post-trade* situation) has been introduced in empirical work (Balassa (1965)) as indicator of a country's trade performance.

and Markusen (1996)). More importantly these models also reveal that multinational activity may have a non-neutral impact on the volume and direction of trade dependent on trade costs, market size and relative factor endowments.

Unfortunately empirical work has largely neglected the role of multinational firms in shaping host countries' trade structure[3,4]. An exception is Balassa (1986) who shows that the inward direct investment in developing countries which is biased towards capital intensive activities, helps explain the trade performance of these countries. Focusing on home country effects, Baldwin (1979) examined the importance of variables that are common in explaining US trade and US outward investment. Along similar lines of research, several empirical papers (Lipsey and Weiss (1981, 1984), Svensson (1996)) have focused on the substitution-complementary issue of foreign direct investment and exports. The result indicate negative as well as positive effects of outward investment on the home country's exports, dependent on the characteristics of goods (intermediate versus final goods) and markets (diversion effect on third markets).

3. THE CHANGING TRADE STRUCTURE OF BELGIUM

Belgium has traditionally been characterized as a small open economy with a level of exports that has risen to 61% of domestic output in 1990. Almost 75% of manufacturing exports are going to other EU member states. The country also attracted a large number of multinational firms principally because of its central location within Europe and its excellent transport infrastructure. The large inflow of foreign direct

[3] Kamal Abd-el-Rahman (1991) while not focusing on multinational firms exclusively reports a dispersion of trade and productivity figures across French firms in industries characterized by comparative disadvantages. All this suggests that the trade performance of countries is explained by the collective advantages and disadvantages appertaining to a country, but also by the specific efficiency or inefficiency of individual firms.

[4] In contrast with the empirical trade research, the international business literature has traditionally paid large attention to competitive advantages. Recent empirical work increasingly analyzes the joint impact of comparative

investment changed the industrial structure of Belgium dramatically: in 1990 multinational firms were responsible for almost 40% of manufacturing employment and 47% of value added realized in manufacturing industries in Belgium.

The formation of the European Community has favored Belgium as host country for foreign direct investment since market integration has stimulated multinational firms to locate their production in the 'core' regions of Europe instead of having subsidiaries in each EU member state (Krugman and Venables (1990)). The removal of barriers to trade and investment urged multinational firms to serve the whole European market from their centrally located subsidiaries, causing an increase in (vertical) multinational activity and intra-European (intra-firm) trade (Baldwin (1990), Motta and Norman (1996), Dunning (1998)). The high export intensities of foreign subsidiaries in Belgium (Sleuwaegen (1987)) indicate that products manufactured in Belgium are sold throughout the European market. As foreign subsidiaries in Belgium are typically active in industries where technological and/or product differentiation activities are important (Sleuwaegen (1984)), Belgium has become an important exporter of differentiated products

These developments challenge the general validity of the standard goods hypothesis and this paper hypothesizes then that the presence of multinational firms shifted Belgium's trade structure towards scale intensive differentiated products. By disregarding the (future) importance of multinational firms, Drèze argued that in spite of the dismantling of EC tariffs, the small local market made it impossible for Belgian firms to be important producers of specialized consumer or producer goods. The remaining non-tariff and cultural barriers between European countries would cause Belgium's comparative advantage to remain in the production of standardized and semi-finished products.

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advantage and competitive advantages on international strategies (Muchielli (1992), Sleuwaegen, Veugelers and Yamawaki (1998)).

Export specialization measures for Belgium over the years confirm the shift in trade structure towards differentiated products. Manufacturing industries are classified as producer/consumer industries and advertising intensive/non-advertising intensive industries[5]. In line with many other studies consumer and advertising intensive industries are taken as industries selling differentiated products (cars, pharmaceuticals, tobacco…). For each group of industries the so-called Balassa index of revealed comparative advantage (Balassa (1965)) as defined in (1), is computed for the years 1960, 1970, 1980, 1990.

$$RCA_{i,B} = \frac{(X_{i,B})/(X_{i,EC})}{(\Sigma X_{i,B})/(\Sigma X_{i,EC})} \qquad (1)$$

with $X_{i,B}$ = exports of Belgium in industry i;
$X_{i,EC}$ = exports of EU(12) in industry i[6].

The results support the standard goods hypothesis for the '60s and '70s, in the sense that Belgium was specialized in the production of producer goods, i.e. intermediate and investment goods. From 1980 onwards however Belgium shows an export specialization in consumer products. Likewise, while in 1960 Belgium was (export-) specialized in only 15% of the consumer industries (i.e. consumer industries with RCA > 1), this proportion has significantly increased to 39% in 1990. The shift in export specialization is even more pronounced for advertising-intensive industries: the median RCA-index for these industries has increased from 0.46 in 1960 to 0.93 in 1990[7].

[5] Consumer industries are industries where at least 20% of the industry supply is sold to final consumers. Advertising-intensive industries are industries where the ratio advertisement expenses/national industry size is larger than 1%. See Davies and Lyons (1996) for more specific information.

[6] EU includes France, Germany, Italy, Netherlands, Belgium, Luxemburg, Denmark, United Kingdom, Ireland, Greece, Spain and Portugal.

[7] As countries' comparative advantage has changed considerably over years (Balassa (1979), UNIDO (1982) and Balassa and Noland (1989)), a similar shift in the trade structure towards consumer goods and advertising intensive industries can be identified in most high income countries (see table 1.8 in Bowen et al (1998)). This paper stresses the contribution of multinational firms in this change in comparative advantage of Belgium.

Table 1: RCA-indexes for Belgium

		PRODUCER GOODS INDUSTRIES	***CONSUMER GOODS INDUSTRIES***	***NON-ADVERTISING INTENSIVE INDUSTRIES***	***ADVERTISING INTENSIVE INDUSTRIES***
1960	RCA-weighted mean[17]	1.20	0.61	1.18	0.46
	RCA-median	0.76	0.48	0.73	0.45
	% (RCA > 1)[18]	43%	15%	37%	15%
1970	RCA-weighted mean[14]	1.08	0.88	1.08	0.78
	RCA-median	0.83	0.75	0.82	0.67
	% (RCA > 1) [15]	43%	31%	40%	32%
1980	RCA-weighted mean[14]	0.93	1.14	1.03	0.92
	RCA-median	0.65	0.84	0.69	0.84
	% (RCA > 1) [15]	33%	30%	34%	22%
1990	RCA-weighted mean[14]	0.84	1.22	0.97	1.06
	RCA-median	0.82	0.90	0.82	0.93
	% (RCA > 1) [15]	39%	39%	39%	39%
significance[19]		0.652	0.005	0.749	0.027

[17] The mean RCA is respectively calculated for the group of producer goods, consumer goods, non-advertising intensive and advertising intensive industries.
[18] Number of sectors with RCA > 1
[19] p-value of difference between 1960 and 1990 shares

The presence of multinational firms also qualifies the contribution of technology to the trade performance of countries. Since these models and their empirical testing only consider 'national' technology ((Gruber et al (1967), Keesing (1967), Lowinger (1975), Soete (1981), Fagerberg et al (1997), Trefler (1995), Harrigan (1997)), the technology content of exports/imports may be systematically underestimated in the case of small open economies hosting a significant number of multinational firms. As competitive advantages of multinational firms are often intangible assets found in the realm of technological know how (Morck and Yeung (1991, 1992), Caves (1996)), significant transfers of technology arise within multinational networks. Figures of royalties and fee payments suggest that foreign subsidiaries in Belgium borrow substantial know how from the group while their own technological efforts are often directed towards customizing this know how to local conditions (Holemans and Sleuwaegen (1988)). Increasing the technology base of host countries, the technology transfer within multinational firms may therefore significantly contribute to the trade performance of these countries. Moreover the spillovers to R&D performed locally may further strengthen the role of R&D-investments undertaken in the host country (Veugelers and Cassiman (1999)).

4. EMPIRICAL MODEL

Econometric analysis of the 'revealed' comparative advantage of Belgium has only taken account of location bound advantages and left out the role of multinational firms. Consistent with (extended) factor proportions theory several studies show that Belgium has a comparative advantage in physical capital intensive industries (Tharakan and Vandoorne (1979), Abraham (1981), Culem (1984), Tharakan and Waelbroeck. (1988)). The significant negative coefficients for human capital reported in a number of these studies suggest that Belgium is relatively less endowed with human capital or that high costs in relation to its supply have driven skilled labor out of the market. The high direct and indirect labor costs in Belgium favor the substitution of labor by capital and deter firms from hiring labor, and in particular

skilled labor, in open competitive sectors[8]. Firms have responded by increasing productivity through large-scale automation and/or relocation of labor-intensive activities to other countries, resulting in a continually rising capital intensity of the production process.

In order to assess the contribution of multinational firms to Belgium's changing trade pattern, we propose an econometric model incorporating traditional location bound sources of comparative advantage as well as firm specific advantages embodied in multinational firms. The empirical model relates the trade performance across sectors to the use of different input factors including technology transferred by multinational firms. The coefficient sign of each variable can be interpreted to indicate whether the corresponding factor is a source of revealed comparative advantage. The use of such a cross-industry regression approach has a long tradition in empirical studies and despite some shortcomings, Bowen and Sveikauskas (1992) have demonstrated that this approach gives reliable results when factor inputs are measured as broad aggregates.

The empirical trade literature typically used the net export index as dependent variable in linking sources of comparative advantage with countries' revealed comparative advantage (Bowen et al (1998)). However, as Drèze's standard goods hypothesis was originally formulated in terms of exports, the RCA-index of (1), which is essentially a measure for countries' relative export specialization, is more appropriate for this analysis[9]. In order to reveal the differential impact of multinational firms on Belgium's export specialization, estimations are done for consumer/producer and advertising-intensive/non-advertising-intensive industries separately.

[8] Skilled labor is intensively used in service industries of which many were heavily protected from foreign competition until the late nineties.

[9] The results for the net export index, reported in annex, do not differ substantially from the results for the RCA-index. The net export index is defined as $NI_{i,B} = (X_{i,B} - M_{i,B})/ (X_{i,B} + M_{i,B})$

with $X_{i,B}$: exports of Belgium in industry i;

$M_{i,B}$: imports of Belgium in industry i.

A first range of independent variables relates to traditional sources of comparative advantage. The variable *physical capital (PHYS)*, defined as the value of industry's fixed assets over total employment in the industry and the variable *human capital (HUM)* reflect the factor endowment explanation of trade performance. The percentage of white-collar workers in industry employment is taken as a proxy for the relative importance of human capital. Consistent with earlier arguments and the results from previous work the sign of physical capital is hypothesized to be positive, the sign of human capital to be negative.

The variable *technology (TECH)* follows the different technology models and more specifically the technology gap model of Posner. As in earlier empirical work (Gruber et al (1967), Keesing (1967), Lowinger (1975)) technology is considered from the input side with TECH defined as the industry R&D intensity (i.e. the ratio of R&D investments to sales)[10]. Higher levels of on-going R&D undertaken within a country raise the capacity to innovate of this country, giving rise to (temporarily) comparative advantage.

Taking into account the arguments from the new trade theory and economic geography models, the variable *SCALE* measures the scale intensity of industries; it is defined as the median firm size in industries in terms of employment. The hypothesized sign of this variable is ambiguous; given the small Belgian market this variable should have a negative effect on the trade performance of Belgian industries. However, following the standard goods hypothesis of Drèze, this negative sign should only prevail in sectors of differentiated products.

The variable *multinationality (MNE)* measures the importance of foreign multinational firms and is defined as the share of employment held by foreign subsidiaries in the industry. The predicted positive sign for MNE indicates that multinational firms through their technology transfer effectively contribute to

the revealed comparative advantage of Belgium. According to the central hypothesis put forward in this paper, this contribution should be the largest in the consumer and advertising-intensive industries as these industries are characterized by a relatively high product differentiation. Moreover the spillovers to R&D-investments are hypothesized to produce an extra effect. Hence, the interaction variable between MNE and TECH as explanatory variable.

The estimating model is specified in log-linear form and pools observations for the years 1990 and 1991; the dummy variable *TIME* controls for changes in variance due to pooling observations for the two consecutive years (Kmenta (1997)):

$$RCA_{i,B} = a + b_1 PHYS_i + b_2 HUM_i + b_3 TECH_i + b_4 SCALE_i + b_5 MNE_i + b_6 (MNE_i * TECH_i) + b_7 TIME \qquad (2)$$

The model is tested against a sample of 129 manufacturing sectors defined on NACE 3-digit level (see annex for descriptive statistics).

5. RESULTS

Table 2 reports the estimation results for the model explaining the trade performance of Belgium for all manufacturing industries, and producer/consumer and advertising intensive/non advertising intensive industries separately. To account for the endogeneity of the MNE-variable the model is estimated using two stage least squares.

[10] Other studies have used so-called output indicators; no indicators are free of shortcomings however. Differences in patent legislation between countries and differences in the propensity to patent between industries are the main

Table 2: Regression results for the RCA-index ($RCA_{i,B}$)

Coefficient (standard deviation)	***ALL INDUSTRIES n = 258***	***PRODUCER GOODS INDUSTRIES n = 128***	***CONSUMER GOODS INDUSTRIES n = 88***	***NON-ADVERTSING INTENSIVE INDUSTRIES n = 160***	***ADVERTISING INTENSIVE INDUSTRIES n = 46***
Constant	-3.006***	-4.552***	-1.695	-3.288***	-1.616
	(0.829)	(0.707)	(1.736)	(0.951)	(1.542)
TIME	0.021	-0.018	0.048	0.049	0.031
	(0.109)	(0.120)	(0.202)	(0.115)	(0.281)
PHYS	0.393**	0.672***	0.158	0.474**	0.090
	(0.133)	(0.123)	(0.258)	(0.161)	(0.241)
HUM	-0.948***	-0.797**	-0.979**	-0.789***	-1.269**
	(0.191)	(0.239)	(0.329)	(0.203)	(0.372)
SCALE	-0.100	-0.164	-0.078	-0.158	0.105
	(0.087)	(0.125)	(0.115)	(0.099)	(0.159)
TECH	0.173*	0.186*	0.118	0.158*	0.299*
	(0.075)	(0.093)	(0.115)	(0.079)	(0.142)
MNE	1.170***	0.696*	1.526**	0.875**	1.190*
	(0.271)	(0.360)	(0.554)	(0.265)	(0.569)
TECH*MNE	0.199***	0.118	0.245**	0.149**	0.329**
	(0.049)	(0.072)	(0.092)	(0.048)	(0.101)
R^2	0.21	0.29	0.10	0.21	0.21

* $p < 0.05$;
** $p < 0.01$;
*** $p < 0.001$
All reported standard errors are heteroscedasticity consistent.

The factors PHYS and HUM have in all equations the hypothesized signs, and except for physical capital in the consumer and advertising intensive industries, all are significant at the 1% level[11]. The positive coefficient for the PHYS-variable implies that Belgium is specialized in the production/exports of physical capital intensive products, suggesting that Belgium is relatively well endowed with physical capital. Endowment figures of Belgium versus the EU indeed confirm this endowment explanation for trade.

problems in the use of patents as proxy (Soete (1981)).
[11] The lower significance for physical capital in consumer and advertising intensive industries is explained by industry characteristics, with physical capital being relatively less important in these industries.

Consistent with Culem (1984) table 3 shows that human capital is equally available in Belgium as in other EU member states, but that especially physical capital is highly abundant in Belgium, resulting in the relative advantage of Belgium for capital intensive activities.

The abundance of physical capital is however not an invariable as traditional trade theory would suggest. In line with Amiti (1998) who theoretically shows that decreasing transport costs causes capital to flow from lower populated to higher populated countries, the inflow of multinational firms have further increased the capital stock in Belgium. Following European integration[12] this process has resulted in the concentration of capital intensive industries in the core regions and labor intensive industries in peripheral regions. Motivated by the access of Belgium to the European market, (vertical) multinationals have located production plants in Belgium while at the same time exporting human capital services from their headquarters. As a consequence differences in relative endowments may have widened.

Table 3: Factor endowments: Belgium versus EU[13]

	Belgium	EU	Belgium/EU
Human capital[14] (in % of population aged 15+)	0.124	0.125	0.992
Physical capital[15] (capital stock/population aged 15+)	54.438	46.017	1.183
Relative factor endowments (physical capital/human capital)			1.193

[12] The assumptions of Amiti's model, namely perfect mobile capital and immobile labor between countries are important characteristics of the factor markets in Europe.
[13] EU includes Germany, France, Italy, United Kingdom, Ireland, Denmark and Spain
[14] Human capital is defined as persons working in Science and Technology occupation (ISCO-levels 2 and 3 respectievely); (source: Eurostat)
[15] Physical capital is total business capital stock; (source: OECD)

The results for the SCALE-variable suggest that in general, taking into account resource variables as well as multinational presence, scale does not seem to affect the trade performance of Belgium. Although this result is in line with previous empirical work on Belgium (Abraham (1981), Tharakan and Waelbroeck (1988)), this conclusion may be too strong given the high correlation between physical capital and economies of scale in industries. Brülhart and Torstensson (1996) show that following European integration sectors in which scale economies relative to transport costs are important, became concentrated in central EU countries and regions.

The results for the TECH variable suggest that the R&D-investments undertaken in Belgium have a positive impact on the trade composition of Belgium and contradict with previous research (Abraham (1981)). The difference with earlier results on the technology variable seems to be attributable to the adoption of the MNE-variable in the regression model. If multinational firms effectively determine the trade structure of Belgium, previous research neglecting the role of multinational firms did suffer from a serious omitted variable bias in its results.

The positive coefficient of the MNE-variable demonstrates the importance of transferred technology within multinational firms[16]. The magnitude of the coefficients reflects the non-negligible impact of multinational firms' activities on Belgium's trade structure. More importantly, the larger coefficients of the MNE-variable for the consumer industries and especially the advertising intensive industries effectively support the central hypothesis that the shift of Belgium's trade performance towards differentiated products is explained by the production/export activities of multinational firms in Belgium.

[16] As such the technological content of Belgian exports will be systematically underestimated by only considering 'national' R&D, i.e. R&D-investments undertaken on Belgian territory.

The positive coefficient of the interaction variable (TECH*MNE) suggest that important spillover effects of transferred technology within multinational networks exist. This transfer may not only benefit R&D-investments done by Belgian subsidiaries of multinational firms but may also spill over to R&D undertaken by other firms in the industry. Following the work of Coe and Helpman (1995), recent empirical work has studied foreign direct investment as an important spillover channel (Lichtenberg and van Pottelberghe (1996), Braconnier et al (1999), Baldwin et al. (1999)).

Reflecting the lower presence of multinational firms in producer industries but especially in non-advertising intensive industries (35% versus 52% in advertising intensive industries), Belgium's trade performance for these industries seems to be principally determined by incumbent firms. Consistent with Drèze's standard goods hypothesis, the small local market has not hindered Belgian firms to become important producers/exporters of intermediate and investment goods, given the comparative disadvantage of larger countries for these products. Hence, while the arguments of Drèze cannot be refuted for industries where technology and/or differentiation advantages are less specific and transferable, the overall trade structure reflects the important role of multinational firms in spreading technology across countries.

6. CONCLUSIONS

In extending traditional empirical trade models with the role of multinational firms, this paper has shown the particular incidence of multinational firms on the trade structure of host countries. For Belgium, a small open economy with a large multinational presence, the role of multinational firms for the trade specialization is of crucial importance and by neglecting it previous studies appeared to have produced seriously biased results. In particular, the results show how the large multinational presence induced by the formation of a common European market has shifted Belgium's trade structure towards differentiated products. Hence, the standard goods hypothesis as originally articulated by J. Drèze is no longer

appropriate to describe the trade composition of Belgium; a result that seems to carry over to other small open economies characterized by a large presence of multinational firms.

The results equally emphasize the contribution of the international technology transfers within multinational firms to the trade performance of countries. Moreover, the finding of an important interaction effect with R&D at the industry level is consistent with technological spillovers to domestic firms, an effect that is receiving growing attention in the literature.

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ANNEX 1

Descriptive statistics of the variables

Unweighted Mean (standard deviation)	***ALL INDUSTRIES***	***PRODUCER GOODS INDUSTRIES***	***CONSUMER GOODS INDUSTRIES***	***NON-ADVERTSING INTENSIVE INDUSTRIES***	***ADVERTISING INTENSIVE INDUSTRIES***
RCA	0.951 (0.741)	0.885 (0.549)	1.047 (0.979)	0.966 (0.823)	0.917 (0.566)
PHYS[20]	1198.81 (934.26)	1260.61 (1032.52)	1089.86 (649.05)	1104.67 (799.95)	1283.12 (551.38)
HUM	0.314 (0.151)	0.302 (0.121)	0.319 (0.145)	0.288 (0.132)	0.401 (0.150)
SCALE	23.844 (45.918)	27.487 (55.231)	16.244 (25.283)	25.347 (51.656)	16.717 (24.323)
TECH	0.014 (0.021)	0.015 (0.019)	0.012 (0.024)	0.011 (0.017)	0.020 (0.031)
MNE	0.394 (0.319)	0.420 (0.304)	0.347 (0.313)	0.350 (0.297)	0.512 (0.302)

[20] Fixed assets in thousands.

ANNEX 2

Correlation matrix for the independent variables (all industries)

	TIME	PHYS	HUM	SCALE	TECH
TIME	1.000	0.321	0.024	-0.008	-0.030
PHYS		1.000	0.171*	0.476*	-0.095
HUM			1.000	-0.109	0.232*
SCALE				1.000	0.082
TECH					1.000

* $p < 0.01$

ANNEX 3

Regression results for the net export index ($NI_{i,B}$)

Coefficient (standard deviation)	***ALL INDUSTRIES n = 258***	***PRODUCER GOODS INDUSTRIES n = 128***	***CONSUMER GOODS INDUSTRIES n = 88***	***NON-ADVERTSING INTENSIVE INDUSTRIES n = 160***	***ADVERTISING INTENSIVE INDUSTRIES n = 46***
Constant	-2.258**	-1.865*	-3.651**	-2.325**	-3.031
	(0.698)	(0.787)	(1.359)	(0.730)	(2.132)
TIME	-0.014	0.012	-0.046	0.017	-0.041
	(0.102)	(0.114)	(0.167)	(0.105)	(0.262)
PHYS	0.362**	0.387**	0.482*	0.456***	0.320
	(0.114)	(0.134)	(0.199)	(0.122)	(0.340)
HUM	-0.726***	-0.646**	-0.994***	-0.591**	-1.044*
	(0.185)	(0.234)	(0.281)	(0.200)	(0.405)
SCALE	-0.128	-0.221	-0.057	-0.207	0.116
	(0.099)	(0.132)	(0.095)	(0.108)	(0.169)
TECH	0.175*	0.237**	0.151	0.220**	0.190
	(0.076)	(0.089)	(0.104)	(0.083)	(0.160)
MNE	0.908***	0.438*	1.806***	0.702**	1.290*
	(0.257)	(0.220)	(0.470)	(0.254)	(0.630)
TECH*MNE	0.152**	0.077	0.290***	0.121**	0.261*
	(0.047)	(0.044)	(0.078)	(0.046)	(0.122)
R^2	0.15	0.16	0.21	0.17	0.11

* $p < 0.05$;
** $p < 0.01$;
*** $p < 0.001$.
All reported standard errors are heteroscedasticity consistent.