DISCUSSION PAPER SERIES

No. 5135

MARKET STRUCTURE IN SERVICES AND MARKET ACCESS IN GOODS

Joseph Francois and Ian Wooton

INTERNATIONAL TRADE

Centre for Economic Policy Research

www.cepr.org

Available online at: **www.cepr.org/pubs/dps/DP5135.asp**

ISSN 0265-8003

MARKET STRUCTURE IN SERVICES AND MARKET ACCESS IN GOODS

Joseph Francois, Erasmus University Rotterdam and CEPR
Ian Wooton, University of Strathclyde and CEPR

Discussion Paper No. 5135
July 2005

Centre for Economic Policy Research
90–98 Goswell Rd, London EC1V 7RR, UK
Tel: (44 20) 7878 2900, Fax: (44 20) 7878 2999
Email: cepr@cepr.org, Website: www.cepr.org

CEPR Discussion Paper No. 5135

July 2005

ABSTRACT

Market Structure in Services and Market Access in Goods

We examine interaction between goods trade and market power in domestic trade and distribution sectors. Theory suggests a linkage between service-sector competition and goods trade, one supported by econometrics involving imports of 22 OECD countries *vis-à-vis* 69 exporters. This points to linkages between market access conditions for goods and the structure of the service sector. Competition in services affects the volume of goods trade. Additionally, because of interaction between tariffs and competition, the market structure of the domestic service sector becomes increasingly important as tariffs are reduced. Also, empirically service competition apparently matters most for exporters in smaller, poorer countries.

JEL Classification: F12, F13 and F23
Keywords: GATS, market access, services trade, strategic competition policy, trade and competition and trade liberalization

Joseph Francois
Tinbergen Institute
Erasmus University Rotterdam
Burg Oudlaan 50-H8-18
3000 DR Rotterdam
THE NETHERLANDS
Tel: (31 10) 408 1391
Fax: (31 10) 408 9146
Email: francois@few.eur.nl

For further Discussion Papers by this author see:
www.cepr.org/pubs/new-dps/dplist.asp?authorid=117038

Ian Wooton
Department of Economics
University of Strathclyde
Sir William Duncan Building
130 Rottenrow
Glasgow G4 0GE
Tel: (44 141) 548 3580
Fax: (44 141) 548 4445
Email: ian.wooton@strath.ac.uk

For further Discussion Papers by this author see:
www.cepr.org/pubs/new-dps/dplist.asp?authorid=109035

Submitted 24 June 2005

1 Introduction

In this paper, we are concerned with the relationship between the traditional concept of market access in goods sectors and the degree of competition in the service sector. In particular, we examine the interaction between trade in goods and the degree of competition in the "margin" services that facilitate the interaction between producers and exporters in one country and final consumers in another. These include domestic shipping and logistic services, of course, as well as the wholesale and retail sectors and other links in the distribution chain that carries imported goods to the consumer.

By exploring these issues, we examine an important though somewhat ignored aspect of the trading system. In the European Union, for example, internal trade in motor vehicles has been hampered by an antitrust exemption for the distribution and servicing of automobiles. (See both Flam and Nordstrom, 1995, and Lutz, forthcoming.) Access to the distribution system was also at the heart of a dispute between the United States and Japan involving Kodak and Fuji film (Nanto 1998). These issues also lurk behind the impact on trade of the retail distribution systems both in Switzerland and Japan, as well as the German experience with retailing cartels and the threat of foreign retail entry to established domestic players. With the elimination of trade barriers for textiles and clothing under the WTO's Agreement on Textiles and Clothing in 2005, the market power of such huge buyers as Wal-Mart may also be an important factor in the transmission of price and quantity changes across global textile and clothing markets. Finally, evidence is emerging that the benefits of non-reciprocal tariff preference schemes may be captured by high-income country importing firms, rather than the low-income country exporter firms for which the programs are intended. (See, for example, Olarreaga and Ozden 2005).

In general, international trade in goods depends on the domestic trade and distribution sector that facilitates this trade. Yet in standard trade theory, this dependency is one of the items we hide under the analytical rug to keep things tractable. [1] In contrast to the standard approach, here we focus explicitly on the degree of competition in the domestic distribution sectors, and the impact on trade in goods. This includes an assessment of linkages between service sector competition and the value of negotiated market access concessions. We proceed in this paper as follows. In Section 2 we develop a

[1] See for example the discussions of trade policy in Anderson and Neary (1992).

basic analytical model, involving a domestic distribution sector with market power. We work with this model to examine the impact of imperfect competition in services for the pattern of trade in goods. In Sections 3 and 4, we then examine the impact on gains from trade for both importers and exports. In Section 5, we work with data on competition in distribution and sales in several OECD countries. Working with a gravity model of trade, we examine econometrically the interaction between import protection, competition, and the pattern of trade. We offer concluding comments in Section 6.

2 Basic Model

We consider the market for imports of a homogeneous good. The domestic government taxes imports that are supplied by competitive firms. Our primary interest is in the domestic sale and distribution network, which we assume to be less-than-perfectly competitive. Thus we shall be focus on the interactions between three sets of agents: the government, consumers, and the distributors.

2.1 Import supply

The home country imports a good that is supplied by competitive, overseas producers. The export supply schedule is imperfectly elastic. Consequently, the importing country has some degree of monopoly power in trade. It subjects trade in these goods to an import tax at rate *t*. This creates a wedge between the *cif* price *p* and the *landed* (that is, after duties are paid) price p^L. Let the total quantity imported be *q*. Then the inverse supply function is[2]:

$$p = a + bq \tag{1}$$

while landed prices are:

$$p^L = p\tau, \quad \text{where } \tau \equiv (1+t). \tag{2}$$

2.2 Import demand

Consumer demand for the imported good is assumed to be inversely related to price. Let p^D be the final demand price, where the inverse demand curve is:

[2] For ease of exposition, we adopt linear relationships for demand and supply function. Non-linear functions would complicate the mathematics and make the results less unconditional, but would provide little additional insight into the issue.

$$p^D = x - yq. \tag{3}$$

2.3 The intermediation sector

Interaction between the exporter and the final consumer is assumed to require the services of a domestic service sector that facilitates both the movement of imported goods inland and wholesale and retail distribution, marketing, and any ancillary services required to sell the goods. These services are supplied by a domestic service cartel (Cournot oligopoly) at constant marginal cost.

The total revenue of a representative firm *i* in the service sector is:

$$R_i = D(q)q_i, \tag{4}$$

where q_i is the quantity sold by a representative intermediary firm *i*. We further assume that there are *n* identical firms in the market, each having a share $\sigma = 1/n$. It is useful to think of σ as an index of market competitiveness that ranges from a value of zero, under perfect competition ($n = \infty$), to a value of one, when a single firm monopolizes distribution ($n = 1$) or, alternatively, an oligopolistic service sector acts as a monopolist through perfect collusion in a cartel.

Assuming a constant marginal cost *c*, profits of firm *i* are:

$$\pi_i = (x - yq)q_i - \left[\tau(a + bq) + c\right]q_i. \tag{5}$$

The first-order condition for profit maximization, assuming Cournot competition, is:

$$q = \frac{x - \tau a - c}{(1 + \sigma)(y + \tau b)} \tag{6}$$

It is evident that the service-sector firms have power on both sides of the market. On the input side, the price they pay for the imported good depends upon the total quantity *q* and the sensitivity of supply to quantity. Similarly, on the demand side, the price at which they sell to consumers is a function of total quantity brought to market. By restricting their trading, the firms are able to both drive down costs and drive up prices, widening the price-cost margin and raising profits. The service-sector margin amounts to:

$$\mu = \frac{c + \sigma(x - \tau a)}{1 + \sigma} \tag{7}$$

Clearly, the mark-up over marginal cost will decline with the tariff. Any attempt on the part of the government to exercise its monopoly power in trade eclipses the ability of the service sector to exercise its market power.

What is the interaction between tariffs, market power, and the volume of trade? Differentiating equation (6) with respect to τ and σ yields the following:

$$\begin{aligned}
\frac{dq}{d\tau} &= -\frac{b\left(x-c-\tau a\right)}{\left(1+\sigma\right)\left(y+\tau b\right)^2} - \frac{a}{\left(1+\sigma\right)\left(y+\tau b\right)} < 0 \\
\frac{dq}{d\sigma} &= -\frac{\left(x-c-\tau a\right)}{\left(1+\sigma\right)^2\left(y+\tau b\right)} < 0 \\
\frac{d^2q}{d\tau d\sigma} &= \frac{b\left(x-c-\tau a\right)}{\left(1+\sigma\right)^2\left(y+\tau b\right)^2} + \frac{a}{\left(1+\sigma\right)^2\left(y+\tau b\right)} > 0
\end{aligned} \tag{8}$$

This allows us to make the following observations.

OBSERVATION 1: Despite the presence of an imperfectly competitive service sector, it remains the case that international trade volumes decline with increases in the import tariff.

OBSERVATION 2: International trade volumes are inversely related to the degree of concentration in the domestic trade and distribution sector, or alternatively the degree of market power exercised in the domestic sector.

OBSERVATION 3: The negative impact of market power on trade volumes is greatest in a zero tariff context, and its marginal impact falls with increased levels of trade.

Hence, the largest impact of imperfect competition in the service sectors will be observed in zero-tariff countries, free-trade areas, customs unions, and under non-reciprocal trade preferences. [3]

[3] For empirical work of course, one must recall that this assumes that we are holding many other things constant. We are hence controlling for other aspects of such arrangements, such as trade facilitation, coordination of regulation, and the possible impact of customs unions on cross-border competition between service firms themselves. In addition, the last observation can be sensitive to significant departures from linearity.

3 Tariffs and the Gains from Trade

We focus next on the welfare implications of a range of alternative tariff regimes for the importer, and the role played by service-sector competition across these possibilities. When the service sector is owned by local firms, domestic welfare Z comprises three elements: profits π, consumer surplus CS, and tariff revenue TR. Thus:

$$Z \equiv \pi + CS + TR \tag{9}$$

Should, however, the service sector be owned by foreign interests then domestic welfare is merely:

$$W \equiv CS + TR \tag{10}$$

An explicit expression for service-sector profits is obtained by combining equation (5) and equation (6).

$$\pi = \mu q = \frac{\left[c + \sigma\left(x - \tau a\right)\right]\left(x - c - \tau a\right)}{\left(1+\sigma\right)^2\left(y + \tau b\right)} \tag{11}$$

As both service-sector's profit margin and the volume of trade decline with the tariff, profits of intermediaries decline as the trade tax is increased.

Given the linear structure adopted for the model, consumer surplus is simply the familiar "triangle" under the demand curve (3) and above the final demand price p^D. Solving using equation (6) yields:

$$CS = \frac{(x - \tau a - c)^2 y}{2(1+\sigma)^2 (y + \tau b)^2} \tag{12}$$

Lastly, tariff revenue is also derived from equation (6):

$$TR = (\tau - 1) pq = \left(\tau - 1\right)\left[\frac{ay\left(1+\sigma\right) + b\left(a\sigma\tau + x - c\right)}{(1+\sigma)^2 (y + \tau b)^2}\right] \tag{13}$$

Figure 1 illustrates domestic welfare and its components for the case of duopoly in the service sector ($\sigma = 2$). As would be expected, consumer surplus declines monotonically with an increasing tariff, while tariff revenue increases to a maximum and then falls. Consequently, for national welfare, there is an interior solution for the optimal tariff, indicated by t^Z. If the service rents are excluded (in the case of foreign ownership for example), the optimal tariff is greater as indicated by t^W. The

government, in exercising its monopoly power in trade, has the ability to limit the ability of the service sector to extract rents. As has already been established, the profits of the service sector decline with the tariff. Consequently when these rents accrue to domestic agents, the government will wish to moderate its use of the tariff.[4]

Now consider the optimal tariff across the range of values of σ, that is, for all the possible levels of competition within the service sector. The first-order condition for the optimum tariff is obtained by differentiating Z with respect to τ. Substituting (11), (12), and (13) into (9), differentiating and solving yields:

$$\tau^Z = \frac{(2b-\sigma y)(x-c)+(1+\sigma)ay}{a\left[y+b(1-\sigma)\right]+(1+\sigma)b(x-c)} \tag{14}$$

This is declining in σ. That is, the optimum tariff falls as market power in the service sector becomes more concentrated. We illustrate our result in Figure 2, where the contours show the various levels of welfare that can be achieved through the choice of tariff for any level of service-sector concentration. The "ridge line" in the contour diagram shows the optimal tariff across the range from perfect competition to monopoly in intermediation services.

It is straightforward to calculate τ^*, the tariff that maximizes aggregate welfare when the service industry is competitive:

$$\tau^* = \frac{y\left(a-c\right)+2b\left(x-c\right)}{\left(a+x\right)\left(b+y\right)-xy}$$

This is the conventional optimal tariff that fully exploits the country's trade power with respect to the exporting nation. As the service sector is making no profits, the only distortion in the market, from the home country's point of view, is its unexploited monopoly power in trade. This is corrected by the imposition of τ^* as shown in the figure.[5]

It is when there is an additional distortion in the market, in the form of an imperfectly competitive distribution sector, that the welfare implications of trade policy become more

[4] The government's ability to use the tariff as a pro-competitive instrument is limited by the impact of the higher tariff on consumers and its revenues. Indeed, the tariff that drives the service sector's margin down to marginal cost ($\mu = c$) is, in fact, a prohibitive tariff that wipes out all of the gains from trade.

[5] For the simulations in Figure 1, $t^* = 1{\cdot}265$, while the value of the optimal subsidy under monopoly is $0{\cdot}8953$.

complicated.[6] It is evident that the optimal tariff declines with increasing concentration in services. Indeed, the optimal tariff when the service sector is a monopoly is a subsidy. The more concentrated the service sector, the greater its exercise of its market power and, consequently, the lower the trade volume. A tariff further reduces the volume of trade, whereas a subsidy increases the level of imports and hence consumption. Such a subsidy benefits the service sector but, as their profits are part of national welfare, a welfare maximizing government would be prepared to offer it.[7]

It is interesting to note that in the linear example under consideration, the trade volume, consumer surplus and aggregate domestic welfare are the same irrespective of whether the government or the service industry is optimally exploiting the country's monopoly power in trade. The only difference that arises is in the distribution of income between the government and the service sector.

We summarize the relationship between tariffs, profits, trade, and welfare in the following observations:

OBSERVATION 4: The optimum import tariff is a decreasing function of the degree of market power exercised in the domestic trade and distribution sectors.

OBSERVATION 5: The optimum mark-up for the domestic trade and distribution sectors is a decreasing function of the underlying import tariff.

4 Market Access and the Exporter

Consider the impact of alternative tariff and competition regimes for the exporter. If we are focused on quantity alone, then equations (6) and (8) point to a negative relationship between tariffs and imperfect competition, on the one hand, and export volumes on the other. In addition, equation (8) also predicts that the trade-volume effect of a tariff reduction depends on the underlying degree of competition in the domestic distribution sector. To some extent, tariff reductions may simply lead to a greater

[6] We assume for illustration that the domestic intermediation sector is wholly domestically owned and therefore the domestic government's goal is to maximize *Z*.

[7] The government can use other domestic instruments to redistribute income away from the service firms.

exercise of market power by the domestic distribution sector, nullifying expected direct benefits from tariff reductions in export markets.

A second measure of the benefits of improved market access conditions is exporter producer surplus *PS*. Once again, in the linear example under consideration, this is simply the area of a triangle, in this instance the area between the inverse supply curve and the export price:

$$PS = \frac{bq^2}{2} = \frac{b(x - \tau a - c)^2}{2(1+\sigma)^2(y+\tau b)^2} \tag{15}$$

This also allows us to calculate the welfare benefit to exporters of improved market access as manifested through increases in export quantities as being simply:

$$\frac{dPS}{dq} = bq \tag{16}$$

Consider the benefit of improved market access through tariff reduction. This is driven by the realized change in export volumes. The greater the export effect, the greater the market access gains. As we have already determined from equation (8), the impact of a tariff on producer welfare is therefore a function of the degree of market power. We summarize this section with the following observations.

OBSERVATION 6: The market-access benefits of tariff reductions in export markets are inversely related to the degree of market power exercised by the domestic trade and distribution sector in the export market.

OBSERVATION 7: The benefits of past market access concessions can be offset by future increases in the degree of market power exercised by the domestic trade and distribution sector in the export market.

The first of these observations formalizes the dependence of goods market integration in the European Union (recall the EU autos exemption) on distribution sector competition. The second goes directly to the heart of the Fuij-Kodak dispute. To use a technical GATT/WTO term, "nullification and impairment" can follow from changes in domestic regulation of the distribution sector.

5 Empirics

We turn next to a short empirical exercise. This involves estimating reduced form gravity equations of bilateral trade flows, based on tariffs, distance, and country-specific effect variables. (See Feenstra 2004 Chapter 5; and Hummels 1999). We include measures of distribution sector competition, as a check on our theoretical results developed above. We will admit at the start of this section that the data are very crude, and as such we simply focus on whether the basic effects we have discussed – imperfect competition in distribution affecting market access in goods – matters in an empirical sense.

Our basic data for this exercise are summarized in Table 1. From the OECD (2000), we work with two estimates of the degree of competition in the road freight and retail distribution for some, but not all, OECD members. This includes an index of barriers to entry in the sector, and also what can be interpreted as an overall or composite index of the degree of competition in the sector. These estimates are a one-off, in that we only have a single set for of indexes for the late 1990s. For trade, we work with bilateral merchandise trade data extracted from UNCTAD's COMTRADE database and matched to import protection data from the GTAP6 database (GTAP 2005). These data are for 2001. They offer the advantage of including a bottom-up concordance from detailed tariff data to aggregate bilateral trade flows, including preferential tariff rates. We also have estimates of the trade-tax equivalent of export barriers as part of the basic trade barrier data. In addition, bilateral export data have been adjusted to reflect estimated freight margins. For 69 countries as exporters, we have matched bilateral import data to other country-specific data for the 22 OECD importers covered by our set of OECD indexes on the distribution and freight sectors. We also incorporate data on distance, common language, and common borders from Gaulier, Mayer, and Zignago (2004). Finally, we also include data on importer GDP and per-capita income from the World Bank (2002). After matching trade data to our competition data, we have 1,725 bilateral trade flows to work with involving OECD countries as importers in 2001.

Our estimating equation is a reduced-form gravity equation, augmented to reflect our observations based on equation (6). Since we are working with a single year, we impose a price normalization, with *fob* prices set at unity. Value flows then map to quantities. Defining imports by country *i* from country *j* as M_{ij}, we work with the following equation.

$$M_{i,j} = \alpha_0 + \alpha_1 \ln(GDP_i) + \alpha_2 Dist_{i,j} + \alpha_3 \ln(T_{i,j}) + \alpha_4 COMLANG_{i,j}$$
$$+\alpha_5 BORDER_{i,j} + \alpha_6 \ln(Index_i) + \alpha_7 \ln(Index_i) * \ln(T_{i,j}) \quad (17)$$
$$+\sum_j \alpha_{8,j} D_j + \alpha_9 NAFTA_{i,j} + \alpha_{10} EEA_{i,j} + \alpha_{11} \ln(PCI_j) * \ln(Index_i) * \ln(T_{i,j}) + \varepsilon_{i,j}$$

The D_j terms are dummy variables assigned to each exporter, to reflect the set of exporter-specific variables that remain fixed across importers. The variables $NAFTA_{i,j}$ and $EEA_{i,j}$ are also dummies, capturing joint membership in either the North American of European free trade block. The terms $Dist_{i,j}$ and $T_{i,j}$ measure bilateral distance and import barriers (trade-weighted import tariffs and trade tax equivalents of export restraints) as a share of total import value. We expect the coefficients applied to these variables, α_2 and α_3 to both be negative. Recall that the *Index* term is meant to capture, at least qualitatively, the effects related to σ in the discussion above. From the expressions in (8), we expect α_6 to be negative as well. We expect the interaction term α_7 to be positive, based on equation (8) and observation (3).[8] We have also included the interaction term α_{11} to allow for possible variations in the impact of tariff and competition-related barriers depending on the level of development of the trading partner.[9] We explore this issue further below with split-sample regressions.

Table 2 presents robust regression results for equation (17), based on both versions of our competition index. We have reported robust regression results because the Breusch-Pagan (1979) Chi-squared test statistic (as implemented in STATA) leads us to reject the hypothesis of homoscedasticity at any conceivably reasonable level of significance. Further examination with Szroeter's (1978) test statistic (a recent STATA addition) points to a pervasive problem, involving roughly half of the right hand side variables. Many of these relate to the exporter fixed effect variables, indicating for example greater variance in the data involving some exporting countries than others. This is not surprising, as we have included relatively small aggregate trade flows (all flows over $10,000), usually involving a

[8] It will be positive assuming the world is not too far from the linearity that we have assumed in the theoretical analysis. Note though that variations in bilateral tariffs, in our data, are likely to be accompanied by institutional variations (like EU and EEA regulatory regimes) that may impact on the relationship of our competition index to trade, and that we are not trying to control for. They will also map to differences in the composition of trade, such that a real effort to disentangle these effects, while beyond the scope of this paper, should examine trade at a more detailed sector level. Also note that to control for potential multicollinearity problems with the interaction term, we have calculated the interaction term in terms of deviations from average values.

[9] Consider, for example, that the EU countries in our sample engage in duty-free trade with each other, and also with the least-developed countries. Along the lines of Oralleaga and Ozden (2005), the lower income countries will be weaker in terms of bargaining power.

range of least developing countries.[10] In these cases, bilateral trade flows may be a function of historical/structural variables unique to a given country pairing. Given the pervasiveness of the problem, there is a not an obvious single adjustment to be made to the data. We therefore resort to robust least squares, involving Huber's (1981) robust regressions as implemented in STATA. These results are what are shown in Tables 2 and 3.

Turning first to Table 2, this reports the results for equation (17) with both indexes. Relevant coefficients are significant in the 0.05 to 0.01 range or better, with the sign predicted from our theoretical analysis for the direct effect from competition. (Where we have expectations of sign, the one-tailed significance results in the table are appropriate. This includes both competition indexes.) An F-test for the joint significance of the competition coefficients α_6 and α_7 rejects the null hypothesis that the coefficients are zero at the .001 level. Country fixed-effect coefficients are not shown, though they are all generally significant at the 0.001 level across all regressions. The pattern of results for competition fits expectations. Basically, these results suggest that tariffs and reduced competition both have a dampening effect on estimated trade flows.

Table 3 presents a further decomposition of patterns in the data, based on split-sample regressions. Implicit in the analysis above is that competition matters more as importers have more market power. In terms of the previous section, this depends on the relative slopes of the supply and demand schedules, in conjunction with the general level of competition in the service sector itself. In a more general sense, we may expect importing/distribution firms to have more market power vis-à-vis smaller suppliers. At the same time, exporters in lower income countries may be less organized, and less adept, in holding their own against market power exercised by buyers. (Imagine WalMart negotiating supplier contracts in Jamaica, as opposed to in Canada). In Table 3 we explore this issue by making the following splits in the data. The first split involves OECD trade with low-income countries (defined as having a per-capita income below $1000 in 2001 dollars), and all other trade. For the second split, we divide the sample into OECD trade where the importer is large (with a nominal

[10] The countries are: Australia; New Zealand; China; Hong Kong; Japan; Korea; Taiwan; Indonesia; Malaysia; Philippines; Singapore; Thailand; Vietnam; Bangladesh; India; Sri Lanka; Canada; United States; Mexico; Colombia; Peru; Venezuela; Argentina; Brazil; Chile; Uruguay; Austria; Belgium; Denmark; Finland; France; Germany; United Kingdom; Greece; Ireland; Italy; Luxembourg; Netherlands; Portugal; Spain; Sweden; Switzerland; Rest of EFTA (basically Norway); Albania; Bulgaria; Croatia; Cyprus; Czech Republic; Hungary; Malta; Poland; Romania; Slovakia; Slovenia; Estonia; Latvia; Lithuania; Russian Federation; Turkey; Morocco; Botswana; South Africa; Malawi; Mozambique; Tanzania; Zambia; Zimbabwe; Madagascar; Uganda.

GDP greater than $500billion) and the exporter is small (defined as having a nominal GDP below $100billion), versus all other trade. For the final split, we examine OECD trade where the importer is large and the exporter is both poor and small. In all cases, we find that the correlation in the data between exports to the OECD and competition is greater when there is likely to be greater market power, in the sense that it matters more for smaller and poorer exporters.[11] The structure of the retail and distribution sector in the OECD countries is more of a trade barrier for small and low-income countries than it is for exporters from higher income and larger economies.

Finally, Table 4 is our attempt to convey a sense of the magnitudes involved, not so much statistically but rather economically. In the table, we have taken the tariff coefficient from Table 2, combined with sample values for EU competition indexes and a competition coefficient estimated for the intra-EU15 subset of our full sample. We have used these to calculate a trading cost- or tariff-equivalent from changing the degree of competition in the sample of EU countries, for intra-EU (i.e. duty-free) trade. Hence, for example, from the first column of numbers in Table 4, moving France to the average level of competition in distribution across the EU would be comparable to eliminating a 4.2 percent tariff for its EU partners. Moving to the most competitive level in the sample would correspond to the elimination of an 8.4 percent tariff. In the table, these trading cost equivalents range between 0.0 and 8.4 percent of the value of trade, with most between 3.0 and 4.0 percent of the value of trade.

The patterns of results in Tables 2-4 suggest that variations in the degree of competition matter. Indeed, problems with competition in domestic distribution and trade activities are likely to themselves act as barriers to trade. In a European context, this means that continued competition exemptions for automobiles, for example, should indeed be expected to hinder trade substantially. This also means that GATS-based liberalization of these service sectors may also mean improved market access conditions for affected goods sectors along the lines developed here.

[11] Further results, not shown here, are consistent with this pattern. For intra-EU trade, for example, competition matters less in the split sample than it does for smaller, poorer countries.

6 Summary and Conclusions

The pattern of trade in goods depends on a number of factors. Recent work has stressed transport costs and its linkages to the geography of production and trade. We take a different slant here. In this paper we examine the interaction between trade in goods and the degree of market power exercised by the domestic trade and distribution sectors – the so-called "margin" sectors. We first develop a theoretical model that allows us to highlight interactions between the degree of competition in domestic service sectors and the pattern of trade in goods. This is followed by an econometric exercise involving the import patterns of 22 OECD countries vis-à-vis 69 trading partners. Our theoretical results point to an expected linkage between service sector competition and goods trade. At least in theory, the domestic service sector can serve as an effective import barrier. This is also supported by our econometric results. These point to statistically significant linkages between effective market access conditions for goods and the structure of the service sector. From back of the envelope calculations, they also point to economically/qualitatively significant effects. (See Table 4.) What all this means is that, by ignoring the structure of the domestic service sector, we may be seriously overestimating the market access benefits of actual tariff reductions given the existence of imperfect competition in the margin sectors. We also find that the competition of margin sectors matters more for poor and small exporters than for others. Finally, our results suggest that GATS-based services liberalization may boost goods trade as well.

7 References

Anderson, J.E. and J.P. Neary (1992). "Trade Reform with Quotas, Partial Rent Retention, and Tariffs," *Econometrica*, 60: 57-66.

Breusch, T.S. & A.R. Pagan (1979), "A Simple Test for Heteroscedasticity and Random Coefficient Variation," *Econometrica* 47, 1287–1294.

Flam, H., and H. Nordström (1995), "Why Do Pre-Tax Prices Differ so much across European Countries," CEPR Discussion Paper No. 1181.

Feenstra, R.C. (2004), *Advanced International Trade*, Princeton University Press.

Guillaume, G., T. Mayer and S. Zignago (2004), "Notes on CEPII's distance measures," CEPII discussion paper, March.

Global Trade Analysis Project (2005), The GTAP Database version 6 (public-release version), GTAP consortium, Purdue University.

Huber, P. (1981). *Robust Statistics*. John Wiley & Sons: New York, 153-199.

Hummels, D. (1999), "Towards a Geography of Transport Costs," mimeo, University of Chicago.

Lutz, M. (forthcoming), "Pricing in Segmented Markets, Arbitrage Barriers and the Law of One Price: Evidence from the European Car Market," *Review of International Economics*.

Nanto, N. (1998), "The Kodak-Fuji Film Trade Dispute at the WTO," Congressional Research Service: Washington.

OECD (2000), "Regulatory Reform in Road Freight and Retail Distribution," paper ECO/WKP (2000)28, Paris.

Olarreaga, M. and C. Ozden 2005, "AGOA and Apparel: Who Captures the Tariff Rent in the Presence of Preferential Market Access?" *World Economy* 28(1).

Szroeter, J. (1978), "A Class of Parametric Tests for Heteroscedasticity in Linear Econometric Models," *Econometrica* 46: 1311-1327, 1978.

World Bank (2002), *World Development Indicators*, Washington DC.

FIGURE 1
DECOMPOSITION OF WELFARE IN THE CASE OF DUOPOLY ($\sigma = 0.5$)

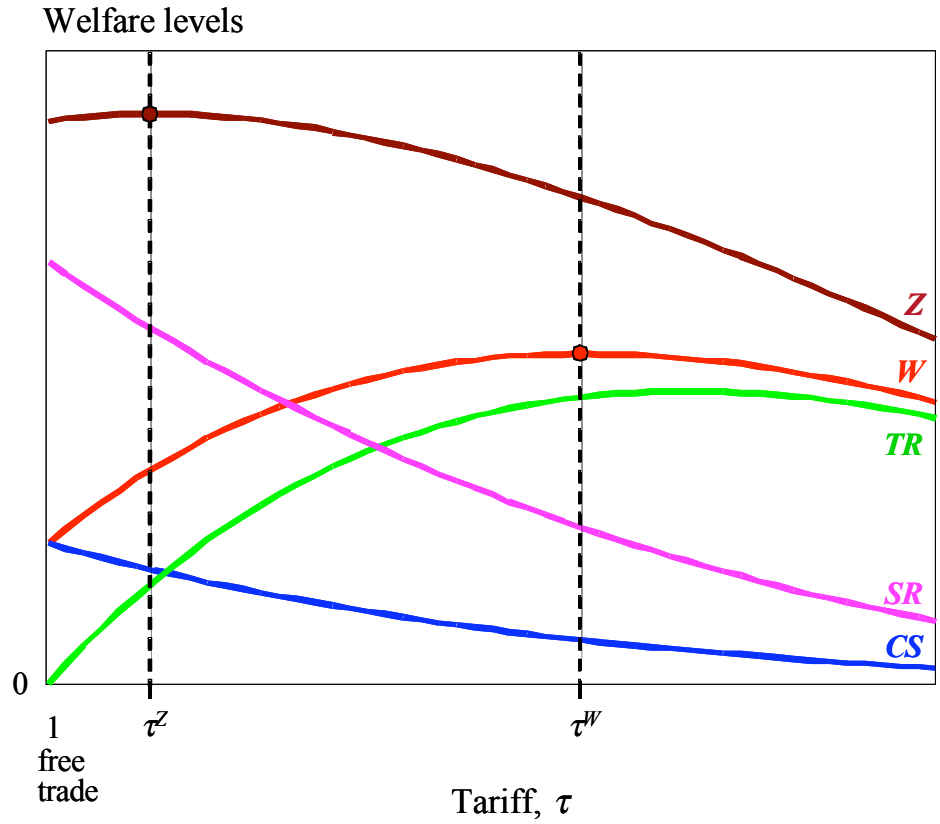

FIGURE 2
WELFARE LEVELS, TARIFFS, AND COMPETITION IN THE DISTRIBUTION SECTOR

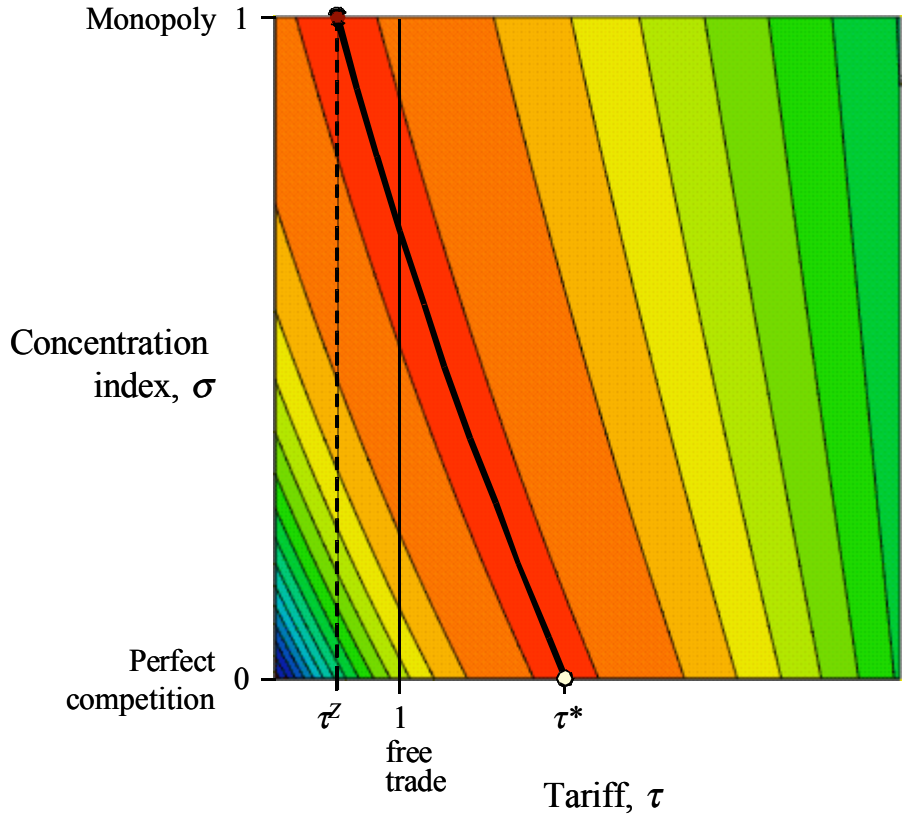

TABLE 1. DATABASE OVERVIEW (VALUE DATA REPORTED IN LOGS)

		Mean	Max	Min
GDP	Importer gross domestic product in billions of dollars in 2001 Source: World Bank (2002).	12.797	16.126	10.858
PCI	PPP-based per-capita income, dollars, 2001 Source: World Bank (2002).	9.675	10.517	7.709
Imports	Millions of U.S. dollars in 2001 Source: UNCTAD COMTRADE and GTAPv6.2 databases.	4.695	12.011	-4.605
Tariffs $\tau = 1 + t$	MFN trade-weighted tariff (with adjustments for trade preferences where available, as reflected in concordance of WTO, UNCTAD, and MACMAPS tariff data Source: GTAPv6.2 database	0.028	0.670	-0.123
Distance	Distance between national capitals, as reported in the CEPII database of distance measures. Source: Gaulier, Mayer, and Zignago (2004)	8.332	9.884	2.821
Border	Sharing a common border. Source: Gaulier, Mayer, and Zignago (2004).	0.041	1.000	0.000
Comlang	Sharing a common language Source: Gaulier, Mayer, and Zignago (2004).	0.059	1.000	0.000
Index 1	Overall index of competition in the retail/distribution sector Source: OECD (2000)	0.735	1.548	-0.223
Index 2	Index of barriers to entry in the retail/distribution sector Source: OECD (2000)	0.747	1.705	-0.357

Note: The scale of competition indexes in levels ranges from 0-6, for least to most restrictive regimes. For countries reported as an interval by the OECD, the mid-point has been used. Countries for which index data are available are: Australia, Austria, Belgium, Canada, Czech Republic, Finland, France, Germany, Hungary, Ireland, Italy, Korea, Mexico, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, United Kingdom, and the United States. Trade data are grouped by these 22 importers and by 69 exporting countries. Applied tariff data and distance data have been matched to these bilateral trade pairs.

TABLE 2. ROBUST REGRESSION ESTIMATES OF GRAVITY EQUATION OF BI-LATERAL TRADE

	MODEL 1 GENERAL INDEX	MODEL 2 BARRIERS TO ENTRY INDEX
α_1: ln(GDP)	0.959 (62.86)***	0.956 (62.33)***
α_2: Dist	-1.057 -(28.51)***	-1.046 -(28.11)***
α_3: lnT=ln(1+t)	-1.836 -(3.30)***	-1.994 -(3.60)***
α_4: Comlang	0.599 (7.19)***	0.595 (7.14)***
α_5: Border	-0.033 -(0.30)	-0.001 -(0.01)
α_6: Competition Index=ln(σ)	-0.300 -(7.73)***	-0.242 -(7.80)***
α_7: Interaction of τ and ln(σ)	4.527 (1.00)	8.020 (2.24)**
α_9: Dummy for European Economic Area	-0.105 -(0.99)	-0.158 -(1.48)
α_{10}: Dummy for NAFTA trade	0.631 (1.92)*	0.684 (2.09)**
α_{11}: Exporter income interaction with tariffs and competition	-0.778 -(1.46)	-1.185 -(2.77)
SUMMARY STATISTICS FOR ROBUST REGRESSIONS Variables	78	78
Observations	1701	1633
Df	1622	1554
F, H_0:Pr($\alpha_1 = ... = \alpha_{10} = 0$), Pr>F	328.86, 0.0	318.59, 0.0
SUMMARY STATISTICS FOR OLS REGRESSIONS R-squared	0.878	0.877

Note: Robust regressions are estimating using Huber method as implemented in STATA, with default convergence criteria. *t*-statistics are reported in parentheses *, **, and *** indicating 0.10, 0.05, and 0.01 levels of significance for a two-tailed test—or 0.05, 0.025, and 0.005 where a one-tailed test is instead appropriate, as discussed in the text.

TABLE 3. ROBUST REGRESSION ESTIMATES, COMPETITION COEFFICIENT WITH SPLIT SAMPLES

	MODEL 1	MODEL 2
Exporter is poor	-0.339 -(3.72)***	-0.328 -(4.43)***
Rest of Sample	-0.271 -(6.46)***	-0.193 -(5.78)***
Large importer, small exporter	-0.366 -(4.65)***	-0.269 -(4.48)***
Rest of Sample	-0.286 -(6.93)***	-0.239 -(6.77)***
Large importer, small poor exporter	-0.327 -(2.46)***	-0.299 -(2.75)***
Rest of Sample	-0.279 -(7.00)***	-0.208 -(6.43)***

Note: Robust regressions are estimating using Huber method as implemented in STATA, with default convergence criteria. *t*-statistics are reported in parentheses *, **, and *** indicating 0.10, 0.05, and 0.01 levels of significance for a two-tailed test—or 0.05, 0.025, and 0.005 where a one-tailed test is instead appropriate, as discussed in the text.

TABLE 4. TRADE-COST EQUIVALENTS FOR INTRA-EU TRADE OF CHANGES IN COMPETITION LEVELS BY MEMBER STATES, PERCENT

	move to average EU regime	move to most competitive EU regime
Austria	-3.4	-7.5
Denmark	-1.3	-5.3
Finland	-1.5	-5.6
France	-4.2	-8.4
Germany	3.9	0.0
Great Britain	-0.4	-4.4
Greece	-0.4	-4.4
Ireland	3.0	-0.9
Italy	-1.7	-5.8
Netherlands	3.0	-0.9
Portugal	-0.6	-4.7
Spain	-0.4	-4.4
Sweden	1.9	-2.1

note: based on competition index 1, and Table 2 coefficient for tariffs, and a split-sample regression estimate of the competition index for the sub-sample of intra-EU trade.