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# International Provision of Trade Services, Trade, and Fragmentation

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## ABSTRACT

# International Provision of Trade Services, Trade, and Fragmentation

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This paper examines the special role that trade liberalization in service industries can play in stimulating not only trade in services itself, but also in stimulating trade in goods. International trade in goods requires inputs from several services industries – what I call trade services, such as transportation, insurance, and finance – in order to complete and facilitate international transactions. Restriction on the ability of national service providers to provide these services across borders and within foreign countries create additional costs and barriers to international trade above those that would arise in otherwise comparable intra-national exchange. As a result, trade liberalization in services can yield benefits, by facilitating trade in goods, that are larger than one might expect from analysis of the services trade alone. This paper explores this idea using simple theoretical models to specify the relationships between services trade and goods trade.

The paper also, to make the point more forcefully, notes the role of services trade in a model of international industrial fragmentation, where production processes can be separated across locations but at some cost in terms of additional service inputs. The incentives for such fragmentation can be larger across countries than within countries, due to the greater differences in factor prices and technologies that are available. However, the service costs of international fragmentation can also be larger, especially if regulations and restrictions impede the international provision of services. As a result, trade liberalization in services can also stimulate fragmentation of production of both goods and services, thus increasing international trade and the gains from trade even further.

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**JEL Subject Code:** F1 Trade
F13 Commercial Pol

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# International Provision of Trade Services, Trade, and Fragmentation [*]

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## I. Introduction

A signal accomplishment of the Uruguay Round of multilateral trade negotiations was the incorporation of trade in services into a GATT-like framework within the World Trade Organization. The incentive to acknowledge even the existence of trade in services came primarily from U.S. private-sector service providers who chafed under restrictions that limited their ability to operate in foreign markets. They were understandably envious of the institutional facilities made available to goods traders by the General Agreement on Tariffs and Trade (GATT) for limiting barriers to market access. These service providers succeeded in making the case, first in the United States and then in the GATT negotiations, that similar rules should apply to international service transactions. The result was the General Agreement on Trade in Services, GATS, which is now one of three rather unequal pillars of the WTO.[1] The GATS has so far not accomplished very much in the way of actual liberalization. But the framework for negotiation that it provides for the next round of trade negotiations promises to foster a process that many hope will

[*] I have benefited from discussions of the topic of this paper with Bernard Hoekman, Bob Stern, Kathleen Trask, and Jaume Ventura.

[1] The other two are the GATT itself and the agreement on trade related intellectual property rights (TRIPs). See Deardorff (1997) for a more complete discussion of the World Trade Organization.

eventually do for trade in services what fifty years of GATT negotiations did for trade in goods.

The motive for liberalizing trade in services, coming as it did from the service industries themselves, was to permit rationalization of service activities along the lines of comparative advantage. It was also, not incidentally, intended to expand the sales and profits of those service providers who were operating from the base of such a comparative advantage. In this sense, the benefits from trade liberalization in services, as well as the costs to those without comparative advantage, are the same as those that trade theory has long attributed to liberalization of trade in goods. Indeed, many have argued that the fundamentals of trade in services are really no different from trade in goods, and only the difficulties of measuring and monitoring trade in services make it distinctive, from a practical policy perspective.[2]

However, for many services the benefits from liberalization extend, in a sense, beyond this, and that is what I will focus on in this paper. Many services play a critical facilitating role in the international trade of products other than themselves, including both goods and other services. This is most obviously true of transportation services, which are necessary for all international trade in goods. But it is also true, perhaps to a lesser extent, of other services such as finance, insurance, and communication, as well as some professional services that are often needed in order to complete the international exchange of goods. And this is equally if not more true of international exchange of services themselves. Tourism, for example, depends critically on international provision of passenger transportation.

[2] See, among others, Deardorff (1985).

It follows, therefore, that liberalization of trade in services can generate benefits beyond the service sectors themselves by reducing the real barriers to trade in other sectors. This is not entirely unique to services, of course. Much trade in goods is of intermediate products,[3] and liberalization of goods trade yields many of its benefits not to consumers directly, but by reducing the costs of other goods. But the mechanism by which service trade can stimulate goods trade is somewhat different, and it bears examination in its own right. That will be the main purpose of this paper: to illustrate, with simple trade theory, how liberalization of trade in services can enhance the gains from trade in goods.

I will do this first, in section II, by using the standard partial equilibrium trade model to compare the benefits of trade liberalization in goods with those from reduced costs of trading that might arise from liberalization of trade in services. In section III, I add the role of trade services to the discussion, and then in section IV I write down a more specific framework for determining and decomposing their costs. This decomposition allows me to identify and focus on the several ways that these costs can be reduced by permitting service providers to operate across national borders. The gains here include the gains from exploiting comparative advantage, of course, but they also go beyond this by permitting providers to avoid duplication of certain fixed costs, and perhaps by allowing them to operate over shorter distances. In section V, I provide a brief discussion of several specific types of trade services, and the extent to which they conform to the more general description of my model.

[3] Sanyal and Jones (1982), in fact, argued that *all* trade is of intermediate products, what they called "middle products."

The benefits from services liberalization become larger if we also add another phenomenon that has been attracting increasing attention recently among trade economists: fragmentation. Suppose that technologies permit production of goods to be fragmented across countries – split into parts that can be done in different locations – and suppose also that fragmentation, like trade, requires additional inputs of internationally provided services. If those services are unavailable or prohibitively expensive, fragmentation will not occur. But as technology and/or trade liberalization in services make them available or bring down their costs, fragmentation will become viable after all. Thus liberalization of services trade can yield even further benefits by permitting greater fragmentation-based trade. This is not fundamentally any different from other gains from trade. But I will argue, in section VI, that it has the potential to be quantitatively more important.

The importance of all of this, as I mention in my concluding section VII, is increasing as negotiations within the WTO continue to reduce barriers to trade and as resistance to globalization also mounts. When this paper was first commissioned and drafted, a new round of WTO negotiations seemed imminent. That is no longer the case, after the events in Seattle in late 1999.[4] However, more limited negotiations within the WTO continue, and there is nonetheless scope for extending the liberalization that has already begun, especially in services. The arguments of this paper suggest that the payoffs may be particularly great for expanding the coverage and effectiveness of the GATS.

[4] See Deardorff and Stern (2000) for some discussion of those events.

## II. Gains from Reductions in Trade Barriers

To start, let us look at the conventional benefits from trade liberalization. That is, consider a good that is imported from a large world market subject to a tariff. Figure 1 shows in two panels what the effects of lowering that tariff will be, under two different assumptions. Panel A shows what happens if the initial tariff is not prohibitive, while panel B shows the prohibitive case. In both, the new tariff is positive and permits trade. The downward sloping line in each panel shows the demand for imports of a good within the importing country, while $p_w$ is the given world price.

In panel A, the initial tariff, $t_1$, raises the price of imports to $p_w+t_1$,, which is below the intercept of the demand curve and therefore permits a quantity of the good, $q_1$, to be imported. When the tariff drops to $t_2$, the price falls to $p_w+t_2$, and the quantity of imports rises to $q_2$. The welfare effects of this are well-known: Consumer surplus (net of producer surplus for competing domestic producers) rises from area $a$ to area $a+b+c$, while tariff revenue changes from $b+d$ to $d+e$. The net effect is that the country's welfare rises by the shaded area, $c+e$. It is perhaps worth noting that if the tariff had fallen to zero, then the net gain would also include area $f$.

In panel B, the initial tariff is high enough to drive imports to zero, and the domestic price is elevated by less than the tariff, just to the intercept of the demand curve. Here there is no tariff revenue to be lost from tariff reduction, and the country gains the entire shaded areas $a+b$, composed of the increase in consumer surplus $a$ and tariff revenue $b$. The gain in welfare appears to be much larger here, but note that the tariff reduction is also much larger. A tariff cut comparable to that in panel A would have yielded less, but since it would include the revenue from the higher new tariff, it might still

be larger than the gain in panel A. In contrast, if the new tariff were zero in this case, then again area *f* would be added to the country's net gain.

Now suppose that trade is not costless, as so far assumed, but rather that to get goods to the domestic market from the world market, where they were bought at price $p_w$, requires that traders purchase certain trade services, such as transportation. In some ways such service costs would seem to be analogous to tariffs, in that they add to the domestic cost of the imported good. Therefore it may seem that the analysis just done for a tariff cut would also suffice for analyzing the effects of services liberalization, once we establish that this will reduce their costs. This is not quite right, however, because service costs of trade are real costs, not just transfers to the government. A separate analysis is needed.

Figure 2 repeats Figure 1, but for the most obvious example of a service cost of trade: transportation. The difference from Figure 1 is that $t_1$ and $t_2$ are replaced by identical real costs of shipping, $s_1$ and $s_2$. These are not transfers to the domestic government, but real resource costs. That is, they are paid to the transportation providers to cover the increased cost of resources that are required for the additional transportation services. This could increase the profits or other incomes of the service providers themselves, but I will simplify by assuming that their costs are constant and that service markets are competitive. It follows that the price of the service remains constant and equal to average cost, therefore yielding no profit or other increase in producer surplus in the service market itself.

The welfare effects of this fall in shipping cost are somewhat different from the fall in the tariff. In panel A, the new gain for the country is the shaded area $b+c$, all of which is a gain in net consumer surplus. There is no tariff revenue for the government to lose,

but on the other hand area *e* is now an increase in real resource costs, not just a transfer to government. Clearly the gain from a drop in shipping costs can be larger or smaller than the gain from an equal drop in a tariff, depending on whether area *b* is greater than or smaller than area *e*. If shipping costs were to fall to zero, on the other hand, then the gain would necessarily be larger than an equal drop in a tariff.

If transport costs are initially prohibitive, however, as in panel B, then the gain from their decline is necessarily smaller than from an equal drop in a prohibitive tariff, unless both of them drop to zero. The reason is simply that the new shipping cost is a real cost, while the new tariff is not.

## III. Gains from Reductions in Barriers to Services Trade

The simplest way to think about trade liberalization in services generally is within the same framework of Figure 1. For example, suppose we are interested in construction services, which can potentially be provided by work crews from a foreign company, so long as they are permitted to operate within the domestic country and are not taxed too heavily. Figure 1 will apply exactly to this case, panel A for a case in which imports of construction services are subject to additional taxes or other fees paid to the local government, panel B to the case where foreign providers are simply excluded. Similarly, suppose that foreign construction companies are allowed to operate within the country but subject to requirements that they jump through various real hoops not required of domestic companies. Then the case is that of Figure 2, which of course could also include the actual transport costs of getting their crews and equipment to the country's borders.

In general, then, the gains from trade liberalization in services may be very much analogous to liberalization of tariff and non-tariff barriers to trade in goods, and this trade

may be analyzed in the same ways. This is a point that I and others made when trade in services first began to be discussed, as in Deardorff (1985).

However, there is one category of services that has some special features worth noting: trade services. By these I mean any services the demands for which arise directly from trade itself, presumably from trade in other industries. Perhaps these services can also be analyzed with the tools above, but their special features make them worth looking at specifically.

The prototypical trade service is transportation. I will focus mostly on that, and my terminology will reflect that, but there are certainly other services that have these features as well, as I will discuss later.

The key is that since trade by definition crosses national borders, any services that cater to that trade are likely to be needed on both sides of the border as well. But if trade in services is not permitted – that is, if service providers are not allowed to operate across these borders – then trade itself is likely to be more costly, if it is possible at all.

An example comes easily to mind in the case of transportation. As I understand it, prior to the North American Free Trade Agreement (NAFTA), Mexican truckers were not allowed to operate within the United States, nor U.S. truckers inside Mexico. If a good was to be shipped by truck between the two countries, then it had to be carried on one country's trucks to the border, unloaded, and then reloaded onto the other country's trucks at the border, and finally shipped the rest of the way.

The costs of this awkward arrangement are obvious, and surely large. Even assuming that the countries allowed the trucks far enough inside their borders to permit them to unload and reload on the same lot, so that they did not have to hand-carry goods

across the border, this restriction of trucking added to the transportation process a wholly unnecessary step of unloading and reloading.

In addition, it must surely be true that trucking firms incur a portion of other fixed costs that do not vary with distance shipped,[5] and that had to be duplicated by firms from both countries every time a good was traded in this way. Adding any other sources of increasing returns to scale and distance that might be present in transportation technology, and one can easily imagine that trade costs were greatly enhanced by this prohibition on (literally) cross-border provision of transportation.

This trucking example will provide the template for my rudimentary model of cross-border provision of trade services. But before I embark on the modeling, however, let me stress the importance of all this, for which the model itself is unnecessary. The point will be that trade in trade services brings down the real cost of trade. The benefits from this may be represented by movement along a demand curve for the service itself, like those of Figures 1 and 2 applied to the service industries, but that misses what is so important about these services. Rather, by allowing cross border provision of trade services we bring down the costs of trade in other things, not just for those services but for everything else. Thus, while a reduced barrier to trade in construction services will increase net consumer surplus of demanders of buildings, a reduced barrier to trade in transportation or another trade service will increase net consumer surplus in *every* industry where trade in the product can avail itself of those services. We're talkin' big bucks here, or at least big utils.

[5] Loading and unloading are themselves such fixed costs.

## IV. A Model of Trade Services

Consider any service, such as transportation, that provides an input that is useful for accomplishing the trade in a good or goods. Output of the trade service is measured in some appropriate units, such as units of the good transported, value of the good insured, etc. Output may also be characterized by one or more other dimensions that are important for determining the usefulness of the service to traders, such as distance or speed, although I will initially allow for neither of these and later, in this paper, will incorporate only distance. In all cases I will focus on the service associated with a particular shipment of a good, S, from a foreign country, F, to the home country, H. I am interested in determining what gives rise to the portion of the cost of shipping the good that arises from input of a some arbitrary trade service, and how this trade-service cost may change as we liberalize trade in the service industry. This cost may be thought of as one component of the shipping cost examined in Figure 2.

To start with, suppose that the per unit cost of the trade service – what I will now call the shipping cost, $s$ – is simply constant, at a rate $c$ that varies across countries where the service providers may be based, in response to the usual determinants of comparative advantage. That is, service providers from country $I$, will have a constant cost $c^I(A^I,w^I)$, where $A^I$ is the technology available in country $I$ for providing this trade service and $w^I$ is a vector of factor prices, including wages, in country $I$. Together, these two arguments embody the usual Ricardian and Heckscher-Ohlin determinants of comparative advantage, the latter entering through relative factor endowments that determine factor prices in general equilibrium. In general these may themselves depend on the openness of trade in services, although that is not something I will allow for here.

Suppose that initially there is no trade in services, and that the home country permits this particular trade service to be provided only by domestic firms with costs $c^H(A^H,w^H)$. Liberalization of trade in services would presumably permit these services to be supplied by a provider based in the foreign country, $F$, from which the good is being imported. Its costs are $c^F(A^F,w^F)$. Or the service might come from a provider based in some third country, $I$, with costs $c^I(A^I,w^I)$. If either of these is lower than $c^H(A^H,w^H)$, then we have the usual gains from trade arising from comparative advantage. However, as noted above, these gains will manifest themselves in lower trade costs of other industries.

Following the trucking example that I mentioned above, however, I will now complicate the service technology, allowing its unit cost per amount shipped to depend on both quantity shipped and distance. Consider again a shipment $S$ of a good from an arbitrary location $A$ to another location $B$. The quantity shipped is $Q^S$. Then, using a service provider from country $I$, the total cost of the service for the shipment is assumed to take the following form:

$$C^I = c_0 + c_1 Q^S + c_2 D_{AB} + c_3 Q^S D_{AB} \tag{1}$$

where the parameters $c_i$, like $c$ above, depend on technology and factor prices in country $I$:

$$c = (c_0,\ldots,c_3) = (c_0(A^I,w^I),\ldots,c_3(A^I,w^I)) \tag{2}$$

The first of these parameters, $c_0$, is a fixed cost per shipment that does not depend on the quantity shipped, nor on the distance shipped. It's presence does not imply the existence of increasing returns to scale, in the usual sense, since it will be repeated for every shipment that the service firm administers. However, it does imply that the cost per unit shipped, $s^I=C^I/Q^S$, declines with the quantity shipped. An example would be the bureaucratic requirements for getting permission for a shipment. The $c_1$ parameter is

simply cost per unit shipped, analogous to the only cost allowed above, such as the cost of loading and unloading. Parameters $c_2$ and $c_3$, on the other hand, involve distance. $c_2$ is a cost per unit of distance, but note that it does not depend on quantity shipped, and therefore should be thought of as another fixed cost. It too will cause $s$ to decline with quantity shipped. In the trucking example, this would include much of the variable cost of transportation, such as the driver's wage, which depends on time spent on the road but not on how much is in the truck. Finally, $c_3$ is a cost that depends on both distance and quantity, such as part of the fuel cost in transportation that depends on both distance and load.

In general, then, the service cost of a shipment depends on both the quantity shipped and distance, through parameters that in turn depend on technology and factor prices of the country providing the service:

$$C^I = C(Q^S, D; A^I, w^I) \tag{3}$$

The service cost per unit shipped, $s$, is this divided by $Q^S$, which I will abbreviate as $s^I(D)$, since I will not be varying $Q^S$:

$$s^I = C^I / Q^S = C(Q^S, D; A^I, w^I) / Q^S = s^I(D) \tag{4}$$

That is the technology, and some notation to represent it. Now I make a critical assumption about policy: I assume that, in the absence of trade in services, service providers are permitted to operate *only* in their own countries. What this means, for the services needed to accomplish a shipment from foreign country $F$ to home country $H$, is that only a Foreign service provider can service the shipment up to the border, and only a home-country provider can service it from there on. Thus I will represent the origin of the shipment as location $F$, within country $F$, and the destination a location in $H$ called $H$. But

no service provider is permitted to service it the whole way. Instead, there is a location $B$ on the border between the countries (or perhaps in international waters), where one provider stops and the other takes over.

With this assumption, the total service cost for the shipment in service autarky becomes

$$\begin{aligned} C^{Aut} &= C^F(Q^S, D_{FB}; A^F, w^F) + C^H(Q^S, D_{BH}; A^H, w^H) \\ &= (c_0^F + c_0^H) + (c_1^F + c_1^H)Q^S \\ &\quad + c_2^F D_{FB} + c_2^H D_{BH} + c_3^F Q^S D_{FB} + c_3^H Q^S D_{BH} \end{aligned} \tag{5}$$

and the service cost per unit shipped – again in service autarky – is

$$\begin{aligned} s^{Aut} &= \left[C^F(Q^S, D_{FB}; A^F, w^F) + C^H(Q^S, D_{BH}; A^H, w^H)\right] / Q^S \\ &= \frac{(c_0^F + c_0^H)}{Q^S} + \left(c_1^F + c_1^H\right) \\ &\quad + \frac{c_2^F D_{FB} + c_2^H D_{BH}}{Q^S} + \left(c_3^F D_{FB} + c_3^H D_{BH}\right) \end{aligned} \tag{6}$$

If trade in services is now permitted, service for the entire shipment will be provided by a single provider, and in general it may or may not be a provider from one of the two countries who are trading the good. Let country $L$, which may be $H$ or $F$, have the lowest cost of providing the service for this particular route from point $F$ to point $H$, not necessarily passing through point $B$. This then is the cost if free cross-border provision of services is permitted:

$$\begin{aligned} s^{Free} &= s^L(D_{FH}) = \frac{c_0^L}{Q^S} + c_1^L + \frac{c_2^L D_{FH}}{Q^S} + c_3^L D_{FH} \\ &\leq \min_{H,F}\left[s^F(D_{FH}), s^H(D_{FH})\right] \end{aligned} \tag{7}$$

This cost is evidently lower than the cost in autarky, $s^{Aut}$. To see the several ways that cross-border provision of services can reduce these costs, I now decompose the cost reduction into three parts, numbered 1, 2, and 3, as follows:

$$\begin{aligned} s^{Aut} - s^{Free} &= s^F(D_{FB}) + s^H(D_{BH}) - s^L(D_{FH}) \\ 1: &= \left[s^F(D_{FB}) - s^L(D_{FB})\right] + \left[s^H(D_{BH}) - s^L(D_{BH})\right] \\ 2: &+ \left(\frac{c_2^L}{Q^S} + c_3^L\right)\left[(D_{FB} + D_{BH}) - D_{FH}\right] \\ 3: &+ \left\{\frac{c_0^L}{Q^S} + c_1^L\right\}(2-1) \end{aligned} \tag{8}$$

1. **Comparative Advantage:** The first line of the decomposition in (8) is the conventional gains from trade due to comparative advantage. It includes the cost reduction that is possible if a different producer, operating from a different base of comparative advantage, does essentially what was being done before. That is, continuing to service the shipment in two parts within each country, we replace the service providers in both with the low-cost provider that may operate from a different country and that therefore, with better technology and/or different factor prices, may be able to provide the service for lower cost. Of course it is possible that the low-cost provider is from one of these two countries themselves, in which case one of the bracketed terms in line 1 is zero. These gains may be large or small depending on the importance of comparative advantage in this context. They may even be negative, if the low-cost provider's advantage derives mainly from servicing longer distances than these internal ones.
2. **Reduced Distance:** It is possible that the border location, through which trade must pass if service trade is not permitted, happens to lie exactly on the least cost trade

route between the two countries, in which case the second effect identified above will be zero. But in general this will not be the case, and a more direct route will exist that bypasses that particular border location. In general, therefore, there will be some cost savings simply from traversing and servicing a shorter distance, as $D_{FH} < D_{FB} + D_{BH}$.

3. **Elimination of Fixed Costs:** The most important cost savings, however, is likely to be found in line 3 of the decomposition. By switching from two service providers to a single one, even if they both have the same technology (as they do in line 3), the need is eliminated to incur two sets of fixed costs. That is, those costs that do not vary with distance, but instead are incurred for each shipment regardless of distance and perhaps in proportion to output, are needlessly duplicated when two providers share the task. One whole set of these fixed costs is therefore saved when the task is unified. To stress this, I have included the arithmetically unnecessary expression "(2−1)" in line 3 of the decomposition, to remind us that fixed costs are being reduced from twice the curly-bracketed expression to only one times it. Of course, whether this is in fact a large source of cost savings depends on the size of these fixed costs, which could for some technologies be negligible. But casual observation suggests that it is often large.

This is all that my model has to say directly about the cost savings from cross-border provision of trade services. However, realistically, there are several more such sources of savings that may enter, and these should be mentioned even though they do not appear explicitly in the model.

4. **Economies of distance:** This one is in the model, at least partially, but it is hard to separate from the other effects. Different service technologies may be more or less well suited to serving shipments over longer distances, and often those suited for

longer distances will not be commercially viable for the short distances that lie only inside of countries. The specification of technology used above incorporates this feature, to an extent, through the cost parameters that do and do not vary with distance. Thus the least cost provider may achieve that low cost, once trade is free, primarily because its costs that vary with distance are small compared to its fixed costs that do not. As mentioned above, either or both bracketed expressions in line 1 of (8) could be small or even negative if the low cost provider is inefficient over short distances, and the cost savings from the more appropriate technology would then be merged into the savings from reduced fixed costs in line 3. Perhaps more importantly, the formulation here has not allowed for any choice of techniques, except across providers. But in fact such choices do exist, and even a domestic provider that currently services only short routes may substitute more appropriate techniques once service trade makes them useful. This substitution, if it occurred, could only reduce costs further.

5. **Economies of scale:** As I stressed above, the formulation here, despite appearance, does not include any economies of scale. That is, a service provider saves nothing in costs by serving multiple shipments of the same size and distance. Yet such economies of scale undoubtedly exist as well, in some trade-service industries just as in many other industries. As cross-border provision of services permits more efficient providers to displace those less efficient, the surviving firms will become larger and may therefore have lower costs. There is nothing new about this effect, but once again it should be remembered that this cost saving too, if it happens, will stimulate trade and the gains from trade in the industries whose trade relies on it.

6. **Border Frictions:** In the model here, the worst that happens when a trade route is arbitrarily divided across service providers from the two countries is that they simply do their work back to back. In fact, when impediments to cross-border provision of services exist, it is likely that the costs of interfacing between the two providers will be higher. In the U.S.-Mexican trucking example that motivated my model, one can easily imagine that the costs of transferring a cargo from a Mexican truck to an American one will exceed just the costs of unloading and then reloading. If the equipment used by both trucking companies are not compatible, it may be necessary to repack a load or transfer it also to another shipping container. If procedures used by the two work crews are not the same, additional inefficiencies may arise from the effort to make them conform. At a minimum, one may simply need a roof over the heads of the workers and their cargo, something that would have been provided naturally at the origin and destination of the shipment. These additional costs could have been included in the model here, at the cost of a bit more notation, but it seems enough merely to point them out separately.
7. **Time:** I mentioned earlier that an important dimension of service provision is time, but I did not include it explicitly in the model here. No doubt the time cost associated with different modes of trade servicing could mostly be included implicitly in the parameters of this model. But it is worth mentioning separately as well, since reduced time costs seem likely to be one of the important benefits of cross-border service provision. When services must be provided by separate institutional entities, it is almost inevitable that time will be wasted in coordinating them. This is time that could easily have been saved if a single provider were permitted to handle the whole job. In

a world where timely provision of inputs and outputs has become one of the most critical elements of competitive success, these time benefits must be far from trivial.

8. **Regulatory Costs:** Many services are regulated by governments. To the extent that these regulations exclude foreign services providers completely, then of course liberalization of services trade means changing these regulations. In some cases, however, foreign service providers are permitted to operate within a country, but the regulations that apply to them increase their costs compared to domestic firms. For example, trucking companies may be permitted to carry cargo into a country but not out, forcing them to bear the cost of returning the trucks to their home market empty. Regulations may also require that certain categories of demanders – especially government agencies themselves – use domestic providers. Like nontariff barriers in goods, these asymmetric regulations undermine competition and efficiency, and their removal will be beneficial. In addition, applying the same regulations to both foreign and domestic service providers may facilitate the use of a single provider for an entire transaction, permitting the sort of cost reduction that has been the subject of this paper.
9. **Red Tape Costs:** Even if the same regulations apply to both foreign and domestic providers in an industry, it may still be necessary to bear the costs of satisfying these regulations in both countries in order to service a complete international transaction. This was mentioned above as one of the sources of the fixed cost, $c_0$, in the model, but the duplication of this cost will not be eliminated merely by permitting providers to operate in both countries subject to their domestic regulations. They will still have to fill out forms in both countries, undergo inspections in both, etc. Services trade

liberalization therefore needs to include provisions for either harmonizing the regulations themselves across countries, so that a single set of procedures will satisfy regulators in both, or it should include mutual recognition agreements whereby firms need only be certified in one country in order to operate in both. Of course, this raises difficult issues when countries disagree on what levels of regulation are needed to protect their citizens' health and safety. But only if this problem is resolved can the full benefits of cross-border service trade be enjoyed.

## V. Specific Trade Services

The discussion so far has attempted to be general, saying things that may apply to any and all trade services. In this section I say a few words about each of several specific and familiar trade services, primarily to address whether they seem to fit well or poorly into the mold of this model. In addition, in some cases, I will acknowledge special characteristics of these specific trade services that may make them particularly important for enhancing trade in goods.[6]

### *Transport Services*

The model was largely motivated, as said above, by the example of trucking services between Mexico and the United States. It therefore seems to fit best the circumstances of transport services more generally. Certainly, transportation services of all sorts are characterized by costs that vary with both quantity shipped and distance. In addition, there routinely exist fixed costs per shipment that are independent of quantity,

distance, or both, such as take-off and landing costs of aircraft, maintenance of railway tracks, and the pay of stevedores in ocean shipping.

Policies regulating the cross-border provision of transport services are apparently as widely varied as the services themselves, but they are notoriously encumbered by restrictions favoring national suppliers. These range from restrictions on domestic flights by international carriers to the notorious Jones Act restrictions on ocean shipping within U.S. territorial waters. Some of these restrictions are meant less to protect domestic suppliers than to protect favored categories of labor, often at the suppliers' expense, and thus seem to operate more directly on the cost parameters of an industry than on who can operate. But either way, one can expect liberalization of trade in transport services to greatly lower the costs of trade.

***Insurance***

International trade is inevitably more risky than domestic trade, because of the broader range of unpredictable shocks to which it is subject from climate, culture, and government interference, not to mention the financial uncertainty of different national currencies and markets. Insurance to protect against these uncertainties is therefore an essential input to international trade, even more so than to domestic commerce. For many of these uncertainties, it is not strictly necessary for the insurance provider to operate physically in a foreign territory, and therefore much of the required insurance can be provided completely by a domestic carrier within, say, the exporter's country of origin. The principal gain from trade in insurance services may therefore be the availability of

[6] See Hoekman and Primo Braga (1997) for a useful discussion of many actual barriers to trade in

lower cost insurance from a foreign carrier – the gain attributed to comparative advantage above.

However, there are surely some risks associated with trade within a foreign country that are not well covered by a domestic carrier. Indeed, some risks may not even be recognized as requiring insurance, leaving a trader exposed to risks that they are not aware of, but that they could have known if they had hired the services of a local provider as well. As a result, the prudent international trading company is likely to require the services of several insurance companies specializing in their several countries of operation. And as in the transport case, the costs of this more complete coverage is likely to be reduced if a single provider, operating routinely in all relevant markets, can provide the coverage.

In other words, while the terminology of the model here was largely taken from the transport industry, it seems likely that it fits the market for insurance as well, although perhaps to a lesser extent.

***Communication***

Increasingly in the modern world, international trade requires rapid and effective communication to specify the details of a transaction and tailor them to the needs of all concerned. It would be hard to overestimate the importance of modern communication technologies for the growth of world trade in recent decades. And yet to a surprising extent, communications are still encumbered by different national standards and restrictions on who can use them, forcing international businesses to work around these

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services.

restrictions by patching together pieces from different companies and different technologies. The rise of the internet is changing much of that, and perhaps such national restrictions on communications will lose their bite as this occurs. But greater freedom for communication firms to operate world-wide will nonetheless still serve a purpose of facilitating trade.

***Travel Services***

Much of the travel industry – both passenger transportation and other services such as hotels, restaurants, and local transportation – is geared to tourists and therefore not directly relevant here except as a category of trade itself that relies heavily on trade services. However, these same services are also used by those who travel on business, and these are an essential input to international trade. In spite of advances in long-distance communication, the on-site presence of people in face-to-face contact and engaged in direct oversight of activities continues to be essential for international commerce. Travel services are therefore a nontrivial input to international trade, even in goods.

Like the other categories of trade services considered here, travel services can be provided more efficiently if done by single, or at least allied, providers that span national borders, so as to coordinate reservations and other aspects of their service. Much of this has already been facilitated in recent years by the formation of international networks of airlines and hotel chains, but these are seldom as efficient as a single larger or merged firm operating across borders.

### *Professional Services*

International transactions, no less than domestic ones, require the services of all manner of professionals. Lawyers are needed to vet contracts with both domestic an foreign suppliers and customers. Accountants must keep the books in a manner compatible with different national requirements. Expansion of a company's operations is likely to require the services in different countries of architects, contractors, real estate agents, and the like. In each case, the service must be tailored to the local market, so that it may seem that separate providers are necessarily called for. However, the services must also be integrated and compatible with what is being done by the same firm in other countries, and this requires effective communication among them. This is most easily accomplished if the national-based providers work together regularly, as they would if they were part of a single multinational service company. Looked at in this way, the costs of professional services may not be all that different from others discussed here. And for many such services, such as law, professionals from one jurisdiction are prohibited from practicing in another.

### *Financial Services*

The final service category I will consider is financial services. This includes a wide variety of services that are necessary for international trade, ranging from export financing to foreign exchange. However, this is the one category where it is not obvious, to me at least, that international provision of the services is really necessary. Most of a trading firm's financial needs can be met, I suppose, within a national firm that knows the client

well, and except for minor transactions, like providing currency to the firm's overseas travelers, the national firm need not have a presence abroad.

However, this does not in any way diminish the importance of the financial services themselves, or mean that well-functioning world financial markets are not critically necessary for international trade. In Deardorff (2000), I examine the disruption that can be caused for trade by a financial crisis that undermines confidence in a nation's currency and its financial institutions. To the extent that more integrated world financial markets can lessen the likelihood of such disruptions, trade and the gains from trade will be among the beneficiaries.

## VI. Fragmentation

The focus here has been on various ways that liberalization of trade in services may reduce the costs of trade, and thereby lead to gains from trade as discussed in Section II. The potential for such gains has arguably expanded in recent years as production processes have become more and more fragmented into smaller pieces done in different locations. This process of fragmentation has appeared in the literature of international trade in several forms and under several names – such as international specialization, outsourcing, and even globalization.[7] A common theme has been that fragmentation permits countries to specialize ever more finely in the bits of production processes in which they have the

[7] Although there may be slight differences in what various authors mean by the terms they use, this list of variations on the theme of fragmentation includes "disintegration" Feenstra (1998), "internationalization" Grossman and Helpman (1999), "intra-product specialization" Arndt (1997), "multistage production" Dixit and Grossman (1982), and "vertical specialization" Hummels et al. (1998). Others have used standard terms such as "subcontracting" and "outsourcing" (Feenstra and Hanson 1996) to address what are certainly important aspects of the phenomenon. I follow Jones and Kierzkowski (1990) using the term "fragmentation."

greatest comparative advantage, and that by locating these different bits in different countries and coordinating them internationally, the world economy can achieve ever greater gains in productive efficiency.

The process of fragmentation is not at all new, but it has been newly extended in recent decades in part by technological changes that have made the international coordination of fragmented production increasingly feasible. These technologies have primarily appeared in service industries, where more rapid and effective transportation and communication across countries has been a precondition for reducing the costs of final products by producing them in stages in different countries. As a result, the international provision of many services has come to play a larger and larger role in international trade, even beyond what it was when products were more typically produced in one place.

This expanded role of services due to fragmentation also gives rise to additional potential gains from further reductions in the costs of services, such as have been the focus of this paper. In one sense, one can simply think of the effects of reduced trade costs depicted in Figure 2 as being repeated over an ever larger number of traded fragments, and thus multiplying the gains from trade.

Another approach is shown in Figure 3, which is adapted from Deardorff (1999). There, the gains from trade in a simple Ricardian trade model are contrasted with the gains from fragmentation in the same model. The Ricardian straight-line transformation curve for two goods without fragmentation is shown as the line $Q_1Q_2$, and the level of consumption in autarky as point $C^{Aut}$. Conventional trade allows the country to specialize in good 1, producing at $Q_1$ and trading at world prices given by the slope of line $Q_1A$ to achieve consumption at point $C^{Free}$. If the technology for good 1 becomes fragmented,

however, then the country can specialize in just one fragment – whichever one it produces relatively most cheaply – and trade the fragment on the world market for a larger quantity of good 1 than it could have produced itself without fragmentation, $Q_1$'. The country's budget line trading on the world market is therefore shifted out by fragmentation, and it can achieve the higher consumption level $C^{Frag}$. The message here is that fragmentation expands a country's consumption possibility set, not just by improving its terms of trade of one final good for another, but by expanding the maximum attainable amount of all final goods, almost as though by an improvement in productivity.[8]

But fragmentation also involves much greater inputs of services than would be needed for trade in final goods only, in order to coordinate the fragments. Therefore, these gains are conditional upon the availability of such services at low cost. The recent emergence of fragmentation as an increasingly important phenomenon in the global economy owes its existence to technological improvements that have brought these costs down to historically low levels. The additional benefits from even greater fragmentation will depend on lowering these costs still further through the sorts of liberalization of trade in services that have been examined in this paper.

## VII. Conclusion

The message of this paper is that there is tremendous scope for the world to benefit by liberalizing trade in services. This is especially true for trade in what I have called trade services – those that facilitate trade in goods and in other services. By bringing down the

[8] It is not literally that production possibilities are necessarily expanded by fragmentation, as explained more fully in Deardorff (1998), where production possibilities are viewed in three dimensions including both an intermediate input and the final product, as well as the other good that both may be traded for.

costs of trade services, liberalization can generate benefits that are not confined only to the services markets themselves, but that will appear in the markets for every other kind of trade that they facilitate.

The paper has examined a variety of ways that removing barriers to the cross-border provision of trade services can lower their costs. These include the gains that conventionally arise from comparative advantage, but in the framework presented here there are additional gains as well that are plausibly larger. These arise especially when restrictions in services markets require that the services needed to facilitate a single trade must be provided by two different national service providers. When that is the case, removal of such restrictions has the added benefit of eliminating duplicated fixed costs.

Regardless of the size of any cost reduction in trade services, the benefits for trade are arguably enhanced by the phenomenon of fragmentation. The more that production processes become split across locations, with the fragments tied together and coordinated by various trade services, the greater are the gains from reductions in service costs. Since fragmentation seems to characterize an increasing portion of world specialization and trade, the importance of service liberalization is growing apace.

All of this is particularly timely right now, as the world hesitates in its forward movement toward more liberal trade. The creation of the World Trade Organization and the GATS provided a framework for making real progress in reducing barriers to trade in services. Had a new trade round been inaugurated at the Seattle 1999 ministerial meeting, as expected, then the arguments made in this paper could have buttressed the case for intensive negotiations in services, where the payoffs can be so great. As it is, however, the timing and perhaps even the likelihood of a new round is in doubt. A backlash against

many aspects of globalization now questions the benefits and the equity of reducing trade barriers and constraining trade policies. How these issues will be resolved is not yet clear, but it does seem evident that the benefits from services liberalization are immune to many of these objections. I would hope that the members of the WTO will be able to move ahead in services liberalization even as other aspects of the WTO agenda may be stalled.

## References


Arndt, Sven W. 1997 "Globalization and the Open Economy," *North American Journal of Economics and Finance* 8, pp. 71-79.

Deardorff, Alan V. 1985 "Comparative Advantage and International Trade and Investment in Services," in Robert M. Stern, (ed.), *Trade and Investment in Services: Canada/US Perspectives*, Toronto: Ontario Economic Council, pp. 39-71.

Deardorff, Alan V. 1997 "An Economist's Overview of the World Trade Organization," in Korea Economic Institute, *The Emerging WTO System and Perspectives from Asia*, Joint U.S.-Korea Economic Studies Vol. 7.

Deardorff, Alan V. 1998 "Fragmentation in Simple Trade Models," Discussion Paper No. 422, Research Seminar in International Economics, University of Michigan, January 7.

Deardorff, Alan V. 2000 "Financial Crisis, Trade, and Fragmentation," Discussion Paper No. 458, Research Seminar in International Economics, University of Michigan, April 18.

Deardorff, Alan V. and Robert M. Stern 2000 "What the Public Should Know about Globalization and the World Trade Organization," Working Paper No. 460, Research Seminar on International Economics, University of Michigan, July 20.

Dixit, Avinash K and Gene M. Grossman 1982 "Trade and Protection with Multistage Production," *Review of Economic Studies* 59, pp. 583-594.

Feenstra, Robert C. 1998 "Integration of Trade and Disintegration of Production in the Global Economy," *Journal of Economic Perspectives* 12, (Fall), pp. 31-50

Feenstra, Robert C. and Gordon H. Hanson 1996 "Globalization, Outsourcing, and Wage Inequality," *American Economic Review* 86, May, pp. 240-45.

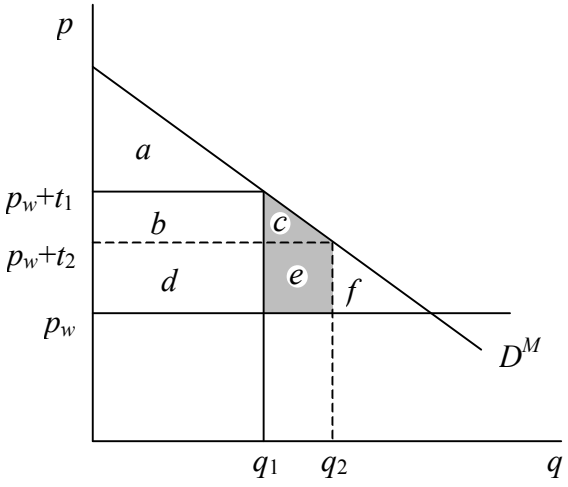
Grossman, Gene M. and Elhanan Helpman 1999 "The Internationalization of Economic Acitivity," National Science Foundation grant, July.

Hoekman, Bernard and Carlos A. Primo Braga 1997 "Protection and Trade in Services," Policy Research Working Paper #1747, World Bank, April.

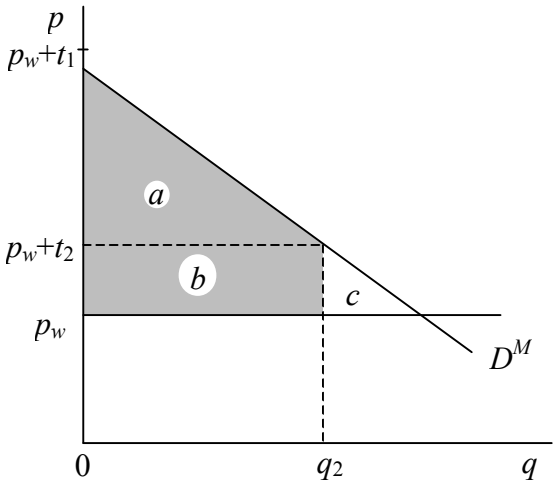
Hummels, David, Dana Rapoport, and Kei-Mu Yi 1998 "Vertical Specialization and the Changing Nature of World Trade," *FRBNY Economic Policy Review*, June, pp. 79-99.

Jones, Ronald W. and Henryk Kierzkowski 1990 "The Role of Services in Production and International Trade: A Theoretical Framework," in Ronald W. Jones and Anne O. Krueger, eds., *The Political Economy of International Trade: Essays in Honor of Robert E. Baldwin*, Cambridge, MA: Blackwell, pp. 31-48.

Sanyal, Kalyan K. and Ronald W. Jones 1982 "The Theory of Trade in Middle Products," *American Economic Review* 72, pp. 16-31.

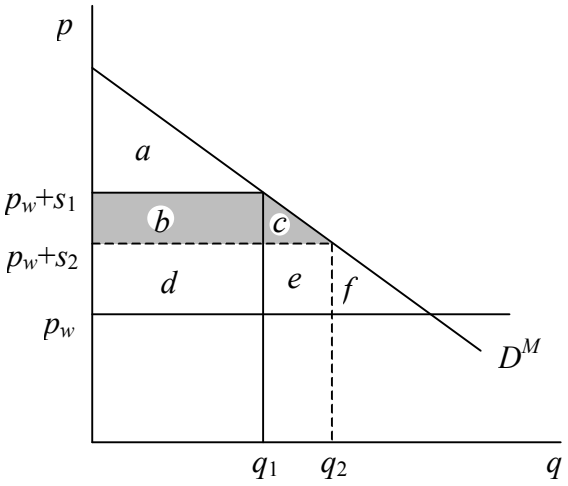



A. Reduction of a non-prohibitive tariff

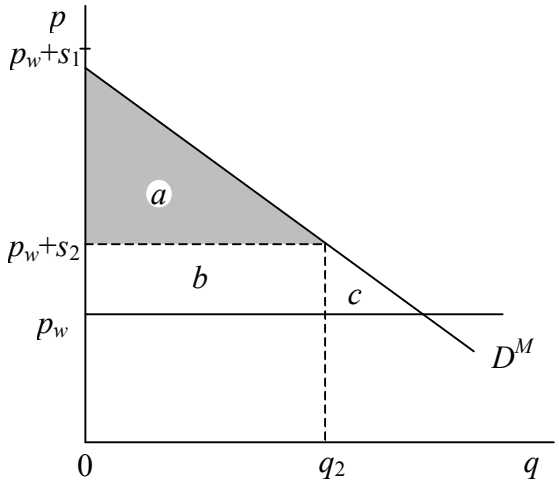



B. Reduction of a prohibitive tariff

Figure 1
Tariff Reduction




A. Reduction of a non-prohibitive transport cost




B. Reduction of a prohibitive transport cost

# Figure 2
# Reduction in Transport Cost

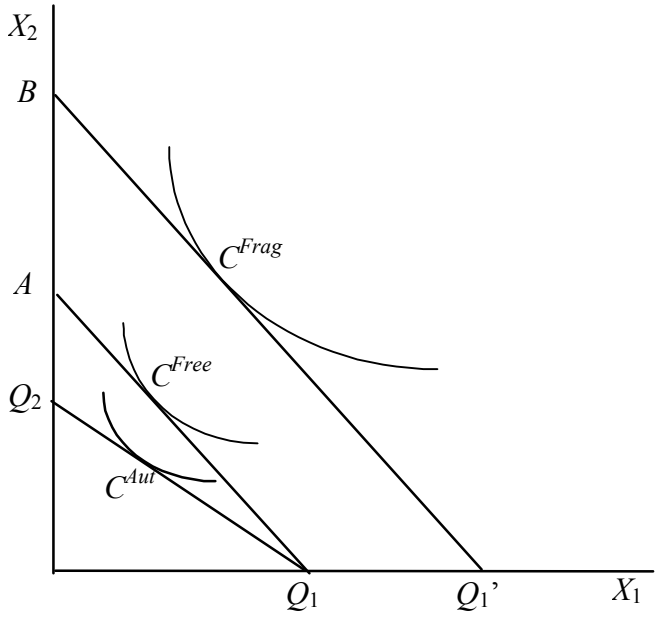



Figure 3
Gains from Trade and Fragmentation