

Trade and Foreign Investment in Business Services

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Abstract

At some conceptual level, trade in goods and services are not that much different. However, the speed at which trade and foreign investment in services is growing, along with the fact that the barriers to these activities are quite different from those for trade in goods prompts us to take a more careful look. The paper begins with a general discussion about the various policies and technological constraints that impact foreign trade and the establishment of foreign commercial presence in intermediate business services. We then discuss which characteristics an accurate modeling approach must capture. Following that, we develop a model that allows for different regimes of trade and/or foreign affiliate production in services using Markusen's knowledge-capital model. Simulations show that the pattern of service firm headquarters and office locations can differ considerably depending on whether it is trade, investment, or both that are either liberalized or become technologically feasible. Our results find that the welfare and factor-price consequences are quite similar across the different scenarios.

April 2008

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1. INTRODUCTION

Trade and foreign direct investment (FDI) in business services has received a lot of attention from economists, politicians, and business journalists. It is not quite clear why this is the case, but we suspect that there is a concern about the loss of skilled and semi-skilled white-collar jobs to developing countries. There was a certain level of controversy and resistance to low-skilled manufacturing jobs being offshored, but the potential loss of skilled jobs in information technology to foreign workers is an even greater perceived threat to workers in developed countries.

It is indeed the case that trade and FDI in business service has increased greatly in the last few years. Statistics are presented in Table 1 and will be discussed more below. It is also clear that much of the increased activity is mediated by multinational firms, whether that is actual FDI (we measure sales of foreign affiliates) or intra-firm trade between parent and affiliate.

Economists have wondered, discussed, and argued for years about how to define services and even more so when incorporating services into international trade and investment analyses. They have also pondered whether services sectors require any new or different theory as opposed to those used for goods trade and investment analysis. At the general level of Debreu-type general-equilibrium models, the abstract theory does not need to make a distinction between goods and services, whatever the latter might be. An objective of this paper is to enquire about an appropriate theory of trade and FDI in services. It is quite possible that no particularly new theory is required, that an adaptation will do, and this is indeed our view. The motivation for our inquiry into this issue is twofold. First, trade and FDI in services has become an important

policy issue, so it deserves to be examined not only empirically but also theoretically as the latter gives structure to the former. Second, the types of restrictions that impede trade and FDI in services and subsequently raise costs to potential service providers are generally quite different from those that impede trade in goods and they have different effects on service providers' decisions to enter a foreign market in a particular manner (cross-border trade versus establishing a commercial presence). We will duck the issue of defining services entirely by concentrating on what the US Bureau of Economic Analysis defines to be business services in their actual data.

Specifically, we are going to use Markusen's (2002) knowledge-capital model of the multinational enterprise (discussed later) to try to fit many of the stylized facts about trade and investment in business services. We argue that this model is relevant and that straightforward adaptations of the model make it a good candidate for analyzing services.

Throughout the paper we focus on the offshoring of services to foreign affiliates. We will not differentiate effects on captive offshoring (within the ownership of the firm) to offshore outsourcing (outside the boundaries of the firm's ownership). This is an old question which has been revitalized recent by new approaches (e.g., Antrás 2003) and it is unfortunately beyond the scope of this paper. The structure of the paper is as follows. Section two presents a short primer on barriers to trade and investment in services. Then we present a general discussion about the characteristics of trade in business services that are essential to modeling services and how they differ from those in goods trade. The model itself follows, and the paper concludes by presenting a set of simulation results and their interpretations.

2. BARRIERS TO TRADE AND INVESTMENT IN BUSINESS SERVICES: A PRIMER

Trade in services encompasses a wide variety of industries, different modes of supply, and both intermediate and final demand. Analyses of trade in services often focuses on the role of services as an input into manufactured goods production and where the role of the multinational in trade in services is likely to be an important one. In addition, services are also intermediate inputs into final service production. There is also an increasing large and important range of services provided directly to the consumer which is experiencing continual expansion due to constant increases in global internet access.

Barriers to trade and investment in services can be roughly broken down into what we could call “natural” economic costs and “policy-imposed” costs. For the former, we are thinking of things like communications and transport costs (workers flying between countries), language, customs, time zones, the need for face-to-face interaction and so forth. Clearly great improvements in communications technology and more speculatively the wide spread adoption of English as a shared second language have reduced these natural barriers and have been responsible for much of the great increase in trade. Our discussion here will concentrate on the second category, since they are more under the control of governments and consistently prevalent across developed and developing countries. A much more in depth and exhaustive treatment of these issues is found in Hoekman (2006).

Policy-induced barriers, henceforth “barriers” for this section, to trade in services take diverse forms and therefore affect service suppliers’ cost functions differently. Regulatory policies, in addition to explicit and implicit barriers to trade in services, generally fall into one of five basic categories. First, there can be quantity-based restrictions imposed on services suppliers

that explicitly restrict the volume of services imported, similar to a quota. The use of a fixed number of licenses available or access to only certain firms or sectors also falls into this category. If a “quota” type policy is only applied to imported services, then we would expect to see more multinationals establishing affiliates in the market (all other things equal). This is similar to a “tariff jumping” activity discussed in traditional theories of the multinational firm. On the other hand, price control restrictions can be implemented which effect a firm’s variable costs. These may take the form of a price floor or ceiling and not affect foreign suppliers differently than domestic firms, however, they are still costly and create an inefficient level of services supplied.

Thirdly, there are numerous barriers to establishment that restrict foreign supply of services due to the high costs of establishing a commercial presence. Policies regarding licensing procedures, requirements and fees can be prohibitive. Bureaucratic red tape, requirements for local management, or lack of transparency all have detrimental effects on the fixed costs of establishing commercial presence for multinationals. These may create a substitution effect with multinationals supplying the service from abroad rather than establish an affiliate. In addition to fixed costs increases firms may also be concerned about risks from opacity of the government or regulators. For instance, governmental departments which control license allocation can decide how difficult or easy it is to obtain information surrounding licensing procedures and requirements. These concerns may create additional incentives for firms to serve the market via cross-border trade. However, it is possible that these policies may also affect the ability to supply the services across the border, which would complicate the firm’s decision.

Fourthly, barriers to trade and establishing commercial presence in services may take the

form of restricting the use of inputs. This category can include restrictions on workers, required percentages of locally produced material inputs, as well as barriers or limits on the use of networks or media for promotion and/or marketing purposes. These policies can greatly increase the costs of operations for foreign suppliers and may be prohibitive to entering the market. Even with economies of scale the increased cost of production is likely to be a deterrent to establishing an affiliate. If the majority of restrictive services trade policies fall into this category we would expect multinational firms to prefer cross-border trade rather than establish an affiliate in order to supply services to that particular market.

The last category of restrictions encompasses the various domestic regulatory barriers that take many forms and are often overlooked when discussing impediments to trade and investment. These include policies regulating professional qualification, residency and citizenship restrictions, obligatory membership in local professional association, juridical requirements, and limitations of inter-professional cooperation. While the policies and regulations may not explicitly target foreign firms they often have this effect in practice. Regulations on professional qualifications are important domestic policies to have so as to guarantee a level of skill and professionalism to consumers. However, when these policies require residency, citizenship, or involve re-certification for professionals with comparable certifications from another country, they become costly. While they are not explicit barriers to trade these policies severely increase the fixed costs (time and money) for a firm establishing commercial presence and may be prohibitive as well. A number of regulatory policies also restrict foreign service suppliers through the lack of transparency and other difficulties encountered through the bureaucratic process of obtaining licenses. Particularly in developing

countries, the licensing processes are complex and non-transparent. These processes are barriers to foreign firms in terms of added costs and increased risk. The fixed costs of entry and market access are increased and depending on the licensing allocation, variable operating costs may also be affected from required paperwork or reoccurring licensing fees.

Another set of issues (or subset of point three above) prevalent in both developing and developed countries are legal policies governing the form of establishment for foreign service suppliers. These act as barriers to firms wanting to establish a foreign affiliate and often reflect market power distortions within the sector. Policies often prevent wholly owned subsidiaries and instead allow specific numbers and locations of branches. They also serve to regulate partnerships, joint-ventures, and foreign ownership percentages. This genre of regulatory policies may have significant effects on a firm's decision to serve a market through cross-border trade or an established affiliate. It is also possible that very open regulatory policies may lead to a firm establishing an affiliate to provide services for the host market and for other markets in the region (export-platform FDI). Overall, it should be stressed that regulatory policies are needed in professional industries in order to insure against fraud and to protect consumers. The problems arise when regulatory policies impose significant fixed and operational costs on foreign entrants into the market. At that point the regulators are creating or exacerbating market inefficiencies and distortions leading to welfare and productivity losses.

Undeniably, foreign service suppliers encounter barriers from explicit trade policies, establishment and market access policies, domestic regulation, as well as other internal policies affecting the costs of supplying services in a country. The effects that these have on the supply of services are intricate and difficult to filter out. Unlike tariffs, most restrictions to services trade

are behind the border and are not clearly quantifiable. Additionally, the effects of policies restricting services trade and affiliate production have complex interactions. They can affect the choice of mode of supply, the quality of the services provided, additional investment in complimentary industries, as well as productivity and economic growth within the economy in question. This complex nature of issues surrounding trade in services is motivating the plethora of research into this area; however, the lack of data makes analysis arduous.

Data on barriers are largely non-existent and furthermore, data on trade flows and foreign affiliate sales at a disaggregated level are unavailable for the majority of trading partners. There have been recent attempts to improve data collection on cross-border trade in services among OECD countries; nevertheless, data on foreign affiliate sales in services is limited to very few countries and are not disaggregated at the sector level. Pressure on national statistical offices to collect and disseminate services data at the sectoral level must continue to be applied by academia, international organizations, and the private sector. Without data it is impossible to make any real analysis of the effects that regulatory and trade policies have on the sale and import of services from foreign suppliers. Likewise any potential effects on welfare, growth, or productivity are indiscernible with any accuracy.

Trade in services is different from trade in goods in many different ways. The most obvious distinction is that freight and transportation costs are not a core cost for services suppliers. Additionally, trade in services often requires face to face interaction with the consumer or client, which is why establishing commercial presence or the temporary movement of personnel is almost always necessary. Therefore, foreign affiliate sales of services are a significant portion of total trade in services, and further, affiliate imports from and exports to

parents (intra-firm trade) also constitutes a large amount of producer services trade. The US Bureau of Economic Analysis publishes data on affiliated and unaffiliated cross-border trade as well as US foreign affiliate sales in services.

Table 1 takes a quick look at the data from 1999 and 2005 and it is clear that the role of the multinational in trade in services is a significant one. The first set of numbers is sales totals in millions of 2000 US dollars for US majority-owned foreign affiliates for all industries, private services and the private services sub-sectors of information, financial and professional services. The following set is the sales of foreign majority owned affiliates in the US for the same set of industries. The next two sets of data are the values of cross-border trade in the same industries, also in millions of 2000 US dollars. Exports and imports are broken into affiliated and non-affiliated trade. Business, professional and technical services (BPT) includes advertising, management and technical consulting, computer system design, architecture, engineering, accounting, legal services and other business services. These are industries that are often highly regulated and are the exact same industries included in the professional, scientific, and technical (PST) category of services within the foreign affiliate sales data. The BEA collects data on foreign affiliate activity separately from how trade accounts are recorded which is why the names are different; however the data is completely comparable.

The data on foreign affiliate sales illustrates the importance of services in all affiliate activity. Private services represent about 15-17 percent of total sales by all foreign affiliates. Over the period 1999-2005 affiliate sales in information, insurance, and professional services have all experienced growth above that of the overall average for all industries. Sales by foreign owned affiliates in the US have experienced higher than average growth for finance and

professional services but have not seen growth in insurance or information. Interestingly, affiliated exports overall have had negative growth while affiliated services exports have grown significantly. This may be representing the ability of multinationals to utilize home country services in their manufacturing and services operations abroad. Home country bias has always been an assumption in trade models, but it also plays a role in multinational production processes.

The trade data shows that the share of affiliated trade in business, professional and technical services is much greater than the shares for finance, private services, or all industries. Combined with the increased growth in both exports of these services and foreign affiliate sales in the same industries (professional, scientific, and technical for the foreign affiliate data) this illustrates the importance of multinational companies in the supply of professional and business services worldwide. Unaffiliated services trade has increased as well in this area and the fact that there has been all this growth in affiliate sales and trade in these highly regulated sectors stresses the need for research into trade restricting policies.

The data on financial services reveals patterns that follow multinational theories about location of production. Outward sales of financial services (US owned foreign affiliates' sales abroad) are growing much more rapidly than affiliated financial services exports. On the other hand, exports of unaffiliated financial services are growing rapidly, likely due to the availability of online financial services and final consumption abroad by households. Additionally, domestic firms in foreign countries have been granted more access to foreign financial services through deregulation and this also likely contributes to the significant growth in unaffiliated trade in financial services. Similarly, inward sales (foreign owned affiliates' sales in the US) and

unaffiliated imports of financial services are experiencing significant growth while affiliated imports are actually decreasing. The importance of final demand at the household level is apparent in the huge rates of growth in unaffiliated imports and exports of financial services. Therefore, the patterns of affiliate supply of financial services seem to follow the theory that horizontal investment displaces affiliated trade. The figures also support a complimentary relationship between commercial presence and cross-border trade; US firms may establish commercial presence to services firms abroad and then supply additional services via cross-border trade. In terms of offshored financial services, the levels of affiliated imports are actually decreasing, which clearly does not support fears of increased levels of US jobs going abroad.

The data on trade and foreign affiliate sales in insurance also shows evidence of the effects of deregulation. Trade in insurance services have skyrocketed over the period looked at in the table and outward sales of insurance have also increased very significantly, while inward sales have decreased. Insurance providers have also been able to capitalize on the growth of global internet access and household consumption of insurance products is likely a large determinant of the increases in traded insurance services..

The role of cross-border services trade for multinationals enters into this discussion as many US manufacturing MNEs demand many different producer services. Horizontal MNEs demand services at home and abroad, and they prefer to use the same service supplier for cost and reputation reasons. This demand has driven US service providers to expand abroad in similar fashion as manufacturing MNEs have for the past 25 years. Certain industries, such as telecoms and financial services have largely become deregulated in most developed countries. There is a great deal of foreign affiliate activity in these industries. Professional services are more regulated

and foreign ownership is often restricted or prohibited. In these industries there can be an increase in cross-border trade to supply services to home country firms abroad. In addition it is quite possible that firms established in another country may decide to provide additional service products to other firms or households. This occurs as the horizontal MNE gains knowledge of the market, regulatory issues, consumer demand, and the economy's infrastructure. Rather than establish a new affiliate it may be easier and more profitable for the firm to provide the additional services from the home country headquarters.

In terms of measuring the restrictiveness of a policy there are three approaches that have been used in the literature: frequency indexes, price impact measures, and quantity based measures. Frequency indexes are comprised by creating a list of barriers that are in place for each sector (ideally) for the import of each service (mode 1 or 3) in each country. The country with the most or least restrictive/protectionist regime for each sector and mode is chosen to be the benchmark for that sector. Tariff equivalents are calculated by comparing country coverage ratios to the benchmark country. The problems with this approach are the arbitrary establishment of benchmark tariff equivalent, the inability to differentiate between barriers that are binding (restrict trade) and those which are not binding due to their redundancy, and most problematic is that the importance of barriers and therefore the level of restrictiveness of a particular barrier does not vary as there is no weighting.

Price impact measures assume that world prices should be equal and therefore one can use econometric methods to estimate price gaps due to restrictions. If data on prices is actually available this is an excellent case study technique however this is not the case. Other than the lack of data there are other issues: differences in quality that will be captured by price

differentials as well, price changes from barriers depend on the elasticity of demand and of supply of that service which also vary, lastly it has been shown that the resulting price wedge often has a rent component and a waste component. The rent component is the increased profits enjoyed due to imperfect competition while the waste component is the resource waste accruing from the restrictions and welfare claims depend on the magnitude of these components. Finally, quantity based approaches compare actual levels of trade flows to potential (or benchmark) levels. This approach often uses the gravity equation, controlling for many of the knowledge-capital model variables as well as measures of “cultural distance”. The problems encountered with this approach again arise from the lack of data on bilateral services trade or foreign affiliate sales. Even with accurate data calculating tariff equivalents from an observed gap in trade is flawed as omitted variables unquestionably also contribute to the difference in observed and predicted trade flows.

3. CHARACTERISTICS OF TRADE IN BUSINESS SERVICES TO CAPTURE IN A FORMAL MODEL

Here is a wish list of characteristics we might like to have in theoretical models of offshoring and trading white-collar services. Much of this is a revision and extension of a similar section in Markusen (2006), since the focus and objectives of the present volume are quite similar to those of the 2005 Brookings Trade Forum. Readers are referred to that volume (Brainard and Collins 2006) for a wide-ranging set of papers on offshoring white-collar services.

- (A) Expansion of trade at the extensive margin: new services produced and traded due to innovations in communications and technology or institutions (e.g., legal

restrictions, privatization, GATS commitments).

This poses a number of challenges to theory, especially the fact that we are talking about non-marginal changes and discrete movements of something being non-traded to potentially lots of trade. Traditional comparative-statics analysis is of little use: it focuses on marginal changes in activities which are already in use in the benchmark. This problem has attracted a lot of recent interest in trading intermediate goods as well, for example Hummels, Ishii and Yi (2001), Yi (2003), and Markusen and Venables (2007). Related work motivated by income distribution effects is found in Feenstra and Hanson (1996, 1997).

- (B) Vertical fragmentation of production: the new traded services tend to be intermediates, but may be upstream, downstream, or not part of a sequence.

Traded white-collar services often have a number of important characteristics that cannot be captured in the simplest off-the-shelf models which assume a set of final goods. One is that they may be firm-specific transactions rather than bought and sold on arm's-length markets. Another is that they may form part of a particular production sequence, such as being a well-defined upstream (design) or downstream (after sales service) component of overall production.

- (C) Location-specific and other complementarities

Thirdly, there may be crucial complementarities among different elements of the production chain, such as between skilled labor and telecommunications equipment and infrastructure. In some cases, it may be the case that services must be produced in the same location as where they are used in downstream or upstream manufacturing activities. Markusen (2006) coined the term "location-specific complementarities" to describe this. This doesn't mean that services, or at least the downstream end product, cannot be traded. It does suggest

however, that a national presence may be required; that is, a firm has to open a local office or branch in a foreign country in order to service firms and consumers in that country. These considerations may also imply another type of complementarity, one that is between liberalization in services and increase trade in goods (Markusen, 1983).

(D) Clear distinction between trade and foreign investment in services

Much of international service activity is carried out by multinational firms with local offices abroad. For this reason there must be a clear and plausible distinction between what is trade and what is affiliate production. Similarly, there needs to be a clear distinction between what is a barrier to trade and what is a barrier to foreign investment (establishing a foreign commercial presence). In some cases a particular policy may be only a barrier to one form of entry while others may be a barrier to both types of entry and there will be different outcomes for the market depending on how the policy/regulation effects entry decisions.

(E) Agglomeration of complementary intermediate services

Related to, but somewhat distinct from point (C), is the issue of whether or not the intermediate business services themselves are more productive when located near to each other, as opposed to just being located near the final user. It might be beneficial for a user firm to be located close to a firm specializing in networking hardware as well as one specializing in the networking software. It may also be beneficial for the latter firms to be located near one another as they require similarly skilled workers and service many of the same clients. This relationship can be modeled using an input-output structure among the service firms, as in Venables (1996). This issue is somewhat beyond the scope of this paper, but it does raise some concerns for small economies. In particular, it raises the possibility of multiple equilibria and that whatever

location gets a head start remains ahead. There is a potentially large market failure here that could call for strong government support for creating a local agglomeration (e.g., the business park concept). Related ideas are found in Markusen (1989), Francois (1990a,b) and Markusen, Rutherford and Tarr (2005).

4. ADAPTATION OF THE KNOWLEDG-CAPITAL MODEL

Markusen's (2002) knowledge-capital model is a framework which allows both national firms, horizontal multinationals, and vertical multinationals to arise endogenously depending on country and technology characteristics. Firms are assumed to possess knowledge-based assets which are alternatively called knowledge capital. Three central assumptions define the model. First, the services of knowledge-based assets can be easily used in foreign location (transportability or fragmentation). Second, the creation of knowledge capital is skilled-labor intensive relative to production. Third, knowledge capital has a jointness (non-rival) property in that it can be used in multiple locations simultaneously without reducing the value of the capital in any particular location. Although this was originally conceived in the context of manufacturing, it seems perfectly appropriate for studying trade versus foreign investment in services.

Suppose we begin with a simple two-final-good, two-factor, two-county Heckscher-Ohlin model and then allow each good to geographically fragment into two separate production activities. Further, one of those two activities, denoted services (S) may be allowed to geographically fragment into a more skilled-labor-intensive "headquarters" activity and a less-skilled-labor-intensive "office" activity.

If we assume free trade in goods, just considering free versus prohibitive fragmentation costs in services means that we do not need to specify which is the upstream and which is the downstream activity. For a much more comprehensive treatment of this case, see Markusen and Venables (2007). Here are the principal features of the model.

- (1) Two factors of production: skilled (H) and unskilled (L) labor
 - Direct use of H and L in production is referred to as value added (VA)
- (2) Two final goods, three production activities
 - AG - unskilled-labor intensive agriculture
 - MAN - skilled-labor intensive manufacturing
 - SER - intermediate services used in MAN and AG
- (3) SER - can fragment into
 - HQ - headquarters, may serve several offices
 - OF - office, produces the deliverable for the client
- (4) Two economies, country i and country j
- (5) There are three generic “types” of services firms, each of which may be located in either country, hence there are six firm types in total
 - N - national firms, provide services to domestic manufacturers, may possibly be allowed to “export” to other country
 - M - multinational firms, have physical production presence in both countries, essentially a “horizontal” multinational
 - V - vertical firm, with headquarters in one country, a single office located in the other, may possibly be allowed to export back to the

home country.

- (6) - There are “trade costs” for N and V firms supplying services abroad (skilled workers have to fly abroad in one direction or the other).
- (7) - There are firm-level scale economies arising from jointness of knowledge-based assets: fixed costs for an M firm are less than double the fixed costs of N or V firms.
- (6) - Services are differentiated or “specialized”, each produced with increasing returns to scale. A wider range of available services increases real productivity for final manufacturers, or lowers their price index for composite services.

To expand on the last point a bit, it is assumed that one unit of two different services is more beneficial to X firms than two units of only one of the services. For example, using two specialized lawyers for a day (e.g., one taxation and one contracts specialist) is better than having two days from a general-purpose lawyer than does many types of legal work including tax and contract law. Fixed costs limit the degree of specialization and diversity than can exist in equilibrium for a small country, and thus access to the larger world market is always productive. Our modeling of services as differentiated intermediate goods follows Ethier (1982) and Markusen (1989).

The model with the two types of fragmentation is illustrated in Figure 1. Consumption comes from the agricultural and manufactured final goods. Manufacturing and agriculture are composed of “value added” (direct contributions of skilled and unskilled labor) and services. It *may* be possible to do these in different locations, implying that *trade in services* is feasible.

Services consist of a headquarters and an office. It *may* be possible to do these in different locations, implying that *foreign investment in services* is feasible.

We are interested in four equilibria, referred to as “regimes”. Some regimes may not be technologically feasible or profitable, or they may not be allowed by regulation. Thus when we refer to trade and investment costs, we will generally be using these terms broadly to include technological and other (e.g., the requirement of face-to-face interaction) “natural” factors and also government rules, regulations, and taxes. In all four regimes, final goods can be traded for a small cost of 0.1%. The four are as follows:

- NN - No trade, no foreign investment (i.e., no M or V firms) allowed
- TN - Trade in services (exports by N firms) allowed, no investment allowed
- NI - No trade in services feasible or allowed, but investment feasible/allowed.
- TI - Trade and investment in services both allowed

By “trade in services allowed”, we do have a small trade costs of one percent, otherwise we have the well-known problem of indeterminacy with three goods and one factor being traded. This one percent is actually important as we will note shortly. By investment allowed, we similarly have a small added fixed cost, set at 2.5%, for a type-V firm over a type-N firm (about 0.6% of total costs), also to prevent some amount of indeterminacy, plus it seems an eminently reasonable assumption that setting up a foreign firm incurs added fixed costs. Fixed costs for a two-office horizontal firm are set at 1.25 times the fixed costs of a type-N firm.

We can think of TN as allowing geographic fragmentation between services and manufacturing, but not allowing fragmentation within a service into headquarters and office. Under NI trade but not investment is feasible/allowed. Regime TI allows both to occur. TN

permits what WTO terminology refers to as Mode 1 trade in services: cross border trade that does not involve an investment and involves minimal movement of persons. NI and TI permit what is called Mode 3, the establishment of a commercial presence (typically by a foreign direct investment) abroad. NI could occur, for example, if there are no government restrictions, but face-to-face contact is required so that investment via a foreign office is possible but exports of services are infeasible. So once again, when we use words like “permitted”, “allowed” or “liberalization” we are referring just as much to developments in technology and communications as to changes in government-imposed barriers.

Figure 2 gives an example of the service provision by one firm, located in the North. The top box is a manufacturing or agriculture firm located in the North and the bottom an manufacturing or agricultural firm located in the South. The domestic service firm has a headquarters in North (middle box of the diagram). It may have a domestic office in North which provides services to Northern firms (this is always allowed). That Northern office may provide services to Southern manufacturing firms, if trade in services (Mode 1) is allowed. The Northern firm may also establish a Southern office if investment in services is allowed (Mode 3). It can then provide services to local firms under regimes NI or TI. It can also provide exports services back to the Northern manufacturing firms under TI (both Modes 1 and 3 allowed), but not under NI.

This completes the general description of the model. One crucial feature of the model is choice of factor intensities for the different activities. We have experimented with this a lot, and there are some differences in results of course. In this paper, we use a very “symmetric” calibration, such that manufacturing and agriculture both devote an equal share of expenditure to

services (20 percent), manufacturing and services have factor intensities symmetrically located around the average world endowment, and (integrated) services factor intensities are exactly at the world average endowment.

Headquarter factor intensities for services are very skilled labor intensive and office production unskilled labor intensive. We calibrate to an elasticity of substitution among services of 4, which in turn implies that 25 percent of the value of services goes to fixed costs and 75 to variable costs. For the factor intensities of these services to add up to the average world endowment ratio, this is going to imply that the intensity ratio for headquarters is more remote from the world average than the ratio of office production. This is going to imply that symmetry will be broken when investment in services is allowed. Numbers are the H/L shares (all functions Cobb-Douglas) used in the numerical simulation model to follow, with the overall “world” endowment normalized to 1.0

Fixed costs of service firm headquarters	4.00
Value added in manufacturing (direct use of H and L)	3.00
Overall manufacturing (value added plus intermediate services)	2.33
Overall service provision (headquarters plus office)	1.00
Service office	0.67
Overall agriculture (value added plus intermediate services)	0.43
Value added in agriculture (direct use of H and L)	0.33

Note that the overall factor intensities in manufacturing and agriculture are reciprocals ($2.33 = 1/0.43$). Thus manufacturing and agriculture are symmetric around overall services which in turn equals the world endowment ratio.

The second step is to calibrate a numerical model used to solve for these equilibria. This is done by assuming that the countries are identical, and that foreign production (type M and V firms) is not allowed, and that trade in services by N firms is prohibitively costly. This scenario is then a benchmark equilibrium in which there is no geographic fragmentation of service production. Services are supplied solely to final-goods producers in the same country. Units are chosen such that the number of national firms in each country is equal to one, and production of each final good and production of services in each country is equal to one. There is no trade in services allowed and, since the countries are identical, there is no trade in final goods either in this benchmark. Thus all trade quantities are zero in the calibrated equilibrium.

Tables 2, 3 and 4 show the world Edgeworth box for our two-country model, where each point in the box is a division of the total world endowment between the two countries, with country i measured from the south-west (sw) corner. Countries differ in size but have identical relative factor endowments along the sw-ne diagonal, and have similar sizes but different relative endowments along the nw-se diagonal.

Table 2 shows the shares of service firms headquartered in country i , with the share headquartered in country j one minus this amount (alternatively, the share in country j is given by the cell which is a reflection through the center point). Table 3 gives that share of services produced in country i . Four scenarios are computed in each case. The first scenario does not allow trade or investment in services, so the active firm types are national firms N_i and N_j . We see that both the share of firm headquarters and the share of services produced are related mostly to country size (and of course track one another closely), but are not equal across countries or between headquarters and output shares along the nw-se diagonal, once the countries are

sufficiently different in size. The points in which the shares are 50-50 is in fact part of the factor-price equalization set for the world economy. Once outside of the set, the skilled-labor-abundant country will have a lower skilled wage, and hence will have a larger number of smaller-output firms: fixed costs are skilled-labor intensive and variable costs unskilled-labor intensive. For example, in the northwest corner, country i has 0.691 share of firms and 0.433 share of services output. Therefore, product variety and hence productivity will be higher in country i which exactly balances the lower quantity in country i , and both countries have identical welfare along the nw-se diagonal as a consequence of the symmetry in the model.

The second box in Figures 2 and 3 lowers the costs for cross-border trade in services to one percent and again, of course, N_i and N_j are types of firms active. As a consequence, firm headquarters and output move in the same direction for a given country, but not exactly (outside the FPE set) due to the difference in factor intensities of fixed and variable costs as just discussed in the previous paragraph. What we see is that allowing trade in services leads to a big shift in service firm location and production away from the smaller country, regardless of whether it is skilled or unskilled-labor abundant. This is the complementarity or agglomeration effect discussed above, combined with the one-percent trade costs. With indeterminacy in production under completely free trade with three goods and two factors, the indeterminacy is broken by the small trade cost, and the services will agglomerate in the larger country, a result well-known in the economic geography literature. An outcome with service firms divided in proportion to country size with equal relative endowments is not an equilibrium in the presence of even very small trade costs, since the aggregate productivity of the service sector will be higher in the country with more diversity (or the price index for the composite service good will

be lower in the large country).

The third boxes in Figures 2 and 3 give the case where investment but not trade becomes feasible or allowed. This regime type is common in many professional service sectors due to the prohibitive regulatory barriers imposed. In this case there are type M_i and M_j firms over much of the box, but also some national firms in the larger country when the countries are of very different sizes (sw and ne corners of the box). Now we see quite a different pattern of where headquarters are concentrated (Figure 2) and where service production is unconcentrated (Figure 3). Headquarters are a fixed cost that depends only on factor prices: its services are a joint input across plants and thus the headquarters location for a type- M firm does not depend on market size. Thus we see that headquarter concentration depends almost entirely on relative factor endowments in the third panel of Figure 2, with concentration in the skilled-labor-abundant country.

Figure 3 shows that service production (panel 3) under investment liberalization follows a close relationship to country size as in the other cases. But it is much less concentrated than in the trade-liberalization case (panel 2), and is much closer to the no trade, no investment case (panel 1). A firm's headquarters is in the skilled-labor-abundant country, and it has outputs in its two offices closely related to each market's size. The headquarters pattern in the Edgeworth box is opposite to that in the case of trade liberalization (panel 2, Figure 2).

The final experiment, the bottom panels of Figures 2 and 3, shows the effect of both trade and investment liberalization due to technical change or regulation. Now type V_i and V_j firms dominate when the skilled-labor abundant country is relatively small (headquartered in that country) and national firms dominate when the countries are similar in relative endowments or

the skilled-labor abundant country is large (headquarters in that country). The pattern of production (panel 4, Figure 3) and trade (not shown) in services closely resembles that in the case of trade but not investment in services allowed (panel 2, Figure 3).

Although the pattern of firm location and production of services varies quite a bit among our four scenarios, the gains from liberalization in all three scenarios are similar. This is shown in the three panels of Figure 4, where numbers are the proportional change in welfare relative to the no trade, no investment benchmark scenario. It is interesting that in the great majority of cells, both countries are strictly better off. We will return to this point in a minute. The only significant difference is that the gains under investment but not trade in services (panel 2) are small than under the other two liberalizations. This is easily understood. Costless (or almost costless) trade is always preferred to having to invest a second fixed cost. However, it is not very meaningful to compare the welfare under these scenarios, since it may be technical feasibility requires face-to-face contact, such that trade in services is simply infeasible and branch-office production via investment is the best we can do. Changes in factor prices are also similar in the three liberalization scenarios (not shown). In the majority of cells both factors gain in both countries. However, the scarce factor can lose when the country is large. This is discussed and explained more in Markusen (2006).

Before closing, some comments on these welfare and factor-price effects are in order. The biggest caveat is that the optimistic scenario that almost every one gains except when the countries are very different in relative endowments or size is partly dependent on the symmetry of the model, in which services have a “neutral” factor intensity and both final goods use services as inputs equally. Earlier work shows that when services enter only one sector, the

ability to trade or invest in foreign service production has many more non-Pareto-improving outcomes, both between and within countries. Typically, the country that is relatively specialized in the sector using services is the loser (if there is one) from introducing trade and/or investment in services. This trade causes a loss of effective monopoly power for this country, and it suffers a negative terms-of-trade effect (Markusen and Venables 2007).

5. SUMMARY AND CONCLUSIONS

This paper offers an approach for modeling trade and foreign investment in services and for both identifying and estimating the costs to the world economy of various barriers to services. We begin with a discussion about the various barriers to both cross-border trade and to establishing a foreign commercial presence via FDI. We argue that the typical barriers are often quite different from those for trade and FDI in goods, and so a whole new empirical approach is needed.

Paralleling the need to develop a data base, we need to think about a conceptual framework for the problem. After identifying some of the characteristics that we think must be included in a modeling framework, we then argue that Markusen's (2002) knowledge-capital model is a good vehicle for a start. It captures and exploits many of the properties of knowledge-based assets that are surely at least as important for services as for manufacturing (where physical capital is often more important).

We contend that some simulations of that model are instructive. Liberalizations, or technical improvements that reduce costs, may occur for cross-border trade and/or for FDI, in the latter case via lowering the fixed costs of establishing a foreign subsidiary. Falling trade costs

alone obviously encourage trade only, while falling investment costs encourage the creation of multi-office horizontal multinationals with local offices serving local customers. When both fall, vertical multinationals, with a skilled-labor intensive headquarters in one country and a less-skilled-labor-intensive office in the other country serving both markets, can arise.

Results are obviously dependent on a range of assumptions, especially factor intensities of various activities (true in any theory model). The simulation results are thus suggestive and certainly not definitive. In spite of this, we think that they are quite useful for further analyses and research. Results indicate that the relocation of service firm headquarters and the relocation of offices varies a great deal whether it is trade costs, investment costs, or both that fall. Some of the general results which we feel will hold up under many alternative parameterizations are as follows.

Decreasing trade but not investment costs obviously moves the production of services and the number of service firms headquartered in a country in the same direction. Services production and firm numbers tend to become more concentrated in the larger country, due to the complementarity among services (a larger range of services makes the final-goods sectors more productive). We see this empirically at the city level, with places like London, New York, and Singapore becoming large business services centers. Concentration of headquarters and service production reacts much less to differences in relative factor endowments between the countries. This is one result, however, that is clearly tied to our assumptions: in particular, that services are needed equally in both final-goods sectors. See Markusen (2006) for an asymmetric case in which the services are only used in one final-goods sector.

Decreasing investment costs but not trade costs has little effect on the location and

concentration of services production, but a big effect on headquarters locations. Headquarters become much more concentrated in the skilled-labor-abundant country, with difference in country size playing quite a minor role.

Liberalizing both trade and investment in services leads to a pattern of service production that closely resembles that for liberalization in trade only; that is, service production is concentrated in the large country, with relative endowments playing a minor role. The pattern of headquarters location could be characterized as “in between” the trade and investment only liberalization scenarios (bottom panel of Table 2). Both differences in size and in relative endowments play a role, with headquarters concentrated in large and/or skilled-labor-abundant countries.

Interestingly however, the pattern of welfare and factor-price changes are much less sensitive to which mode of services supply is liberalized or where costs fall. Regardless of whether it is trade costs or fixed costs of investment that are falling, the system finds very different channels of arbitrage, but rather similar welfare consequences in the end. It is the case that the welfare benefits are greater for liberalization of trade than for liberalization of investment (Table 4). This is due to the added fixed costs of a second office in horizontal investment whereas eliminating trade costs means that a firm can costlessly add supply to a foreign market. In a sense, the model is going to produce a finding that trade liberalization is more beneficial than investment liberalization by assumption. However, this point is not very relevant if there are natural barriers to trade in services, such as the need for face-to-face contact, that cannot simply be eliminated by policy changes. The welfare numbers we get for liberalization of both trade and investment in services (Table 4, bottom panel) look quite similar

to the benefits we get from liberalizing trade alone (top panel). To the extent that barriers to trade are policy imposed and not natural, this suggests that trade liberalization is particularly valuable as it avoids the fixed costs of establishing a foreign commercial presence.

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TABLE 1: US Foreign Affiliate Sales and Cross Border Trade

Outward US Foreign Affiliate Sales-all countries			
	1999	2005	% change
Total Sales-All Industries	2316654.8	3276024.4	41.41%
Total Private Services	353200.0	528000.0	49.49%
Information	63236.5	97069.9	53.50%
Finance & Insurance	86337.1	140341.6	62.55%
Finance	32330.4	43847.0	35.62%
Insurance	54006.6	96495.7	78.67%
PST	65290.2	97490.9	49.32%
Sales in Total Private Services = 15.25% and 16.12% of All Industries Sales in 1999 and 2005 respectively			
PST- Professional, Scientific, and Technical Services			
All data are in millions of 2000 US dollars			
Inward Foreign Affiliate Sales-all countries			
	1999	2005	% change
Total Sales-All Industries	1831561.1	2213172.5	20.84%
Total Private Services	293500.0	389000.0	32.54%
Information	46440.3	48138.5	3.66%
Finance & Insurance	95840.7	104308.3	8.84%
Finance	15651.8	25458.9	62.66%
Insurance	80188.9	78849.4	-1.67%
PST	15757.0	49648.7	215.09%
Sales in Total Private Services = 16.02% and 17.57% of All Industries Sales in 1999 and 2005 respectively			
PST- Professional, Scientific, and Technical Services			
All data are in millions of 2000 US dollars			
Cross-Border Trade- All countries-Exports			
	1999	2005	% change
All Industries	1287247.6	1586285.5	23.23%
All Industries-Affiliated	194697.1	186463.5	-4.23%
All Industries-Unaffiliated	1092550.5	1399822.0	28.12%
Total Private Services	265100.0	368000.0	38.82%
Total Private Services-Affiliated	32952.4	44441.2	34.86%
Total Private Services-Unaffiliated	73245.5	101278.7	38.27%
Financial Total	17789.3	31626.3	77.78%
Financial-Affiliated	4087.2	4312.0	5.50%
Financial-Unaffiliated	13702.2	27314.3	99.34%
Insurance Total*	3119.2	6011.5	92.73%
BPT Total	54683.1	73911.2	35.16%
BPT-Affiliated	26379.5	37062.1	40.50%
BPT-Unaffiliated	28303.5	36849.1	30.19%
Imports of total private services = 20.59% and 23.19% of trade in all industries in 1999 and 2005 respectively			
*Insurance transactions are considered unaffiliated by BEA			
BPT-Business, Professional, and Technical Services			

(Table 1 continued)

Cross-Border Trade- All countries-Imports			
	1999	2005	% change
All Industries	1543920.8	2177244.7	41.02%
All Industries-Affiliated	186215.3	231946.0	24.56%
All Industries-Unaffiliated	1357705.5	1945298.8	43.28%
Total Private Services	183000.0	282000.0	54.10%
Total Private Services-Affiliated	25670.2	35340.6	37.67%
Total Private Services-Unaffiliated	31048.8	53285.4	71.62%
Financial Total	9623.2	11105.6	15.40%
Financial-Affiliated	6130.7	5192.0	-15.31%
Financial-Unaffiliated	3492.5	5913.6	69.32%
Insurance Total*	9593.9	25064.2	161.25%
BPT Total	28238.2	42913.2	51.97%
BPT-Affiliated	19462.0	29868.1	53.47%
BPT-Unaffiliated	8776.1	13045.1	48.64%

Imports of total private services = 11.85% and 12.95% of trade in all industries in 1999 and 2005 respectively

*Insurance transactions are considered unaffiliated by BEA

BPT-Business, Professional, and Technical Services

Figure 1: Structure of production

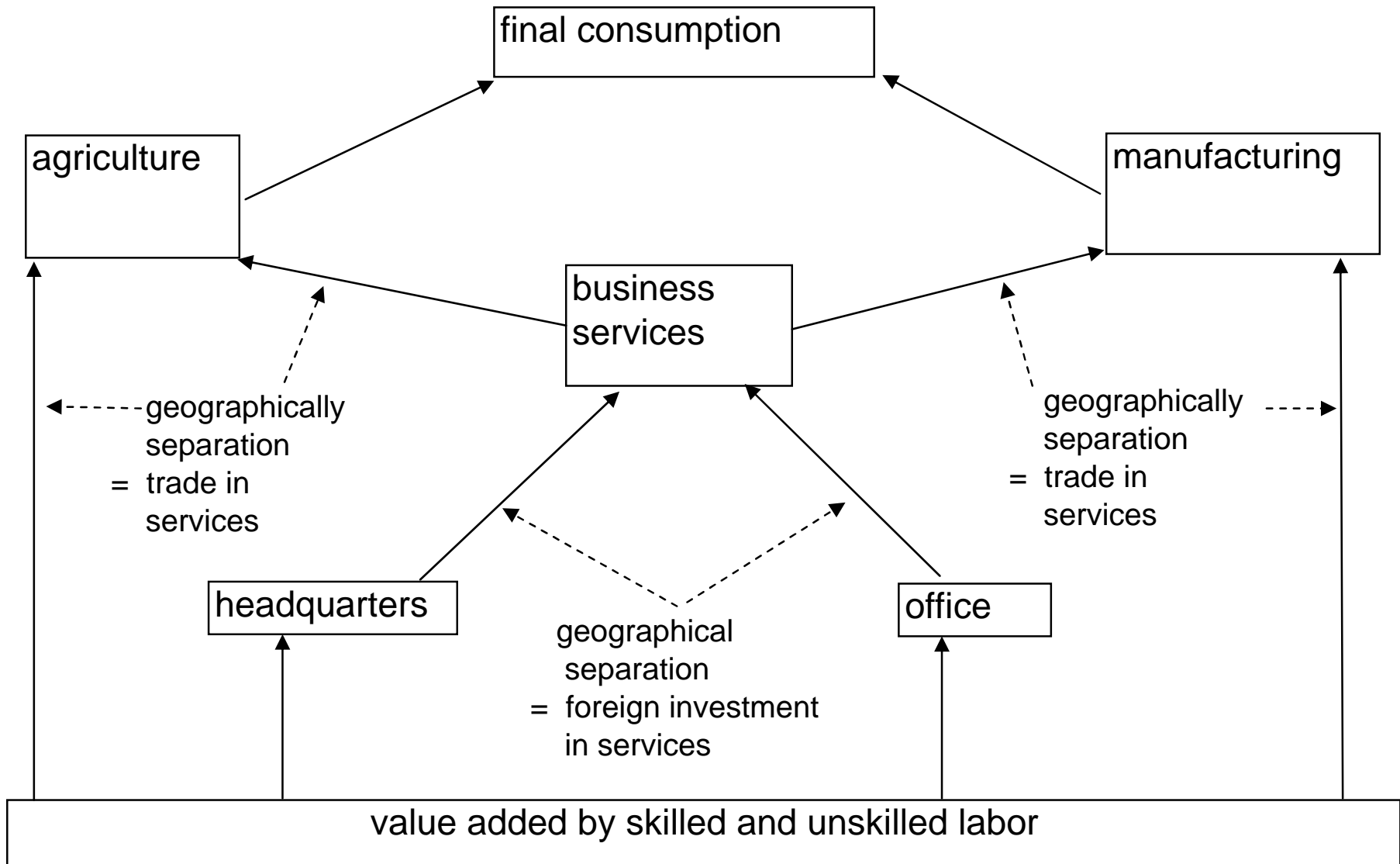


Figure 2: Types of trade in services for a North service firm

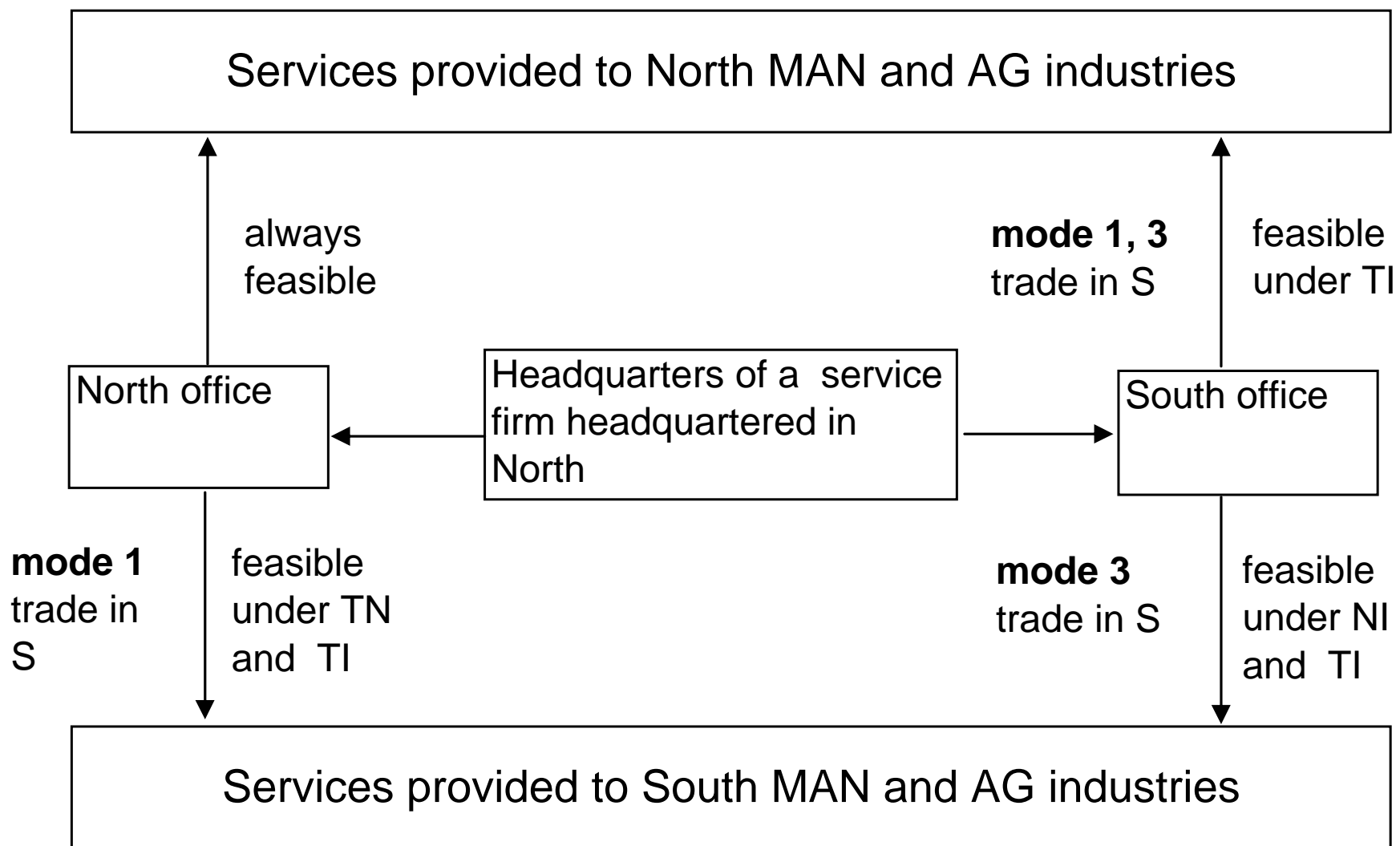


Table 2: Share of service firms headquartered in country i (origin: sw corner)

No trade or investment in services

i's share of skilled labor	0.9	0.691	0.728	0.755	0.777	0.795	0.812	0.829	0.858	0.910
	0.8	0.541	0.579	0.610	0.638	0.662	0.705	0.756	0.807	0.858
	0.7	0.458	0.485	0.500	0.551	0.603	0.654	0.705	0.756	0.801
	0.6	0.386	0.416	0.449	0.500	0.552	0.602	0.653	0.704	0.742
	0.5	0.320	0.352	0.398	0.449	0.500	0.551	0.602	0.648	0.680
	0.4	0.258	0.296	0.347	0.398	0.448	0.500	0.551	0.584	0.614
	0.3	0.199	0.244	0.295	0.346	0.397	0.449	0.500	0.515	0.542
	0.2	0.142	0.193	0.244	0.295	0.338	0.362	0.390	0.421	0.459
	0.1	0.090	0.142	0.171	0.188	0.205	0.223	0.245	0.272	0.309
	O_i	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9

i's share of unskilled labor O_j

Trade but not investment in services

i's share of skilled labor	0.9	0.691	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	0.8	0.106	0.579	0.810	1.000	0.842	0.796	0.860	0.919	1.000
	0.7	0.000	0.240	0.500	0.578	0.654	0.727	0.782	0.860	1.000
	0.6	0.000	0.000	0.422	0.500	0.578	0.621	0.727	0.796	1.000
	0.5	0.000	0.160	0.346	0.422	0.500	0.578	0.654	0.840	1.000
	0.4	0.000	0.204	0.273	0.379	0.422	0.500	0.578	1.000	1.000
	0.3	0.000	0.140	0.218	0.273	0.346	0.422	0.500	0.760	1.000
	0.2	0.000	0.081	0.140	0.204	0.158	0.000	0.190	0.421	0.894
	0.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.309
	O_i	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9

i's share of unskilled labor O_j

Investment but not trade in services

i's share of skilled labor	0.9	1.000	1.000	1.000	1.000	1.000	1.000	0.654	0.570
	0.8	1.000	1.000	1.000	1.000	1.000	0.523	0.518	0.496
	0.7	1.000	1.000	0.527	0.526	0.526	0.525	0.523	0.465
	0.6	1.000	1.000	0.527	0.527	0.526	0.526	0.472	0.470
	0.5	1.000	0.710	0.527	0.527	0.500	0.473	0.473	0.290
	0.4	1.000	0.530	0.528	0.474	0.474	0.473	0.473	0.000
	0.3	1.000	0.535	0.477	0.475	0.474	0.474	0.473	0.000
	0.2	0.534	0.504	0.482	0.477	0.000	0.000	0.000	0.000
	0.1	0.430	0.346	0.000	0.000	0.000	0.000	0.000	0.000
	O_i	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8

i's share of unskilled labor O_j

Both trade and investment in services allowed

i's share of skilled labor	0.9	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	0.8	1.000	1.000	1.000	1.000	1.000	0.790	0.853	0.920
	0.7	1.000	1.000	0.504	0.579	0.652	0.723	0.787	0.850
	0.6	0.938	0.102	0.428	0.504	0.579	0.632	0.717	0.785
	0.5	0.732	0.209	0.355	0.428	0.500	0.572	0.645	0.791
	0.4	0.377	0.215	0.283	0.368	0.421	0.496	0.572	0.898
	0.3	0.093	0.150	0.213	0.277	0.348	0.421	0.496	0.000
	0.2	0.070	0.080	0.147	0.210	0.000	0.000	0.000	0.000
	0.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	O_i	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8

i's share of unskilled labor O_j

Table 4: Proportional welfare gains for country i over no trade, no investment in services

Unshaded cells: welfare strictly increases for both countries

Trade but not investment in services

i's share of skilled labor	0.9	0.043	0.239	0.103	0.049	0.036	0.026	0.018	0.011	0.007	j
	0.8	-0.099	0.044	0.095	0.056	0.032	0.023	0.018	0.014	0.011	
	0.7	0.050	0.000	0.044	0.039	0.033	0.027	0.022	0.018	0.018	
	0.6	0.109	0.041	0.051	0.044	0.038	0.032	0.027	0.023	0.026	
	0.5	0.108	0.060	0.058	0.051	0.044	0.038	0.033	0.032	0.036	
	0.4	0.106	0.076	0.068	0.059	0.051	0.044	0.039	0.056	0.049	
	0.3	0.103	0.090	0.078	0.068	0.058	0.051	0.044	0.095	0.103	
	0.2	0.125	0.105	0.090	0.076	0.060	0.041	0.000	0.044	0.219	
	0.1	0.153	0.125	0.103	0.106	0.108	0.109	0.050	-0.129	0.043	
	O_i		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	
i's share of unskilled labor											

Investment but not trade in services

i's share of skilled labor	0.9	0.072	0.051	0.024	0.015	0.008	0.004	0.000	0.000	0.000	j
	0.8	0.034	0.061	0.037	0.027	0.018	0.011	0.006	0.002	0.000	
	0.7	0.042	0.035	0.033	0.027	0.021	0.016	0.010	0.006	0.005	
	0.6	0.052	0.042	0.039	0.033	0.027	0.021	0.016	0.011	0.014	
	0.5	0.062	0.051	0.047	0.040	0.033	0.027	0.021	0.019	0.022	
	0.4	0.075	0.065	0.057	0.048	0.040	0.033	0.027	0.030	0.031	
	0.3	0.089	0.079	0.067	0.057	0.047	0.039	0.033	0.039	0.040	
	0.2	0.097	0.094	0.079	0.065	0.050	0.047	0.042	0.021	0.050	
	0.1	0.097	0.097	0.099	0.092	0.085	0.079	0.072	0.052	0.031	
	O_i		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	
i's share of unskilled labor											

Both trade and investment in services allowed

i's share of skilled labor	0.9	-0.018	0.156	0.103	0.049	0.036	0.026	0.018	0.011	0.007	j
	0.8	0.012	0.026	0.083	0.056	0.033	0.023	0.018	0.014	0.010	
	0.7	0.106	0.024	0.044	0.039	0.033	0.027	0.022	0.018	0.017	
	0.6	0.106	0.040	0.051	0.044	0.038	0.032	0.027	0.023	0.026	
	0.5	0.105	0.059	0.058	0.051	0.044	0.038	0.033	0.032	0.037	
	0.4	0.103	0.076	0.068	0.059	0.051	0.044	0.039	0.055	0.052	
	0.3	0.101	0.090	0.078	0.068	0.058	0.051	0.044	0.089	0.075	
	0.2	0.122	0.105	0.090	0.076	0.061	0.041	0.020	0.091	0.182	
	0.1	0.153	0.125	0.103	0.106	0.108	0.109	0.050	-0.010	0.192	
	O_i		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	
i's share of unskilled labor											