Trade and foreign direct investment in business services

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Focus on business services, though some of these are increasingly provided directly to the final user (internet: airline tickets, hotels, insurance, and so forth).

Outline:

Classification of types of barriers (elusive and unsatisfactory)
Measurement issues and approaches
Modeling approach

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

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

Classification of barriers is a frustrating exercise:

barriers that seem to fit into multiple categories

barriers that seem to fit into none.

(1) Border barriers (mode 1)

quantity restrictions

price (cost) raising measures

(2) Barriers to investment (commercial presence, mode 3)

right of establishment

national treatment

restricted sectors, restrictions on acquisition

(3) Restrictions/regulations *de factor* but not *de juro*

discriminatory

residency requirements

professional licensing, lack of mutual recognition

Measuring restrictiveness of policy.

(1) Frequency indices

create lists of barriers for each sector (mode 1 and 3)

rank countries by count of barriers

country with fewest barriers in a sector is benchmark, assigned a tariff equivalent.

other countries assigned a tariff according to their count.

Problems:

- arbitrary benchmark
- each barrier counted the same
- problem again of redundant barriers

(2) Price impact measures

Assume that the price of a service should be equal across countries

Differences in prices attributed to restrictions

example: what does a Belgian plumber get paid for a day?
what could a Polish plumber be hired for?

difference is deemed to be the “shadow cost” of a restriction
can be used in a numerical model to simulate liberalization

Problems:

difference in local factor costs (or housing costs)
differences in quality
separating “rent” from “waste” component of the restriction

(3) Quantity based approach

compare actual levels of trade or affiliate activity to predicted values

difference is assumed to reflect restrictions

example: “gravity” equations are estimated, and these estimates then generate a predicted trade volume for each country in each industry.

“residual” between actual and predicted volume is attributed to a restriction.

Problem: countries have comparative advantages in certain industries: Germany in cars, UK and Ireland in services

expect large deviations from equal export shares

Problem (1) if something is not traded, how unprofitable is it? How do we know what will happen when a barrier is removed?

Problem (2) suppose that there is a quota on licenses. Is that equivalent to a 10% tariff, a 30% tariff?

Problem (3) rent versus waste component of barrier
imperfect competition and/or inefficiency

Background 2: characteristics to capture in a formal modeling approach

(1) Expansion of trade at the extensive margin: new things traded

(2) Vertical fragmentation of production: services as intermediates

(3) Location-specific and other complementarities

(4) Offshoring of skilled services to skilled-labor-scarce countries

(5) Reversal in the direction of trade. Exports to richcountry

(6) Barriers often fixed costs of establishing foreign commercial presence. *Treating barriers as ad valorem trade costs is not appropriate.*

Requires imperfect competition and scale economies

Suggested modeling approach

(1) Two factors of production: skilled (H) and unskilled (L) labor

(2) Two final goods, three production activities

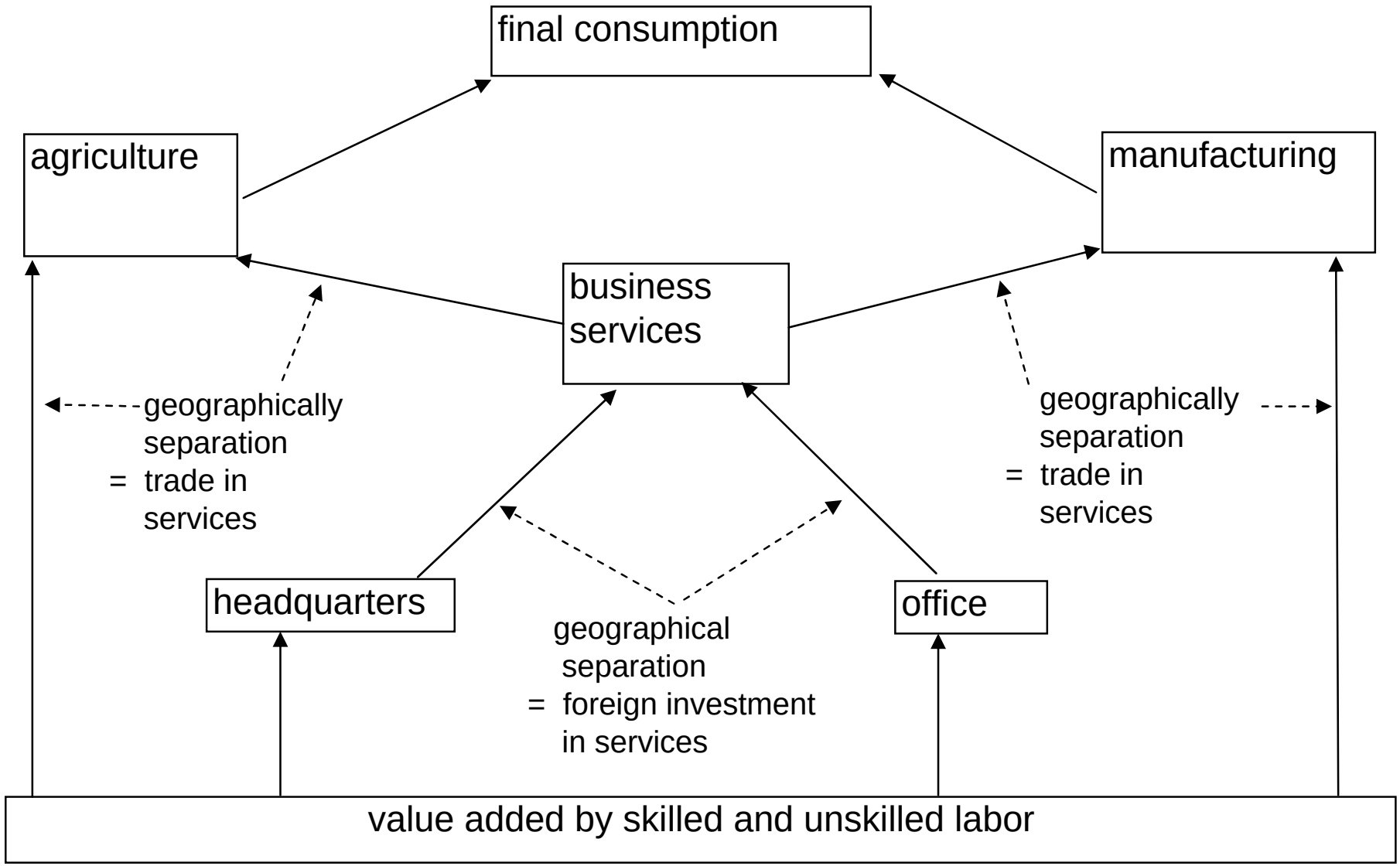
AG - unskilled-labor intensive agriculture (no offense to farmers)

MAN - skilled-labor intensive manufacturing, can fragment into
- VA value added by skilled and unskilled labor
- SER services

(3) SER - can fragment into

- HQ headquarters, may serve several offices
- OF office, produces the deliverable for the client

Figure 1: Structure of production



(4) 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 X producers, may (not) “export” to other country

M - multinational firms, have physical production (C) presence in both countries: “horizontal” multinational

V - vertical firm, with headquarters D in one country, production C location in the other, may (not) export back to home

We are interested in three equilibria, referred to as “regimes”:

NN - No trade, no foreign investment (i.e., no M or V firms) allowed or feasible

TN - Trade in services (exports by N firms) allowed, no investment allowed or feasible

Fragmentation of X and S, but S integrated
Permits “Mode 1" trade in services

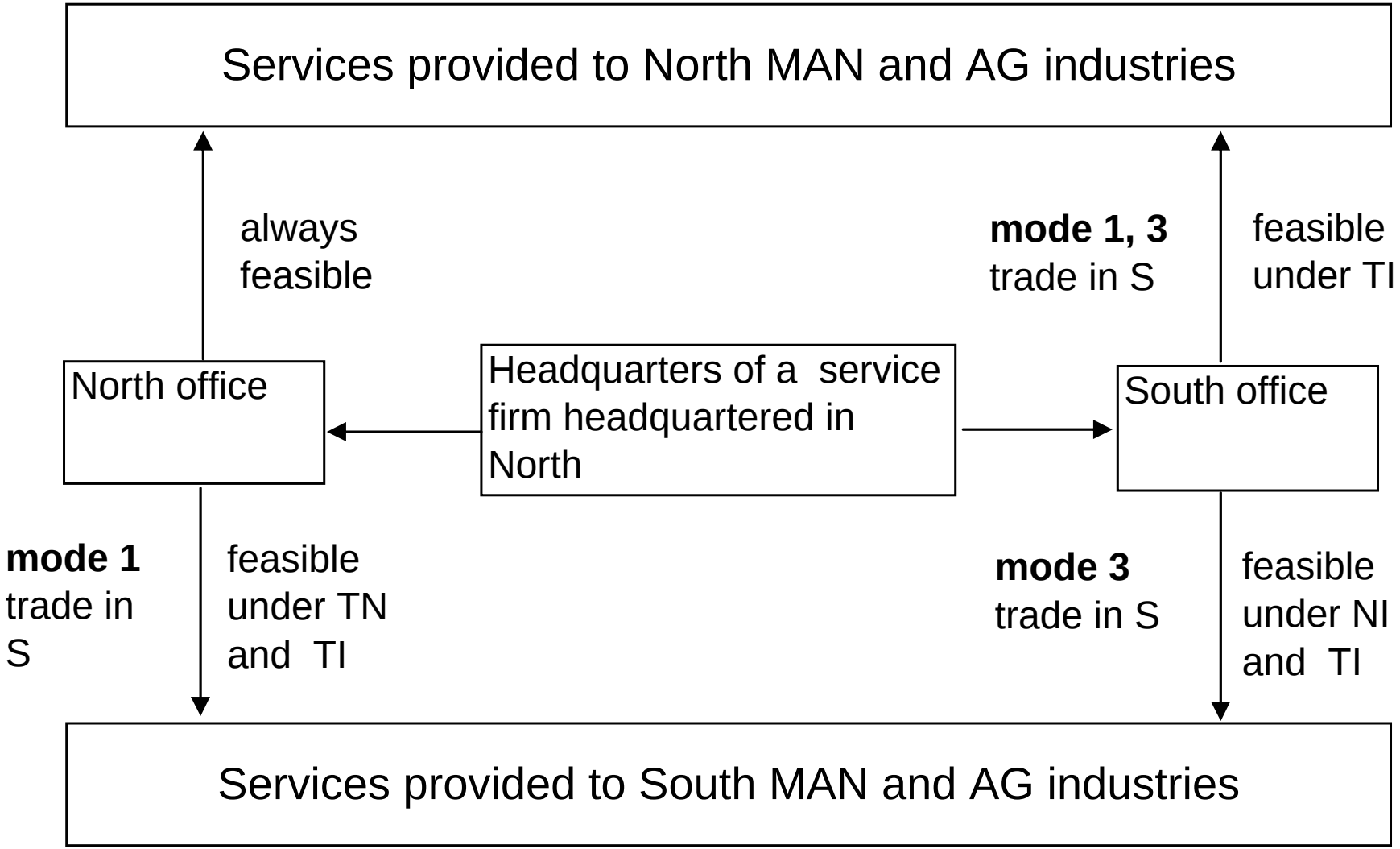
NI - Investment in services allowed, trade in services infeasible

Fragmentation of S, but not S from X. “Mode 3"

TI - Trade and investment in services both allowed

Permits “Mode 3" and “Mode 1" trade in services

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



SHARE OF S FIRMS HEADQUARTERED IN H

	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
0.10	0.691	0.728	0.755	0.777	0.795	0.812	0.829	0.858	0.910
0.20	0.541	0.579	0.610	0.638	0.662	0.705	0.756	0.807	0.858
0.30	0.458	0.485	0.500	0.551	0.603	0.654	0.705	0.756	0.801
0.40	0.386	0.416	0.449	0.500	0.552	0.602	0.653	0.704	0.742
0.50	0.320	0.352	0.398	0.449	0.500	0.551	0.602	0.648	0.680
0.60	0.258	0.296	0.347	0.398	0.448	0.500	0.551	0.584	0.614
0.70	0.199	0.244	0.295	0.346	0.397	0.449	0.500	0.515	0.542
0.80	0.142	0.193	0.244	0.295	0.338	0.362	0.390	0.421	0.459
0.90	0.090	0.142	0.171	0.188	0.205	0.223	0.245	0.272	0.309

No trade no investment
Headquarters concentration depends on country size and skilled-labor abundance

	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
0.10	0.691	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
0.20	0.106	0.579	0.810	1.000	0.842	0.796	0.860	0.919	1.000
0.30	0.000	0.240	0.500	0.578	0.654	0.727	0.782	0.860	1.000
0.40	0.000	0.000	0.422	0.500	0.578	0.621	0.727	0.796	1.000
0.50	0.000	0.160	0.346	0.422	0.500	0.578	0.654	0.840	1.000
0.60	0.000	0.204	0.273	0.379	0.422	0.500	0.578	1.000	1.000
0.70	0.000	0.140	0.218	0.273	0.346	0.422	0.500	0.760	1.000
0.80	0.000	0.081	0.140	0.204	0.158	0.000	0.190	0.421	0.894
0.90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.309

Trade, no investment
Headquarters concentration depends on country size

	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
0.10	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.654	0.570
0.20	1.000	1.000	1.000	1.000	1.000	0.523	0.518	0.496	0.466
0.30	1.000	1.000	0.527	0.526	0.526	0.525	0.523	0.465	0.000
0.40	1.000	1.000	0.527	0.527	0.526	0.526	0.472	0.470	0.000
0.50	1.000	0.710	0.527	0.527	0.500	0.473	0.473	0.290	0.000
0.60	1.000	0.530	0.528	0.474	0.474	0.473	0.473	0.000	0.000
0.70	1.000	0.535	0.477	0.475	0.474	0.474	0.473	0.000	0.000
0.80	0.534	0.504	0.482	0.477	0.000	0.000	0.000	0.000	0.000
0.90	0.430	0.346	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Investment, no trade
Headquarters concentration depends on skilled-labor endowment

	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
0.10	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
0.20	1.000	1.000	1.000	1.000	1.000	0.790	0.853	0.920	0.930
0.30	1.000	1.000	0.504	0.579	0.652	0.723	0.787	0.850	0.907
0.40	0.938	0.102	0.428	0.504	0.579	0.632	0.717	0.785	0.623
0.50	0.732	0.209	0.355	0.428	0.500	0.572	0.645	0.791	0.268
0.60	0.377	0.215	0.283	0.368	0.421	0.496	0.572	0.898	0.062
0.70	0.093	0.150	0.213	0.277	0.348	0.421	0.496	0.000	0.000
0.80	0.070	0.080	0.147	0.210	0.000	0.000	0.000	0.000	0.000
0.90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Trade and investment
Headquarters concentration depends on country size and skilled-labor abundance

SHARE OF SERVICES PRODUCED IN I

	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
0.10	0.433	0.555	0.620	0.674	0.722	0.767	0.811	0.858	0.910
0.20	0.354	0.473	0.547	0.602	0.653	0.704	0.756	0.807	0.858
0.30	0.308	0.421	0.500	0.551	0.602	0.653	0.705	0.756	0.820
0.40	0.272	0.380	0.449	0.500	0.551	0.602	0.654	0.704	0.790
0.50	0.239	0.342	0.398	0.449	0.500	0.551	0.602	0.658	0.761
0.60	0.210	0.296	0.346	0.398	0.449	0.500	0.551	0.620	0.728
0.70	0.180	0.244	0.295	0.347	0.398	0.449	0.500	0.579	0.692
0.80	0.142	0.193	0.244	0.296	0.347	0.398	0.453	0.527	0.646
0.90	0.090	0.142	0.189	0.233	0.278	0.326	0.380	0.445	0.567

No trade no investment
Production concentration depends on country size and skilled-labor abundance

	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
0.10	0.433	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
0.20	0.054	0.473	0.778	1.000	0.842	0.796	0.860	0.919	1.000
0.30	0.000	0.206	0.500	0.578	0.654	0.727	0.782	0.860	1.000
0.40	0.000	0.000	0.421	0.500	0.578	0.621	0.727	0.796	1.000
0.50	0.000	0.160	0.345	0.421	0.500	0.579	0.655	0.840	1.000
0.60	0.000	0.204	0.273	0.379	0.422	0.500	0.579	1.000	1.000
0.70	0.000	0.140	0.218	0.273	0.346	0.422	0.500	0.794	1.000
0.80	0.000	0.081	0.140	0.204	0.158	0.000	0.222	0.527	0.946
0.90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.567

Trade, no investment
Production concentration depends on country size

	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
0.10	0.422	0.546	0.613	0.670	0.720	0.767	0.814	0.868	0.919
0.20	0.346	0.463	0.540	0.597	0.650	0.713	0.766	0.820	0.872
0.30	0.298	0.411	0.499	0.553	0.606	0.659	0.713	0.767	0.837
0.40	0.260	0.368	0.446	0.499	0.553	0.606	0.661	0.714	0.805
0.50	0.226	0.333	0.393	0.446	0.500	0.554	0.607	0.667	0.774
0.60	0.195	0.286	0.339	0.394	0.447	0.501	0.554	0.632	0.740
0.70	0.163	0.233	0.287	0.341	0.394	0.447	0.501	0.589	0.702
0.80	0.128	0.180	0.234	0.287	0.350	0.403	0.460	0.537	0.654
0.90	0.081	0.132	0.186	0.233	0.280	0.330	0.387	0.454	0.578

Investment, no trade
Production concentration depends on country size and skilled-labor endowment

	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
0.10	0.000	0.662	1.000	1.000	1.000	1.000	1.000	1.000	1.000
0.20	0.000	0.227	0.660	1.000	1.000	0.790	0.853	0.920	1.000
0.30	0.000	0.000	0.504	0.579	0.652	0.723	0.787	0.850	1.000
0.40	0.000	0.000	0.428	0.504	0.578	0.632	0.717	0.786	1.000
0.50	0.000	0.155	0.354	0.428	0.500	0.572	0.646	0.845	1.000
0.60	0.000	0.214	0.283	0.368	0.422	0.496	0.572	1.000	1.000
0.70	0.000	0.150	0.213	0.277	0.348	0.421	0.496	1.000	1.000
0.80	0.000	0.080	0.147	0.210	0.000	0.000	0.340	0.773	1.000
0.90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.338	1.000

Trade and investment
Production concentration depends on country size

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

Unshaded cells: welfare strictly increases for both countries

I's share of skilled labor	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.9	0.043	0.239	0.103	0.049	0.036	0.026	0.018	0.011	0.007
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 — I's share of unskilled labor

Proportional welfare change from introducing trade in services

I's share of skilled labor	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.9	0.072	0.051	0.024	0.015	0.008	0.004	0.000	0.000	0.000
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 — I's share of unskilled labor

Proportional welfare change from introducing investment in services

I's share of skilled labor	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.9	-0.018	0.156	0.103	0.049	0.036	0.026	0.018	0.011	0.007
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 — I's share of unskilled labor

Proportional welfare change from introducing trade and investment in services

Simulation Results:

Liberalization of trade but not investment in services leads to:
- concentration of service firm headquarters in large countries
- concentration of service firm offices in large countries

Liberalization of investment but not trade in services leads to:
- concentration of service firm headquarters in skilled-labor-abundant countries
- little change in the concentration of offices from NN case

Liberalization of both leads to:
- concentration of headquarters as in NI
- concentration of offices as in TN

However, interesting thing is that welfare and factor price changes in the three liberalization scenarios are not that much different from one another.

Difficult numerical modeling issues:

(1) Dimensionality

Instead of a single cost function to represent domestic production of services in a competitive, constant-returns model

mr $\leq$ for n firm
mr $\leq$ for m firm on domestic sales
mr $\leq$ for m firm on foreign sales
mr $\leq$ for v firm
mk rev $\leq$ fixed costs for n firm
mk rev $\leq$ fixed costs for an m firm
mk rev $\leq$ fixed costs for a v firm

(2) Calibration of cost functions for AG and Man, when some type of services are not available in the benchmark.

Are non-imported services (or products of foreign firms producing in the country) symmetric substitutes for ones that are available in the benchmark?

$$S = \left[\sum_k n_k S_k^{\alpha} \right]^{\frac{1}{\alpha}} \qquad k = ni, nj, mi, mj, vi, vj$$

(3) How unprofitable are non-traded, non-mne provided services in the benchmark? If a 20% government barrier is removed, it may be still non-traded due to the need for face-to-face contact.

(4) Computation problem near zero for a particular type of service.

Even with an elasticity of substitution greater than one, the demand price for a service (or any good) that is not produced is infinite.

The isoquant hits the axis at an infinite or zero slope.
This creates difficulties for the solution algorithm.

One simple fix is to give the representative agent in each country a small endowment of each of the six composite service goods.

(5) Imperfect competition rents versus waste.

If a service is 20% more costly abroad, how much might be monopoly rents for local producers, how much might be waste due to inefficient production. Matters to counter-factuals.

The difficult way forward:

(1) identifying barriers

do they explicitly target foreign firms
are they “natural” or policy-imposed

(2) quantifying the barriers

(3) assessing the counterfactuals

crucial to the question of whether or not it matters
e.g., maybe some barrier is non-binding, redundant