

Technology, Trade in Services, and Economic Growth

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Why Technology and Services?

Both are 'Special'

- **ICT is a 'general purpose technology'**
 - IT investment wrt income > 1 (growth elastic)
 - IT investment wrt price $\gg 1$ (price elastic)
- **Services are income and development elastic**
 - Services demand wrt income > 1 (growth elastic)
 - Services share of GDP rises with economic development

Implications?

Expanding global and local markets for technology *and* ICT-enabled services

Technology Leads to Trade in Services

- **Already Global: Services that move people, voice, or things**
 - Cross-border: Transportation, Travel, Passenger Fares, Communications
 - Direct investment: Wholesale and retail trade establishments
- **Recently More Global: Services in business and information activities**
 - Education, finance, insurance, medical
 - Business and Professional services: accounting, consulting, information services, engineering design
- **From non-traded to tradable via lower transactions costs:**
 - Internet and information technologies; digitization
 - US-India international call drops in half (1996 to 2001)
 - PC density in China increases seven-fold (1996 to 2001)
 - Codification of information:
 - ‘Expert systems’ reduce need for specific knowledge
 - Standardized information tools (Microsoft products, standardized programming languages)
- **From inside the company to out-sourced to off-shored**
 - Functional separation & fragmentation of production

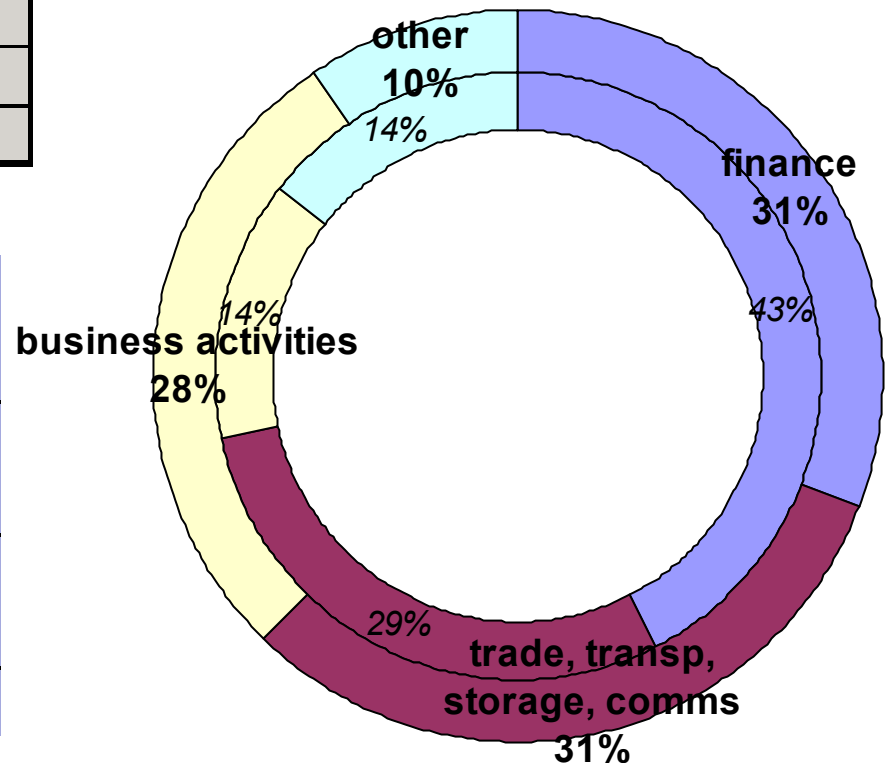
Global Perspective: FDI & International Services Trade

Fast growing cross border and trade & investment linkages

Global Services Trade		Growth 96 to 02 (in percent)
(IMF data)		
transportation, passenger, travel, govt		14
other services		36
memo: global goods trade		20

Global Inward FDI stock		
(UNCTAD data)		
	1990	2002
	per cent	per cent
primary	9	6
mfg	42	34
services	49	60

FDI outward stock: services
(1990: \$948 billion; 2002: \$4363 billion)



Newly-Global Services

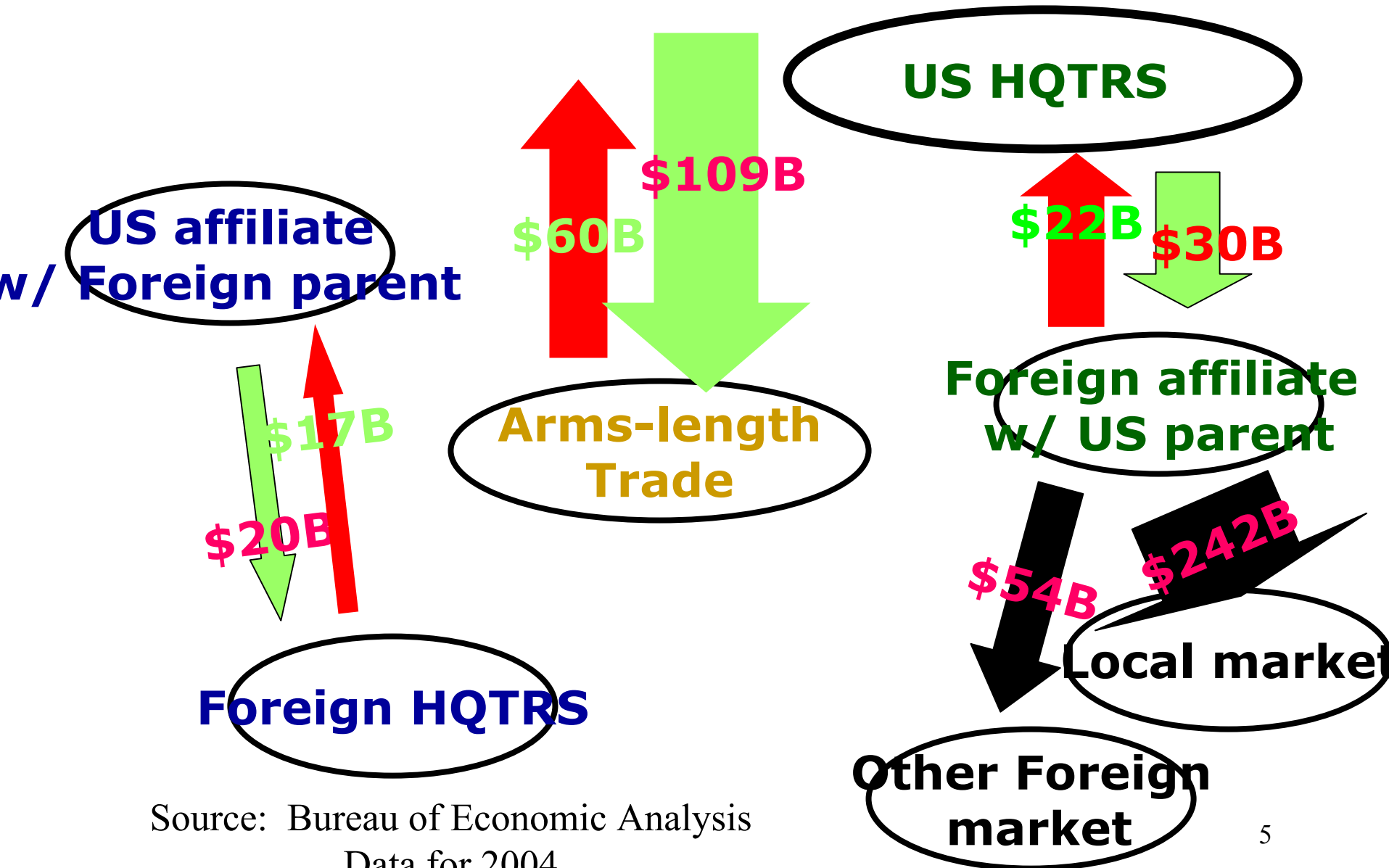
US example

	1992	1997	2000	2002	2005
Share OPS in total exports G&S	8.2%	9.0%	10.2%	12.8%	13.0%
Share OPS in total imports G&S	3.9%	4.1%	4.2%	5.0%	5.3%
Share OPServices in total export services	28.7%	27.4%	27.9%	30.3%	29.2%
Share OPServices in total import services	18.2%	15.9%	15.4%	15.8%	15.6%

Source: Bureau of Economic Analysis, OPS – ‘Other Private Services’

US Perspective: FDI & International Trade in Services

Localized affiliate sales nearly double cross-border trade



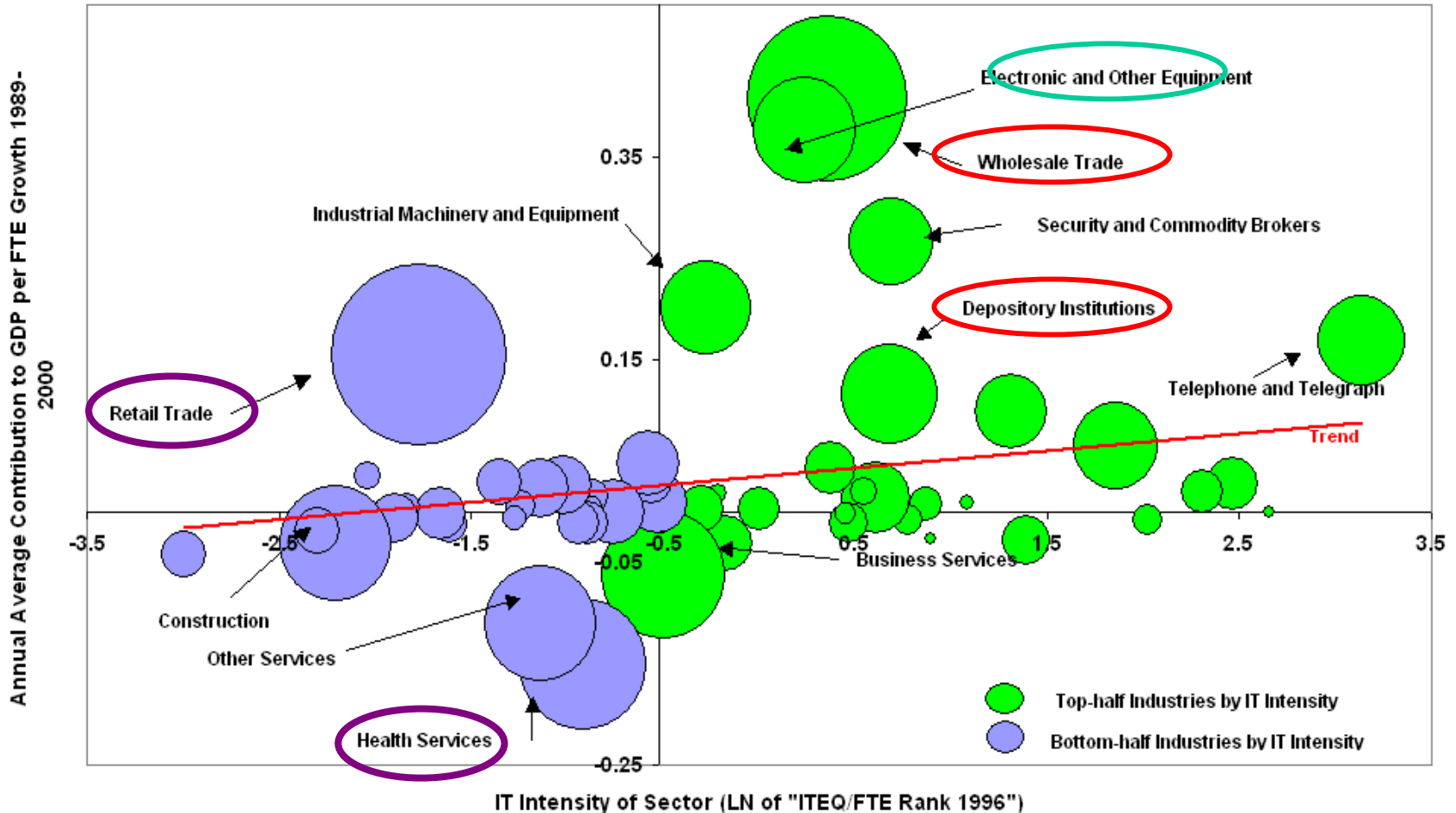
Source: Bureau of Economic Analysis
Data for 2004

ICT, Domestic Impact, and Globalization

Trade accelerates change, diffusion, and policy demands

- **ICT is productivity enhancing**
 - Gains from *diffusion* ... (it's not just about IT per se)
 - Diffusion varies across sectors... (esp. important in services)
 - Affects labor tasks, wages, employment... (winners, losers)
- **Globalization and ICT: a US example**
 - Trade and global markets cut ICT prices an additional 10-30%
 - Yielding $\frac{1}{2}$ of the productivity acceleration, and accounting for *more than $\frac{1}{4}$ \$ trillion (1995-2000)*; this from globalization of IT alone

Technology, Services, Productivity Growth: US example



Source: Economics and Statistics Administration, U.S. Department of Commerce, DE2002 Table A.4.4 as presented in Mann (2006) Accelerating the Globalization of America

*Leading sectors—already networked, common software 'platform'.
Lagging sectors—diverse firm sizes, complex relationships, regulations*

Technology, Services, Productivity Growth: US and Europe Compared

Table 2.4 Average Annual Growth of GDP per Hour Worked of ICT-producing, ICT-using and non-ICT Industries in EU and US 1979-1995 and 1995-2002

	1979-1995		1995-2002	
	EU-15	US	EU-15	US
Total Economy a)	2.3	1.2	1.8	2.5
ICT Producing Industries	6.8	7.2	8.6	9.3
ICT Producing Manufacturing b)	11.6	15.1	16.2	23.5
ICT Producing Services	4.4	2.4	5.9	2.7
ICT Using Industries c)	2.3	1.6	1.8	4.9
ICT Using Manufacturing	2.7	0.8	2	2.6
ICT Using Services	2	1.9	1.7	5.3
or which				
Wholesale Trade	2.4	3.5	1.5	8.1
Retail Trade	1.7	2.4	1.5	7.1
Financial Services	1.9	1.5	2.3	5
ICT-intensive Business Services	0.8	-0.9	0.6	0.7
Non-ICT Industries	1.9	0.4	1.1	0.2
Non-ICT Manufacturing	3.2	2.3	2.1	1.2
Non-ICT Services a)	0.8	-0.3	0.5	0.2
Non-ICT Other	3.4	1.4	2.1	0.4

a) excl. real estate

*Is European experience due to insufficient IT investment
Or insufficient change in workplace practices and new products?*

exact grouping.

Source: van Ark (2005), table 4.

Technology Intensity in the Global Value Chain

Sectors differ

Why firms differ in the use of technology in the global value chain

- Cost savings
- Industry readiness, product fit
- Internal-firm use
- Supplier/Buyer use
- Stages of use

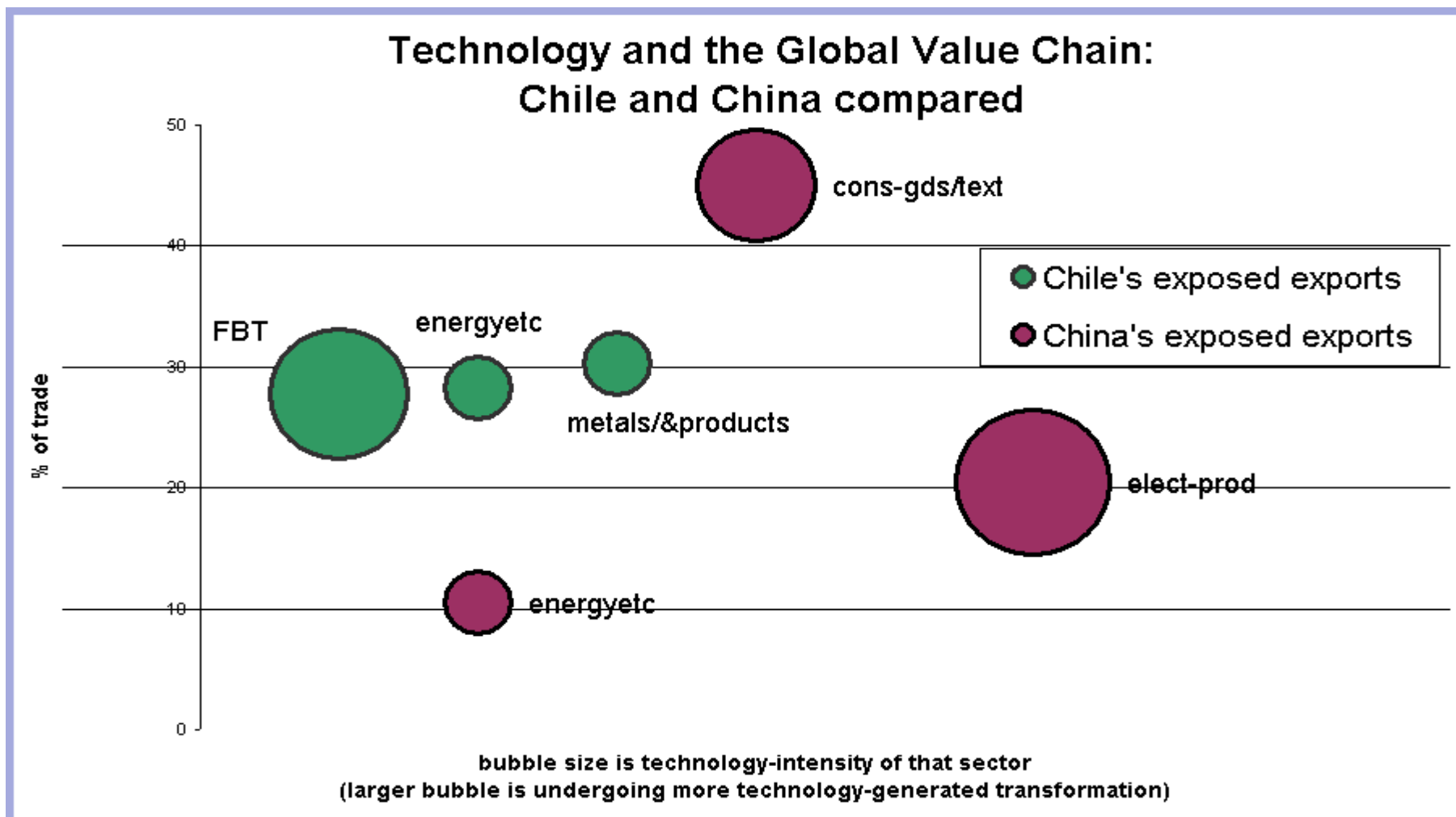
Intensity of Technology Use

(1-5, 5 is highest)

Sector	
Food Ingredients	4
Consumer goods	3
textiles	3
energy, chem, natl res.	1
Pharmaceuticals	4
metals/metal products	1
Indus eqpt & Supplies	3
Electronic Components	5
Autos	3

Technology and the Global Value Chain

A country's trade categories expose it to more (or less) value-chain competition



See Mann (2001) Chapter 9, Global Information Technology Report for methodology¹⁰

Trade in Manufactures & Services Infrastructures

Services are esp. important for developing countries

	Full sample	South to north trade	South to south trade
Tariff rates	-1.555***	-1.512	-1.5***
Port Efficiency, Importing Country	0.307*	0.344	-0.283
Port Efficiency, Exporting Country	0.924***	0.845***	0.949***
Customs Env., Importing Country	0.472**	1.041	0.202
Regulatory Env., Importing Country	0.281*	-1.120*	0.816***
Regulatory Env., Exporting Country	0.620***	2.437***	0.827***
E-Services Infra., Importing Country	0.729***	2.134***	0.866
E-Services Infra., Exporting Country	1.943***	2.124***	3.133***
Adjusted R-squared	0.758	0.702	0.649
Number of the observations	7,904	2,188	3,094
Note: Significance levels at 10%, 5% and 1% denoted by “*”, “**”, and “***”, respectively.			
Source: Wilson, Mann, Otsuki. Assessing the Potential Benefit of Trade Facilitation A Global Perspective			

Tariff reductions raise trade, and are very important

Lower trade costs, esp. via services infrastructures, is highest elasticity

South-to-North trade particularly hampered by high south trade costs

US Imports of Business Services:

Developed, developing countries differ

Role for IT networks, trade agreements, services intensity in GDP, MNC networks

Model: Total import +Cost Index Total US import BPS = $\beta_0 + \beta_1 \cdot \text{GDP} + \beta_2 \cdot \text{Cost Index} + \beta_3 \cdot \text{Internet per capita} + \beta_4 \cdot \text{Asset_tertiary} + \beta_5 \cdot \text{English} + \beta_6 \cdot \text{Bilateral Trade} + \beta_7 \cdot \text{Distance} + \beta_8 \cdot \text{Tax} + \beta_9 \cdot \text{Corruption} + \beta_{10} \cdot \text{Services \% GDP} + \beta_{11} \cdot \text{\# Affiliate/GDP}$

time series (1995-2004 check) , country cross section (40 check)

Above average income				Below average income			
Source	SS	Number of obs 210		Source	SS	Number of obs 224	
Model	266.4367			Model	146.0018		
Residual	20.69782			Residual	34.77908		
Total	287.1346	Adj R-squared 0.924		Total	180.7809	Adj R-squared 0.7976	
Intotal_m	Coef.	Std. Err.	t	Intotal_m	Coef.	Std. Err.	t
lngdp_us	1.405056	.1083885	12.96	lngdp_us	0.270986	.1087474	2.49
lnwagegdp_92	0.765912	.1161104	6.60	lnwagegdp_92	-0.37435	.0788075	-4.75
lnint_percapita	0.145473	.0142636	10.20	lnint_per	0.053147	.0105966	5.02
lnasset_te~y	-0.163398	.0521402	-3.13	lnasset_te~y	0.13647	.0511134	2.67
lang	1.25369	.1010982	12.40	lang	0.179352	.093363	1.92
bil_trade	-0.204888	.1081981	-1.89	bil_trade	0.586421	.0856115	6.85
Indist	-4.384023	.6099813	-7.19	Indist	-3.7982	.7849737	-4.84
lnbeat99	-1.05433	.0763649	-13.81	lnbeat99	-0.44703	.1126838	-3.97
lnpci2006	-0.685292	.1844113	-3.72	lnpci2006	-0.00807	.1070837	-0.08
lnavg_serv	-1.801989	.4982067	-3.62	lnavg_serv	3.260277	.6016798	5.42
lnaff_gdp_~o	0.397733	.1065479	3.73	lnaff_gdp_~o	-0.91183	.1607213	-5.67
cons	-11.30707	3.001563	-3.77	cons	-20.3822	4.024498	-5.06

Source: Mann work in progress

Final Observations

- **Technology and services**
 - Drive IT-enabled services exports
 - Improve trade facilitation, reduce trade costs
 - Create/maintain global value chain competitiveness
- **Technology not alone, crucial role for**
 - human capital
 - good government
 - positive business climate
 - trade negotiations !
- **Policy focus**
 - Not only on trade competitiveness
 - But also on domestic development