

Internationalization of Intangibles

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Outline

- Motivation, international business “facts”
- Framework (the data businesses have)
- Intangible capital, questions raised by intangibles in international context
- Previous literature
- Existing data and data gaps
- Implications for analysis and measurement

Global business strategies and economic growth

- Emerging countries are expanding many times faster than advanced ones--competing for global demand is the “new normal” of business
 - ✓ A company can operate in the global marketplace and build a foreign customer base through exports,
 - ✓ . . . or it can set up affiliates and serve foreign customers through direct sales abroad.
 - ✓ No single strategy is appropriate and most MNCs do both
- But just how a country’s businesses “do” global business will shape course of a the country’s income growth—the nature of its productive capacity and types of workers employed

Facts about US MNCs and international trade

- US-headquartered MNCs
 - ✓ Relative size and growth of affiliate sales has been staggering
 - ✓ Still, the share of US exports accounted for by US-headquartered MNCs was 45 percent in 2010
 - ✓ Exports by affiliates of foreign-own MNCs located in the US account for another sizeable share of exports (18 percent*)
- Stylized “facts” of trade
 - ✓ Trade is extremely concentrated across firms (top 1 percent of trading firms by trading value accounted for 80 percent of trade, top 10 percent over 95 percent)
 - ✓ . . . and these firms tend to ship a relatively large number of products to a large number of destinations, suggesting U.S. trade grows along these extensive margins (adding products and geographies)

Framework for this paper – let's look at the MNC

- As a practical matter, concepts of production and income are harder to pin down as geography “shrinks” (via globalization or disaggregation) and firms’ business transactions cross borders
- This suggests working/thinking about concepts at the firm or enterprise level and moving from there to a regional or national level.
 - ✓ MNC is the unit of decision
 - ✓ Intangible capital reflects capabilities of the MNC, may be non-rival within the MNC but that does not preclude measuring the capital and associating a ROR with it
 - ✓ ...that R&D is conducted in Ireland doesn't change things for the MNC
 - ✓ But it does change a country's net investment position and current account
 - ✓ Models get complicated, so let's look at numerical example

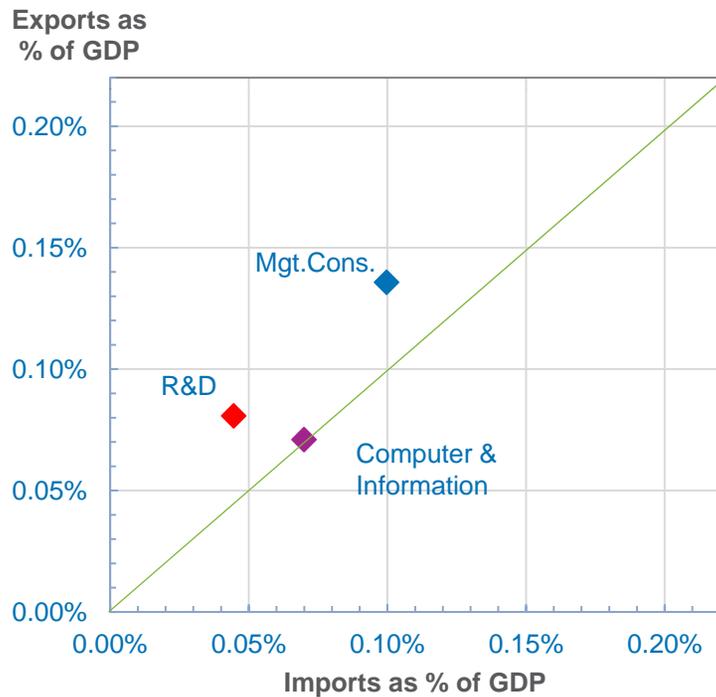
Example: **X** is a firm in country **C** that conducts its R&D in A, makes its product in B, and sells to consumers in C and D.

Item	FIRM X Total	COUNTRY			
		A	B	C	D
Production cost	100		100		
Product imports	---			50	50
R&D	20	20			
Marketing	30			20	10
Management/Adm.	15			10	5
Total Cost	165	20	100	80	65
Sales	215		100	100	115
Surplus	50	-20	0	20	50
Royalty and license fees	0	70		-20	-50
Services (Intangibles)	65	20		30	15
of which: investment	38	20		12	6
Memo: Employment	110	10	80	15	5

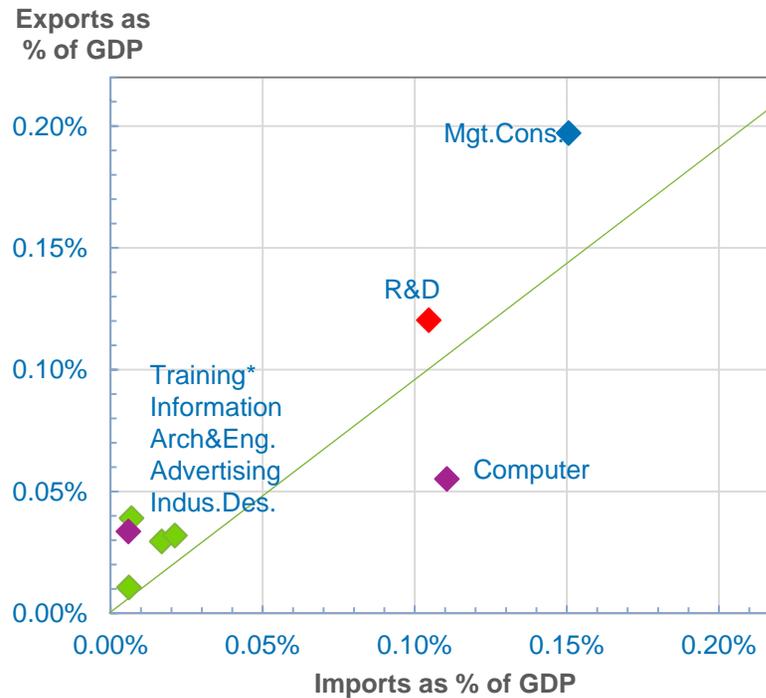
Corrado and Hulten, "Internationalization of Intangibles" March 1, 2013.

Services Trade in Intangible Asset Types – flows are two-way and expanding relative to GDP

2001-2005



2006-2010



* Items are listed in order of import penetration, low to high.

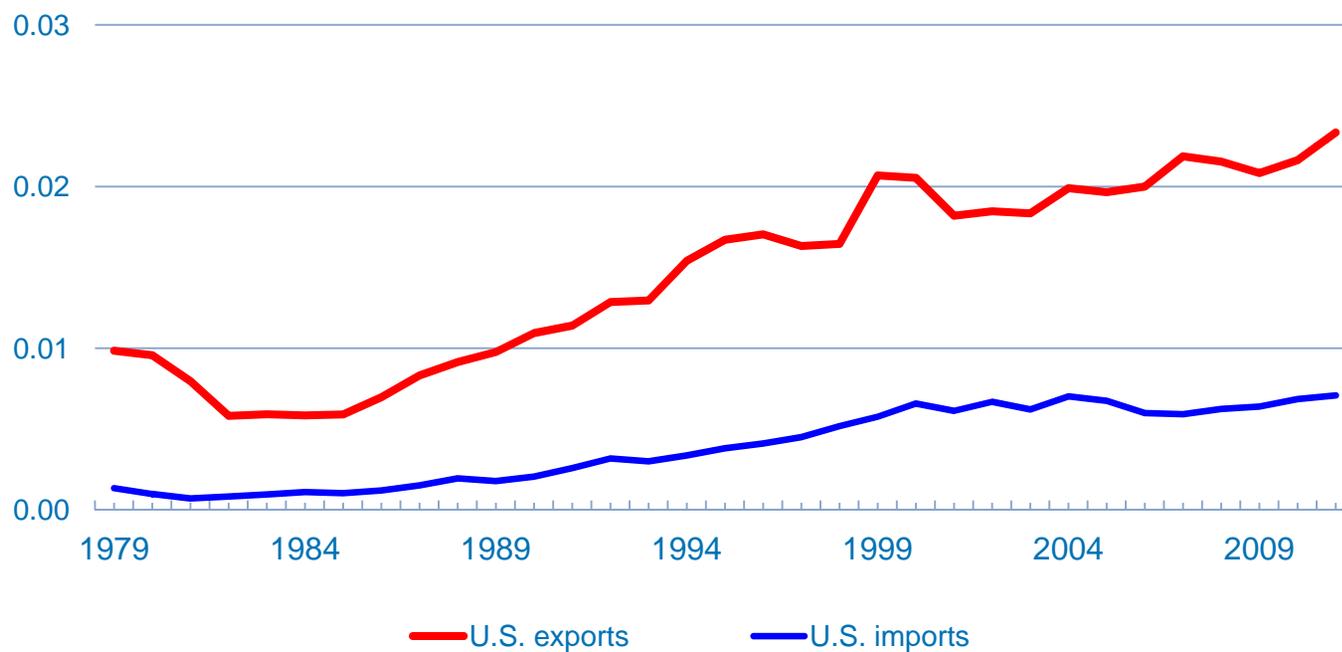
Figure 6. Investment and legal forms

Source—Clayton/Mitra-Kahn (2010) as modified by Corrado (2012).

Type of Investment ¹	Legal Forms					Tacit
	IPR				Other (trade secrets, contracts, etc.)	
	Patents	Copyright	Design IPR	Trade-mark		
Software	X	X	X			
Databases		X			X	
Science R&D	X		X			
E&A originals		X	X			X
Design	X	X	X			X
Marketing, marketing res. & communication		X		X	X	X
Business process	X	X			X	X
Training						X

1. Mineral exploration is excluded.

Figure 5. Royalty and license fees relative to intangible capital, 1979 to 2011



Source—Royalty and license fees are BOP receipts (exports) and payments (imports). Intangible capital is from authors' previous work.

Intangible capital model

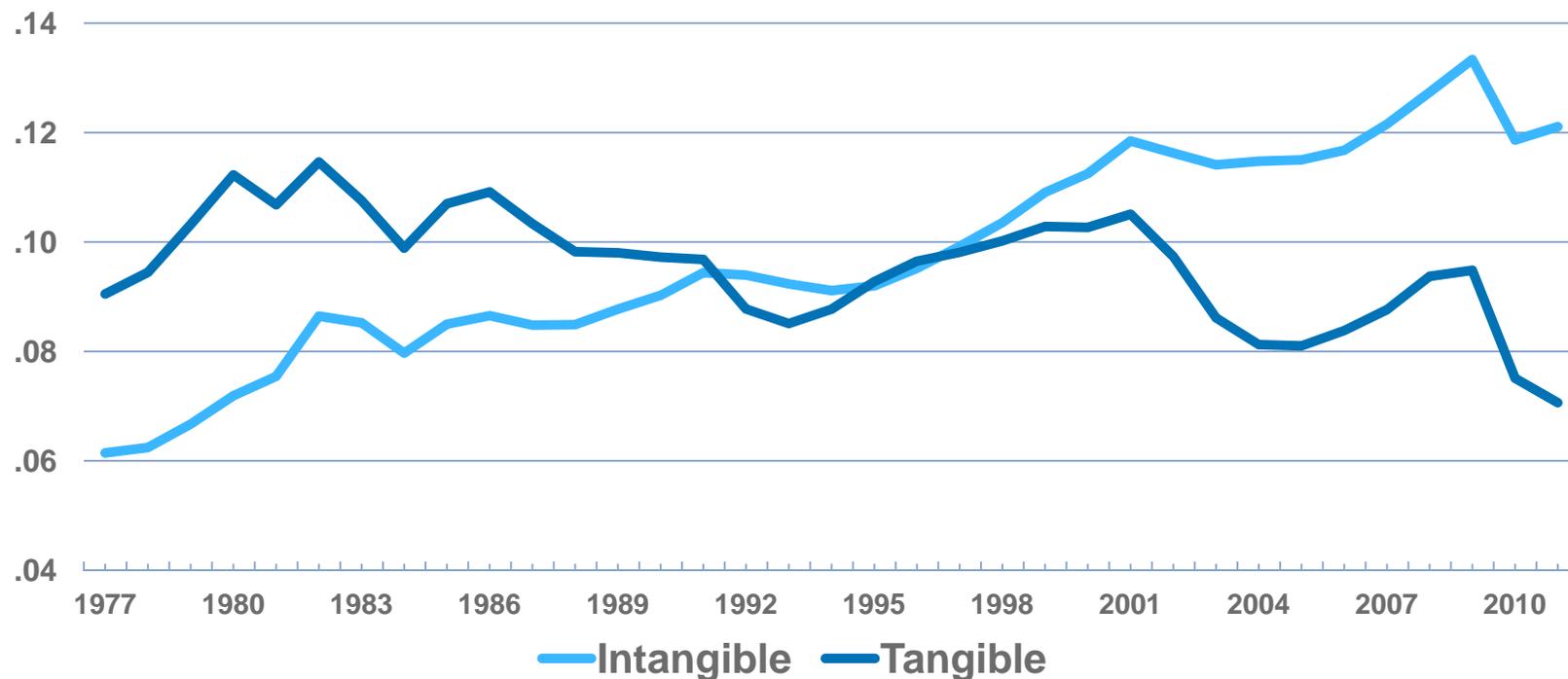
- Corrado, Hulten, and Sichel (2005, 2009) introduced intangible capital into the neoclassical model of growth to analyze U.S. productivity performance and innovation
 - ✓ Model treats most spending on R&D, design, brand equity, and organizational structures (incl. training) as business investment
 - ✓ Investments in software (and databases) and in mineral exploration are already capitalized in U.S. national accounts
- When all intangibles are included in data for U.S. business sector
 - ✓ Intangible investment is nearly twice as large as tangible investment in recent years.
 - ✓ Intangible capital accounts for 30 percent of labor productivity growth.
 - ✓ MFP growth as a percent of labor productivity growth (the “measure of our ignorance”) is reduced from 47 percent to 33 percent (1979 to 2007).

The Corrado, Hulten, and Sichel intangibles framework

Broad category	Type of Investment
Computerized Information	<ul style="list-style-type: none">• Software• Databases
Innovative Property	<ul style="list-style-type: none">• R&D• Mineral exploration• Entertainment and artistic originals• Other new product development costs (e.g. design)
Economic Competencies	<ul style="list-style-type: none">• Branding and reputation (mkt. research and advertising)• Firm-specific human capital (training)• Organizational capital (business process investment)

The U.S. intangible investment rate overtook the tangible rate by the end of the 1990s

Investment, Private industries, 1977 to 2011
(ratio to existing GDP)



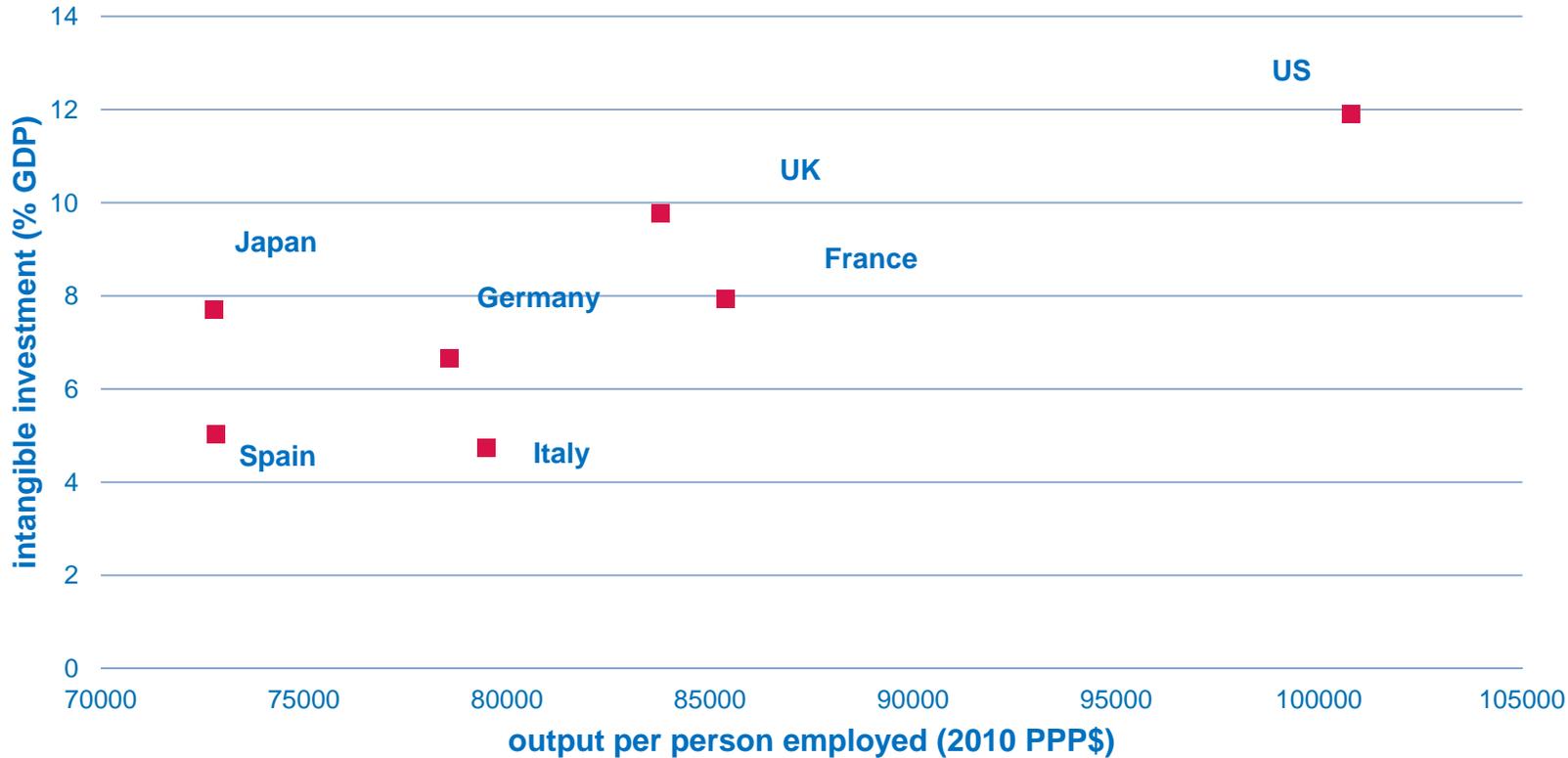
Excludes real estate/housing.

Corrado and Hulten, "Internationalization of Intangibles" March 1, 2013.

Intangible capital model, continued

- CHS approach has been applied to most OECD countries, and some emerging ones, too
 - ✓ U.S. propensity to invest in intangible greater than other advanced countries

U.S. propensity to invest in intangible capital is higher than in other advanced countries



SOURCE—GDP per worker is from The Conference Board’s Total Economy Database (2012). Intangible investment estimates are from the INTAN-Invest database (Corrado et al. 2012) and Fukao, Hisa and Miyagawa (2012).

Thinking about intangibles and globalization . . .

- The primary focus of analysis of intangibles has been national because so much of the production of intangible investment occurs in-house (e.g. R&D and marketing)
 - ✓ But some of these productive assets can be used elsewhere, i.e., firms have the ability to “re-use” capital across geographies (just as they do across establishments within a country)
- Do international accounts data capture all relevant payment to, flows of, and investments in knowledge capital?
 - ✓ How are technology transfers accounted for in international data?
 - ✓ Do intangibles resolve the “dark matter” critique?
 - ✓ Does the possible of greater “re-use” mean depreciation rates used in the intangible literature are too fast?

Thinking about intangibles and globalization, continued

- Is the tilt toward intangible investment a globalization phenomenon?
 - ✓ A reflection, perhaps, of an economy supported by repatriated income from overseas investment, or a reflection of a domestically-oriented service economy?
- The tilt is associated, at least in part, with the IT revolution.
 - ✓ IT capital and intangibles are complements in production
 - ✓ But then IT can be said to have enabled globalization (supply chains, drastically lower communications costs) and encouraged the spread of intangible capital as well
- But we don't know the relevance for policy w/o knowing whether the international accounts adequately represent the "true" flows of knowledge capital.

Selected previous literature

- Prescott and McGrattan (2009, 2010) introduced technology capital owned by MNCs into the neoclassical model of growth to evaluate concerns of high U.S. current account deficits.
 - ✓ Calibrations implied smaller current account deficit and a U.S. net asset position as much as 20 percent larger than reported position (late 2000's)
 - ✓ Bridgman found that intangible capital could explain most of the differential in ROR on DIA vs FDI, consistent with differential propensities to invest in intangible capital by US vs EU/Japan who are primary FDI
- Yorgason (2007) of BEA evaluated the impact of capitalizing R&D
 - ✓ Obtained a negligible impact on current account and **lower** US net direct investment position in 2004 (b/c increase in inward larger than outward)
- How to reconcile?

Changing R&D Expense to R&D Investment (Yorgason)

■ Framework

- ✓ Does NOT affect trade in services—the flow of R&D services continues to be recorded as previously
- ✓ DOES affect investment income and thereby current account
- ✓ DOES affect Direct and International investment positions (and thereby national balance sheet) because stocks previously unrecorded

■ Results

- ✓ Negligible impact on current account (b/c adjustment = + current year spending - depreciation)
- ✓ Net direct investment position lower (increase in inward larger than outward)

Existing data and data gaps

- BEA's MNC surveys are a rich source of information
- If the capitalization of R&D is a guide, capitalizing the current production of other intangible assets will not have large impacts on international accounts
- But many other intangible assets are not as well protected by IPRs and international trade statistics will not pick up in-kind transfers.
- Estimation of intangibles in the domestic context proceeded from investment.
- Estimation in an international context will, in all likelihood, need to proceed using more indirect methods, such as keying off of RORs.

Thankyou

Issues raised by example, continued

- The corresponding balance sheets/investment positions are not shown . . .does A's royalty income owe to technology capital transferred from C to A?
 - ✓ Probably, and probably a lot of it: assuming a 20 percent gross return, then stock is 350.
- Isn't the R&D production in country A a services imports by C?
 - ✓ (I think so).
 - ✓ Ditto for the marketing and management in country B, i.e., aren't these services provided by C?
- If these are classified (at least partially) as fixed investments, how is services trade affected?
 - ✓ It isn't if they are there in the first place.

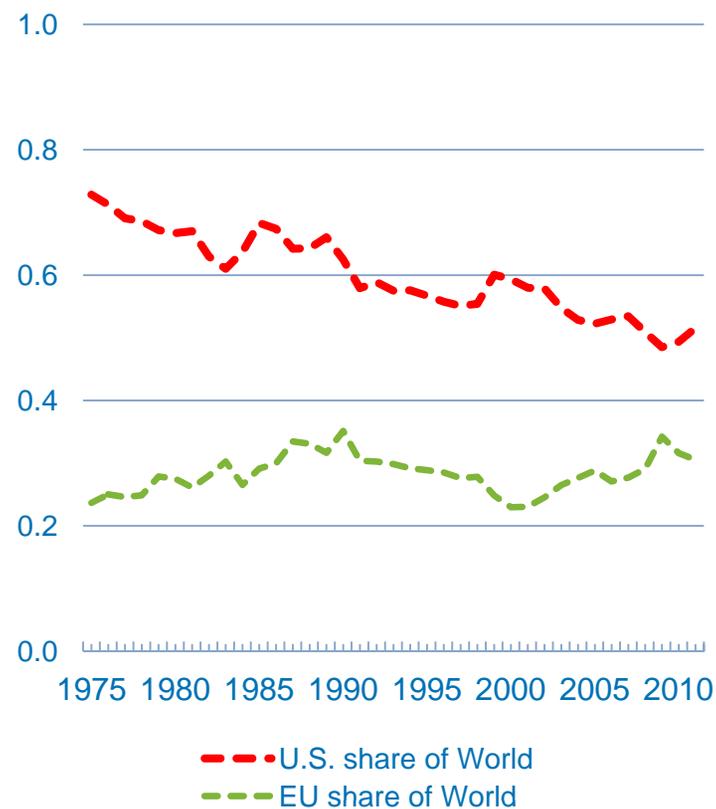
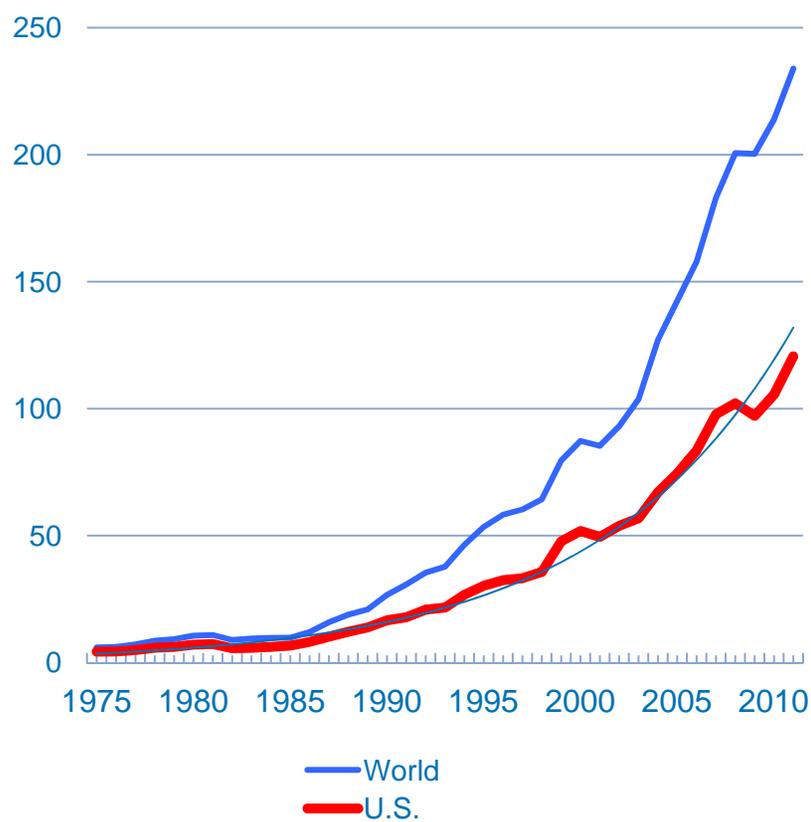
Backup slides

Issues raised by example

- Distinction between diffusion, asset transfers, and direct investment abroad
- Aspects of all these processes have been labeled “technology transfers”
 - ✓ An employee of X’s R&D plant in country A departs and starts a new lab in country A that copies X’s design. Is that technology transfer?
 - No, that’s stealing, but it is a form of diffusion.
 - ✓ Some of B’s production capability (outside of X’s plants) mimics X’s production processes, plant layout, and supply logistics. What’s that?
 - Usually called diffusion and is related to the service lives of intangible assets.
 - A design or a process may never “wear out” in a physical sense, but after a time it ceases to earn returns.
 - ✓ The scope of US DIA (in terms of asset types) follows from the scope of private investment

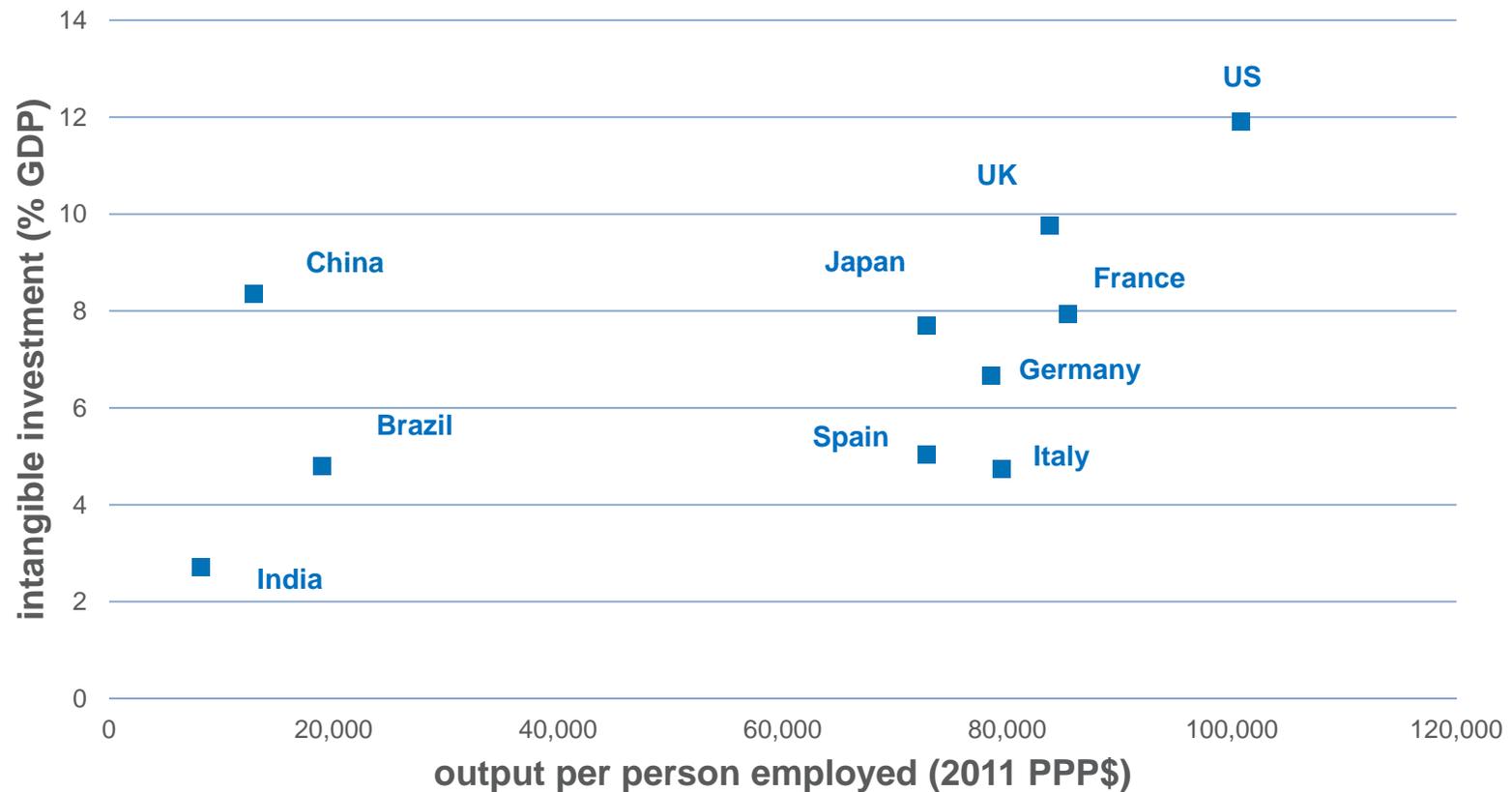
Royalty and license fees growing rapidly

(receipts aka exports, BOP, billions of dollars, 1975 to 2011)



Corrado and Hulten, "Internationalization of Intangibles" March 1, 2013.

Globally, higher rates of intangible investment are associated with higher levels of GDP per worker



SOURCE—The Conference Board, based on its Total Economy Database (2012) and estimates reported in INTAN-Invest (Corrado et al. 2012), Dutz et al. (2012), Fukao, Hisa and Miyagawa (2012), Hulten and Hao (2012), and Hulten, Hao, and Jaeger (2012).

NOTE—Intangible investment in China and India is total economy, whereas for other countries investment is for the market sector.

The R&D and IPR marketplace: What do the data capture?

- Existing R&D services revenue and IPR income data consist of a mix of concepts: asset sales, license/user fees, and contract research
- Price collectors do not now collect data on transactions in the R&D/IPR marketplace
- . . . the mix makes this an especially complex task:
 - ✓ Unit contract and IPR price observations could correspond to an asset replacement price or a per period rental price depending on whether knowledge is being rented or sold. (Certain fees and contracts are in between. See Corrado, Goodridge and Haskel 2011 p.10-11 for further discussion.)
 - ✓ A further complication is that sales prices reflect a mix of assets of different ages (like a mix of transaction prices for new and used cars), which further complicates interpretation of the data.

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