Intellectual Monopoly in Global Value Chains

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Outline

1. Overview on global value chains
2. Endogenous asymmetries of market structures
3. The GVCs-IPRs nexus
4. Network externalities and increasing returns on intangibles
5. Intangibles profits and investment
Global Value Chains: Just the Rage or Reality of 21st Century Capitalism?

- GVCs have grown in magnitude, scope, and complexity, driven by technology, managerial strategy, geo-political change and development policy, trade and investment liberalization
- GVCs offer theory of capitalist development (“upgrading”); also central to deindustrialization (“downgrading”)
- GVCs raise problems of measuring trade (gross vs. VA trade)
- GVCs raise issues about the theory of trade (upgrading as defiance of comparative advantage)
- “G” is a misnomer: GVCs are largely regional and have very lumpy geographical impact on development
- GVCs present new political economy of globalization, shift toward private governance and a “governance deficit”
- Backlash against globalization threatens GVCs
Stylized Facts

- “Outsourcing”/”Offshoring” (the share of imported intermediates in total intermediates use) has grown among OECD countries.
- There has been a steady increase in developing country reliance on exports for demand and this export orientation is increasingly south-south.
- 50% of trade is in intermediates. Biggest share growth is developing country manufacturers (Sturgeon)
- These exports rely heavily on imports. That is, export growth depends on import growth (Jensen, OECD/WTO, UNCTAD).
“The great doubling” and “second unbundling”

Exhibit 1: Workers in the Global Labor Force and the Global Capital/Labor Ratio, 2000, Before and After China, India, and ex-Soviet bloc join global economy

Source: Employment from ILO data, laborsta.ilo.org/ Millions of Economically Active Persons, 2000 Capital-labor ratio, calculated from Penn World Tables as described in Freeman 2005, scaled so before is 1.00.
Growing Export Orientation in Low- and Middle-Income Countries

Exports from Low- and Middle-Income Countries

a. Low- and Middle-income Country Exports (% World Exports)

b. Selected-country Exports (% GDP)

Source: Authors’ illustration with data from World Development Indicators, World Bank, 2012.

Note: Low- and middle-income countries covers most developing countries.
GVC expansion: 1995-2011
Foreign Value Added in exports of 7 biggest economies

Author's computation using OECD TIVA database
Most Exports Come From Firms That Also Import

- Of firms that import and export:
  - Manufacturing: 30.5%
  - Wholesale: 47.9%

- 85% of known export value comes from firms that import and export

U.S. Department of Commerce (2012)
Simple Taxonomy of Lead-Firm Governance of GVCs

- **Buyer-led**: large retailers or brands, flexibility and timing of delivery, intense competition among suppliers (Wal-mart, The Gap).
- **Producer-led**: more technology sharing between lead firm and first- and second-tier suppliers (Boeing, General Motors).
- GVCs are complex, regional, nested, varied in structure and governance.

*Note: Governance perspective differentiates GVC analysis from input-output analysis.*
Complex: Mobile Telecom Global Value Chain

**H/W Manufacturing**
- N/W Infrastructure Production
- Input materials
  - Hardware parts
  - R&D Product Design
    - Assembly & Testing
      - Mobile Phone
  - Software & Applications

**S/W Development**
- Application stores

**Sales & Marketing**
- Independent retailer
  - Mobile Phone manufacturer
  - Mobile Network operator

**Mobile Service & Use**
- N/W Infrastructure Construction
  - N/W Infrastructure Operation
  - Voice/text service
  - Mobile Phone In Use
    - Mobile Internet Service
    - Mobile Content
    - IP Platform Operation (e.g., billing; WAP service)
  - Consumer-generated Service
    - Consumer-generated mobile Internet application & service
  - Phone and airtime resale
  - After Use
    - e-waste
    - Recycling
Regional: Hard disc drive assembler in Thailand

Nested: The Apple iPod (30gb, $300 retail) (Sturgeon)
Low Cost Assembly and Global Sourcing.
Varied by share of intermediates/final trade: Apparel, Autos, and Electronics, 1998-2006
Varied in Governance Structures (Gereffi et al. 2005)
Endogenous asymmetry of market structures in GVCs

Asymmetry of market structures within GVC
(Milberg and Winkler, 2013, p.123-130).

Oligopolistic lead firms at the top
markup pricing power and concentration of industry

Dispersion among lower-tier suppliers
as more developing countries entered lower- and medium-tech industries

Endogenous production of asymmetries

global competition
(i) inducing competition among suppliers
Labor fragmentation, excess capacities, capital mobility
(ii) offloading risk to suppliers
Shareholder value revolution (Lazonick and O’Sullivan, 2001)

Intellectual monopolization
(i) IPRs: entry barriers through branding minimizing technology sharing.
(ii) Information returns, network externalities, IPRs in trade agreements
Offshoring and externalization:
Endogenous Asymmetry of Market Structure in GVCs

\[ m = \left[ \frac{P}{w_a} \right] - 1 \]
Sources of Asymmetry

- Labor surplus and export orientation
- Scale economies
- Branding
- Inducing competition among suppliers (factor market power)
- Offloading risk (e.g. of inventory adjustment)
- Limiting technology access
- Notes:
  - Theory of externalization rather than internalization.
  - Within-link power asymmetries are crucial

«Cost-accounting effect is both fueled and amplified by changes in relative market power»
Intellectual monopolization versus global competition

value share

value chain

R&D  design  IS  logistics  production  logistics  IS  marketing  after-sales

intellectual monopolization

global competition

1970 value chain

21st century value chain
The «smile curve» of value added, with $600 iPhone 4 example

Cost differentials lower the share of value added for routine business functions, which are shifted to developing countries.

Functions become geographically segmented between knowledge clusters, for higher value-added functions, and production clusters, which pool lower value-added functions, creating low value-added traps (China, the exporter of record, contributes only 1.1% of a $600 iPhone’s value).

Source: T. Sturgeon, for UNCTAD, with iPhone example drawn from OECD, 2011.
Globalization

THE GVC - INTELLECTUAL PROPERTY NEXUS
Globalization of IPRs: NAFTA, TRIPS, (DOHA), PTAs

Integrated into the multilateral trade agenda

Dramatic change in U.S. IP law in the 80s
TRIPS agreement within the WTO activated in 1995
  Set minimum standards for regulation of IPRs, subject to dispute settlement
Tightening stopped by developing countries at Doha in 2001

Push via Preferential Trade Agreements (PTAs)

Supplement to TRIPS: Domestic US and EU IP law as templates
  (Abbott, 2006; Shadlen, 2008)
North: Harmonizing regulatory policies and IP advantages, investor rights
South: Securing market access beyond preferential treatment
  (Manger and Shadlen, 2014).
Trade Agreements and IPRs

Author's computation based on DESTA database
IPRs in trade agreements

Author's computations using DESTA database
Northern Atlantic push to Globalization of IPRs
Countries entering in PTAs with IPRs provisions by decade

Author's computations using DESTA database
Hegemony in international patents
Main countries contributing to Triadic patent families

Author's computations using DESTA database
IPRs and Economic Development

*Patents as deviation from competitive ideal – spur to innovation.

*Ongoing debate on role of patents in innovation and economic development (North vs. Mokyr).

*IPRs and knowledge appropriation in LDCS
  FDI: in search of spillovers
  Trade: middle-income countries import technology, but IPRs reinforce GVC asymmetry (entry barriers and rising IP payments)

*Rodrik (2017): “one needs to assume an implausibly high elasticity of global innovation to developing countries’ patents to compensate for what is in effect a pure transfer of rents from poor to rich countries.”
GVCs and IPRs are self-reinforcing

Fragmentation:
- Intangibles circulate to sustain fragmented chain
  \textit{Specifications, know-how}
- Risk of IP appropriation

IPRs protection:
- Induces fragmentation
- (Including with sophisticated tech and branding features)
Sources of intellectual monopoly

**Natural Oligopoly**: Facebook, also Apple (controls IP and demands info from suppliers – “a closed eco-system where it exerts control over nearly every piece of the supply chain from design to retail store” Satariano and Burrows, 2011)

**Network externalities** through complementarities (e.g. inventory. Control and chain management) data centralization: Google, Facebook, Amazon, Tencent, Alibaba, but also buyer-led (Wal-Mart), and predictive maintenance data in IT (IBM, SAP, Microsoft, Intel, Cisco) and manufacturing (Rolls-Royce, GE, Siemens), construction.
Figure 12: Total and average cost dynamics for tangible intensive and intangible intensive segments (authors' elaboration)
Networks externalities and Scale

GVCs as networks

Externalities from complementarities
Value increased by combination
Necessitate integration:
* specifications (Economides, 1996)
  IS as informational backbone

Centralization of externalities

the integrator is in position to reap the benefits => participants “pay-in” through lower prices their entry
Accumulation of data out of IS

Increasing returns to scale

Non-rival assets with low or zero marginal costs
Intangibles-intensive firms benefit more from increasing returns (no diseconomies of scale as with tangibles)
The battle for information and network returns

Managing the chain: Amazon v/s Wal-Mart

“retailers need to figure out how to manage sophisticated supply chains connecting Southeast Asia with stores in big American cities so that they rarely run out of product. They need mobile apps and websites that offer a seamless user experience so that nothing stands between a would-be purchaser and an order. (...). Larger companies that are good at supply chain management and technology can spread those more-or-less fixed costs around more total sales.”

(NY Times, June 19 2017)

Capturing the data on machinery

“Manufacturers such as Rolls-Royce, GE and Siemens have been investing in “predictive maintenance” technology for years. It is just one of the myriad ways they capture data across the value-chain to improve efficiencies and automate work.”

(FT, April 27 2017)
« We manufacture products that generate power, that automate manufacturing processes, that scan people (like CT and MRI machines), and that move people and goods from place A to place B. That’s a lot of products, and all those products have sensors. (...), once we get the data, we have the data analytics platform and the cloud. We have a proprietary cloud, for example, an on-site cloud. Our customers care about manufacturing and engineering data and intellectual property rights because [this type of data] is the holy grail of innovation ».

Joseph Kaeser, Siemens CEO, 2016
Intellectual monopoly in GVCs

- GVCs trade
- Intellectual property rights
- Information network externalities
- Market power of lead firms
Intellectual monopolization: natural monopoly, network externalities and uneven returns to scale

value share

global competition

1970 value chain

21st century value chain

value chain

R&D design IS logistics production logistics IS marketing after-sales
Intellectual monopoly in GVCs: A taxonomy of rents related to intangible assets

<table>
<thead>
<tr>
<th>TYPE</th>
<th>DESCRIPTION</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LEGAL IP RENT</strong></td>
<td>Rationing via exclusive rights on product production, process uses, cultural and scientific items, and marketing investment</td>
<td>Patents on pharmaceuticals, software copyright on features and coding, trademark protection (Nike, Louis Vuitton)</td>
</tr>
<tr>
<td><strong>VERTICAL NATURAL MONOPOLY RENT</strong></td>
<td>Returns on intangibles underlying the integration</td>
<td>Apple supply chain management</td>
</tr>
<tr>
<td></td>
<td>Network complementarities within GVC</td>
<td>Valeo, Bosch supply chain management of auto parts</td>
</tr>
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<td></td>
<td>Sunk costs resulting from asset specificities</td>
<td></td>
</tr>
<tr>
<td><strong>INTANGIBLES-DIFFERENTIAL RENT</strong></td>
<td>Uneven returns to scale on intangibles versus tangibles allow intangible intensive segments of the chain to capture a larger share of the gains</td>
<td>Apple and Nike fabless manufacturing versus assembling factories</td>
</tr>
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<td>Nespresso versus coffee producers</td>
</tr>
<tr>
<td><strong>DATA-DRIVEN INNOVATION RENT</strong></td>
<td>Central control of data generated along GVCs via asymmetric information systems</td>
<td>Siemens sensors on machinery, Goodyear tires sensors</td>
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<tr>
<td></td>
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<td>Wal-Mart retaillink software</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amazon shopping histories</td>
</tr>
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</table>
Extending Heintz’s model of branding rents to IP (Cambridge Journal of Economics, 2006)

$$\max_\theta \alpha(b) \delta(P, Y) - c\delta(P, Y) - \mu(b)$$
INTANGIBLES, PROFITS AND INVESTMENT IN GVCS

NON FINANCIAL ASSETS: COMPUTERIZED INFORMATION, TECHNOLOGICAL KNOW-HOW, ARTISTIC ORIGINAL ART, DESIGN AND NEW PRODUCTS, BRANDS, EMPLOYER-PROVIDED TRAINING AND ORGANIZATIONAL STRUCTURE
Intangibles intensity growing and higher in advanced countries

average and median of industry/country revenue (weighted average)

Source Compustat North America & Global  (assistance by O. Vallès)
Industries investment/profits in advanced economies and developing countries (2000-2015)

Author's computations based on Compustat
Intellectual monopoly and GVCs: spurring financialization?
Dividends and Share Buybacks as share of net income, 1981-2017
(Source: Lazonick, 2018)
Skills-biased labor markets and finance-biased equity markets: implications for U.S. income distribution

Source: Milberg and Winkler (2013).
Summary and hypotheses

Need to break out tangible and intangible capital in GVCs
   Linked to a tightening of IPRs
   And uneven distribution of network externalities gains

IP monopoly favors market power of lead firms
   Value capture support profits margin
   Diminishing pressure to invest
      stagnation with higher distributed profits

IP monopoly is obstacle to catch-up by developing countries
   Ambiguous impact of IPRs
      More ideas circulate but limited appropriation
      Restrain investment opportunities
   No countervailing force to networks externalities
      natural monopoly dynamics
   Limits value capture and room for social upgrading
Policy implications

“Trade liberalization” a misnomer
   Beyond trade agreements, a regulatory agenda
   With crucial implication for GVC dynamics

Privatization of ideas is adverse to development
   An issue beyond IPRs
   Network externalities, an underestimated problem

Intellectual monopoly
   A new outlook on GVC upgrading possibilities
   A progressive agenda on weaker IPRs and data openness
   Dilemma of regulating a natural monopoly
Thank you!
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Trends in Wage Shares: Asia, Asia (excluding China) and Middle East (index = 100 in 2000)

Notes:
1. The wage share is adjusted for changes in the incidence of self-employment when the information is available. The regional averages shown in the figure are GDP-weighted averages, transformed into an index to facilitate the comparison of trends.
2. The wage share measures the share of income created that goes to workers. This is in contrast to the profit share, which measures the share of income that goes to capitalists.

Source: ILO World of Work Report (2011)
Trends in Wage Shares: Africa, North Africa and Latin America (index = 100 in 2000)

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Trends in Wage Shares: Advanced Economies and Central and Eastern Europe and Central Asia (index = 100 in 2000)

Panel C. Advanced economies and Central and Eastern Europe and Central Asia

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