New Trends in Value Chain Upgrading:
Lessons from Large and Small Countries

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US International Trade Commission, Washington, DC
1. Global Value Chains & Development

2. Industrial Upgrading in GVCs: Trends & New Realities
   A. Mexico & China
   B. Costa Rica & Brazil

3. Implications for “Inclusive” Value Chain Development
Global Value Chains
and Development
Globalization & Development – Key Trends

- **Post-Washington Consensus world** – Global economic recession of 2008-09 and rise of “middle powers” has changed export-oriented model
- **Large emerging economies** like China, India and Brazil are both export platforms and turning inward
- **Small economies** are seeking specialized niches in the global economy and regional economic blocs
- **Lead firms in global value chains** are streamlining and consolidating their sourcing and production networks
The Global Value Chain Approach

Global value chain framework developed over the past decade by a diverse interdisciplinary and international group of researchers who have tracked the global spread of industries and their implications for both corporations and countries

- Global value chain analysis provides both conceptual and methodological tools for looking at the global economy
  - **Top down** – a focus on lead firms and inter-firm networks, using varied typologies of industrial “governance”
  - **Bottom up** – a focus on countries and regions, which are analyzed in terms of various trajectories of economic and social “upgrading” or “downgrading”
Key GVC Research Objectives

1. A detailed mapping of the actors in specific value chains in particular countries or regions

2. An assessment of the upgrading (or downgrading) trajectories in the value chain with regard to multiple analytical dimensions

3. The identification of constraints and opportunities for value chain development leading to strategies to drive industry growth
## Value Chain Development: An Integrated Diagnostic Tool

### 5 Development Goals
1. Poverty Reduction
2. Employment Creation and Income Generation
3. Economic Growth
4. Firm Development
5. Environmental Stability and Cleaner Production

### 7 Dimensions of Value Chain Analysis
1. Sourcing of inputs and supplies
2. Production capacity and technology
3. End markets and trade
4. Governance
5. Value chain finance
6. Sustainable production and energy use
7. Business environment and socio-political context

## Relationship Between Value Chain Dimensions and Development Goals
(data are hypothetical)

<table>
<thead>
<tr>
<th>Value Chain Development Dimensions</th>
<th>Poverty Reduction</th>
<th>Employment and Income</th>
<th>Economic Growth</th>
<th>Firm Development</th>
<th>Cleaner Production &amp; Environmental Sustainability</th>
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<tbody>
<tr>
<td>Improving sourcing of inputs and supplies</td>
<td>++++</td>
<td>++</td>
<td>+++</td>
<td>++</td>
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<tr>
<td>Improved production capacity and technology</td>
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<tr>
<td>End-markets and trade</td>
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<tr>
<td>Improved governance of value chain</td>
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<td>Improved sustainable production and energy use</td>
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<td>+</td>
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<tr>
<td>Value chain finance</td>
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<tr>
<td>Improved business environment and socio-political context</td>
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<td>+++</td>
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<td><strong>TOTAL</strong></td>
<td>++</td>
<td>+</td>
<td>++</td>
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Industrial Upgrading: Cases of Mexico and China
Functional Upgrading in GVCs

Upgrading refers to the strategies that stakeholders (countries, regions and firms) can take to improve their position within the global economy.

Where Are the High-Value Activities in GVCs?
Composition of Mexico’s Exports to the U.S. Market, 1990-2010

Source: UN Comtrade (http://comtrade.un.org/db/dqBasicQuery.aspx), Feb 2012
Composition of China’s Exports to the U.S. Market, 1990-2010

Source: UN Comtrade (http://comtrade.un.org/db/dqBasicQuery.aspx), Feb 2012

## Mexico’s and China’s Leading Exports to the United States, 2000-2011

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<tbody>
<tr>
<td></td>
<td></td>
<td>Value (billions)</td>
<td>Share of US market</td>
<td>Value (billions)</td>
</tr>
<tr>
<td>752</td>
<td>Automatic Data Processing Machines and Units</td>
<td>Mexico 6.4</td>
<td>11.2</td>
<td>13.8</td>
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<tr>
<td></td>
<td></td>
<td>China 6.5</td>
<td>11.4</td>
<td>54.2</td>
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<tr>
<td></td>
<td></td>
<td>US Total 57.1</td>
<td></td>
<td>81.2</td>
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<tr>
<td>764</td>
<td>Telecommunications Equipments and Parts</td>
<td>Mexico 9.2</td>
<td>20.4</td>
<td>13.0</td>
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<td></td>
<td></td>
<td>China 4.8</td>
<td>10.6</td>
<td>46.2</td>
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<tr>
<td></td>
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<td>US Total 45.1</td>
<td></td>
<td>100.6</td>
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<tr>
<td>778</td>
<td>Electrical Machinery and Apparatus</td>
<td>Mexico 3.2</td>
<td>18.2</td>
<td>5.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>China 2.1</td>
<td>11.9</td>
<td>10.9</td>
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<tr>
<td></td>
<td></td>
<td>US Total 17.6</td>
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<td>29.5</td>
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<tr>
<td>784</td>
<td>Auto Parts and Accessories</td>
<td>Mexico 4.7</td>
<td>16.1</td>
<td>14.0</td>
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<tr>
<td></td>
<td></td>
<td>China 0.5</td>
<td>1.7</td>
<td>5.9</td>
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<td></td>
<td></td>
<td>US Total 29.2</td>
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<td>51.0</td>
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<tr>
<td>821</td>
<td>Furniture</td>
<td>Mexico 3.2</td>
<td>15.5</td>
<td>5.2</td>
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<td></td>
<td></td>
<td>China 5.3</td>
<td>25.7</td>
<td>17.8</td>
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<tr>
<td></td>
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<td>US Total 20.6</td>
<td></td>
<td>35.2</td>
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<tr>
<td>84</td>
<td>Articles of Apparel and Clothing</td>
<td>Mexico 8.8</td>
<td>13.1</td>
<td>4.1</td>
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<tr>
<td></td>
<td></td>
<td>China 8.9</td>
<td>13.3</td>
<td>34.9</td>
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<tr>
<td></td>
<td></td>
<td>US Total 67.1</td>
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<td>88.6</td>
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U.S. General Imports, CIF Value
Main Competitors in the U.S. Market for Automatic Data Processing Machines and Data (SITC 752)

U.S. General Imports, CIF Import Values
Main Competitors in the U.S. Market for Telecommunication Equipment and Parts (SITC 764)

U.S. General Imports, CIF Import Values
Why is China gaining U.S. market share over Mexico?

- China is a lower-cost producer overall (labor costs lower, but not transport & tariffs)
- China has huge scale and scope economies (supply-chain cities)
- China has a coherent and multidimensional upgrading strategy – diversify and add high value activities
- China is using direct foreign investment to promote “fast learning” in new industries
- China uses access to its domestic market to attract TNCs and promote knowledge spillovers
China’s Supply Chain Cities in Apparel

Made in China, Shipped Worldwide

The factory towns on the coast of China manufacture clothing to keep America’s closets full, making everything to wear from head to toe.

**Factory orders, 2003**

- **MEN’S WEAR**
  - Zhucheng
  - 100 million pieces
  - Production: $600 million
  - Total sales: $100 million

- **CASUAL WEAR**
  - Haiyu, Changshu
  - 160 million pieces
  - Production: $260 million
  - Total sales: $58 million

- **DOWN-FILLED PRODUCTS**
  - Xintang, Hangzhou, Xiaoshan
  - 26 million pieces
  - Production: $470 million
  - Total sales: $290 million

- **TIES**
  - Shengzhou
  - 300 million pieces
  - Production: $1.21 billion
  - Total sales: $384 million

- **SOCKS**
  - Datang, Zhuji
  - 9 billion pairs
  - Production: $1.57 billion
  - Total sales: $240 million

- **UNDERWEAR**
  - Jinjiang, Shenhu
  - 969 million pieces
  - Production: $360 million
  - Total sales: $290 million

- **WEDDING DRESSES, EVENING GOWNS**
  - Chaozhou
  - 510 million pieces
  - Production: $950 million
  - Total sales: $640 million

- **JEANS**
  - Xintang, Zengchong
  - 225 million pieces
  - Production: $1.04 billion
  - Total sales: $480 million

*Includes all textiles made in the city.
†Wedding dress and evening gown exports only.

Sources: China National Textile Council; Shanglu Underwear Association; Datang Town Government

What kinds of work are Chinese, Indian, and American engineers actually doing?

- Answer: Not just product adaptation, but cutting-edge research & commercialization

China: More than 1,000 MNC R&D Centers

- GE’s China Technology Center: Advanced research in energy storage, environmental management
- Microsoft Research Asia: Cutting-edge graphics & multimedia research
China Is Climbing the Value Chain

• Moving from low-technology to high-technology manufactured goods

• Moving from manufacturing to high value services
  – R&D, design, marketing of national brands (autos, appliances, telecom), logistics, finance

• Moving from inward FDI (joint ventures & technology transfer) to outward FDI (primary commodities, computers, shipping)
But Beware…

• High tech exports don’t necessarily mean high value added production
  – CASE: China and the iPod

• Export dependence has economic growth and employment risks
China assembles all iPods, but it only gets about $4 per unit - or just over 1% of the US retail price of $300.

451 parts that go into the iPod

The retail value of the 30-gigabyte video iPod that the authors examined was $299 in June, 2007.

Hard Drive by Toshiba → Japanese company, most of its hard drives made in the Philippines and China; it costs about $73 - $54 in parts and labor -- so the value that Toshiba added to the hard drive was $19 plus its own direct labor costs.

Video/multimedia processor chip by Broadcom → American company with manufactures facilities in Taiwan. This component costs $8.

Controller chip by Portal Player → American company with manufactures. This component costs $5.

-Final assembly → done in China, costs only about $4 a unit

The unaccounted-for parts and labor costs involved in making the iPod came to about $110.

The largest share of the value added in the iPod goes to enterprises in the United States → $163 of the iPod’s $299 retail value in the United States was captured by American companies and workers, breaking it down to $75 for distribution and retail costs, $80 to Apple, and $8 to various domestic component makers.

The bulk of the iPod’s value is in the conception and design of the iPod. That is why Apple gets $80 for each of these video iPods it sells, which is by far the largest piece of value added in the entire supply chain. Apple figured out how to combine 451 mostly generic parts into a valuable product.

U.S. Bilateral Trade Balance with China for One Unit of iPhone 4 (US$)

Source: OECD (2011: 40)
Manufacturing GVCs in Small and Large Countries:

Costa Rica and Brazil
GVCs in Costa Rica and Brazil

- 2 Current Studies: Duke CGGC (Center on Globalization, Governance & Competitiveness)
  - Costa Rica: Ministry of International Trade
  - Brazil: CNI (National Industry Confederation)

- 3 Manufacturing GVCs:
  - Medical devices
  - Electronics
  - Aerospace

- **Research questions:** How well positioned are Costa Rica and Brazil to upgrade in these GVCs, and what factors contribute to positive or negative outcomes?
Brazil – Regional Power Advantages

• Brazil is using its large domestic market to “build” global supply chains rather than simply “join” them
• “Back to the future” – Industrial policy is being used to promote MNC entry, with an emphasis on domestic ownership, local linkages and innovation (like autos in 1970s & computers in 1980s)
• Key examples:
  – Medical devices – GE Healthcare seeks to expand
  – Electronics – Foxconn in Brazil
  – Aerospace – Embraer as a magnet
• **Disposables** are both the largest product category exported and an area of growing exports.

• Medical equipment surpassed **dental products** as the second largest export category in 2002.

• Export statistics hide the sectors of greatest importance, since the main export items tend to be low-tech. Brazilian government and private sector actors are working to promote price-competitive, mid-tech exports.
Evolution of Brazilian Medical Device Imports

- Imports exceed exports by factor of about 5.
- Growth in imports across all product categories
  - Medical equipment and laboratory equipment are two largest categories of imports. These are also main focuses of current industrial policy.
- Private hospitals import more than public hospitals in Brazil. The growth in medical device imports reflects the expansion of the private healthcare system.
Brazil’s Position in the Medical Devices GVC

Research & Product Development
- Prototype
- Regulatory Approval
- Process Development
- Sustaining Engineering

Components Manufacturing
- Software Development
- Electronics development
- Precision metal works
- Plastics extrusion & molding
- Weaving/Knitting Textiles

Assembly / Production
- Assembly
- Packaging
- Sterilization

Distribution & Marketing
- Wholesale distributors
- Doctors & Nurses
- Hospitals (Public/Private)
- Individual Patients

Post-Sales Services
- Training
- Consulting
- Maintenance, Repair

Input Suppliers
- Resin
- Metals
- Textiles

Market Segments
- Dental (26)
- Laboratory (22)
- Disposables (20)
- Medical Equipment (120)
- Implants (32)
- Radiology (10)

Number of National Firms
- 0 - 20
- 21 - 40
- > 40

82% of national firms are SMEs

MNC Concentration
• GE seeks to gain access to Brazil’s rapidly growing healthcare market. Industrial policy tools create further incentives for local production.
  – The Brazilian informatics law creates offers tax incentives for local production and R&D on medical devices and other electronics.
  – The Dilma administration recently approved of a 25% preference for the national healthcare system to purchase locally manufactured medical devices (Law 12349, Decree 7767).
  – Certification by ANVISA, the regulatory arm of the Ministry of Health, is required to distribute medical devices in Brazil. ANVISA certification is very difficult and time-consuming (1 year on average), so MNCs frequently find it easiest to acquire local companies.

• GE is pushing for relaxed ANVISA requirements, but through its control of the largest public healthcare system in the world, the Brazilian government is in a strong bargaining position.
Both aggressive industrial policy and the large domestic market have lured Foxconn to Brazil.

- Facing a reduction in cell phone exports from $2.2 billion in 2007 to $1.0 billion in 2010, Brazil initiated direct negotiations with Foxconn to assemble Apple products, including the iPhone and iPad, in Brazil.
- Through the Program for the Development of the Semiconductor and Display Industry (Padis), Brazil has offered Foxconn several incentives, valid until 2022:
  - Reduce social security contributions from 9.25% to 0%
  - Reduce tax on industrialized products from 15% to 0%
  - Reduce taxes on Foxconn’s imported intermediate goods
- The Brazilian informatics law sets steep tariffs on imported electronics (47% in the case of the iPhone), creating further incentives for local production.

Foxconn’s activities are currently limited to assembly, because the company’s key component suppliers remain in East Asia. Foxconn announced that it may produce components in Brazil in the future.
Costa Rica: Medical Devices GVC

- Exports
- Role of Local and Foreign Firms in GVC
- Success Story – one example
- Challenges
Costa Rica's Medical Exports by Product Category: 1998-2011

- **Disposables** still the largest product category exported, but no longer a strong growth area.
- Exports in **surgical instruments** have grown steadily since 2005.
- **Therapeutics** has become 2nd largest category since 2008; likely to increase as newly established firms complete transfer of new product lines.
- Limited export of highest value **capital equipment** (eg. Electronic/software devices)
Local firms are mainly in packaging & support services (12 of 19) versus 4 in limited role in plastics molding & metal finishing and 1 OEM with exports under $2 million.
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
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<tbody>
<tr>
<td>2004</td>
<td>First production plant opens in Costa Rica (10,000m²)</td>
</tr>
<tr>
<td>2005</td>
<td>Exports: US$18 million</td>
</tr>
<tr>
<td>2008</td>
<td>Second plant opens. (32,000m²) First plant restructuring</td>
</tr>
<tr>
<td>2010</td>
<td>Initial plant reopens after restructuring</td>
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</table>

**Functional Upgrading**
- 2004: Manufacturing functions
- 2012: Engineering for process improvements → Focused on cardiology segment; strategy – to alleviate R&D costs in the US.

**Product & Process Upgrading**
- Biopsy forceps → Labor intensive, basic metal works & extrusion.
- Urethral stent → Thermoforming, laser marking, coating capabilities.
- Today – CR facilities cover 42 manufacturing processes.

**Market Diversification**
- Gastroenterology segment → Urology → Cardiovascular

**Forward Linkages**
- Recent co-location of sterilization vendors will allow the firm to export directly to global distribution centers
Implications for “Inclusive” Value Chain Development

• Costa Rica
  – Exports in manufacturing GVCs to climb “technology” value chain
  – Limited to parts supply only; related global services
  – Skills shortages

• Brazil
  – MNC investments to create local linkages
  – Protectionist policies favoring domestic producers
  – Innovation emphasis

• Role of SMEs in GVC internationalization
  – High value niches (e.g., software)
  – Support & service activities at lower levels of the value chain
THANK YOU!

Questions?

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