Commodity Chains and Economic Development:

One and a Half Proposals for Spatially-Oriented Research

OVERVIEW: propose two vastly different approaches to studying the role of commodity chains in the global economy as a way of getting a handle on industrial upgrading ("moving up")

- develop an index of industrial upgrading for individual countries which is then used as the dependent variable in causal models incorporating various predictors of industrial upgrading
  - this approach is developed somewhat more extensively, since it unabashedly cribs from a project David Smith and I unsuccessfully proposed to the NSF a few years ago
- a commodity chains-based decision approach that would attempt to model the complex interactions between the commodity chain and its regional environment
  - this approach is developed more briefly and speculatively, mainly because I really have no idea how to proceed further
- outline:
  - some theoretical considerations: GCCs, social networks, and role of state policy
  - recent changes in global production
  - the proposals

I. SOME THEORETICAL CONSIDERATIONS (I won't discuss this at any length since these issues are well-known to all of you)

A. Global Commodity Chains – Gary Gereffi; cottage industry; etc.

1. GCC's, as is well-known to the WST folks here, were originally defined by Hopkins and Wallerstein as "network[s] of labor and production processes whose end result is a finished commodity;" they are similar to value chains in the business economics literature
   a) three main dimensions
      (1) input-output structure: set of products and services linked together in a sequence of value-adding economic activities
      (2) territoriality dimension: identifies the geographical dispersion or concentration of raw material, production, export, and marketing networks – where the CC touches down, why, and with what effects [this is of particular interest to this workshop]
      (3) governance structure: power and authority relationships that determines how financial, material, and human resources, as well as economic surplus, are allocated and flow within a chain

b) two types:

(1) PDCC's: industries in which large integrated industrial enterprises play the central role in controlling the production system (including its forward and backward linkages

- capital- and technology- intensive industries dominated by transnational corporations

(2) BDCC's: industries in which large retailers, marketers and branded manufacturers play the pivotal roles in setting up decentralized production networks in a variety of exporting countries

- labor-intensive industries consumer-goods industries such as garments, footwear, toys, handicrafts and consumer electronics
- controlled by increasingly large retailers or marketers that order the goods supply the specifications

(3) PDCC's → BDCC's: Wal-Mart, not General Motors, is the world's largest corporation

(4) highest value-added activities are often more closely associated with consumption than production: the shift to BDCC's → creation of competitive advantages through product differentiation and customization for distinct market segments, rather than merely by cutting labor costs

(5) bottom line: the economic success of newly industrializing nations will largely depend on their firms' ability to "move up" into these higher value-added economic activities

2. the East Asian NIEs were able to "move up" during the 1980s and 1990s, when their growth rates averaged 7-8% annually, thanks to:
   a) continuous technological improvement of production processes
   b) the production of new products and the provision of new services
   c) in generally engaging in ever-higher value-added economic activities
3. in other words, East Asian firms moved up from:
   a) "captive networks" in which producers are limited to assembly of cut fabric following detailed instructions →
   b) "relational value chains" entailing "more complex forms of coordination, knowledge exchange, and supplier autonomy" =
   c) full-package production: the ability to go beyond simple assembly and supply the client with a completely finished product by providing designing, sourcing, cutting, sewing, assembling, labeling, packaging, and shipping

4. this process of "moving up" into FPP has a strong geographical dimension:
    a) initially, only the East Asian NIEs (Hong Kong, Taiwan, and South Korea); today, China is opening factories in Thailand and elsewhere
    b) meanwhile, the bottom of major exporting countries has expanded to include:
        (1) initially, Indonesia, Thailand and Malaysia
        (2) then India and Pakistan; then Turkey (world's fifth-largest apparel exporter, mainly to EU); Tunisia
        (3) by 2000, the list included the Philippines and Viet Nam; Bangladesh and Sri Lanka; Morocco and Mauritius; and – thanks to NAFTA – Mexico
        (4) the phase-out of quotas under the MFA next Jan 1 will further shift all this around, with China becoming the main producer
    c) in regional terms,
        (1) Northeast and Southeast Asia: apparel production has declined in importance, except for China (top export item, and growing), Indonesia, and Viet Nam
        (2) South Asia, Africa, Mexico, the Caribbean Basin and Central and Eastern Europe: apparel is growing in importance, and is sometimes the leading export

B. Social Networks: Personal Ties and Spatial Proximity: along with labor costs, these are key determinants of industrial location. Two ways to look at this:

1. ***Personal Ties:*** the ability of firms to create informal business networks in service of global production has been a key ingredient in East Asia's economic success; Chinese businesses in particular are said to prosper as a result of their reliance on informal personal networks and connections
    a) *guanxi* obligations of mutual obligation and reciprocity that are frequently mediated through family or community ties
    b) enables firms to remain small and more responsive to quickly changing market conditions, while at the same time gaining access to the large capital, resource, and information pools of the business group
    c) it does so by establishing informal alliances based on trust between firms in business groups, which in turn allow the network as a whole, rather than individual firms, to organize and manage a large portion of the commodity chain
2. ***Spatial Proximity:*** the agglomeration effects associated with spatially concentrated, tightly integrated metropolitan regions ("industrial districts")

that confer competitiveness by permitting a quick and flexible response to rapidly-changing market demands

a) the physical presence of numerous suppliers and producers, concentrated in geographically interdependent networks of small firms, factories, and specialized local labor markets, and with close access to major markets +

b) the presence of a strong support infrastructure such as business associations, supplier clubs, and private or state-supported research and development facilities

c) especially when mediated by family connections & other personal relationships, professional and community-based ties, trade associations, common culture +

d) → lowered transaction costs → competitive advantage

C. **The Role of State Policy:** state policy also contributed to economic growth in East Asia

1. maintaining low wages through the labor repression in South Korea, Taiwan, and Singapore
2. large-scale underwriting of a social wage in the form of extensive public housing schemes in Singapore and Hong Kong
3. investment in education and training throughout the NIEs
4. various forms of industrial policy during the latter phases of export-led growth and secondary import substitution in South Korea, Taiwan, and Singapore
   - credit control and price-rigging as a means to prod companies into higher value-added, higher wage and more technology-intensive forms of production
   - enforced savings, as exemplified by Singapore's Central Provident Fund
   - public investment in the creation and refinement of new technologies, such as government R&D centers whose results were made available to private companies
   - state creation of industrial sectors that did not previously exist either through state companies or through the supply of credit and financial guarantees to private companies
   - state discouragement of speculative domestic or overseas investment, thus indirectly ensuring its flow into manufacturing
   - direct state ownership of key industries – for example, banks in South Korea, or airlines, armaments, ship-repairing in Singapore

II. RECENT CHANGES IN GLOBAL PRODUCTION: growing power of large retail multinationals; the second the emergence of a stratum of giant multinational factories

A. The Growing Importance of Large Retailers

1. the "retail revolution" of 1965-1980 which → mass merchandising giants such as Wal-Mart, K-Mart, and Target; and, later, specialty retailers such as Home Depot, Best Buy, Circuit City, and Office Depot
    - this revolution in turn → specialized distributors, marketers, and assemblers such as Nike, The Limited, Dell, and Gateway
2. giant retailers > largest manufacturers in terms of revenues:
    - world's 40 largest retailers accounted for nearly $1.3 trillion in revenues in 2001, nearly 4 percent of the world GDP
    - among the top 40, 12 are based in the U.S. (43% total sales); almost all the rest are from the EU (46%).
        - the only Asian firms in the top 40 are 5 Japanese retailers (11%)
        - Wal-Mart accounts for nearly a fifth of the combined sales of the top 40, more than three times those of its nearest competitor, France's Carrefour
3. in other words, the U.S. dominates the world, and Wal-Mart dominates the U.S.
    - 4 largest U.S. retailers account for about a tenth of total U.S. retail sales.
    - Wal-Mart's 2002 revenues of $246 billion made it the world's 18th largest economy, roughly tied with Switzerland
4. important emerging dynamic: the US and EU overwhelmingly control the retail end, at a time when retailers in general are exerting increasing control over the global economy →
    a) large retailers = large volume requirements → large factories (1000+ workers) as potential suppliers
    b) a parallel trend toward "lean retailing:
        - retailers have brought their wholesalers (manufacturers = marketers) under much tighter control by requiring adoption of electronic data interchange technologies (sales data exchange, standards for product labeling, inventory management, etc.)
        - this favors Hong Kong, Taiwanese, and South Korean garment firms, which are set up to do this effectively: small, local firms elsewhere may provide cheaper labor, but they can't handle the investments in electronic data interchange
5. these trends also raise new challenges for workers:

- because giant retailers (and their wholesalers) can place their orders anywhere on the planet they choose, their contractors are seen as relatively powerless price-takers, rather than partners and deal-makers
- → "race to the bottom," where retailers and marketers play off competing contractors to force prices (and wages) down and thwart unionization drives,
- BUT ALSO: if large retailers and manufacturers can be made to pressure their suppliers by consumer pressure, gains for labor can also be achieved – as occurred in Mexico's Kukdong (Mexmode) factory and the Dominican Republic's BJ&B cap company

6. IN SUM, the experience of the East Asia NIEs (who relied on apparel and textile production as integral parts of successful development strategies) may be difficult to replicate in a world where the retail end is much more tightly controlled today than it was 20-30 years ago.

B. **Growing Importance of Major Producers:** retail dominance is being challenged somewhat by the rise of global contractors, typically from South Korea or Taiwan, many of whom began as small local producers in their home countries, using their know-how to go multinational, and now have grown to giant size

1. examples:

a) Nien Hsing Corporation, a Taiwanese multinational that employs more than 20,000 workers in five Central American factories, as well as thousands of workers in a Mexican factory and two in Lesotho

- founded in 1986, Nien Hsing is currently the world's largest jeans maker, with an output of 40 million pairs in 2000
- it makes jeans for Wal-Mart, JC-Penny, K-Mart, the Gap, Sears and Target
- it is also the sixth-largest denim maker, producing 60 million yards per year.

b) Yupoong, Inc., a South Korean multinational, which is the world's second largest cap manufacturer, exporting their "flexfit" hats (motto: "worn by the world") to some 60 countries

- Yupoong operates the BJ&B hat factory in DR, the scene of the second recently successful labor struggle that we will consider
- also, Dhakarea Ltd. in Bangladesh.

c) Boolim, a South Korean multinational that was founded in 1994 by Y.S. Lim, who had headed up Macy's in South Korea for 14 years

- makes athletic, casual wear, and knitwear in China, Indonesia, Sri Lanka, Bangladesh, Saipan, Thailand, Philippines, Malaysia, Myanmar, Guatemala, Mexico, Dominican Republic, Nicaragua, Honduras, El Salvador and Vietnam

- clients include Nike, Polo Ralph Lauren, Kenneth Cole, Calvin Klein, and NBA Properties.

d) Pou Chen, a Taiwanese multinational, is 50% owner of Yue Yen Industrial, a Hong Kong-listed shoe manufacturer that is the world's largest, employing 150,000-170,000 workers worldwide, and accounting for 17% of the world market

- Yue Yen makes shoes for Nike (about half of its total production), as well as adidas-Saloman, Reebok, New Balance, Asics Tiger, Converse, Puma, Keds, Timberland, and Rockport
- most of its shoes are made in low-cost factories throughout southern China; its Yue Yen II factory complex in Dongguan, China, employs more than 40,000 workers
- Nike's biggest supplier, providing 15% of Nike's shoes, with one Indonesian factory turning out a million shoes a month for Nike
- the company's Huyen Binh Chanh mega-factory in Vietnam will be the largest footwear factory on the planet, employing 65,000 workers

2. again, these trends also raise new challenges for workers:
   - the growing importance of giant producers may paradoxically be facilitating worker organizing, since the large factories are vulnerable to pressure from the large retailers and manufacturers that use them
   - a number of successful unionization drives have occurred in such factories in recent years, including the Kukdong (now Mexmode) apparel factory in Mexico, the BJ&B hat factory in the Dominican Republic (owned by Yupoon); and Hien Hsing factories in Mexico (Chentex) and Lesotho
   - in these cases, pressure on the factories and their clients (which included Nike, Reebok, the Gap, and other major U.S. companies) by local independent labor unions, supported by U.S. and EU unions and NGOs, have caused the parent companies to allow the formation of independent unions

III. ESTIMATING THE DETERMINANTS OF INDUSTRIAL UPGRADING

A. Measuring Industrial Upgrading

1. Appelbaum, Smith, and Wong (1998) suggested developing an index of industrial upgrading in individual countries, estimating causal models using this index as the dependent variable
2. the basic idea would be to model the determinants of a country's ability to "move up" into higher value-added activities – say, over the period 1965-2000 (or 2005, depending on data availability)
   - "moving up" = adopting more capital-intensive processes and techniques,

while at the same time switching to the production of more sophisticated and expensive 'high-end' goods

3. UN data permits us to capture this: yearly international trade data that provide standardized comparable information across a range of countries

    a) data are coded using the hierarchically ordered Standard International Trade Classification (SITC), which allows us to examine a level of detail ranging from either very broad (one- or two- digit categories) or extremely specific (seven- to nine-digit categories)

        - these data also include information on the unit volume and dollar value of the international commodity flows

    b) once bilateral trade flow data (at the 2-digit level) is collected for each pair of countries, the data can be factor-analyzed to identify more-or-less discrete "bundles" of exports which flow together in the circuits of world trade

    c) this was done 15 years ago by David Smith and Roger Nemeth, who at that time identified 5 major groups or "bundles" of two-digit commodities (from food products and low wage/light manufacture to hi tech/heavy manufacture)

    d) the Smith/Nemeth strategy could be replicated, but using international commodity trade data for all countries in the most recent year available (the Smith/Nemeth analysis relied on 1980 data)

    e) this industrial upgrading index could then be used as one measure (several other measures are described next)

B. Analysis of patterns of industrial upgrading in trade with US (2-digit level)

1. the analysis of commodity trade from non-core nations to the US between 1965 and 2000 would yield an image of how each country's export profile has changed over the last 35 years, revealing differences in the path of industrial transformation between countries

2. There are a number of possible measures that tap into dimensions of the production side of industrial upgrading, which can be arrayed from the simplest to the most complex:

    a) changing average unit value of trade in all products

    b) changing average unit value amount for major product groups: compare the changing production levels of different commodities (at either grouped, generic, or very specific-levels of classification) by calculating autocorrelation models of changes in either volume or value over the 35 year period (or any shorter periods)

        - the coefficient of the time variable estimates the annual growth rate for that type of export

    c) changing index of dissimilarity, calculated from the largest fifteen

two-digit SITC categories in each country

- this measure gauges export diversification: countries undergoing industrial upgrading should have a higher degree of dissimilarity over time
- both weighted and unweighted measures could be constructed in a range between 0 and 100.

d) changing concentration measures, also calculated from the largest fifteen two-digit SITC codes for each country

- this measure gauges export specialization: countries undergoing industrial upgrading are likely to have a lower degree of concentration over time
- this measure also ranges from 0 to 100

e) changing index of industrial transformation, calculated using recalibrated Smith-Nemeth "bundles"

- this measure is defined as the total value of export in hi-tech/heavy manufacture to low wage/light manufacture
- for countries undergoing industrial upgrading the index should increase over time

3. There should be major differences between countries on all these indices

a) the East Asia NIEs should reveal a steady pattern of upgrading over almost the entire period - has this upward arc slowed or stagnated in light of the East Asian slowdown of 1997-8?

b) the second-tier East and Southeast Asian NIEs should have begin this process later and scored more modestly

c) latecomers like China and Vietnam should have begin even more recently, but perhaps have particularly steep recent increases

d) do the various latecomers simply follow a trajectory that replicates the initial group of NIEs? is their upgrading is more rapid? do they skips stages?

e) finally, it should be possible to determine whether there is a distinctive "Asian model" that is distinguishable from less-developed countries in other regions, like Latin America or Africa

C. Analysis of Determinants of Upgrading in Apparel and Consumer Electronics

1. more fine-grained analysis of upgrading is possible using seven- and nine-digit SITC categories, focusing in particular on apparel and consumer electronic assembly
2. once again, trade data could be analyzed for the 40-year period for all non-core countries with the US, in order to facilitate a comparison with the East Asian NIEs, since both of these industries served as critically important

motors of export-led industrialization in that region

a) in apparel manufacture, Hong Kong and Taiwan moved from sewing, to sourcing offshore production for U.S. and European designers; they are now moving up into designing and marketing branded labels themselves

b) similar process has occurred in South Korea and Singapore's consumer electronics industries, where the movement has been from component assembly to engineering and design

c) it seems reasonable to assume that these two industries are playing the same role throughout East and Southeast Asia, and may potentially play this role in other countries

- e.g., a retrospective look at patterns of apparel or electronics upgrading in South Korea or Taiwan from the 1970s could be compared to more recent changes in China or Vietnam

d) a careful examination of such patterns should therefore make it possible to discern the developmental sequences that all countries have followed

3. one strategy could involve pooled panel regression in order to estimate models that control for the initial values of the dependent variable while assessing the impact of independent variables (over time)

4. principle determinants (independent variables):

- *firm competitiveness*, as indexed by average measures of labor cost and productivity, quality, reliability, etc (some of these ratings may have to be subjectively based on the perceptions of experts familiar with the industries of different countries)
- *time-to-market* (this would be one principal spatial component of the model – estimating the relative importance of spatial propinquity in commodity flows, looking, for example, at changing regional patterns of import-export relations)
- *the degree to which highly networked, spatially concentrated industrial districts exist* that reduce transaction costs and enable firms to engage in all aspects of production (measuring this and estimating effects would provide another spatial component of the model)
- *the social organization of a country's firms into mutually supportive networks* of producers and suppliers, in particular the presence of informal (e.g., Chinese) business networks
  - operationalizing this could be difficult; at worst, dummy or simple ordinal variables could be developed as subjective measures based on existing research
- *the role of retailers* relative to manufacturers as the principal customer

for exports from each countries (i.e., private label production)

- suggestions for estimating this would be welcome; I can find no systematic source of data on this, although information could possibly be gleaned – laboriously – from the annual reports of publicly-traded retailers and manufacturers

- the relative importance of *transnational producers* in each country's factory sector (this would require a country-by-country survey of knowledgeable experts)
- *changing trade barriers*, including preferential trade agreements such as the North American Free Trade Agreement (NAFTA), the African Growth and Opportunity Act (AGOA), the Caribbean Basin Trade Partnership Act (CBTPA), and the Andean Trade Preferences Act (ATPA)
  - these could be incorporated by means of dummy variables, or perhaps ordinal measures reflecting experts' perception of their impact on trade
- *state role*, as indexed by the proportion of government spending in business, infrastructure, and education; the extent of national industrial policy
  - most likely these would be dummy variables intended to capture the degree of marketization vs. central planning, based on the characterization of these economies in the literature
- *the role of labor*, in particular the presence of an independent labor movement, strikes and work stoppages, etc.

5. secondary variables of substantive interest could include:

- Flexibility/adaptability, as indexed by the average manufacturing firm size; market concentration; and percent of GDP generated by SMEs
- Human capital development, as indexed by the percentage of the adult population with secondary education or more; the percentage of the population with tertiary education; and the percentage of the population with technical/engineering education
- Foreign penetration: ratio of FDI/DBI
- Domestic economic conditions, as indexed by the absolute size of the economy (an index of the size of the domestic market), domestic savings rates; the unemployment rate; the ratio of public to private investment ratio; the percent GDP that is generated by exports
- Entrepreneurship, as indexed by the percent of the working population that is self-employed; and the new business start-up rate
- Demographic characteristics, such as the age structure of the population which could effect workforce participation

IV. A COMMODITY CHAINS-BASED DECISION APPROACH TO MODELING INDUSTRIAL UPGRADING

A. the GCC framework lends itself to a decision model approach to understanding the determinants of a firm's locational decisions (i.e., to move production to – or out of – a particular location), the regional impacts of those locational decisions, and the impact of any resulting regional changes on subsequent decisions

1. to my knowledge this approach has never been attempted (which probably says something about its feasibility, if not its merit)

2. in this final section I schematically outline such an approach, in hopes that someone will discern a plausible modeling and research strategy.

B. the basic logic would be as follows:

1. construct a hypothetical global commodity chain for a product, modeled on the actual structure of any existing firm - for example, the U.S.'s largest apparel retailer, The Gap (with 2003 sales of $14.5 billion)

a) begin by mapping out all of the networks on the commodity chain: with apparel, for example, these would include networks having to do with:

- raw material inputs (both natural and synthetic fibers)
- components (yarn, fabrics, petrochemicals, synthetic fibers)
- production (divided into different geographic regions)
- export (branded companies, overseas buying offices, trading companies)
- marketing (department stores, specialty stores, mass merchandise chains, discount chains, and off-price outlets)

2. Conceptualize each of these networks as a set of decisional nodes

- for example, if the hypothetical firm is engaged in making a part cotton / part synthetic blouse, it needs to make decisions about where to source the cotton; where to source the synthetics; where to acquire bolts of fabric; where to assemble the blouse; etc.

3. each hypothetical decision-maker then conducts an "environmental scan," looking at different locational options for the activity in question

a) should garment assembly be done in a contract in Los Angeles? Mexico? Bangladesh? China?

b) model the determinants of this decision, based on what we know about such decisions, incorporating all of the predictors that are considered in the previous approach to estimating the impact of industrial upgrading:

- labor costs and productivity, labor militancy, the presence (or absence) of labor unions

- production quality
- transportation costs, time-to-market (including reliability)
- preferential trade treatment
- the presence (or absence) of large producer transnationals
- the presence of supportive social networks and viable industrial districts
- state policies, etc.

4. assume a set of locational decisions, based on the foregoing considerations, for each decisional node. Begin by focusing on assembly, which is the most crucial node from an economic development perspective
    a) model the impact of each decision on the location that is chosen
    b) one set of impacts would have to do with industrial upgrading, e.g.:
        - prospects for the development of indigenous full-package production capabilities
        - the development of local backward and forward linkages in the commodity chain, including developing textile suppliers at one end, and original brand manufacturing (OBM) capabilities on the other
    c) the other set of impacts might have to do with labor – for example, the effect on wages, inequality, and labor militancy
5. Taking these impacts on the chosen location into account, what is the likely feedback on the decision-maker in that particular node of the commodity chain?
    a) at what point does the retailer or manufacturer decide to move production elsewhere?
    b) what are the determinants of such a decision (for example, local labor shortages, that result in rising wages)?
    c) what could be done locally to discourage such a decision?
6. calibrate the accuracy of the model by comparing its results with actual results in comparable production systems over the past decade.

C. repeat with other commodity chains – for example, in a capital intensive industry (e.g., automobile manufacture), or a labor-intensive industry that is more capital-intensive than apparel manufacture (e.g., footwear)

D. aggregated across firms, what does this approach tell us about the prospects for industrial upgrading?