Structural change, labor productivity and globalization

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What do economists usually mean by structural transformation?
structural transformation →
dual economy models
a la Arthur Lewis →
agriculture to manufacturing →
economic growth
Consider India in 1990
India fits the Lewis Model

Correlation Between Sectoral Productivity and Change in Employment Shares in India (1990-2005)

\[ \beta = 35.2372; \text{t-stat} = 2.97 \]

Log of Sectoral Productivity/Total Productivity

- \( \beta \) denotes coeff. of independent variable in regression equation:
  \( \ln(p/P) = \alpha + \beta \Delta \text{Emp. Share} \)

*Note: Size of circle represents employment share in 1990
**Note: \( \beta \) denotes coeff. of independent variable in regression equation:

Source: Authors' calculations with data from Timmer and de Vries (2009)
So does China

Correlation Between Sectoral Productivity and Change in Employment Shares in China (1997-2007)

\[ \beta = 14.0055; \text{t-stat} = 1.02 \]

*Note: Size of circle represents employment share in 1997
**Note: \( \beta \) denotes coeff. of independent variable in regression equation:

\[ \ln(p/P) = \alpha + \beta \Delta \text{Emp. Share} \]

Source: Authors’ calculations with data from China’s National Bureau of Statistics
So, what does the rest of the world look like?
Correlation Between Sectoral Productivity and Change in Employment Shares in Venezuela (1990-2005)

\( \beta = -14.5675; \ t\text{-stat} = -3.44 \)

*Note: Size of circle represents employment share in 1990

**Note: \( \beta \) denotes coeff. of independent variable in regression equation:

\[ \ln(p/P) = \alpha + \beta \Delta \text{Emp. Share} \]

Source: Author's calculations with data from Timmer and de Vries (2007)
Correlation Between Sectoral Productivity and Change in Employment Shares in Zambia (1990-2005)

Log of Sectoral Productivity/Total Productivity

\[ \beta = -10.9531; \text{ t-stat } = -3.25 \]

**Note:** Size of circle represents employment share in 1990.

**Note:** \( \beta \) denotes coeff. of independent variable in regression equation:

\[ \ln(p/P) = \alpha + \beta \Delta \text{Emp. Share} \]

Source: Authors' calculations with data from CSO, Bank of Zambia, and ILO's KILM
United States

Correlation Between Sectoral Productivity and Change in Employment Shares in U.S. (1990-2005)

\[ \beta = -8.9330; \text{t-stat} = -1.44 \]

Log of Sectoral Productivity/Total Productivity vs. Change in Employment Share (\( \Delta \text{Emp. Share} \))

*Note: Size of circle represents employment share in 1990
**Note: \( \beta \) denotes coeff. of independent variable in regression equation:
\[ \ln(p/P) = \alpha + \beta \Delta \text{Emp. Share} \]

Source: Author's calculations with data from Timmer and de Vries (2007)
How important has structural change been as a determinant of labor productivity and to what extent does it explain regional patterns of growth?
Labor productivity growth decomposition

\[ \Delta Y_t = \sum_{i=n} \theta_{i,t-k} \Delta y_{i,t} + \sum_{i=n} y_{i,t} \Delta \theta_{i,t} \]

\[\uparrow\]

within

\[\uparrow\]

structural change

\(Y\) refers to aggregate labor productivity, \(y\) is sectoral labor productivity, \(\theta\) is employment share, \(\Delta\) is the first-difference operator, \(i\) indexes sectors, \(t-k\) and \(t\) stand for initial and final years.
Data

• Start from Groningen Growth and Development Center (GGDC) data base, which provides employment and real valued added statistics for 27 countries disaggregated into 10 sectors (Timmer and de Vries, 2007; 2009)
  – We converted local currency value added at 2000 prices to dollars using 2000 PPP exchange rates.
• Complement with data from national sources for 11 additional countries (China, Turkey, and several African countries)
• For the most part, VA comes from national income accounts, while level and structure of employment come from population censuses (and other household surveys)
  – Since employment data are not based on labor force or industrial surveys (save for extrapolation purposes), coverage of informal sector should be less problematic than otherwise
Decomposition of productivity growth, by region: 1990 - 2005

Decomposition of productivity growth by country group, 1990-2005
What’s going on? Some possibilities:

- Some countries have more “surplus labor” in agriculture than others
- Role of comparative advantage: primary products versus manufactures
- Labor market rigidity: spatial or sectoral barriers to labor mobility
- Trade/industrial/currency policies
But each country has its’ own story

• Need to complement with more micro analysis
• Consider the U.S. for a moment
• Ebenstein, Harrison, McMillan and Phillips (2011) use data from current population surveys combined with data on trade and offshoring to show that:
  – Globalization is associated with a reallocation of workers across sectors and occupations
  – Reallocation across sectors is associated with a 2-4% decline in wages and if accompanied by a switch in occupation a 3-11% decline in wages
  – Effects are most pronounced for the period 1997 to 2002
U.S. Structural Change 1997-2007


$\beta = -19.7657; t\text{-stat} = -2.03$

*Note: Size of circle represents employment share in 1997
**Note: $\beta$ denotes coeff. of independent variable in regression equation: $\ln(p/P) = \alpha + \beta \Delta \text{Emp. Share}$

Source: Author’s calculations with data from Timmer and de Vries (2007)
What is going on in the U.S.?

• We should be able to explain – lots of data
• Why does 1997-2007 look so bad?
• Why loss of jobs in manufacturing?
• Technology?
• Changing demand patterns?
• Globalization?
Offshore Employment by U.S. Firms in Developing Countries
Pattern is driven by China

Graphs by Country or area name
Employment Changes: U.S. & China

Percentage Point Changes in Manuf. Employment by sector
U.S. vs China 1990-2005

\[ \Delta\%L_{\text{Manuf, US}} = -0.1 - 0.29 \cdot \Delta\%L_{\text{Manuf, China}} \]
(-3.21)
Conclusions

• The mechanisms by which “globalization” has an impact on labor have not been well understood
• Most research on globalization and labor market outcomes has focused on manufacturing alone
• I hope that I have convinced you that a more complete understanding of the impact of globalization on labor market outcomes calls for an economy-wide perspective
• For developing countries, the presence of large inter-sectoral productivity gaps ensures significant potential for rapid economic growth but fulfilling this potential requires an ongoing process of diversification and structural change
• China OEZ, Zambia, Pakistan, Egypt, Benin, Nigeria, Ethiopia, Russia, Vietnam, S. Korea, Cambodia, Thailand, Indonesia, Tanzania (Brautigam and Xiaoyang, 2011)