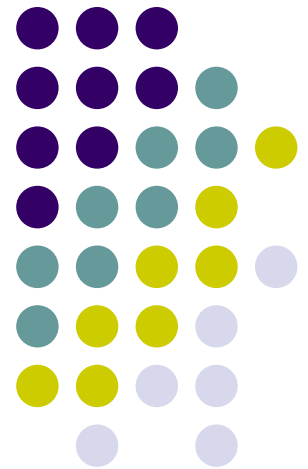
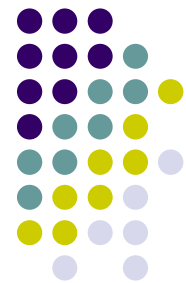


Introduction to Economics of Development

Lewis Two-sector
Migration Model





What's Happening 03/06/08

The world's 25 richest billionaires:

| RANK | NAME | CITIZENSHIP | AGE | NET WORTH (\$BIL) | RESIDENCE |
|------|-----------------------------------|---------------|-----|-------------------|----------------|
| 1 | Warren Buffett | United States | 77 | 62.0 | United States |
| 2 | Carlos Slim Helu & family | Mexico | 68 | 60.0 | Mexico |
| 3 | William Gates III | United States | 52 | 58.0 | United States |
| 4 | Lakshmi Mittal | India | 57 | 45.0 | United Kingdom |
| 5 | Mukesh Ambani | India | 50 | 43.0 | India |
| 6 | Anil Ambani | India | 48 | 42.0 | India |
| 7 | Ingvar Kamrad & family | Sweden | 81 | 31.0 | Switzerland |
| 8 | KP Singh | India | 76 | 30.0 | India |
| 9 | Oleg Deripaska | Russia | 40 | 28.0 | Russia |
| 10 | Karl Albrecht | Germany | 88 | 27.0 | Germany |
| 11 | Li Ka-shing | Hong Kong | 79 | 26.5 | Hong Kong |
| 12 | Sheldon Adelson | United States | 74 | 26.0 | United States |
| 13 | Bernard Arnault | France | 59 | 25.5 | France |
| 14 | Lawrence Ellison | United States | 63 | 25.0 | United States |
| 15 | Roman Abramovich | Russia | 41 | 23.5 | Russia |
| 16 | Theo Albrecht | Germany | 85 | 23.0 | Germany |
| 17 | Liliane Bettencourt | France | 85 | 22.9 | France |
| 18 | Alexei Mordashov | Russia | 42 | 21.2 | Russia |
| 19 | Prince Alwaleed Bin Talal Al Saud | Saudi Arabia | 51 | 21.0 | Saudi Arabia |
| 20 | Mikhail Fridman | Russia | 43 | 20.8 | Russia |
| 21 | Vladimir Lisin | Russia | 51 | 20.3 | Russia |
| 22 | Amancio Ortega | Spain | 72 | 20.2 | Spain |
| 23 | Raymond, Thomas & Walter Kwok | Hong Kong | NA | 19.9 | Hong Kong |
| 24 | Mikhail Prokhorov | Russia | 42 | 19.5 | Russia |
| 25 | Vladimir Potanin | Russia | 47 | 19.3 | Russia |

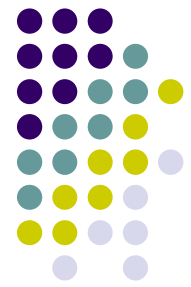


Model Motivation

- Why do we need a two-sector model?
 - Basic economics problem: how to allocate constrained resources more efficiently
 - Misallocation inefficiency in developing countries
 - Too much labor in traditional agricultural sector
 - Farmers not working at their full potential (efficiency)
 - Underemployment/Hidden unemployment/Disguised Unemployment
 - Industrial sector with a much higher productivity, needs to absorb more labor into workforce
 - Potential efficiency gains from labor migration to higher productivity sectors



Arthur Lewis (1915-1991)



Why is this significant?

| country | labor force (in millions) | agricultural % GDP | GDP, nominal (in billions) | agricultural employment share |
|---------|------------------------------|-----------------------|-------------------------------|-------------------------------------|
| Somalia | 3.7 | 65% | 2.5 | 71% |
| India | 516 | 18% | 1090 | 60% |
| China | 803 | 12% | 3249 | 43% |
| Mexico | 45 | 4% | 886 | 18% |
| US | 153 | 1% | 13790 | 0.6% |



The problem of surplus labor

At point g and thereafter, $MPL=0$, with more labor working on the fixed amount of land, the more severe the surplus labor problem becomes. This results in lower labor productivity on average.

In other words, everyone is not working at their full potential, or at least some of them are shading.

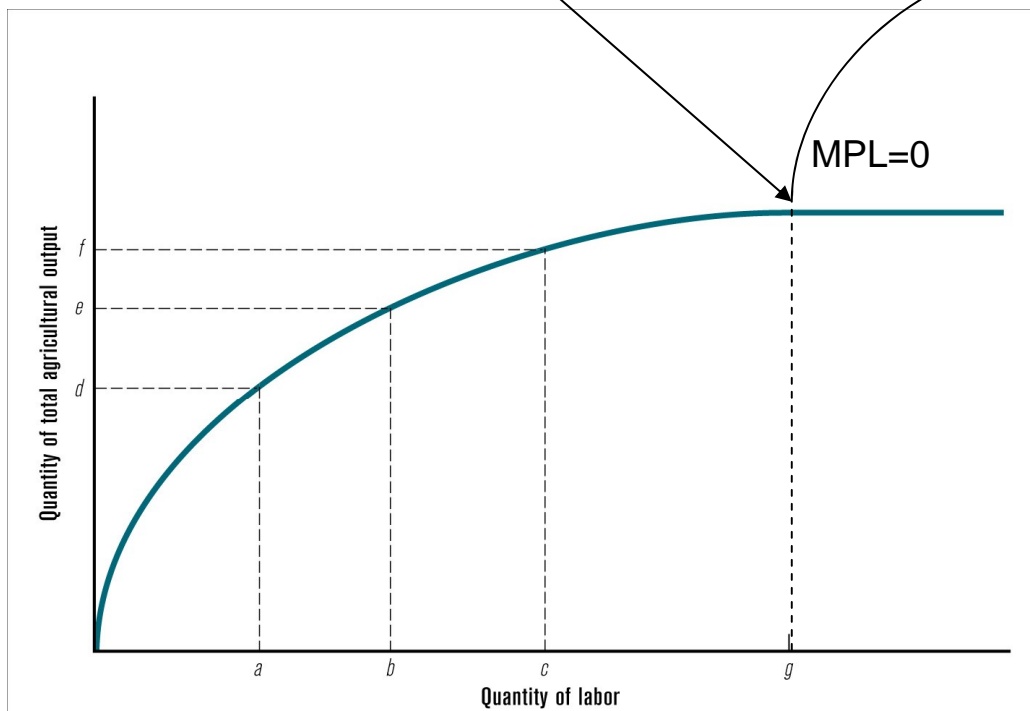


FIGURE 4.8 The Agriculture Production Function

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Supply & Demand of Labor in Industrial Sector

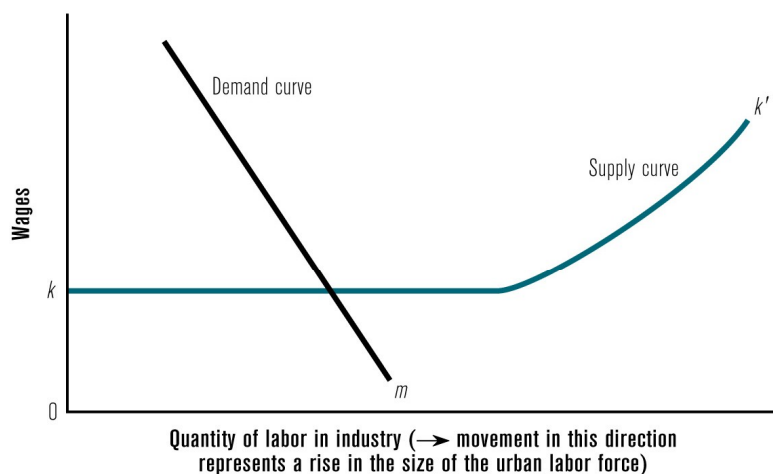


FIGURE 4.10 The Supply and Demand for Industrial Labor

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- When industrial sector offers a wage that is slightly higher than rural wage, it provides incentives for farmers to move out of agricultural sector.
- As the demand of labor in industrial sector increases, more and more rural labor migrate to urban area. At on point (the kink point on supply curve), surplus labor will disappear and MPL goes back to positive.
- With fewer farmers left, the agricultural output will not necessarily fall as everyone previously was not working at their full potential. In fact, after pullout of surplus labor, productivity may increase, so does wage.



Application: Why China Grows So Fast

According to Spence(2007):

- High savings and investment
 - Including public investment in education and infrastructure
- People are employed more productively
 - Labor migration from agricultural to industrial
 - More people work for private sectors, away from State-Owned-Enterprises (SOEs), the source of huge resources misallocation.
- International trade
- Technology / applied practical knowledge

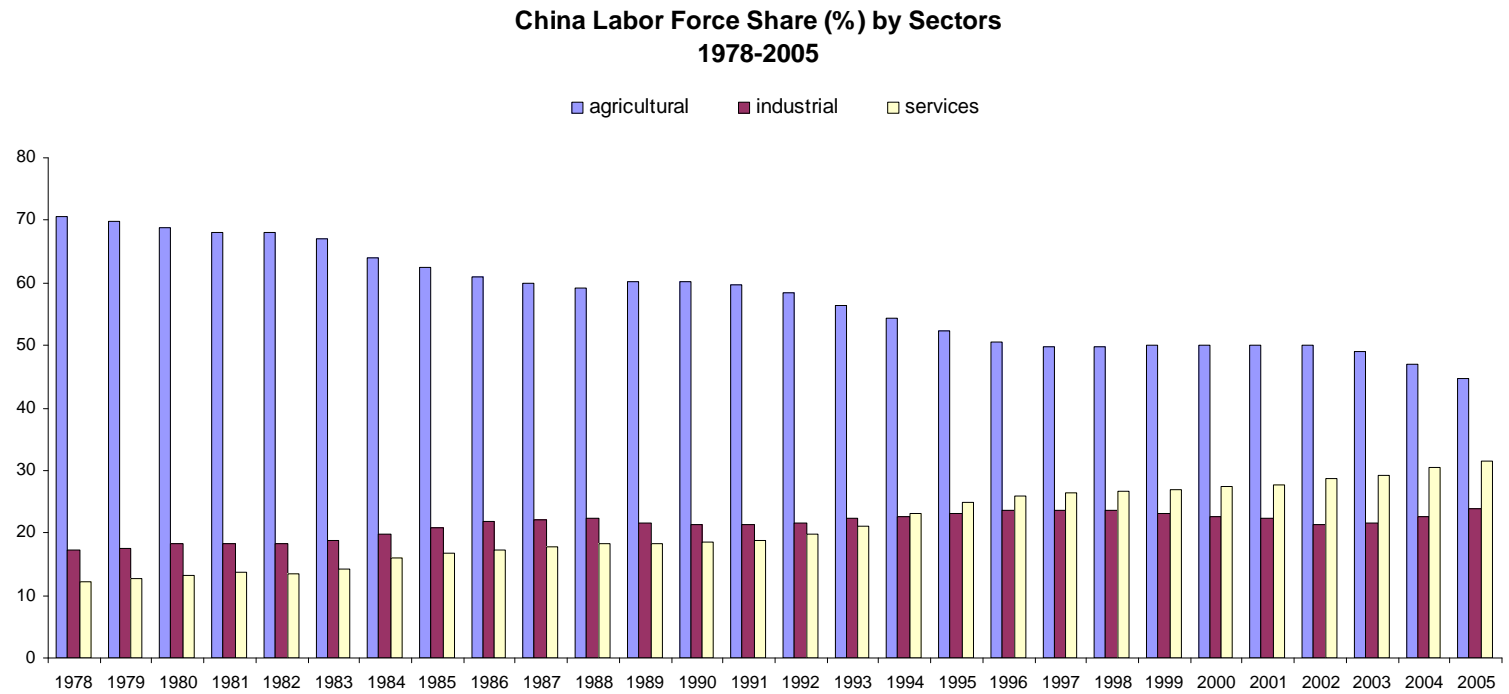


2001 Nobel winner



Application: Why China Grows So Fast

- People are employed more productively
 - From agricultural (lower productivity) → industrial and services sector (higher productivity)

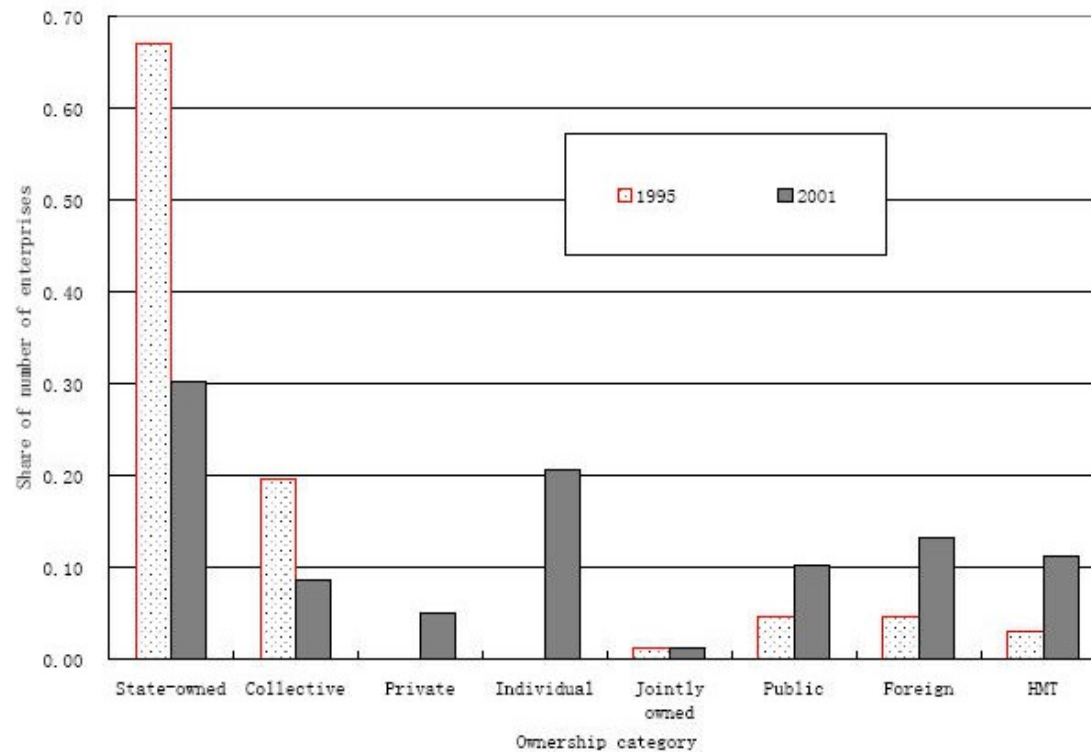




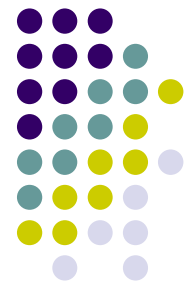
Application: Why China Grows So Fast

- People are employed more productively
 - Declining role of State-Owned Enterprises

Figure 9: Changing ownership structure of Chinese industry



HMT: Hong Kong, Macao, Taiwan Invested.



Application: Why China Grows So Fast

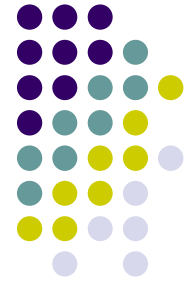
- People are employed more productively
 - SOEs are one big source of misallocation inefficiency

Decomposition of rates of return on capital

| | 1998 | Rate change due to increase in | | | 2003 |
|--|------------------------------------|--------------------------------|----------------------|-------------------|------------------------------------|
| | Rate of return on physical capital | Profit margin | Capital-output ratio | Depreciation rate | Rate of return on physical capital |
| Rate of return on physical assets ^a | | | | | |
| All enterprises | 6.1 | +2.1 | +5.3 | -1.3 | 12.2 |
| State controlled companies | 4.8 | +3.6 | +3.3 | -1.6 | 10.2 |
| Controlled directly by the state | 3.9 | +2.9 | +2.8 | -1.4 | 8.2 |
| Controlled by state held companies | 7.4 | +5.8 | -0.9 | -0.6 | 11.7 |
| Other forms of state control | 8.5 | +3.4 | +6.0 | -2.3 | 15.6 |
| Collectively controlled | 11.1 | +0.2 | +5.5 | -0.4 | 16.3 |
| Private companies | 7.8 | +1.2 | +6.7 | -0.7 | 15.0 |
| Non-mainland controlled | 4.7 | +2.9 | +8.3 | -1.3 | 14.5 |
| Controlled by individuals | 12.0 | +0.4 | +4.6 | -1.0 | 16.0 |
| Controlled by non-state companies | 8.6 | +2.8 | +2.1 | -0.5 | 13.0 |

Source: China National Bureau of Statistics industrial microdata and OECD analysis.

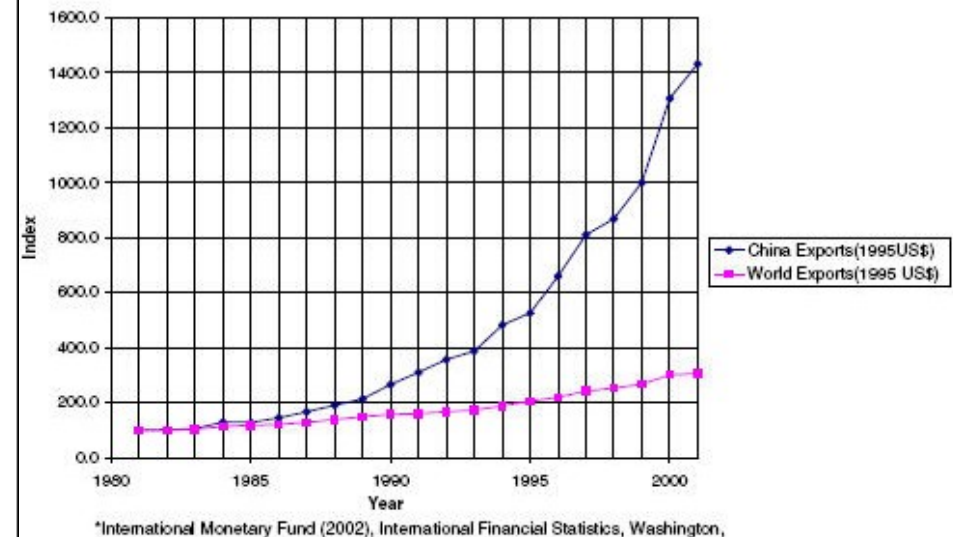
^a Rate of return on physical capital calculated as operating surplus divided by fixed assets and inventories.

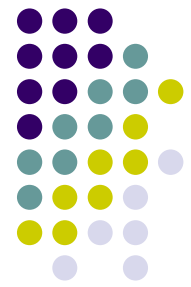


Application: Why China Grows So Fast

● International trade

- Spence, “There are no examples of sustained high growth in the postwar period that do not involve integration into the global economy”.

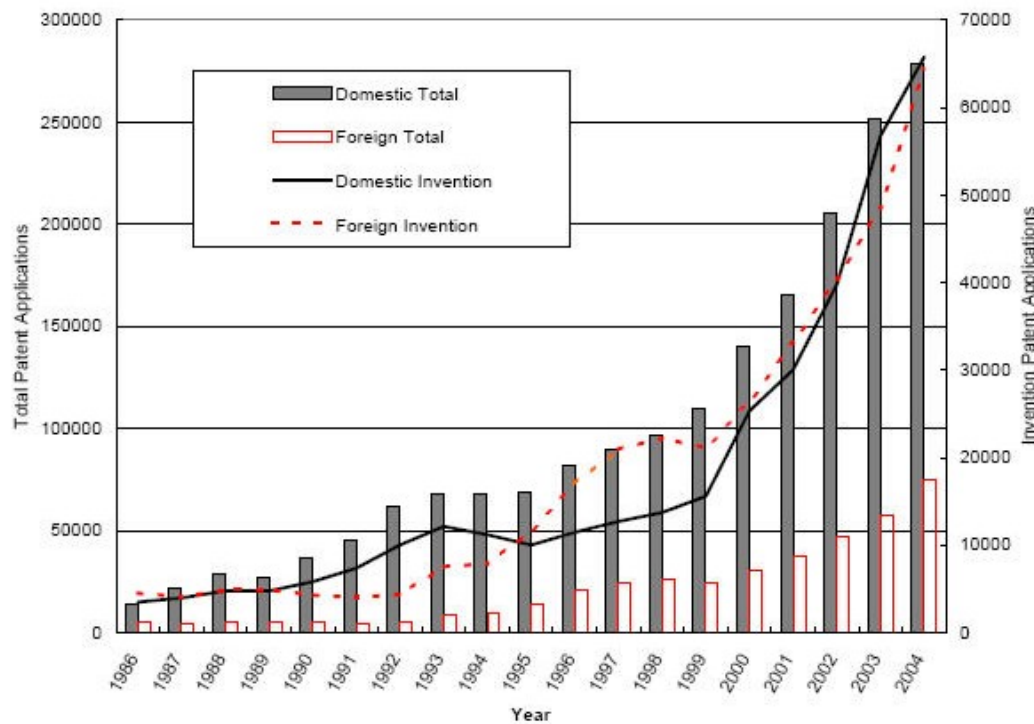




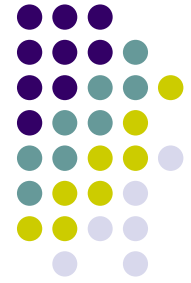
Application: Why China Grows So Fast

- Technology advancement: fast rising patent applications

Figure 1: Chinese Patent Applications, 1986-2004



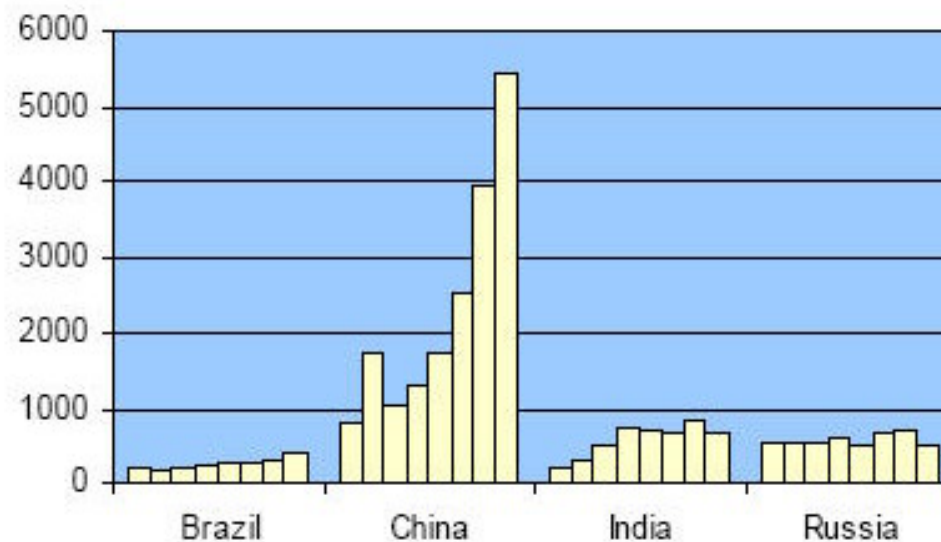
Source: web site of China's National Bureau of Statistics - www.stats.gov.cn.



Application: Why China Grows So Fast

- Technology advancement:
 - Fast rising patent applications: comparison among emerging economies

Number of international patent applications (PCT) in BRIC countries, 2000–2007



Source: WIPO (www.wipo.int)



Application: Why China Grows So Fast

- Technology advancement: fast catch-up in R&D investment

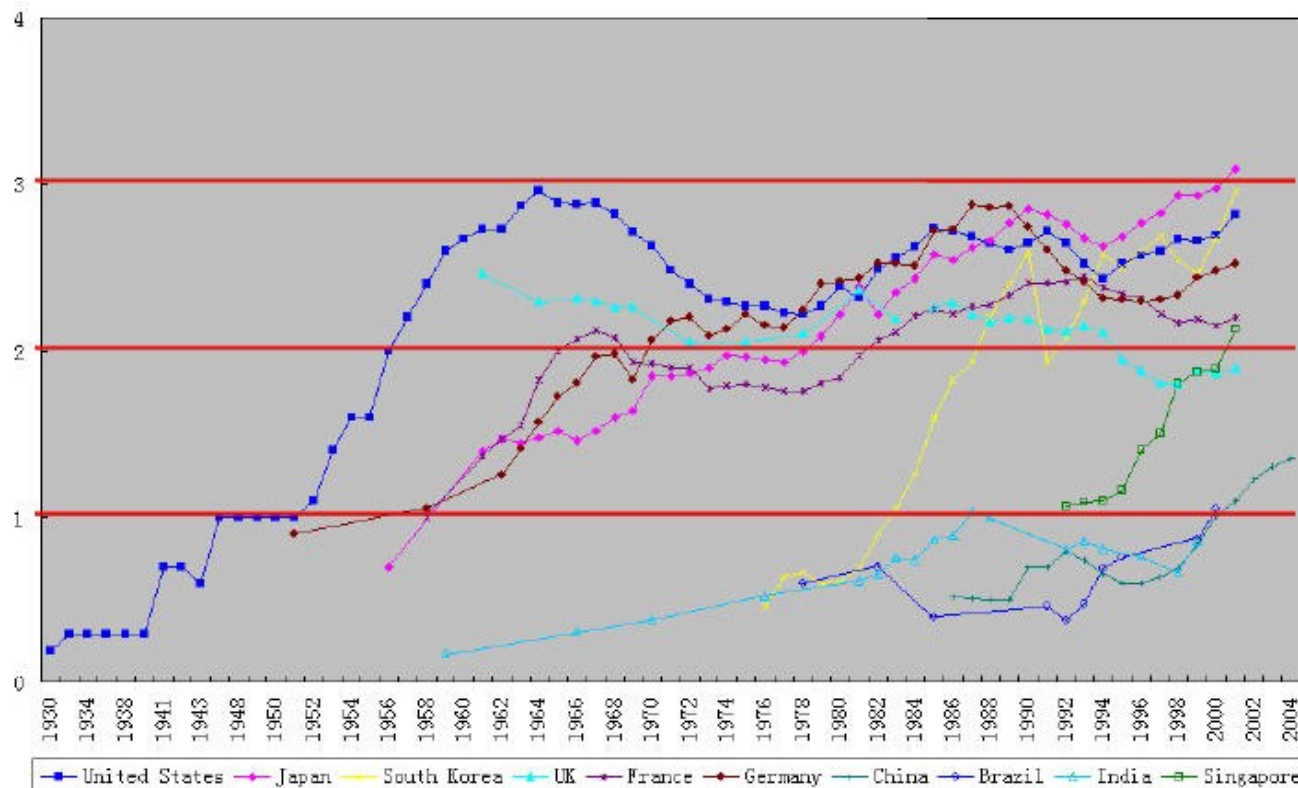
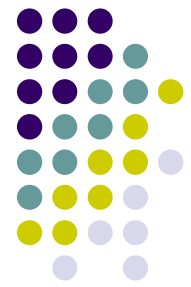


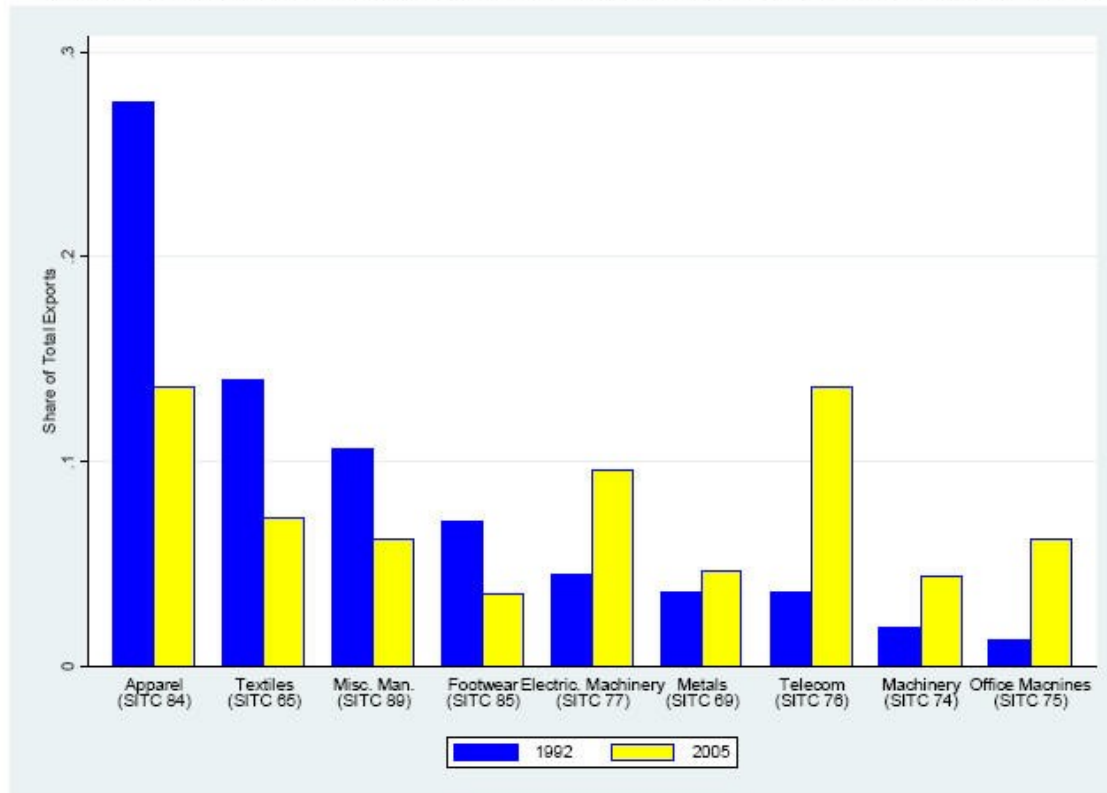
Figure 2. Historic R&D/GDP (or GNP) in 10 Countries
(R&D/GDP ratio (%) on the vertical axis)



Application: Why China Grows So Fast

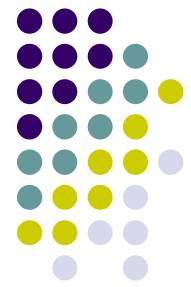
- Technology advancement: increasing sophistication of export?

Figure 2: The Reallocation of Manufacturing Exports Across Major Two-digit Sectors



* A sector is defined as major if the sector's share of total trade is above 3% in 1992 and/or 2005. These sectors account for about 70 percent of manufacturing exports.

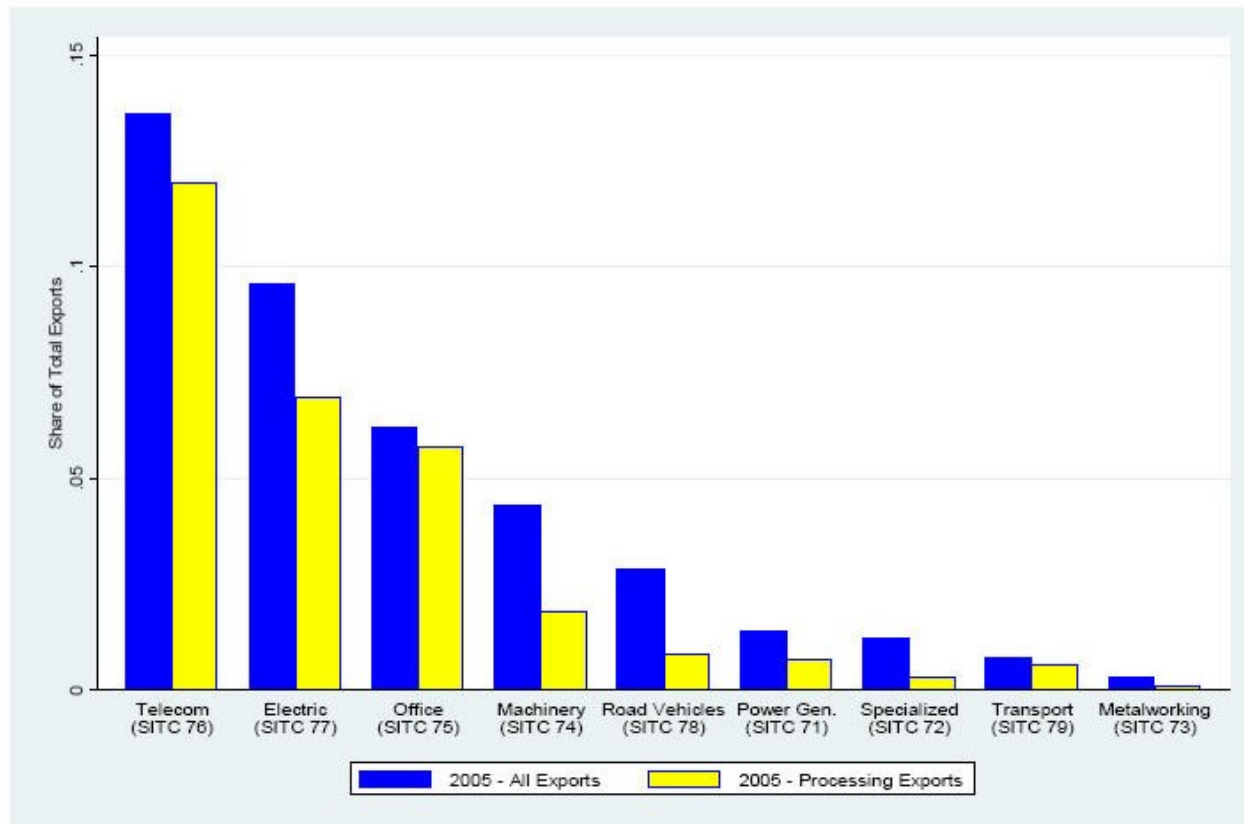
Source: Amiti and Freund, "An Anatomy of China's Export Growth".

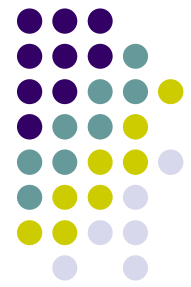


Application: Why China Grows So Fast

- Technology advancement: increasing sophistication of export?

Figure 3: Machinery Exports and Processing Trade

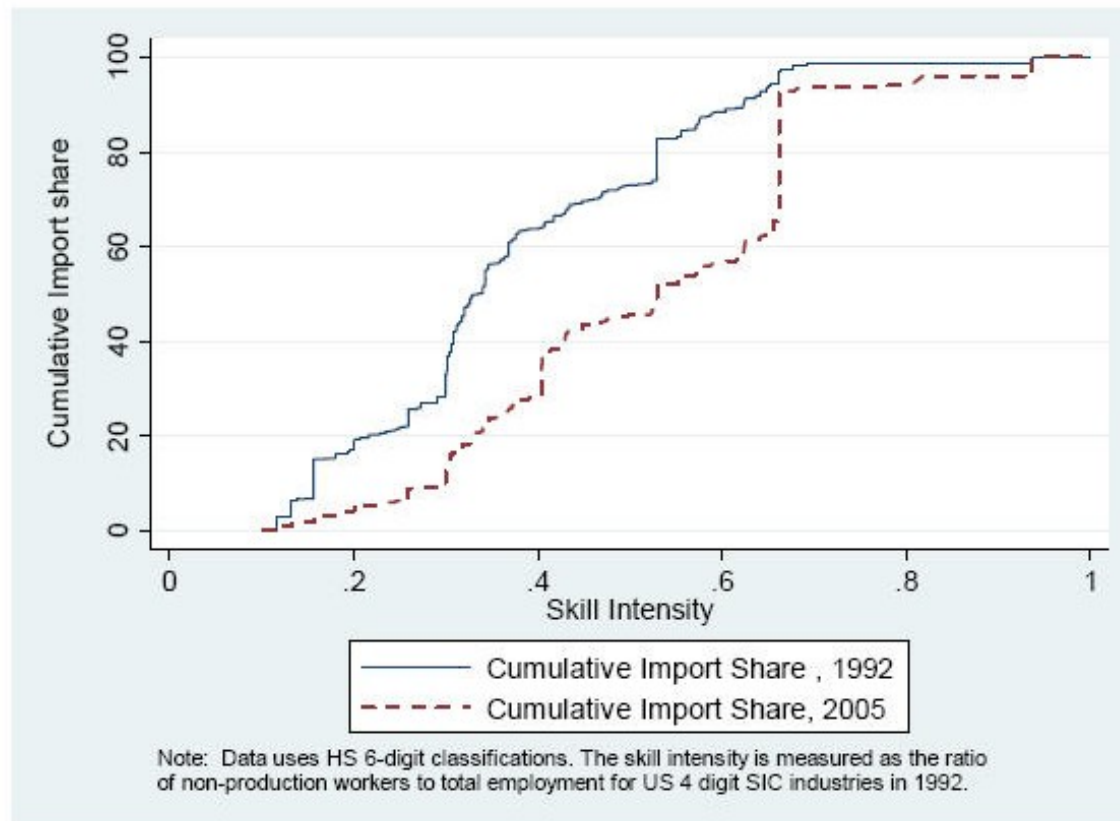


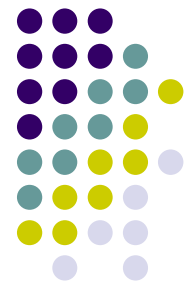


Application: Why China Grows So Fast

- Technology advancement: increasing sophistication of export?

**Figure 6: Cumulative Import Share and Skill Intensity
Processing Trade**





Application: Why China Grows So Fast

- Technology advancement: increasing sophistication of export?

**Figure 5: Skill Intensity of China's Manufacturing Exports
Excluding Processing Trade**

