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Information Technology and the New Globalization: Asia's economy today and tomorrow

Handout

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Global Value Chain in Asia and Its Implication to Japan

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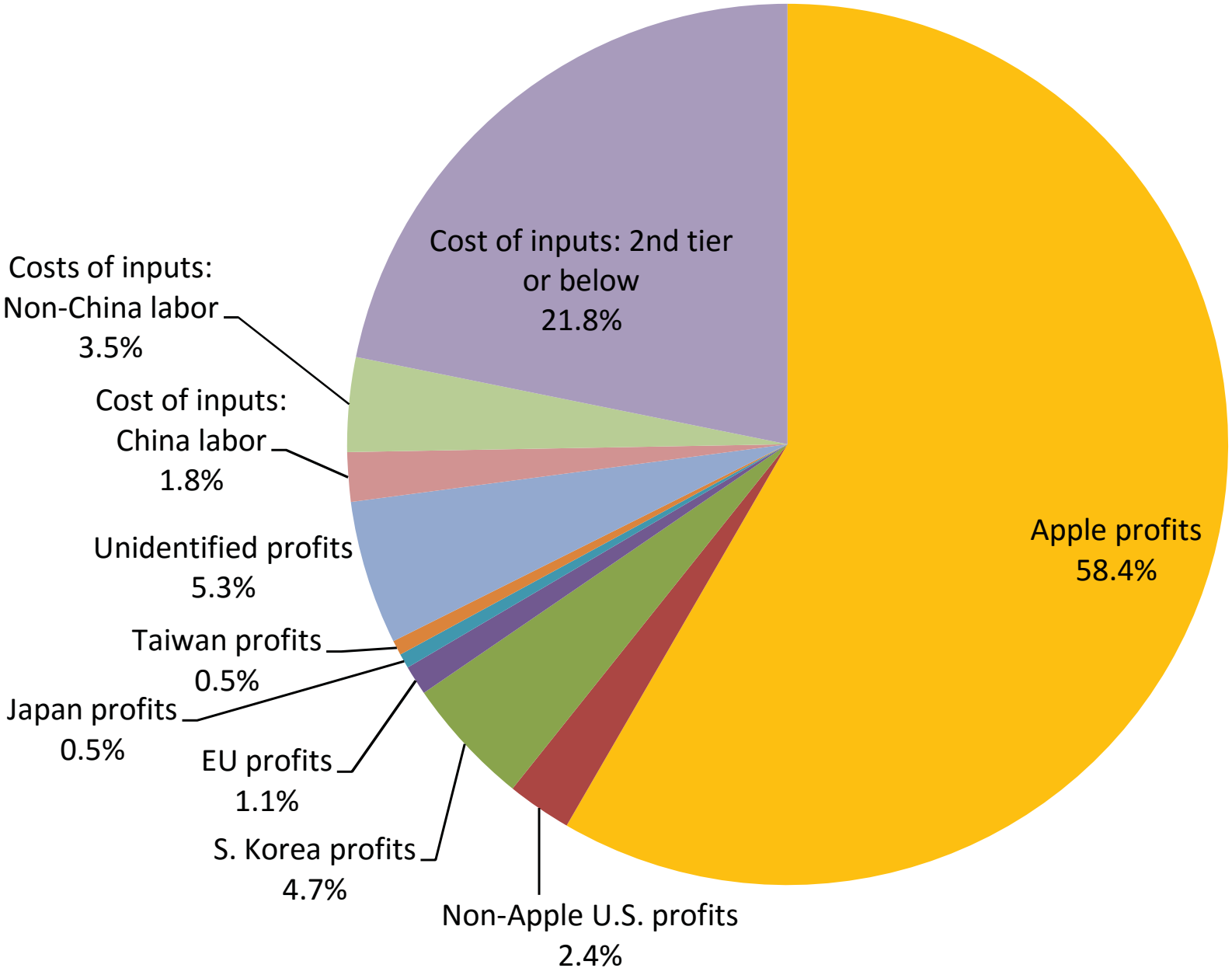
Introduction

Background

- The international competitiveness of industries has long been one of the central issues in the business (e.g., Porter, 1990, HBR) and economics (e.g., Fagerberg, 1988, EJ) literatures.
- Traditionally, the shares in the world export markets are used to measure the competitiveness of industries.
- However, because of the increases in intermediate inputs trade, "the conventional indicators of competitiveness based on gross exports become less informative" (Timmer, Los, Stehrer and de Vries, 2013, EP).
- This is because the large share of an industry's exports does not necessarily mean that the industry can capture large value added if the main production process of the industry consists of simple assembly activities based on imported intermediate inputs.

Figure 1. An example of the iPhone 4 (2010) (assembled in China)



Source: Kraemer, Linden and Dedrick (2011, Working Paper)

Background

- In light of the increasing importance of intermediate inputs trade, Timmer, Los, Stehrer and de Vries (2013) examined the competitiveness of the industries in the EU27 countries, using the World Input-Output Database (**WIOD**) from 1995 to 2009.
  - The competitiveness is measured by the **global value chain (GVC) income**.
  - The **GVC income** is defined as the income of all production factors in the country that have been directly and indirectly used in the production of final manufacturing goods **where the last stage of production takes place in any country in the world**.
- They found that "**real GVC income has increased in all EU countries**, with a major shift in the balance between the old EU 15 and the new EU 12" (p. 636).

GVC income versus value added exports

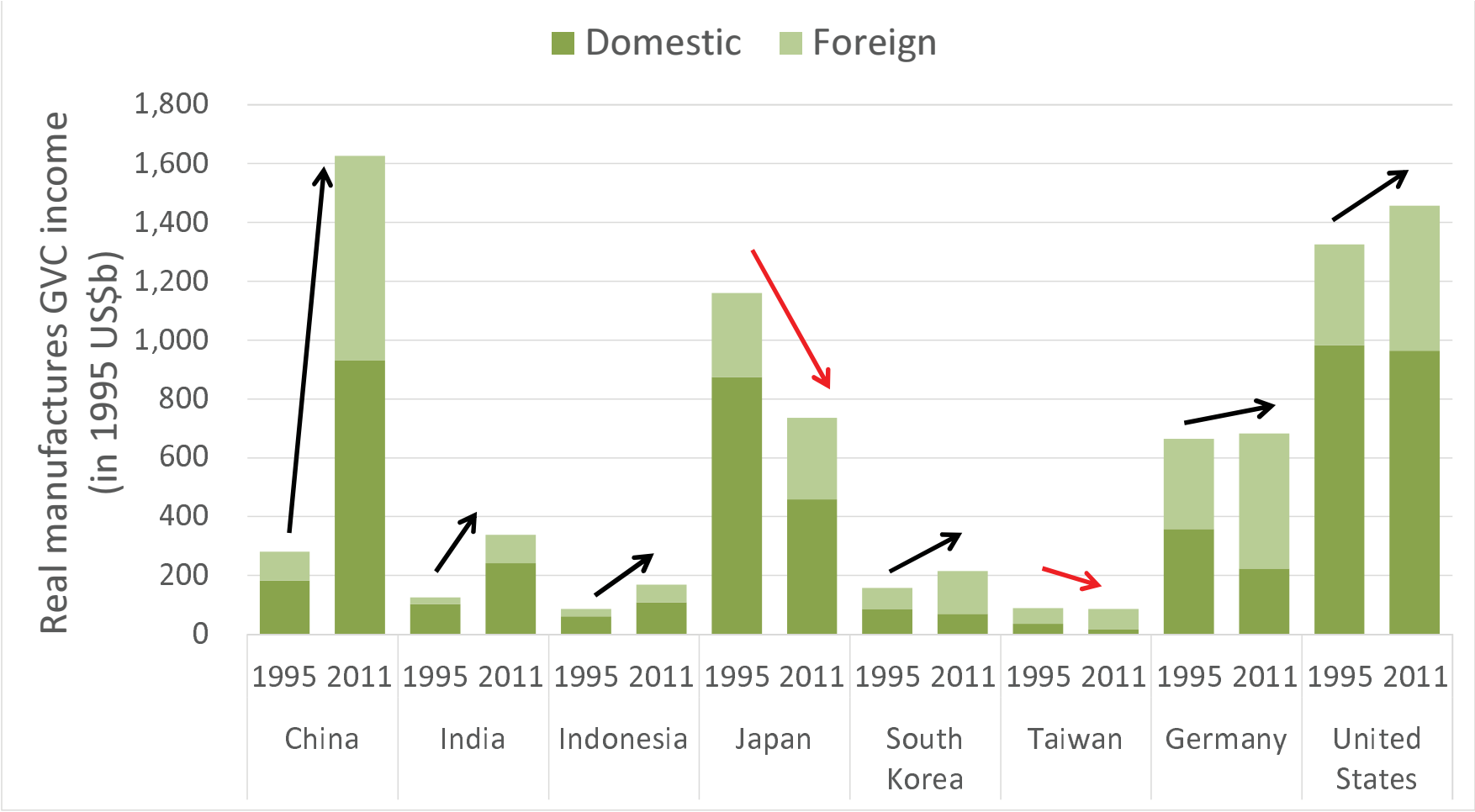
- The GVC income is similar to but different from value added exports.
  - Unlike value added exports, the GVC income takes into account value added generated from domestic final demand as well as foreign final demand.
- Note that Asian countries may present different pictures from European countries.
  - The development of cross-border production sharing is more advanced in East Asia than in North America and Europe (Kimura, 2006, AEPR).
  - Factory Asia is more like a network and much less like the hub-and-spoke pattern that is observed in Factory North America and Factory Europe because the processing of manufacturing products often involves stops in multiple nations (Baldwin and Lopez-Gonzalez, 2015, WE).

Research question: Is Asia the same as Europe?

- Although it may be controversial to use the manufacturing GVC income as a proxy of competitiveness, it may be interesting to ask how it differs among Europe, Japan, and the United States.
  - For the increasing importance of the services sectors in developed countries, see Jorgenson and Timmer (2011, SJE).
  - Morikawa (2016, Nikkei) also argued the importance of services sectors in Japan.
- Kiyota, Oikawa, and Yoshioka (2016, RIETI-DP) examined the manufacturing GVC income in six Asian countries – China, India, Indonesia, Japan, Korea and Taiwan – based on the **GVC income**.
  - We utilize the WIOD for 1995–2011.
  - We also examined the GVC income in Germany and the United States.
  - Appendix slide explains the measurement of the GVC income.

Results

Figure 2. Real manufactures GVC income in Asian countries



1. Unlike European countries, the real GVC income declined in Japan and Taiwan.
   - This is mainly due to the rapid decline in domestic demand.
2. The increasing GVC income of Chinese, Indian and Indonesian manufacturing is remarkable.

Discussions

An implication to US trade deficit

- Xing and Detert (2011, Aussenwirtschaft) asked how the iPhone widened the US trade deficit with China.
- They found that "the iPhone contributed US$1.9 billion to the US trade deficit with China" (p.339).
- They argued that "conventional trade statistics greatly inflate trade deficit between a country used as export-platform by multinational firms and its destination countries" (p.349).

↪ The US trade deficit with China does not necessarily indicate that the declining US competitiveness or the "unfair" trade practices by China.

An implication to the Japanese economy

- Japanese firms actively engage in the formation of GVC, or production network, in Asia through foreign direct investment (FDI) and/or offshoring.
- A concern may be that FDI/offshoring causes a hollowing out of industries in Japan.
- How does FDI/offshoring affect the Japanese economy?

How does FDI/offshoring affect the Japanese economy?

FDI/offshoring does not seem to have significantly negative effects on domestic employment in Japan.

- Kiyota and Kambayashi (2015, RWE)
  - Estimate labor demand function, using **confidential firm-foreign affiliate matched data**.
  - The substitution between domestic and foreign workers is negligibly small.
  - The decline of the manufacturing labor demand is mainly driven by the declining price of capital (e.g., ICT, robots, etc.).
- Ando and Kimura (2015, AEP)
  - Examined the relationship between FDI and job creation/destruction, using **confidential firm-level data**.
  - Found that expanding multinationals intensified headquarters activities.
- Kiyota and Maruyama (2017, JAE)
  - Estimated labor demand function for high-, middle-, and low-skilled workers, using the **JIP database**.
  - Found that offshoring did not have significantly negative effects on any types of skill demand.

How does FDI/offshoring affect the Japanese economy?

However, FDI/offshoring may cause productivity slowdown...

- Kneller, McGowan, Inui, and Matsuura (2012, JJIE)
  - Examined the effects on plant survival, using **confidential firm-plant matched data**.
  - Found that FDI caused the exit of relatively productive plants, which results in the decline in aggregate productivity.
    - ★ MNEs' plants are generally more productive than domestic firms' plants.

Conclusion

Conclusion

1. Unlike European countries and the United States, the real GVC income declined in Japan and Taiwan.
   - This is mainly due to the rapid decline in domestic demand.
2. The increasing GVC income of Chinese, Indian and Indonesian manufacturing is remarkable.
3. The previous studies such as Kambayashi and Kiyota (2015, RWE) and Kiyota and Maruyama (2017, JAE) suggest that FDI/offshoring does not seem to have significantly negative effects on domestic employment in Japan.
4. However, Kneller, McGowan, Inui, and Matsuura (2012, JJIE) suggest that FDI/offshoring may cause productivity slowdown through the closure of relatively productive plants...

Conclusion

- Kambayashi and Kiyota (2015) found that the decline of the manufacturing labor demand is mainly driven by the declining price of capital (e.g., ICT, robots, etc.).
- However, we should note that the ICT and robots would create new jobs:

Conclusion

David Autor (2016) "Will automation take away all our jobs?"

- Automated teller machines (ATMs), automated teller machines, replaced a lot of teller tasks. The number of tellers per branch fell by about a third.
- But banks quickly discovered that it also was cheaper to open new branches, and the number of bank branches increased by about 40 percent in the same time period.
- The net result was more branches and more tellers.

↪ To discuss about the effects of the technological progress, empirical studies need to focus not only on the short-term partial equilibrium effects but also on the long-term general equilibrium effects...

Appendix

Appendix: Measurement of GVC income

$$\mathbf{v} = \hat{\mathbf{p}}(\mathbf{I} - \mathbf{A})^{-1}\mathbf{f}^m \tag{1}$$

- $\mathbf{v}$: the vector of the GVC income
- $\hat{\mathbf{p}}$: a diagonal matrix whose element is the value added per gross output produced.
- $\mathbf{A}$: a global intermediate input coefficients matrix
  - $\mathbf{A}$ indicates the output from industry s in country i used as the intermediate input by industry t in country j as the share of output in the latter industry.
  - The matrix $\mathbf{A}$ describes how the goods of each country-industry are produced using a combination of domestic and foreign intermediate inputs.
- $\mathbf{f}^m$: the vector of the manufacturing final demand.

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