Research Proposal (Example)

Are U.S. Exports Different from China's Exports?

Evidence from Japan's Imports

Kozo Kiyota

Faculty of Business Administration, Yokohama National University

1 Introduction

With the rapid expansion of China's exports, it is interesting to consider how China's exports compete with other countries' exports. Several studies have addressed whether or not China's exports displace other Asian countries' exports (e.g., Hanson and Robertson, 2007). However, no studies have examined explicitly the similarities or differences of exports between two of the largest trading countries, namely China and the United States. In other words, we do not know whether or not trade theory can explain the differences or similarities of export products between China and the United States.

This paper asks following two questions. First, is the number of products exported in common, or "overlapping" products between China and the United States large? In other words, do U.S. export products overlap with China's export products? Second, are the quality and variety of exports different between China and the United States?

The contribution of this paper is twofold. First, to the best of my knowledge, this paper is the first study that compares directly the overlap, quality, and variety of China's and U.S. export products. Several papers have addressed empirically the issues of the quality and variety of exports and imports.[1] In spite of the rapid increases in China's exports, little attention has been given to the differences in the quality and variety of China's and U.S. export products. This is partly due to prevailing notion that there is little overlap between China's and U.S. products. There may also be problems of data availability. Because the quality and variety of products can be defined within the same product category, the difference of quality or variety is not an issue so long as China and the United States export different categories of product. In addition, a clean match between trade data and data on domestic products is difficult to obtain. Indeed, previous studies on the quality and variety of exports have mainly utilized U.S. import data. However, China's and U.S. products can be compared directly if one uses the import data of another country in which detailed product-level data are available. Accordingly, this paper uses Japan's import data that permit direct comparison of China's and U.S. products.

Second, in examining the difference of exports between China and the United States, this paper takes into account both overlapping products and products that are not exported in common by two countries, that is, "non-overlapping" products. Note that the Export Similarity Index employed by Schott

---

[1] For example, Feenstra, Yang, and Hamilton (1999) and Schott (2004, 2008) have examined the quality and variety of U.S. imports.

(2008) does not take into account non-overlapping products. Non-overlapping is hardly observed at the aggregated industry level but is often observed at the disaggregated product level and, therefore, cannot be ignored. This paper therefore utilizes a cross-country analogue to Feenstra (1994) so that the analysis can take into account non-overlapping as well as overlapping products.

2 Table of Contents

3 Research Design

3.1 Methodology

To compare the quality and variety of imports between China and the United States, I follow the Feenstra et al. (1999) approach, which is summarized as follows. Suppose that there are $j(=1,...,J)$ countries and $i(=1,...,N)$ products for a given industry. Country j supplies the products $I_j \subseteq \{1,...,N\}$. Let I be the set of overlapping products between countries j and k (i.e., $I = (I_j \cap I_k)$). Let x_{ij} be the import quantity of product i from country j and $\mathbf{x}_j$ be the corresponding import vector. Similarly, denote p_{ij} as the price of product i from country j and $\mathbf{p}_j$ as the corresponding price vector. Following Feenstra et al. (1999), the quality and variety indexes are defined as follows.

The product variety index of country j relative to country k in a given industry $V_{j/k}$ is defined as:

$$V_{j/k} = \frac{\lambda_j}{\lambda_k},$$

where $\lambda_j = \sum_{i \in I_j} p_{ij} x_{ij} / \sum_{n \in I} p_{nj} x_{nj}$, which equals the ratio of the expenditure on the entire set of good I_j relative to common goods I in country j. If the relative expenditure shares on common goods are the same between countries j and k, $\ln V_{j/k} = 0$. If the import share of non-overlapping products from country j becomes large relative to country k, $\ln V_{j/k} > 0$.

The product quality index of country j relative to country k in a given industry $Q_{j/k}$ is defined as:

$$Q_{j/k} = \frac{e_j / e_k}{P(\mathbf{p}_j, \mathbf{p}_k, \mathbf{x}_j, \mathbf{x}_k, I)}, \; P(\cdot) = \prod_{i \in I} \left(\frac{p_{ij}}{p_{ik}} \right)^{\omega_i(I)},$$

where e_j and e_k denote unit-expenditure on imports from country j and k in a given industry, respectively; and $P(\cdot)$ is the price index; $\omega_i(I)$ is the logarithmic mean of the expenditure shares of the two countries,

normalized to sum to unity. If the unit-expenditure and unit-price are the same between countries j and k, $\ln Q_{j/k} = 0$. If country j exports more higher-priced products than country k within a given industry, $\ln Q_{j/k} > 0$.

Let country j be the United States while country k be China. If the quality (or the variety) of U.S. exports is greater than that of China's exports, the log of the index takes positive values:

$$\ln(Q_{US/CN}) > 0 \text{ and } \ln(V_{US/CN}) > 0$$

To make the comparison clear, I also examine the exports from the EU to Japan.

3.2 Data

This paper uses Japan's import data from the Ministry of Finance (MOF) (2007), *Trade Statistics of Japan*.[2] The data are available monthly on the 9-digit Harmonized System (HS).[3] The HS was introduced in 1988 and revised in 1992, 1996, 2002, and 2006.[4] To trace each product category consistently through time, I use annual data for 2002-2006.

This paper uses manufacturing import data from Japan. There are three advantages in focusing on Japan's imports. First, Japan is one of the largest trading partners for both China and the United States.[5] China's and U.S. exports to Japan, therefore, should reflect some of the important features of their production. Second, Japan is a country with which both China and the United States have not yet established free trade agreements. There is thus little concern about the effects of trade policy. Finally, import data are available at the 9-digit level. This enables me to compare China's and U.S. exports at highly disaggregated level. To make the comparison clear, I also examine the exports from the EU to Japan.

3.3 Expected results

The Ricardian model suggests that countries with higher productivity will export products that differ from countries with lower productivity. The standard Heckscher-Ohlin (HO) model suggests that relatively labor-abundant countries will export labor-intensive products while relatively capital-abundant countries will export capital-intensive products. Given that the United States is more capital abundant and/or more productive than China, both traditional trade models imply that the United States can be expected to export products that are different from China's products.

One would thus expect that U.S. exports are different from China's exports in the sense that the number of products exported in common, or "overlapping" products, would be rather small. A recent study by Schott (2008), however, suggests that such a prediction might not be applicable to China's exports. Using U.S. product-level import data, he found that the similarity of exports between China and the OECD (except the United States) was greater than one would expect given China's size and income level.

---

[2] The 9-digit trade data are available at the MOF website: http://www.customs.go.jp/toukei/info/index_e.htm

[3] The HS is an international product classification based on the International Convention on the Harmonized Commodity Description and Coding System. The HS is standardized universally at 6-digit categories but may be different at 7-digit or more detailed level categories.

[4] For more detail, see http://www.mof.go.jp/singikai/kanzegaita/tosin/kana171215gai/06.pdf

[5] According to JETRO (2007), for the United States, Japan is the third largest export destination (5.8 percent of total exports) next to Canada (22.3 percent) and Mexico (12.9 percent). Similarly, for China, Japan is the third largest export destination (9.5 percent of total exports) next to the United States (21.0 percent) and Hong Kong (16.0 percent).

This "puzzle" could possibly be explained by the "new" trade theories that emphasize the role of horizontal product differentiation (e.g., Krugman, 1979) or vertical product differentiation (e.g., Flam and Helpman, 1987). But whether or not existing theories can explain the differences of exports between China and the United States is still an open question. A study on the similarities or differences between China's and U.S. exports may thus provide a deeper understanding of current patterns of international trade as well as the empirical validity of trade theories.

4 Time Schedule

Due date: February 29, 2008

- November 1-15, 2007: Review literature
- November 16-30, 2007: Construct dataset
- December 1-15, 2007: Estimate the product quality and variety index and summarize major findings
- December 16-31, 2007: Write the first draft
- January 1-15, 2008: Revise the first draft
- January 16-31, 2008: Write the second draft
- February 1-15, 2008: Revise the second draft
- February 16-29, 2008: Write the final draft

References

Feenstra, Robert C. (1994) "New Product Varieties and the Measurement of International Prices," *American Economic Review*, 84(1): 157-177.

Feenstra, Robert C., Tzu-Han Yang, and Gary G. Hamilton (1999) "Business Groups and Product Variety in Trade: Evidence from South Korea, Taiwan and Japan," *Journal of International Economics*, 48(1): 71-101.

Feenstra, Robert C. and Shang-Jin Wei (2007) (eds.) *China's Growing Role in World Trade*, forthcoming from NBER/University of Chicago Press.

Flam, Harry and Elhanan Helpman (1987) "Vertical Product Differentiation and North-South Trade," *American Economic Review*, 77(5): 810-822.

Hanson, Gordon H. and Raymond Robertson (2007) "China and Manufacturing Exports of Developing Countries," in Feenstra and Wei (2007).

Japan External Trade Organization (JETRO) (2007) JETRO website. (http://www.jetro.go.jp) (In Japanese)

Krugman, Paul R. (1979) "Increasing Returns, Monopolistic Competition, and International Trade," *Journal of International Economics*, 9(4): 469-479.

Ministry of Finance (2007) *Trade Statistics of Japan* Website (http://www.customs.go.jp/toukei/ info/tsdl.htm). (In Japanese)

Schott, Peter K. (2004) "Across-Product versus Within-Product Specialization in International Trade," *Quarterly Journal of Economics*, 119(2): 647-678.

Schott, Peter K. (2008) "The Relative Sophistication of Chinese Exports," *Economic Policy*, 23(53): 5-49.