This PDF is a selection from a published volume from the National Bureau of Economic Research

Volume Title: China's Growing Role in World Trade

Volume Author/Editor: Robert C. Feenstra and Shang-Jin Wei, editors

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-23971-3

Volume URL: http://www.nber.org/books/feen07-1

Conference Date: August 3-4, 2007

Publication Date: March 2010

Chapter Title: Comment on "The Anatomy of China's Export Growth"

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Chapter URL: http://www.nber.org/chapters/c10452

Chapter pages in book: (56 - 61)

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Comment

Bin Xu

Amiti and Freund wrote a revealing and stimulating piece on characteristics of China's export dynamics. I summarize their main findings in the following and offer my comments under each of their findings.

> *Finding 1: The skill content of China's exports increased from 1992 to 2005, but the increase was driven almost entirely by China's processing exports. There was little skill upgrading found in China's nonprocessing exports.*

This is a striking result to me. To comment on this result, we need to understand the method used by the authors. The authors first rank China's five-digit International Standard Industrial Classification (ISIC) industries in ascending order of skill intensity. Due to unavailability of relevant Chinese data, the industry skill-intensity ranking is based on Indonesian data. The authors then compute the cumulative export shares of the industries. If a country's cumulative export shares of low-skill industries decrease over time, it is considered as evidence of rising skill content of the country's overall exports. The authors find such a decrease in China's manufacturing exports in the period of 1992 to 2005 but no such a decrease in China's *nonprocessing* manufacturing exports in the same period.

To explain Amiti and Freund's method, let us consider a model of two industries, a low-skill industry 1 and a high-skill industry 2. Denote h_1 and h_2 as skill intensity of exports from 1 and 2, respectively, h_e as skill intensity of total exports, and λ as export share of 1. Then $\lambda h_1 + (1 - \lambda)h_2 = h_e$. By

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definition, an increase in the (relative) skill content of the country's exports refers to an increase in h_e.

The approach of Amiti and Freund is to detect changes in skill content from changes in λ. For China's nonprocessing exports, they find little changes in λ. What does this finding tell us? It tells us that distribution of nonprocessing export shares is quite stable in the period of 1992 to 2005 across Chinese manufacturing industries. In other words, there are little export-share shifts from low-skill industries to high-skill industries with regard to nonprocessing exports. As is clear from the model, a constant λ implies no changes in skill content *only if* h_1 and h_2 are unchanged. In footnote 3 of their paper, Amiti and Freund recognize that their result only gives an indication of shifts between industries (λ) and do not say if there has been any within-industry skill upgrading (h_1 and h_2). Still, I want to caution the reader that one cannot draw a conclusion of no skill upgrading in China's nonprocessing exports without looking at changes in skill intensities of Chinese industries that conduct nonprocessing exports.

I must add that the preceding point does not downgrade the very valuable finding by Amiti and Freund that there exists a sharp difference in across-industry–export-share distribution between processing and nonprocessing exports. This finding calls for future research to explore the underlying reasons for this sharp difference. Given this paper's finding of across-industry skill upgrading in China's processing exports and the likely occurrence of within-industry skill upgrading of Chinese exports, the skill content of China's processing exports should have risen. Amiti and Freund provide some evidence that the skill content of China's processing *imports* increased significantly, which supports an argument that the rising skill content of China's processing exports resulted from rising skill content of China's imports of intermediate goods used in producing processing exports. As the authors recognize, rising skill content of processing imports does not rule out the possibility of skill upgrading of China's value added in the production of processing exports. Future research is needed to estimate the contribution of China's value added to the skill upgrading of its process exports.

Finding 2: China's export growth was accompanied by increasing specialization or decreasing diversification.

To comment on this result, we need to first understand what the authors mean by specialization and diversification. The authors use two measures to gauge the degree of what they call "export specialization." First, they rank products in ascending order of export share, compute the cumulative shares for 1992 and 2005, and compare them. For China's top 500 export products, they find that the cumulative share for 2005 is lower than that for 1992, which they interpret as increased export specialization. Second, they compute a Gini coefficient and find that its value rises for China's exports

from 1992 to 2005, which they interpret as indication of increased export specialization.

From the two measures the authors use, it is clear that their definition of export specialization (diversification) is indeed inequality (equality) of export-share distribution. Take an example of three goods. If a country initially exports the three goods evenly, $s_1 = s_2 = s_3 = 1/3$, where s denotes export share, then the Gini coefficient is zero. Suppose later on export shares become $s_1 = 1/6$, $s_2 = 1/3$, and $s_3 = 1/2$, then the Gini coefficient becomes 0.5. This rise in the Gini coefficient indicates that the export-share distribution has become more uneven but does it necessarily mean that the country's export structure has become more specialized? To answer this question, let us rank 1, 2, 3 in ascending order of skill intensity. Suppose initially China's export shares are $s_1 = 1/2$, $s_2 = 1/3$, and $s_3 = 1/6$, where half of China's exports are in the low-skill good 1. Suppose at a later time China's export shares become $s_1 = s_2 = s_3 = 1/3$, which indicates that China's export-share distribution has become more equal. In terms of export specialization, China has become less specialized in the low-skill good 1, but more specialized in the high-skill good 3. This example shows that we really cannot conclude from a more even export-share distribution that export structure has become less (or more) specialized.

The chapter associates increased specialization (accompanying export growth) with traditional trade theory, and more diversified export structure with the cost discovery theory of Hausmann and Rodrik (2003) and the stage-of-diversification theory of Imbs and Wacziarg (2003), and interprets the finding of China's rising export specialization as evidence supporting the traditional trade theory. I don't think this interpretation is proper. In the standard 2×2 Heckscher-Ohlin (HO) model, a country produces both goods (i.e., diversification in production), exports one good, and imports the other good. In this model, export growth cannot be interpreted as rising export specialization. In HO models with more goods than factors, export patterns are indeterminate, and, hence, there is no meaningful definition of export specialization. In multicone HO models, export growth is associated with product specialization, but it is not about increased export shares of a given set of goods. Rather, export growth is usually accompanied by shifting of product mix from one set of goods to another set of goods. In contrast, the associations between diversification and growth in the aforementioned development theories are derived from models of different nature, and it is farfetched to link them to the current context.

Finding 3: China's export growth was driven overwhelmingly by export expansion of existing goods, with only a small contribution from export expansion of new goods.

The authors attempted two approaches. First, they use Harmonized System (HS) six-digit data in concordance to the same 1992 product codes,

rank these goods in ascending order of export share, split them into deciles by export value in 1992, and examine the changes of export shares of the deciles from 1992 to 2005. They find that the bottom 20 percent of China's export value more than doubled in this period. In other words, the goods with the lowest export values in 1992 saw the fastest growth in export value in the period. The authors view it as suggesting a sizable role for the extensive margin (i.e., export growth from introduction of new goods).

As the authors point out, HS six-digit categories are too aggregated to be able to identify new products. Low export shares of HS six-digit categories do not necessarily contain new goods, so the observed rapid export expansion in these categories may well be that of the existing goods, that is, the intensive margin. Although this approach based on HS six-digit data does not identify the contributions of the intensive margin and extensive margin, the authors find that the reshuffling of China's HS six-digit categories during the period 1992 to 2005, while occurring mainly in the bottom 20 percent by export value, was mainly in the mid-to-upper range by product category rank (splitting exports into deciles by the number of product categories in 1992), shifting from the top decile to the four deciles below the top. I find this pattern very interesting. If the top decile corresponds to the most labor-intensive goods (large export items of China in 1992), the next four deciles correspond to goods of middle-range skill intensities; then the preceding pattern suggests that there was skill upgrading in China's export structure from 1992 to 2005 in industries of low-to-middle skill intensities (which was exactly what figure 1.4 of the paper shows). Moreover, the fact that it occurred mainly in the bottom 20 percent by export value suggests that this skill upgrading of China's export structure was mainly driven by the expansion of *small* export items whose skill intensities lie in the middle range. I think this is an interesting pattern worthy of further exploration.

To examine the relative contribution of intensive and extensive margins to China's export growth, the authors use the (second) approach of computing the Feenstra (1994) index of variety growth and decomposing export growth into the intensive margin and extensive margin (defined as creation of new export goods less destruction of old goods). They use HS eight-digit data collected by China and HS ten-digit data collected by the United States. To alleviate the distorting effect of a major reclassification of HS codes in 1996, they implement their estimation using the sample period of 1997 to 2005. The results indicate that China's export growth has been small in the extensive margin as compared to other non-Organization for Economic Cooperation and Development (OECD) countries. I think this is a very useful finding as it tells us something important about the mode of China's export growth. Recent studies by Rodrik (2006) and Schott (2008) find that China's exports have more overlaps with that of advanced countries than would be expected from its income level. Given the large overlaps of exports by China and advanced countries, whether China's export growth relies more on the

intensive margin or the extensive margin becomes an important factor in assessing the nature of export competition between China and advanced countries.

> *Finding 4: For the same HS ten-digit goods exported to the United States, the price index for China fell by 13 percent, while the price index of the rest of the world rose by 3 percent, in the period of 1997 to 2005.*

Amiti and Freund are not the first to point out that price of China's exports to the U.S. market has been declining relative to that of other countries. Schott (2008) used the same HS ten-digit data, compared Chinese and OECD export unit values, and identified a trend of increasing price discount of Chinese exports that has existed since 1980.

What is behind this trend of falling prices of Chinese exports? One can think of several hypotheses. First, price can be a signal of product quality. Even at the HS ten-digit level, goods are still of great heterogeneity, as one can see from the big variation of unit values of the same good imported from different countries. If one interprets the price difference between Chinese and OECD goods as reflecting product quality difference, as does Schott (2008), one may conclude that falling prices of Chinese goods are of less a concern to advanced countries as they do not directly compete with the high-quality varieties exported by advanced countries. Second, falling prices of Chinese exports may be a result of the increasing volume of Chinese exports. This terms-of-trade hypothesis is proposed by the authors of this chapter, who argue that the large increase in export growth along the intensive margin suggests that China's export growth is likely to put downward pressure on world prices. The authors do not provide, however, any evidence to support this argument. One might be interested to see if there is a positive correlation between growth of China's exports and decline of their prices at the product level. Besides these two hypotheses, falling prices of Chinese exports may be due to some other reasons. For example, Chinese export firms have seen improved productivity and increased domestic competition, both of which may lead to lower export prices. During the 1980s and 1990s, there was depreciation of China's real exchange rate, which may have also played a role in lowering China's export prices during the period.

In sum, I find this chapter by Amiti and Freund very interesting and stimulating. China has emerged as a major force in international trade, yet our understanding of the characteristics of Chinese foreign trade is still quite rudimentary. By identifying several interesting patterns of China's export growth and raising a number of important questions with regard to these patterns, Amiti and Freund's research provides an excellent starting point for further exploration of this topic.

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