Does Japan Limit Its Imports for Comparative Advantage Reasons?–The Case of Agricultural Manufactures

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Abstract. Using yearly trade data from 1976 to 2015, this study explores the Japanese import trade patterns. Specifically, we develop an approach to identifying the government interference in trade. The empirical results show that Japan has comparative disadvantage and trade deficits in its agricultural manufactures, but there is no evidence that Japan attempts to improve the comparative advantage by import limitation.

Introduction

The 1973 oil crisis urged Japan to make its economic development by facilitate its trade. Most literatures focus on the Japanese exports which helps the country to keep its current account surplus. As the two-gap model [1, 2] predicts, the external balance-of-payments gap can be used as a key to the internal investment-savings gap. In other words, the Japanese current account surplus can boom the Japanese aggregate demand and thus guarantee the economic growth.

Some studies argues that Japan facilitates its export to achieve current account surplus. Ricardian free trade theories insist that a country should specialize in and export products that it enjoys comparative advantages while imports products that it has comparative disadvantages; however, the theory of dynamic comparative advantages suggests that by government-led export facilitation, the larger export scale may cause an effect of increasing return [3] by which the comparative advantage of a certain industry or a product can improve. Noting that both export facilitation and import limitation policies are trade protectionism by distorting trade patterns, it is also an interesting question how much the Japanese import trade patterns divergence from the equilibrium.

This paper examines the distortion of the Japanese import trade patterns under the protectionism trade policies. Specifically, we analyze the trade patterns of the Japanese agricultural manufactures because for this category, the trade policy is widely viewed as protectionism. This fact enables us to scrutinize the feasibility of dynamic comparative advantage theories.
Methodology and Data

Measurements

A many of previous studies [4, 5] use the "revealed comparative advantage index" (RCA) to measure the comparative advantage that is revealed in the exports of a certain product.

\[
RCA_{ik} = \left( \frac{X_{ik}}{X_i} \right) / \left( \frac{X_{wk}}{X_w} \right)
\]

(1)

where \(X_{ik}\) stands for the exports of product \(k\) by country \(i\), \(X_i\) is the total exports of country \(i\), \(X_{wk}\) is the world exports of product \(k\), and \(X_w\) represents the total world exports. The value of RCA varies from 0 to infinity with a median of 1. \(RCA_{ik} > 1\) indicates that country \(i\) is more specialized in product \(k\) than world average. However, the asymmetric distribution of RCA index may overstate the weight of the more specialized products in cross-commodity analysis, implying that the mean of RCA for a specific country is systematically higher than 1 [6]. To address this problem, we apply a logarithmic transformation [7] by

\[
RSCA_{ik} = \frac{RCA_{ik} - 1}{RCA_{ik} + 1}
\]

(2)

where \(RSCA_{ik}\) is "revealed symmetric comparative advantage index" of product \(k\) that country \(i\) exports. The value range of the index is \([-1, 1]\) with a mean of zero. \(RSCA_{ik} > 0\) corresponds to \(RCA_{ik} > 1\) and implies that country \(i\) has revealed comparative advantage in product \(k\). When turning to imports, we have to employ

\[
RCA_{ik}^M = \left( \frac{M_{ik}}{M_i} \right) / \left( \frac{M_{wk}}{M_w} \right)
\]

(3)

where \(M\) stands for the import amount, to measure the comparative advantage revealed in the imports of product \(k\). We therefore use

\[
RSCA_{ik}^M = \frac{- (RCA_{ik}^M - 1)}{(RCA_{ik}^M + 1)}
\]

(4)

to capture the symmetric comparative advantage index revealed in the imports of product \(k\) by country \(i\). A negative sign is added because in the view of comparative advantage theories, the more the amounts of product \(k\) country \(i\) imports, the less the comparative advantage that country \(i\) has.

Net export capabilities are measured by

\[
NX_{ik} = \left( \frac{X_{ik} - M_{ik}}{X_{ik} + M_{ik}} \right)
\]

(5)

where \(NX_{ik}\) presents the "ratio of net exports" to total trade value of product \(k\) by country \(i\). In particular, the value interval of this ratio is \([-1, 1]\) as well, enabling further comparisons of \(RSCA_{ik}\) and \(NX_{ik}\) across products.

If a country builds its imports on comparative advantages without any government interference, Heckscher-Ohlin-Ricardo approach predicts that the condition of \(NX_{ik} = RSCA_{ik}^M\) must holds. Pang and Hong (2009) derived a measurement of propensity for trade pattern:

\[
h_{ik} = NX_{ik} - RSCA_{ik}^M
\]

(6)

to capture how much a country’s trade policy distorts the trade pattern [8]. \(h_{ik}\) index has a value range of \([-1, 1]\) with a mean of zero. In this study, a \(h_{ik}\) index value bigger than zero
suggests that the trade policy is characterized as “import limitation” because the net export capability of a country is higher than its comparative advantage promises, by limiting the imports. If $h_{ik} < 0$, the implication is on the opposite side. The country’s trade policy is rather more import facilitating than limiting.

When there are multiple products in the category of “agricultural manufactures”, we choose weighting to obtain the propensity of imports trade pattern distortion for the product categories:

$$H_{ij} = \sum_{k=1}^{n} (h_{ik} \cdot w_{ik}), (k \in j)$$  \hspace{1cm} (7)

$j$ stands for the aggregated product category which consists of $n$ products. Specifically,

$$w_{ik} = \frac{(X_{ik} + M_{ik})}{\sum_{z=1}^{n} (X_{iz} + M_{iz})}$$  \hspace{1cm} (8)

is the weight of product $k$ by country $i$. We use the amount of both exports and imports to weight because in the structure of $h_{ik}$ index, we also employ the measurement of $NX_{ik}$, which involves both exports and imports.

Data

This study employs yearly three-digit level trade data as classified by Standard International Trade Classification Revision 2 (SITC Rev.2) to conduct analysis. Annual data from 1976 to 2015 are compiled from UN Comtrade Database on April 30th, 2016.

Following Lall (2000), who proposes a classification for SITC Rev.2 products according to technological structure of exports [9], we identified 27 agricultural manufactures with Japan as the reporter. The total amount of world imports for each three-digit SITC product ($M_{wk}$) is obtained by summing up that of each individual country. Table 1 gives the SITC codes of the involved agricultural manufactures.

<table>
<thead>
<tr>
<th>Table 1. SITC Rev.2 Three-digit Agricultural Manufactures (26 products).</th>
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</thead>
<tbody>
<tr>
<td>287, 288, 289, 323, 334, 335, 411, 511, 514, 515, 516, 522,</td>
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<tr>
<td>523, 531, 532, 551, 592, 661, 662, 663, 664, 667, 688, 689</td>
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Empirical Results

Fig. 1 illustrates the changes of $NX_{ij}$ (net export capability index), $RSCA_{ij}$ (revealed symmetric comparative advantage index), as well as $H_{ij}$ (propensity of imports trade pattern distortion index) of the Japanese agricultural manufactures during the period of 1976 to 2015.
Both net export capability index \((NX_{ij})\) and revealed symmetric comparative advantage index \((RSCA_{ij})\) are persistently lower than zero, implying that the Japanese trade in product category of agricultural manufactures are in deficits and these products are in comparative dis-advantage as a whole. The findings are consistent to the previous literatures. The net export capability index \((NX_{ij})\), however, shows a tendency of a rising time trend, while the revealed symmetric comparative advantage index \((RSCA_{ij})\) is very stable during the period. This suggests that the Japanese import trade policies on the agricultural manufactures have little effects on the improvement of the comparative advantage.

What is interesting is that the weighted propensity of imports trade pattern distortion index \((H_{ij})\) has kept negative, implying that the Japanese trade policy tends to facilitate the imports rather than to limit the imports in the agricultural manufactures. This holds during the entire sample period and is statistically significant. The fact challenges the common wisdom that Japan protects its agricultural manufacturing industries by import limitation. In other words, the evidence from Japan provides no evidence for the dynamic comparative advantage theories.

**Conclusion**

This study empirically analyses the import trade pattern of the Japanese agricultural manufactures. We find that net export capability index \((NX_{ij})\) and revealed symmetric comparative advantage index \((RSCA_{ij})\) are negative for this product category. However, there is no evidence that Japan has taken a trade policy that is featured with import limitation. On the contrary, our results show that the weighted propensity of imports trade pattern distortion index \((H_{ij})\) is persistently negative with statistical significance, casting heavy doubts on the arguments that Japan has tried to protect its agriculture related industries by imposing more limitations on the imports. Comparing to the actual comparative advantage of the industries, the Japanese imports has been rather facilitated.
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References


