Does Korea Restrict its Imports of the Primary Agricultural Products?

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ABSTRACT
This paper empirically examines the trade patterns of the Korean primary agricultural products to assess how much the Korean trade policy restricts the imports of this product category. We use yearly trade data from 1976 to 2016 to obtain the revealed symmetric comparative advantage and the trade balance. The difference between the two indicators can reveal the policy interference tendency. To our surprise, the results show that Korean policy contrarily facilitates the imports of primary agricultural products during the period. That may be an evidence of the adoption of virtual land strategy, which prompts Korea to import more agricultural products than the comparative advantage predicts.

INTRODUCTION
Korea is a country with tight natural resource constraints. There is more than 50 million a population living in its limited total territory of 0.37 million square kilometers, making a high population density. The rapid economic growth of Korea from 1960s to 1980s is often named the Korean miracle [1], and many scholars attribute this success to the Korean government dominated economy featured with trade policy interference [2-3].

Some scholars argue that a country can facilitate its economic development by means of imports restriction. This seems to be true for the Korean imports of the comparative disadvantaged primary agricultural products. A popular strand of views stands that Korea shows the weaknesses or the comparative dis-advantages in the
imports of the primary agricultural products, especially the primary agricultural products. Given the domestic political arrangements which are in favor of the farmer households, the lack of international competitiveness has prompted Korea to impose tougher trade policies to protect the Korean agricultural industries [4-5].

More literatures investigate the trade policies by focusing on the exports. They argue that export facilitation is also an approach to trade protectionism. The theories of strategic trade or dynamic comparative advantages emphasize that a country can improve the comparative advantages of its strategically important industries by means of export facilitation or import restriction, while neo-classical economists believe that a country should export commodities have comparative advantages, and import those that are comparatively dis-advantageous. Empirically, however, little works directly compare a country’s trade balance with its comparative advantages.

This study aims to assess the Korean trade policy in the primary agricultural products imports. If Korea does tend to improve its comparative advantages of the industries by import restriction, it should deliberately import less primary agricultural products than the real comparative advantages guarantee to make use of virtual land [6]. This hypothesis sets a logical start point for our following work.

**METHODOLOGY**

Scholars use "revealed comparative advantage index" (RCA) to capture the comparative advantage that is revealed in the exports of a certain product [7-8].

$$RCA_{ik} = \frac{(X_{ik} / X_i)}{(X_{wk} / X_w)}$$

(1)

where $X_{ik}$ represents the exports of product k by country i, $X_i$ stands for the total exports of country i, $X_{wk}$ and $X_w$ are for the world exports of product k and the total world exports. The value of RCA ranges from zero to infinity with a median of 1. $RCA_{ik} > 1$ implies that country i has comparative advantage in product k. The asymmetric distribution of RCA index, however, prevents the direct comparison of the means of RCA for a specific country [14]. Following Dalum (1998), we apply a logarithmic transformation [9] by

$$RSCA_{ik} = \frac{(RCA_{ik} - 1)}{(RCA_{ik} + 1)}$$

(2)

where $RSCA_{ik}$ is "revealed symmetric comparative advantage index" of country i’s product k exports. The value range of the index is [-1, 1] with a zero mean. $RSCA_{ik} > 0$ is equivalent to $RCA_{ik} > 1$ and implies that country i has comparative advantage in the export of product k. The comparative advantage in the imports involves a transformation by

$$RCA_{ik}^{M} = \frac{(M_{ik} / M_i)}{(M_{wk} / M_w)}$$

(3)
where $M$ stands for the value of import, to measure the comparative advantage revealed in the imports of product $k$. We employ

$$RSCA^M_{ik} = -(RCA^M_{ik} - 1)/(RCA^M_{ik} + 1)$$

(4)

to measure the symmetric comparative advantage index revealed in the imports of product $k$ by country $i$. To keep consistent with the comparative advantage of imports, we deliberately attached a negative sign because 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

$$NX_{ik} = (X_{ik} - M_{ik})/(X_{ik} + M_{ik})$$

(5)

where $NX_{ik}$ expresses the "ratio of net exports", or the trade balance to total trade value of product $k$ by country $i$. The value range of $NX_{ik}$ ratio is also $[-1, 1]$, making it possible to compare the $RSCA_{ik}$ and $NX_{ik}$ of a product. If country $i$'s imports of product $k$ involves no government interference, free trade theories argue that the condition of $NX_{ik} = RSCA^M_{ik}$ holds. Pang and Hong (2009) derived a measurement of policy interference:

$$h_{ik} = NX_{ik} - RSCA^M_{ik}$$

(6)

to capture how much the trade policy distorts the trade pattern [10]. $h_{ik}$ index has a value range of $[-1, 1]$ with a mean of zero. An $h_{ik}$ index bigger than zero suggests that the trade policy is characterized as “import restriction” because the net export capability of a country is higher than its comparative advantage promises. 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 “primary agricultural products”, weighting is necessary for the policy interference in the category:

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

(7)

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

$$w_{ik} = (X_{ik} + M_{ik}) / \sum_{k=1}^{n} (X_{ik} + M_{ik})$$

(8)

is the weight of product $k$. 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. For the $RSCA_{jk}$ of the aggregated product category, the weight is
\[ w_{ik} = M_{ik} / \sum_{k=1}^{n} M_{ik} \]  

(9)

because no export is involved in the measurement of RSCAik of imports [11].

DATA

We employ three-digit level trade data from 1976 to 2016 as classified by Standard International Trade Classification Revision 2 (SITC Rev.2). The annual data are compiled from UN Comtrade Database on April 30th, 2017.

Lall (2000) proposed a classification scheme for three-digit SITC Rev.2 products according to the technological content [12]. Following his research, this study identified 19 primary agricultural products with Korea as the reporter. The total amount of world imports for each three-digit SITC product (Mwk) is obtained by summing up that of each individual country. Table I. gives the SITC codes of the involved primary agricultural products.

<table>
<thead>
<tr>
<th>TABLE I. SITC REV.2 THREE-DIGIT PRIMARY AGRO-PRODUCTS</th>
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<tr>
<td>001, 011, 022, 025, 034, 036, 041, 042, 043, 044, 045, 054, 057, 071, 072, 074, 075, 081, 091</td>
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EMPIRICAL RESULTS

Figure 1 illustrates the changes of the weighted \( NX_{ij} \) (net export capability index), \( RSCA_{ij} \) (revealed symmetric comparative advantage index), as well as \( H_{ij} \) (government interference index) of the Korean primary agricultural products from 1976 to 2016. Both the weighted revealed symmetric comparative advantage (\( RSCA_{ij} \)) and the net export capability index (\( NX_{ij} \)) of the category of primary agricultural products have never risen above zero. Their gap or the government interference index (\( H_{ij} \)), has been persistently negative, indicating that the policy interference is facilitative for the imports.

We conducted one-sample T-tests to examine whether the means of the measurements are significantly different from zero. In the unreported T-test results, the average RSCAik has never been significantly different from zero at 0.1 confidence levels, while the policy interference (\( H_{ij} \)) have been always statistically significantly negative at 0.001 levels.
These empirical results indicate that the import policies for the Korean primary agricultural products are facilitative rather than being restrictive.

CONCLUSION

This study analyses the import trade pattern of the Korean primary agricultural products. We find that the weighted revealed symmetric comparative advantage and the policy interference of the primary agricultural products category negative. One-sample T-tests with zero as the test value show that the un-weighted revealed symmetric comparative advantage is not significantly different from the world average, while the policy interference indices have been significantly negative for each individual year during the sample period.

There is no evidence that Korea takes import restriction trade policies. Our results show that the policy interference index has been negative with statistical significance, suggesting that Korea has been facilitating the imports of primary agricultural products as a category. The theory of dynamic comparative advantages fits poorly for the primary agricultural products. We argue that Korea has adopted a virtual land strategy to make use of agricultural imports.

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REFERENCES