Determinants of Korea's Imports and its Effects on Distribution of Firms

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I.   Introduction

Recently, Korea's trade has been declining for the second year in a row, due to maturity of global value chains and the slow pace of recovery in the world economy. In particular, imports declined more than exports, but the trade surplus is expanding instead of shrinking. While expressing their concerns over the decline in exports, policy makers and experts seem to care less the decrease in imports. Behind these responses lies the normative dichotomy that the increase in exports is positive for the national welfare but the increase in imports is negative. More importantly, there is still a lack of clear understanding about Korea's import structure.

In this paper, we analyze determinants of Korea's imports in the context of the interaction between exports and foreign investments, and investigate the effects of imports on firms' exit and productivity, in order to understand Korea's import structure and distributional influences of imports.

Since 1988, Korea's overall imports have increased substantially, except for during the currency crisis and the global financial crisis. However, they have recently declined mainly due to the sharp drop in imports of raw materials.

Korea's major importing partner countries have changed from developed countries in the past to resource-abundant countries and developing countries. By type, intermediate goods account for about 50% of imports, raw materials and capital goods account for 20% each, and consumption goods account for around 10%.

Korea's import structure has been closely related with export and foreign direct investment because of its scarce natural resources and utilization of global value chains.

II. Determinants of Imports by Type

In order to analyze the determinants of imports by type, we constructed a theoretical model and found two propositions. First, regardless of type, imports will increase as the economic sizes of importing partner countries

become larger and will decrease as the transaction costs with the importing partner increase. Second, while imports of consumption goods increase as the income level and market size of importing partners grow, imports of intermediate goods and raw materials used as production inputs increase as the outputs and exports of industries grow in size.

The results of the empirical analysis based on the theoretical model are summarized as follows. First, as exports grow, imports of intermediate goods and raw materials used as production input factors will increase, while imports of consumer goods will decrease. Second, imports of intermediate goods and raw materials are positively related with inward foreign direct investment (FDI), but imports of consumption goods are negatively affected by inward FDI. Third, the more industries spend on R&D investment, the more the industries import intermediate goods and raw materials. Fourth, the effects of import liberalization are different for each type of import. The influence of tariff rates was limited for raw materials and capital goods imports.

<Table 1> Determinants of Korea's imports by type

	Consumption goods	Intermediate goods	Raw material goods	Capital goods
Export	-0.137*** (0.019)	0.235*** (0.0157)	0.193** (0.081)	-0.022 (0.027)
Tariff	-4.898** (0.462)	-3.338*** (0.224)	-0.128 (0.246)	-5.099 (4.112)
Economic size	-0.124* (0.0726)	-0.491*** (0.0377)	0.579*** (0.211)	0.144 (0.122)
Wage	0.29*** (0.053)	0.357*** (0.029)	-0.092 (0.143)	-0.222 (0.164)
R&D	-0.208*** (0.023)	0.09*** (0.014)	0.179*** (0.0653)	0.027 (0.045)
Sum of GDP	2.080*** (0.011)	2.141*** (0.0065)	0.901*** (0.0344)	2.063*** (0.012)
Difference in GDP	0.449*** (0.006)	0.169*** (0.0035)	0.157*** (0.0163)	-0.2*** (0.0063)
Similarity of economic size	2.355*** (0.048)	2.55*** (0.032)	1.81*** (0.143)	1.909*** (0.062)
FTA	0.022*** (0.008)	0.548*** (0.012)	-0.033 (0.059)	0.653*** (0.022)
FDI	-0.02** (0.0086)	-0.002 (0.0052)	0.071*** (0.197)	-0.017* (0.009)
R2	0.291	0.308	0.345	0.373
# of obs	178579	479704	21875	131474

Note: 1) Numbers in parenthesis represent robust standard errors, and ***, **, * denote statistical significance at 1%, 5%, 10%, respectively.
2) All regressions contain year, industry, and import partner dummies

According to the analysis of Korea's import structure, imports of consumption goods declined by 0.137%, and imports of intermediate materials and raw materials were shown to increase by 0.235% and 0.193%, respectively, when exports increased by 1%. When inward FDI increased by 1%, imports of consumption goods and capital goods decreased by 0.02% and 0.017% respectively, while imports of raw materials were expected to increase by 0.071%.

III. Effects of Imports on Distribution of Firms

The main results of analyzing the effects of imports on a probability of firms' exit are as follows. First, the increase in total imports raises the probability of a firm's exit due to increased market competition, whereas the firm size, capital stocks, and productivity lower the probability. Second, imports of raw materials and intermediate goods lower the probability of a firm's exit. Technological upgrade

or cheap imported intermediate goods improve marginal firms' competitiveness and hence their survival chances. Third, whether firms are exporting or not does not significantly affect the relationship between import penetration and firms' exit. Fourth, the magnitude of the effects of imports on firms' exit varies from industry to industry

<Table 2> Effects of Korea's imports by type on probability of firms' exit

Model	Logit (Fixed Effect)	Instrumental variable 1 (Fixed Effects)	Instrumental variable 2 (Fixed Effects)
Ln(employment)	-1.747***	-0.065***	-0.066***
Profit	-0.009	-0.000	-0.000
Ln(Capital Intensity)	-0.493***	-0.019***	-0.017***
Consumption goods	0.533***	0.009***	0.023***
Raw material goods	-2.687***	-0.013**	-0.049***
Capital goods	0.147***	0.003***	0.003***
Intermediate goods	-0.116***	-0.004***	-0.004***
Market concentration (HHI)	-0.159***	-0.012***	-0.003***
Ln(Labor Productivity)	-0.249***	-0.004***	-0.004***
R&D ratio	0.511***	0.019***	0.015***
Entry Cost	-8.914***	-0.272***	-0.278***
# of observation	18,278	68,737	64,541
# of firms	3,295	9,658	9,528

Note: 1) Numbers in parenthesis represent robust standard errors, and ***, **, * denote statistical significance at 1%, 5%, 10%, respectively.
2) All regressions contain year, industry, and import partner dummies

Also, we investigate the effects of imports by type on productivity structure. First, total im-

port penetration rates have an inverse U-shaped relationship with total factor productivity. Second, these nonlinear relationships between import penetration rates and total factor productivities are very different for each type of imports by industry. In order to investigate the effects of imports on the distribution of productivity within the industry, we decompose changes in the productivity into within-firm effects, between-firm effects, and exit and entry effects. When imports increase, within-firm effects are significant in food, iron, and transportation industries while between-firm effects are significant in oil and iron industries. Only in the transportation industry do the exit and entry effects turn out significant. Third, total import penetration rates have a positive impact on the growth rate of productivity thanks to the economies of scale, whereas the penetration rates of intermediate goods import increase productivity through technological progress.

IV. Policy Implications

In this paper, we derive three policy proposals. The first is to introduce a new statistical system for imports that should be linked with exports and investment. Also, the new system should contain statistics for e-commerce imports in order to reflect recently changing trend in imports of consumption goods. A low share of consumption goods imports is observed because of the possibility that the import statistics might have neglected B2C e-commerce trade.

The second is to improve the trade adjustment assistant (TAA) program. An increase in imports will bring higher competition to the domestic market and induce the exit of firms with low productivity. Market competition caused by increased imports may result in the

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exit of marginal firms while worsening profit-ability of small sized firms with high productivity. The current TAA program in Korea, however, cannot distinguish marginal firms from small champion firms even though these two groups need different prescriptions.

The third proposal is to customize policies to account for different effects of imports by type. As the FTA tariff elimination schedule goes forward, the effects of imports are expected to grow. To introduce a customized policy for imports by type, it is necessary to raise the understanding of Korea's import structure. In addition, a nonlinear relationship between imports and productivity should be considered when pursuing trade liberalization policy. **KIEP**