

# The Effects of Increased Trade with China and Vietnam on Workers' Earnings and Job Security in Korea<sup>1</sup>

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## I. Introduction

Korea's trade share with China and Vietnam has increased significantly as a result of China's and Vietnam's rapid economic growth since the 2000s. China and Vietnam's share of total Korean trade increased significantly from 15.3 percent and 0.8 percent in 2003 to 23.9 percent and 6.4 percent in 2021. China is now Korea's number one export and import partner, with Vietnam emerging as the third largest export partner and sixth import partner.<sup>2</sup>

Changes in the trade structure centered on China and Vietnam prompted a reorganization of Korea's industrial structure, resulting in significant changes in labor demand by industry and occupation. On average, according to Koo and Kim (2020)<sup>3</sup>, industries that are heavily exposed to import competition from China and Vietnam (e.g., textiles, apparel, footwear, computers and imaging equipment,

etc.) saw a relative decrease in employment, whereas industries with a significant increase in exports to China and Vietnam (e.g. machinery and equipment, precision machinery, semiconductors, ferroalloys, etc.) went through a relative increase in employment. In the same vein, occupations with high exposure to import competition from China and Vietnam (e.g., textile/apparel-related jobs, materials and construction-related jobs, etc.) experienced a relative decrease in employment, while occupations with high exposure to increased exports to China and Vietnam (e.g., chemical and electrical and electronic engineers, natural science/life science-related professions, etc.) had a relatively high growth in employment. In particular, the import/export effects by occupation were estimated to be greater than that by industry.

<sup>1</sup> This is a summary article based on the fourth chapter of Koo and Kim (2020).

<sup>2</sup> <http://stat.kita.net> (accessed on Apr. 1, 2022)

<sup>3</sup> See the third chapter of Koo and Kim (2020).

Unless the labor market is completely efficient, this shift in employment structure would result in adjustment costs. Workers in high-demand industries and occupations, for example, are more likely to enjoy higher wages and job security, whereas workers in low-demand industries and occupations are more likely to face unemployment, turnover, and lower wages.<sup>4</sup>

Using the Korean Labor and Income Panel Study, this study empirically examined how changes in the domestic employment structure caused by changes in Korea's trade structure with China and Vietnam affected domestic worker income and employment stability over a long period of time (10 years). Based on the findings, we discussed policy implications for addressing the problem of polarization caused by Korea's trade and allowing different classes to benefit more evenly from trade.

This study differs from previous studies primarily in the following ways. First, using labor panel data, we analyzed not only the effect of exposure to import competition from underdeveloped countries but also the effect of increased exposure to exports to underdeveloped countries. Second, the effects on exposure by industry as well as by occupation were estimated together. Third, instrumental variables were used to alleviate the endogeneity problem and fixed effects on individual workers were controlled.

<sup>4</sup> For example, see Baumgarten, Girshecker, and Görg(2013); Ebenstein et al.(2014)

## II. Empirical Methodology and Data

### 1. Industrial Effects

The following econometric model was used to examine how Korea's increased export to/import competition from China and Vietnam affected Korean manufacturing workers' earnings and employment over the long term (10 years).<sup>5</sup>

$$\begin{aligned}
 Y_{ij[t,t+9]} = & \beta_0 + \beta_1 \Delta IMP_{j,[t,t+9]}^{CV} \\
 & + \beta_2 \Delta EXS_{j,[t,t+9]}^{CV} + P_{it} \gamma \\
 & + X_j \theta + \alpha_i + \eta_{[t,t+9]} + \epsilon_{ij[t,t+9]}
 \end{aligned} \tag{1}$$

In equation (1),  $Y_{ij[t,t+9]}$  denotes the dependent variable indicating the change in monthly earnings or cumulative number of involuntary job losses over the ten years from year  $t$  to year  $t+9$  of worker  $i$  who belongs to industry  $j$  in year  $t$ . One of the key explanatory variables,  $\Delta IMP_{j,[t,t+9]}^{CV}$  means the level of industry  $j$ 's exposure to increased import competition from China and Vietnam from year  $t$  through year  $t+9$ . It is calculated as the difference in imports from China and Vietnam between  $t+9$  and  $t$  divided by the domestic absorption at  $t$  in industry  $j$ . The other key explanatory variable,  $\Delta EXS_{j,[t,t+9]}^{CV}$ , refers to the level of industry  $j$ 's exposure to increased exports to China and Vietnam from year  $t$  through year  $t+9$ . It is

<sup>5</sup> The equation (1) is an extended version of the main econometric model of Autor et al. (2014).

calculated as the difference in exports to China and Vietnam between  $t+9$  and  $t$  divided by the total production at  $t$  in industry  $j$ .<sup>6</sup> We should note that the difference in Korea's trade with China and Vietnam can depend on various domestic factors related to workers' labor market outcomes as well as exogenous trade shocks. To alleviate this endogenous problem, we use instrument variables for  $\Delta IMP_{j,[t,t+9]}^{CV}$  and  $\Delta EXS_{j,[t,t+9]}^{CV}$ , respectively, in which Korea's trade with China and Vietnam is replaced with other comparable countries' trade with China and Vietnam over the same period, then estimate equation (1) by using 2SLS. By doing so, we attempt to capture the exogenous variation in  $\Delta IMP_{j,[t,t+9]}^{CV}$  and  $\Delta EXS_{j,[t,t+9]}^{CV}$  caused by China's and Vietnam's economic growth.<sup>7</sup>

The vector  $P_{it}$  means worker  $i$ 's characteristics in year  $t$  which include age, age squared, and job tenure, while the vector  $X_j$  indicates industry  $j$ 's characteristics in the base year 2003 such as average capital/wage per worker, cumulative outbound foreign direct investment to China and Vietnam and so on. The variable  $\alpha_i$  denotes the worker  $i$ 's time invariant traits. Lastly, the vector  $\eta_{[t,t+9]}$  are year dummies controlling for global time effects. The weight for each respondent is considered in the regression and the error terms are clustered at the respondent level to calculate robust standard errors.

<sup>6</sup> We follow Koo and Whang (2018) for the variable construction.

<sup>7</sup> These instrument variables are constructed in the same spirit as Autor et al. (2013) in their description.

## 2. Occupational Effects

Within the same occupation, workers have similar skill levels and are more likely to perform similar jobs, whereas within an industry there is a mix of workers with very heterogeneous characteristics. As a result, the effects of trade shocks may be more pronounced in occupational analysis (Ebenstein et al. 2014, Traiberman 2019). Based on the equation (2) below, we investigate how the difference in occupational exposures to Korea's increased imports from/exports to China and Vietnam affected Korean manufacturing workers' earnings and job stability over a 10-year period from 2003 to 2018.

$$\begin{aligned}
 Y_{ijk[t,t+9]} = & \beta_0 + \beta_1 \Delta IMP_{k,[t,t+9]}^{CV} \\
 & + \beta_2 \Delta EXS_{k,[t,t+9]}^{CV} + P_{it} \gamma \\
 & + X_j \theta + \alpha_i + \eta_{[t,t+9]} + \epsilon_{ij[t,t+9]}
 \end{aligned} \tag{2}$$

The equation (2) is basically the same as the equation (1) except that the measures for Korean industry  $j$ 's exposures to trade shocks from China and Vietnam,  $\Delta IMP_{j,[t,t+9]}^{CV}$  and  $\Delta EXS_{j,[t,t+9]}^{CV}$ , are translated into Korean occupation  $k$ 's exposures to trade shocks from China and Vietnam,  $\Delta IMP_{k,[t,t+9]}^{CV}$  and  $\Delta EXS_{k,[t,t+9]}^{CV}$ , respectively. Specifically, according to Ebenstein et al. (2014),  $\Delta IMP_{k,[t,t+9]}^{CV}$  ( $\Delta EXS_{k,[t,t+9]}^{CV}$ ) is calculated as

We choose Japan, Taiwan, Singapore, Malaysia, Thailand, and India as comparable countries for Korea in terms of the economic size in the Asian region.

the weighted average of  $\Delta IMP_{j,[t,t+9]}^{CV}$  ( $\Delta EXS_{j,[t,t+9]}^{CV}$ ) based on the whole industry distribution in occupation  $k$ . In order to address endogeneity issues, as in the analysis for industrial effects, we instrument  $\Delta IMP_{k,[t,t+9]}^{CV}$  and  $\Delta EXS_{k,[t,t+9]}^{CV}$  by using Korea's comparable countries' trade data with China and Vietnam and apply the 2SLS to the estimation of equation (2).

The definitions of the other variables in equation (2) are the same as those in equation (1). The regression is also weighted considering each respondent's sample weight, and clustered at the respondent level to generate robust standard errors.

### 3. Data and Sample Selection

We construct a worker-level long panel data using the Korean Labor and Income Panel Study during the period 2003-2018. To track long-term changes in a worker's labor market outcomes over a 10-year period, we only include workers in the sample who were observed to be between the ages of 18 and 54 and working in the manufacturing sector between 2003 and 2009, and then observed again 9 years later. In addition, a worker's 10-year changes in labor market outcomes have to be observed at least twice during the period 2003-2018 to be included in the sample, because we control for individual fixed effects as seen in equation (1) and (2).

The (instrument) variables for Korea's industrial/occupational exposures to increased imports from/exports to China and Vietnam are

constructed by using UN Comtrade data, the Mining and Manufacturing Survey data provided by Statistics Korea, annual data on new registrations for employment insurance by industry and occupation provided by Korea Employment Information Service and so on.

## III. Main Results

Table 1 displays the regression results for the impact of trade exposures to China and Vietnam by industry on workers' labor market outcomes over a 10-year period. According to the results of column (1), as a worker's industry's exposure to import competition from China and Vietnam increased by 10% p over the next ten years, the worker's average monthly earnings growth decreased by 5.1 percent. In contrast, while the industry's export exposure has increased by 10%p over the last ten years, the growth in the industry workers' average monthly earnings has increased by 5.3 percent over the same period. Particularly for workers in industries heavily exposed to import competition from China and Vietnam, the employment environment was relatively unstable; the number of times workers experienced involuntary job loss increased by 0.08 on average (refer to column (2) of Table 1).

To see if the results in Table 1 columns (1) and (2) were primarily due to industry-specific characteristics rather than the degree of trade exposure to China and Vietnam by industry, I add a number of industry-related control variables in columns (3) and (4) and

check the robustness of the previous findings. For example, variables indicating the degree of exposure to foreign direct investment in China and Vietnam by industry are added to control for the effect of offshoring in China and Vietnam on workers' income and employment. Furthermore, the variables average capital/wage per worker at the industry level in the base year (2003) are added to control for capital dependence and

average (labor) productivity of each industry prior to exposure to the China-Vietnam trade shock. The results in columns (3) to (4) show that the results in columns (1) to (2) were qualitatively preserved even when the additional industry-specific control variables were included in the regression. Furthermore, the absolute value of the coefficient estimates for key variables increased, as did the statistical significance of the estimates.<sup>8</sup>

**Table 1. The Long-term (10 years) Effects of Industrial Exposure to Imports from/Exports to China and Vietnam on Workers' Labor Market Outcomes**

	Period: 2003–18			
	Log difference in Monthly earnings for 10 years	Number of involuntary job losses for 10 years	Log difference in Monthly earnings for 10 years	Number of involuntary job losses for 10 years
	(1) (2SLS)	(2) (2SLS)	(3) (2SLS)	(4) (2SLS)
Industrial exposure to import competition from China and Vietnam for 10 years	-0.514*** (0.189)	0.008*** (0.003)	-0.585*** (0.186)	0.010*** (0.003)
Industrial exposure to export expansion to China and Vietnam for 10 years	0.525** (0.205)	-0.001 (0.002)	0.559*** (0.215)	-0.003 (0.002)
Job tenure (Until the first observation)	-0.027 (0.038)	0.004*** (0.001)	-0.025 (0.039)	0.004*** (0.001)
Age	0.038 (0.276)	-0.005* (0.003)	0.107 (0.278)	-0.008** (0.003)
Age <sup>2</sup>	0.001 (0.002)	-0.000** (0.000)	0.001 (0.002)	-0.000** (0.000)
Industrial exposure to FDI to China and Vietnam for 10 years			-4.474 (4.010)	0.121** (0.052)
Capital per worker (industry level in 2003)			-0.002 (0.002)	0.000*** (0.000)
Annual wage per worker (industry level in 2003)			0.022 (0.033)	-0.001* (0.000)
Individual fixed effect	Included	Included	Included	Included
Year fixed effect	Included	Included	Included	Included
Observation	3,579	3,579	3,579	3,579
# of respondents	833	833	833	833

Note: The figures in parenthesis are robust standard errors. (\*\*\*)  $p < 0.01$ , (\*\*)  $p < 0.05$ , (\*)  $p < 0.1$

<sup>8</sup> In their additional analyses, Koo and Kim (2020) find that the disparity in industry exposure to trade shocks

from China and Vietnam tended to widen the gap in income growth rates for younger workers while tended to widen the gap in job stability for older workers.

According to the results in column (1) of Table 2, when the exposure of a worker's occupation to import competition from China and Vietnam increased by 10% over the next ten years, the worker's average monthly earnings growth decreased by 34% during the same period. On the other hand, if a worker's occupation's exposure to an increase in exports to China and Vietnam increased by 10% over the next

ten years, the worker's average monthly earnings increased by 27% during the same period. In turn, the effect of occupational exposure to trade shocks with China and Vietnam on the number of involuntary job losses was estimated not to be statistically significant. Even when other characteristics of workers' industries were controlled for, these results remained robust (see Table 3, columns (3) to (4)).

**Table 2. The Long-term (10 years) Effects of Occupational Exposure to Imports from /Exports to China and Vietnam on Workers' Labor Market Outcomes**

	Period: 2003–18			
	Log difference in Monthly earnings for 10 years	Number of involuntary job losses for 10 years	Log difference in Monthly earnings for 10 years	Number of involuntary job losses for 10 years
	(1) (2SLS)	(2) (2SLS)	(3) (2SLS)	(4) (2SLS)
Occupational exposure to import competition from China and Vietnam for 10 years	-3.439* (1.969)	-0.018 (0.017)	-3.251* (1.911)	-0.015 (0.014)
Occupational exposure to export expansion to China and Vietnam for 10 years	2.665** (1.197)	0.004 (0.009)	2.581** (1.179)	0.002 (0.008)
Job tenure (Until the first observation)	0.013 (0.110)	0.003* (0.002)	0.051 (0.109)	0.003** (0.002)
Age	1.184 (0.778)	0.008 (0.007)	1.109 (0.770)	0.006 (0.006)
Age <sup>2</sup>	-0.008 (0.005)	-0.000 (0.000)	-0.007 (0.005)	-0.000 (0.000)
Industrial exposure to FDI to China and Vietnam for 10 years			-5.571 (7.677)	0.153 (0.100)
Capital per worker (industry level in 2003)			0.001 (0.002)	0.000** (0.000)
Annual wage per worker (industry level in 2003)			0.018 (0.044)	-0.001 (0.001)
Individual fixed effect	Included	Included	Included	Included
Year fixed effect	Included	Included	Included	Included
Observation	1,452	1,452	1,452	1,452
# of respondents	537	537	537	537

Note: The figures in parenthesis are robust standard errors. (\*\*\*)  $p < 0.01$ , (\*\*)  $p < 0.05$ , (\*)  $p < 0.1$

## IV. Conclusion

This study empirically demonstrates that changes in trade structure caused by the rise of China and Vietnam over the last 20 years have had a significant impact on the widening of the income and employment stability gap for Korean workers. An important policy goal for Korea, which is heavily reliant on trade, is to ensure that the benefits of trade and openness are distributed evenly to all classes of society while minimizing the harm. In order to achieve the policy goal, the analysis results of this paper show that it is necessary to institutionalize a systematic process for monitoring

changes in Korea's trade structure and preparing response policies from a mid- to long-term as well as a short-term perspective. Furthermore, the results indicate that policy efforts are required to identify blind spots where existing trade adjustment assistance policies, employment insurance systems, and vocational training policies do not adequately protect or support workers, and supplement and improve them. More follow-up research is needed to gain a better understanding of the mechanism by which external trade shocks are transmitted to the domestic labor market in order to develop more effective domestic supplementary measures for trade shocks. **KIEP**

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