



RIETI Discussion Paper Series 25-E-108

The Effect of Import Shocks on Internal Migration in Japan

ENDO, Masahiro

Keio University

MATSUURA, Toshiyuki

RIETI

SASAHARA, Akira

Keio University



Research Institute of Economy, Trade & Industry, IAA

The Research Institute of Economy, Trade and Industry

<https://www.rieti.go.jp/en/>

The Effect of Import Shocks on Internal Migration in Japan *

Masahiro ENDOH

Keio University

Toshiyuki MATSUURA

Keio University/Research Institute of Economy, Trade and Industry

Akira SASAHARA

Keio University

Abstract

This study analyzes the effect of import shocks from China on population movement within and across regional employment zones in Japan based on Japanese census data from the 1990s to the 2010s. This effect was estimated for eight population groups defined by combinations of age and gender: the total population, and those aged 15–29, 30–44, and 45–59 by age group, and males and females by gender. Increases in imports from China had no significant effect on population movements within commuting zones or on net outflows from zones, but they significantly reduced both inflows to and outflows from zones, suggesting that import shocks tend to suppress inter-regional migration. The effect was observed across all age groups and for both men and women. Estimates indicate that regional differences in import shocks lowered both inflow and outflow rates. The magnitude was generally moderate compared with the actual ratios, but inflow migration of young women was relatively strongly suppressed.

Keywords: import shocks, internal migration, commuting zones

JEL classification: F16, F66, J61

The RIETI Discussion Paper Series aims at widely disseminating research results in the form of professional papers, with the goal of stimulating lively discussion. The views expressed in the papers are solely those of the author(s), and neither represent those of the organization(s) to which the author(s) belong(s) nor the Research Institute of Economy, Trade and Industry.

* This study was conducted as part of the project “Globalization and Regional Economies” undertaken at the Research Institute of Economy, Trade and Industry (RIETI). A draft of this paper was presented at the RIETI DP Seminar, and the authors would like to thank the participants for their helpful comments. We are especially grateful for the valuable comments and suggestions by Sachiko KAZEKAMI (Keio University), Hisamitsu SAITO (Hokkaido University), Yasuyuki TODO (Waseda University), and Eiichi TOMIURA (RIETI/Otsu Women’s University). This study utilizes microdata from the questionnaire information of *The Population Census*, conducted by the Ministry of Internal Affairs and Communications (MIC), and *The Economic Census for Business Activity*, conducted by MIC and the Ministry of Economy, Trade and Industry.

1. Introduction

Changing one's place of residence is a life-altering event, forcing one to adapt to and navigate new surroundings, cope with unexpected events, and expend time and money. Still, many people change their addresses regularly. In Japan, one in five people relocates within a five-year period. Their motivations are numerous, but one powerful exogenous economic factor is trade shocks. The effect of trade shocks on employment, wages, and other economic and social conditions has been widely and rigorously studied, and its effect on relocation, or internal migration, is also worth examining.

Numerous studies have investigated the effect of trade shocks on inter-regional migration. First, positive export shocks attract immigrants to affected regions. Hering and Paillacar (2016) used access to foreign markets as a proxy for positive export shocks and observed an increase in immigration to Brazilian regions. Facchini et al.'s (2019) analysis of Chinese regional migration data found that regions experiencing a reduction in trade policy uncertainty with respect to the United States attracted workers from other regions. These inflows presumably result from strong responses to tightening labor demand by both employers and employees: employers expand their search for labor beyond their own region, while employees actively respond to better labor contracts that more than offset the costs of moving.¹ Governments may also respond to export shocks by endogenously adjusting their domestic policies to become more hospitable to immigration. Tian (2024) observed this pattern in Chinese prefecture-level migration policies between 2001 and 2007.

Evidence on how regional import shocks affect emigration to other regions or immigration into the region is more complex. Import shocks may neither promote nor deter inter-regional migration. For example, Topalova (2010) and Erten et al. (2019) demonstrated

¹ Although Twinam (2022) did not directly observe inter-regional migration, the study utilized the quartz crisis of the 1970s, which devastated the Swiss watch industry, to examine the effect of negative export shocks and found that they led to a rapid population decline in the affected areas. This result is symmetric to that observed in the case of positive export shocks.

that the degree of regional import tariff reduction did not affect migration inflows into regions in India and South Africa, respectively. Similarly, Dix-Carneiro and Kovak (2019) found that regional import tariff reductions did not promote migration outflows from regions in Brazil. These muted responses to import shocks may be because laid-off workers cannot afford to move elsewhere in search of work owing to reduced income, and therefore instead try to find new jobs nearby.

Other evidence suggests either positive or negative effect of import shocks on inter-regional migration. Analyzing individual-level U.S. data, Greenland et al. (2019), for example, found that the granting of Permanent Normal Trade Relations status to China in 2001 promoted emigration.² Conversely, Tomiura and Suzuki (2021) used Japanese individual-level data and found that unemployed residents in prefectures more affected by import shocks were less likely to have lived in a different prefecture one year earlier, suggesting that import shocks suppress inter-prefectural migration among unemployed people. Tomiura and Suzuki (2021) unfortunately do not explore this counterintuitive result for Japan. For Korea, Choi et al. (2025) showed that in-migration decreased in locations with greater import competition.

This study extends the literature on import shocks in two ways. First, it investigates the effect of import shocks on intra-regional migration. Second, it incorporates both migration inflows to and outflows from affected regions. Using Japanese data, the analysis shows that increased imports from China reduced both inflows to and outflows from affected regions with statistical significance, consistent with the previous finding for Japan but in contrast to the null or positive effects of imports reported in studies on Brazil, India, South

² Follow-up studies in the context of the United States showed that the effects of Chinese import competition on internal migration were smaller relative to the effects of the introduction of robots on internal migration (Faber et al., 2022), and foreign-born workers had greater migration responses relative to native workers (Yu, 2023; Autor et al., 2023; Autor et al., 2025). Adão et al. (2020) and Borusyak et al. (2022) emphasize the importance of accounting for general equilibrium effects when analyzing the effect of a shock on internal migration.

Africa, and the United States. Possible explanations include the higher share of value added from the manufacturing sector and the higher inter-regional reallocation costs in Japan than in those countries. From the perspective of magnitude, the extent to which inflow and outflow ratios were suppressed by import shocks is moderate compared with the actual ratios. Furthermore, increased imports from China had no significant effect on intra-regional migration or on net outflows from regions.

The remaining paper is structured as follows. Section 2 explains the data sources, variable construction, and regression methodology. Section 3 presents the estimation results and discusses their interpretation. Finally, section 4 summarizes the study.

2. Data and methodology

This study employs the concept of commuting zones to demarcate Japanese regions. The commuting zones follow the classification proposed by Adachi et al. (2021), who define them based on the 1995 zoning.³ Four types of migration serve as dependent variables. First, intra-region migration refers to people who have changed their address within a zone. Second, net outflow is defined as the difference between emigrants from the zone and immigrants into the zone. The third and fourth types are the components of net outflow: outflow and inflow. Migration is observed over four five-year periods: 1995–2000, 2005–2010, 2010–2015, and 2015–2020. The data are drawn from the microdata of questionnaire responses in *The Population Census*, which is conducted every five years by the Statistics Bureau of the Ministry of Internal Affairs and Communications (MIC).

There are eight population groups, defined by combinations of age and gender: the total population, populations aged 15–29, 30–44, and 45–59 by age group; and males and

³ Our “regional employment zones” are equivalent to “commuting zones” in Adachi et al.’s (2020) paper. As a result, “inter-regional migration” refers to migration across commuting zones, and “intra-regional immigration” refers to migration within each commuting zone.

females by gender. For each age–gender group, four migration indices are constructed:

$Y_{m,g,r,t+5}$, where m denotes the types of migration, g the age–gender group, r the commuting zone, and $t+5$ indicates that the migration occurred between years t and $t+5$. Each index is calculated as the number of individuals in a given migration category divided by the group’s population at the year t . For example, the inflow index for females aged 15–29 in the period 2015–2020 in a given commuting zone is defined as the number of females aged 15–29 residing outside the region in 2015 who migrated into the region during 2015–2020, divided by the number of females aged 15–29 in the zone in 2015.

The change in import shocks from China for region r between years t and $t+5$, $\Delta IP_{r,t+5}$, is calculated as a Bartik instrument using the following equation:

$$\Delta IP_{r,t+5} = \sum_i \left(\frac{L_{i,r,t-4}}{L_{r,t-4}} \frac{IM_{i,t+5} - IM_{i,t}}{L_{i,t-4}} \right), \quad (1)$$

where $IM_{i,t}$ denotes imports of products classified in industry i from China in year t . Thus, $IM_{i,t+5} - IM_{i,t}$ represents the five-year change in imports. This is divided by $L_{i,t-4}$, the total number of workers in industry i in Japan in year $t-4$, to obtain per-worker import changes. The four-year lagged number of workers is used to mitigate the endogeneity between imports and employment. These per-worker import changes for each industry are summed over industries in each commuting zone r , weighted by $L_{i,r,t-4}/L_{r,t-4}$, where $L_{i,r,t-4}$ is the lagged number of workers in industry i in zone r , and $L_{r,t-4}$ is the lagged total number of workers in zone r , including workers in industries without any imports.⁴ The data on the number of workers are obtained from *The Establishment Census of Japan*, *The Establishment and Enterprise Census of Japan*, and *The Economic Census for Business Activity*. Japanese

⁴ The dataset covers 306 commuting zones and 63 industries. Although Adachi et al. (2021) define 315 commuting zones based on 1995 zoning, nine regions are excluded because they either had no workers in industries competing with imports or their manufacturing activity was nearly halted owing to major disasters or accidents.

import data are obtained from *UN Comtrade*.⁵

The instrumental variable for $\Delta IP_{r,t+5}$ is constructed by replacing $IM_{i,t+5} - IM_{i,t}$ in equation (1) with $EX_{i,t+5}^{China} - EX_{i,t}^{China}$, where $EX_{i,t}^{China}$ is the total Chinese exports of products classified in industry i in year t to eight high-income countries, following Autor et al. (2013): Australia, Denmark, Finland, Germany, New Zealand, Spain, Switzerland, and the United States. Chinese export data are also obtained from *UN Comtrade*.

The migration index, $Y_{m,g,r,t+5}$, is regressed on several independent variables as follows:

$$Y_{m,g,r,t+5} = \alpha + \beta_1 \Delta IP_{r,t+5} + \beta_2 \ln Pop_{r,t} + \beta_3 sWorker_{r,t} + \mathbf{X}'\boldsymbol{\beta} + \varepsilon_{r,t}, \quad (2)$$

where $\ln Pop_{r,t}$ and $sWorker_{r,t}$ are the logarithm of the total population and the share of workers in the total population in commuting zone r in year t , respectively; $\mathbf{X}$ is the column vector including period dummies and block dummies (Hokkaido, Tohoku, Kanto, Chubu, Kinki, Chugoku–Shikoku, and Kyushu–Okinawa); and $\varepsilon_{r,t}$ is the error term. The instrumental variable method is applied to the regression in equation (2), where $\Delta IP_{r,t+5}$ is regressed on the instrumental variable in the first stage.⁶

Table 1 reports summary statistics for the total male and female populations, highlighting the characteristics of the variables used in this study. The variables are weighted by the total male or female population in each region; hence, the means correspond to national averages. The distributions of the variables are approximately symmetric, and their standard deviations are of moderate magnitude, indicating no severe skewness or dispersion. The table further shows that, over a five-year interval, approximately 13% of the male and

⁵ As an alternative method for constructing an import shock index, Haneda and Kwon (2023) calculated the value of Chinese imports flowing into each Japanese prefecture. Although their method allows researchers to capture the value of imported goods consumed in each prefecture, the regional definitions used in this study do not align with prefectural boundaries. Therefore, their method is not employed in this study.

⁶ The data for $\Delta IP_{r,t+5}$ and its instrumental variable, $\ln Pop_{r,t}$, and $sWorker_{r,t}$, used in this study are also employed by Mori et al. (2025).

female populations changed residence within the same region, while 8% of men and 6% of women migrated across regions.⁷

The weighted mean intra-regional and outflow migration ratios for each age and gender group are shown in Figure 1. Both genders exhibit the tendency that the ratio of intra-regional migration is higher than that of outflow migration, and that the ratio is higher among younger groups.

3. Estimation results and implications

Table 2 summarizes the results of estimating the effect of $\Delta IP_{r,t+5}$ on four types of internal migration in the male and female groups. The Kleibergen–Paap F statistic is 10.97 for men and 11.26 for women, which is larger than the rule-of-thumb threshold of 10, indicating that possible weak identification does not bias the results. Columns (1-1) and (1-2) show the results for intra-regional migration for men and women, respectively. No statistically significant effect of $\Delta IP_{r,t+5}$ is observed in either of two cases, indicating that import shocks have not had a significant effect on reallocation within the same commuting zones. The same outcome is also observed for net outflow in columns (2-1) and (2-2).

However, when net outflow is decomposed into outflow and inflow, $\Delta IP_{r,t+5}$ reduces both migration flows with statistical significance. That is, the import shocks suppressed both inter-regional immigration and emigration, resulting in the negligible effect on net outflow. Columns (3-1) and (3-2) are the results on outflow, while columns (4-1) and (4-2) are those on inflow; all indicate a negative and statistically significant effect of $\Delta IP_{r,t+5}$. For total male population, since the mean value of $\Delta IP_{r,t+5}$ is 0.034 in Table 1, it

⁷ Among those who lived in Japan at the time of the previous *Population Census*, some are missing from the current *Census* data regarding the commuting zones from which they moved, either because they did not respond to the relevant entries or because they moved abroad. Consequently, in our dataset, the weighted mean share of inflow is slightly larger than that of outflow, which should be demographically equal.

decreases both outflow and inflow by 0.008 ($= 0.034 \times -0.236$ for outflow and $= 0.034 \times -0.225$ for inflow). These correspond to approximately one-tenth of the mean share of male outflow and inflow migrants (0.075 in Table 1). Similarly, since the mean value of $\Delta IP_{r,t+5}$ is 0.034 in Table 1 for total female population, it decreases outflow by 0.007 ($= 0.034 \times -0.219$) and inflow by 0.009 ($= 0.034 \times -0.261$). These correspond to approximately one-ninth of the mean share of female outflow (0.062) and one-seventh of that of female inflow (0.063), respectively.

The stark contrast between the insignificant effect of import shocks on intra-regional migration and their significant depressing effects on outflows and inflows may be explained by differences in reallocation costs. The cost of intra-regional moves is relatively low and, therefore, affordable even for people whose wages are negatively affected by import shocks, whereas the high cost of inter-regional moves is not affordable for them.

In previous studies, Topalova (2010) on India, Dix-Carneiro and Kovak (2019) on Brazil, and Erten et al. (2019) on South Africa found no significant effects of increased imports on migration outflows or inflows, whereas Greenland et al. (2019) on the United States found a positive effect on emigration. One possible explanation for the distinct and statistically significant negative effects of import shocks in Japan is that the manufacturing sector accounts for a larger share of the Japanese economy than in those countries. For example, the ratio of manufacturing value added to total gross domestic product in 2015 was 20.5% in Japan, compared with 15.6% in India, 12.5% in South Africa, 11.3% in the United States, and 10.5% in Brazil, according to the *World Development Indicators* of the World Bank. Note also that inter-regional moves in Japan are so costly, both financially and psychologically, that individuals whose incomes decline as a result of import shocks cannot afford the cost of relocation, even if potential new jobs exist outside their current commuting

zone and moving could increase their expected income.⁸

The estimated coefficient of $\Delta IP_{r,t+5}$ and its 95% confidence interval for each age–gender group are shown in Figure 2. Import shocks are not statistically significant for intra-regional and net outflow migrations in any age–gender group but significant for outflow and inflow migrations across all groups, even after decomposing total the male and female populations. Regarding outflows and inflows, the point estimates are negatively larger for younger groups, but they are roughly proportional to the observed outflow and inflow ratios of the corresponding groups (see Figure 1 for outflow migration ratios).

One exception is the point estimate for inflows among women aged 15–29, which is relatively large in magnitude (−0.688) compared with the observed inflow. This suggests that they are more reluctant to move into commuting zones heavily affected by import shocks. This finding may be explained by two factors. First, younger people have less hysteresis in job experience and, therefore, can more readily avoid moving into regions strongly affected by import shocks. Second, industries with a comparative disadvantage have been more affected by import competition, and these industries—such as textiles and food processing—tend to be more female-labor intensive.

Figure 3 shows the actual outflow and inflow migration ratios of six age–gender groups, along with their hypothetical migration ratios in the absence of import shocks from China.⁹ The estimated increases in outflow and inflow ratios without import shocks range from 0.004 (outflow and inflow, women aged 45–59) to 0.024 (inflow, women aged 15–29). On average, these estimated increases are modest compared with the actual ratios. Note that

⁸ The high cost of inter-regional moves in Japan may explain why Tomiura and Suzuki (2021) found a negative effect of import shocks on annual inter-prefectural migration only among unemployed individuals, whose incomes are lower than those of the employed.

⁹ Hypothetical migration ratios are calculated by subtracting the product of the change in import shocks and its point estimate from the actual migration ratios. For example, the hypothetical inflow migration ratio without import shocks for women aged 15–29 (0.198) is obtained by taking their actual inflow ratio (0.173) and subtracting the product of the two aforementioned terms ($0.036 \times -0.688 = -0.025$).

the estimation method is a back-of-the-envelope calculation, and the constraint that the weighted means of hypothetical outflow and inflow ratios across commuting zones should, by definition, be equal is not taken into account.

4. Concluding remarks

This study analyzes the effect of increases in imports from China on population movement within and across commuting zones in Japan using Japanese census data from the 1990s to the 2010s. First, import shocks had no significant effect on population movements within commuting zones or on net outflows from zones for any of the eight gender–age groups. Second, they significantly reduced both inflows to and outflows from zones for all gender–age groups, suggesting that import shocks suppress inter-regional migration. Third, the magnitude of the effect on inter-regional migration ratios due to import shocks was generally moderate compared with the actual ratios, although inflow migration of young females was relatively strongly suppressed.

The statistically significant suppression of two-way inter-regional migration by import shocks across all gender–age groups in Japan, in contrast to the cases observed in other countries, extends the findings of Tomiura and Suzuki (2021) and echoes the findings of Choi et al. (2025) in the Korean context. Possible explanations include Japan’s higher share of value added from the manufacturing sector and the higher costs of inter-regional relocation. If this reasoning accurately reflects the experience of Japanese residents, and the suppressing effect of import shocks on interregional migration undermines the efficiency of labor reallocation, recommended policies would include supporting the development of a more user-friendly information platform covering various aspects of job change, such as job openings and relocation guidance, and providing relocation subsidies. These measures would help affected individuals find higher-paying jobs outside their current regions.

References

- Adachi, D., T. Fukai, D. Kawaguchi, and Y. U. Saito (2021) “Commuting zones in Japan,” *RIETI Discussion Paper Series*, 20-E-021, Research Institute of Economy, Trade and Industry.
- Adão, R., C. Arkolakis, and F. Esposito (2020) “General equilibrium effects in space: Theory and measurement.” *NBER Working Paper*, No. 25544, National Bureau of Economic Research.
- Autor, D. H., D. Dorn, and G. H. Hanson (2013), “The China syndrome: Local labor market effects of import competition in the United States,” *American Economic Review*, 103: 2121–2168.
- Autor, D. H., D. Dorn, and G. H. Hanson (2023) “Trading places: mobility responses of native and foreign-born adults to the China trade shock,” *NBER Working Paper*, No. 30904, National Bureau of Economic Research.
- Autor, D. H., D. Dorn, G. H. Hanson, M. R. Jones, and B. Setzler (2025) “Places versus people: The ins and outs of labor market adjustment to globalization.” *RFBerlin Discussion Paper*, No. 37/25, Rockwool Foundation Berlin.
- Borusyak, K., R. Dix-Carneiro, and B. Kovak (2022) “Understanding migration responses to local shocks,” Available at SSRN: <http://dx.doi.org/10.2139/ssrn.4086847>.
- Choi, J., H. Kim, and S. Lee (2025) “The China shock and internal migration: Evidence from bilateral migration flows,” Unpublished manuscript, Yonsei University.
- Dix-Carneiro, R. and B. K. Kovak (2019) “Margins of labor market adjustment to trade,” *Journal of International Economics*, 117: 125–142.
- Erten, B., J. Leight and F. Tregenna (2019) “Trade liberalization and local labor market adjustment in South Africa,” *Journal of International Economics*, 118: 448–467.

- Facchini, G., M. Y. Liu, A. M. Mayda and M. Zhou (2019) “China's “Great Migration”: The impact of the reduction in trade policy uncertainty,” *Journal of International Economics*, 120: 126–144.
- Faber, M., A. P. Sarto, and M. Tabellini (2022) “Local shocks and internal migration: The disparate effects of robots and Chinese imports in the US,” *NBER Working Paper*, No. 30048, National Bureau of Economic Research.
- Greenland, A., J. Lopresti, and P. McHenry (2019) “Import competition and internal migration,” *Review of Economics and Statistics*, 101: 44–59.
- Haneda, S. and H. U. Kwon (2023) “Econometric analysis on the impact of China shock on employment in Japan” (English translation of the Japanese title), *RIETI Discussion Paper Series*, 23-J-021, Research Institute of Economy, Trade and Industry (in Japanese).
- Hering, L. and R. Paillacar (2016) “Does access to foreign markets shape internal migration? Evidence from Brazil,” *World Bank Economic Review*, 30: 78–103.
- Mori, H., K. Muroga, and A. Sasahara (2025) “Gender-specific exposure to trade, labor market adjustments, and the family,” *RIETI Discussion Paper Series*, 25-E-031, Research Institute of Economy, Trade and Industry.
- Tian, Y. (2024) “International trade liberalization and domestic institutional reform: Effects of WTO accession on Chinese internal migration policy,” *Review of Economics and Statistics*, 106: 794–813.
- Tomiura, E. and Y. Suzuki (2021) “The impact of imports from China on labor mobility in Japan: An empirical analysis using microdata from the Employment Structure Basic Survey” (English translation of the Japanese title), *CCES Discussion Paper Series*, 71, Center for Research on Contemporary Economic Systems, Graduate School of Economics, Hitotsubashi University (in Japanese).

- Topalova, P. (2010) “Factor immobility and regional impacts of trade liberalization: Evidence on poverty from India,” *American Economic Journal: Applied Economics*, 2: 1–41.
- Twinam, T. (2022) “Trade competition and migration: Evidence from the quartz crisis,” *Journal of International Economics*, 138: 103653.
- Yu, Chan (2023) “The role of immigrants in the United States labor market and Chinese import competition,” *Journal of International Economics*, 144: 103792.

Table 1. Summary Statistics of total male or female population

Variable	Mean	Std. dev.	P10	P90
[For regressions of total male migration]				
Share of intra-region male migrants in total male population	0.133	0.045	0.084	0.189
Share of net outflow male migrants in total male population	-0.000	0.010	-0.011	0.011
Share of outflow male migrants in total male population	0.075	0.019	0.057	0.099
Share of inflow male migrants in total male population	0.075	0.022	0.054	0.103
Change in import penetration ($\Delta IP_{r,t+5}$, million JPY)	0.034	0.063	-0.042	0.114
Change in export from China to major countries, IV for $\Delta IP_{r,t+5}$ (million USD)	0.718	0.792	0.110	1.905
Log. of total population ($\ln Pop_{r,t}$)	14.148	1.519	12.308	16.717
Share of workers in total population ($sWorker_{r,t}$)	0.489	0.031	0.452	0.532
[For regressions of total female migration]				
Share of intra-region female migrants in total female population	0.134	0.041	0.086	0.188
Share of net outflow female migrants in total female population	-0.000	0.012	-0.013	0.012
Share of outflow female migrants in total female population	0.062	0.016	0.047	0.080
Share of inflow female migrants in total female population	0.063	0.020	0.041	0.087
Change in import penetration ($\Delta IP_{r,t+5}$, million JPY)	0.034	0.063	-0.042	0.114
Change in export from China to major countries, IV for $\Delta IP_{r,t+5}$ (million USD)	0.716	0.792	0.105	1.905
Log. of total population ($\ln Pop_{r,t}$)	14.117	1.515	12.285	16.717
Share of workers in total population ($sWorker_{r,t}$)	0.489	0.031	0.451	0.532

Note: Observations are 1,224. The sample includes 306 commuting zones, each observed over four periods (1995–2000, 2005–2010, 2010–2015, and 2015–2020). Variables are weighted by the total male or female population of each commuting zone at the start of each period.

Source: Authors' calculation from *UN Comtrade*, *The Population Census* conducted by MIC, *The Establishment Census of Japan* conducted by MIC, *The Establishment and Enterprise Census of Japan* conducted by MIC, and *The Economic Census for Business Activity* conducted by MIC and the Ministry of Economy, Trade and Industry.

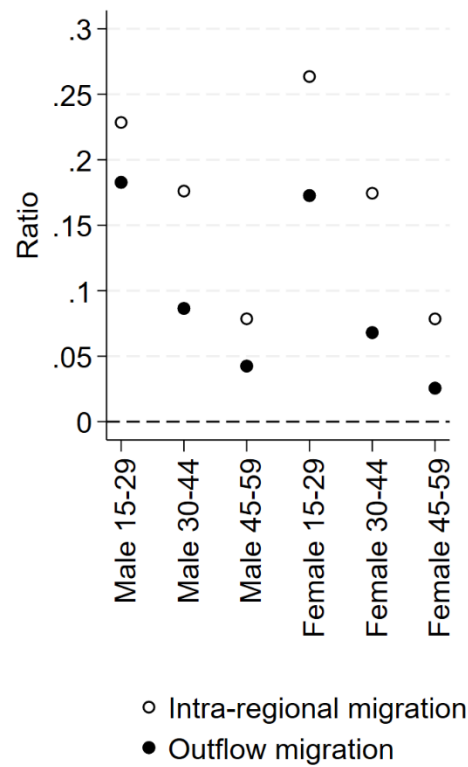
Table 2. Impact on internal migration: total male or female population

Variable	(1-1) Intra- region, male	(1-2) Intra- region, female	(2-1) Net outflow, male	(2-2) Net outflow, female	(3-1) Outflow, male	(3-2) Outflow, female	(4-1) Inflow, male	(4-2) Inflow, female
$\Delta IP_{r,t+5}$	-0.055 (0.110)	-0.096 (0.107)	-0.011 (0.041)	0.042 (0.043)	-0.236*** (0.059)	-0.219*** (0.051)	-0.225*** (0.081)	-0.261*** (0.078)
$\ln Pop_{r,t}$	0.022*** (0.001)	0.021*** (0.001)	-0.001 (0.001)	-0.003*** (0.001)	-0.002** (0.001)	-0.004*** (0.001)	-0.001 (0.002)	-0.001 (0.001)
$sWorker_{r,t}$	0.301* (0.164)	0.201 (0.132)	-0.031 (0.030)	0.041 (0.036)	-0.024 (0.061)	-0.021 (0.050)	0.007 (0.078)	-0.063 (0.070)
K-P F stat	10.97	11.26	10.97	11.26	10.97	11.26	10.97	11.26

Note: Observations are 1,224. The sample includes 306 commuting zones, each observed over four periods (1995–2000, 2005–2010, 2010–2015, and 2015–2020). Period fixed effects and block fixed effects (Hokkaido, Tohoku, Kanto, Chubu, Kinki, Chugoku–Shikoku, and Kyushu–Okinawa) are included in all columns. Regressions are weighted by the male population for columns (1-1), (2-1), (3-1), and (4-1); and by the female population for columns (1-2), (2-2), (3-2), and (4-2) of each commuting zone at the start of each period. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' calculation.

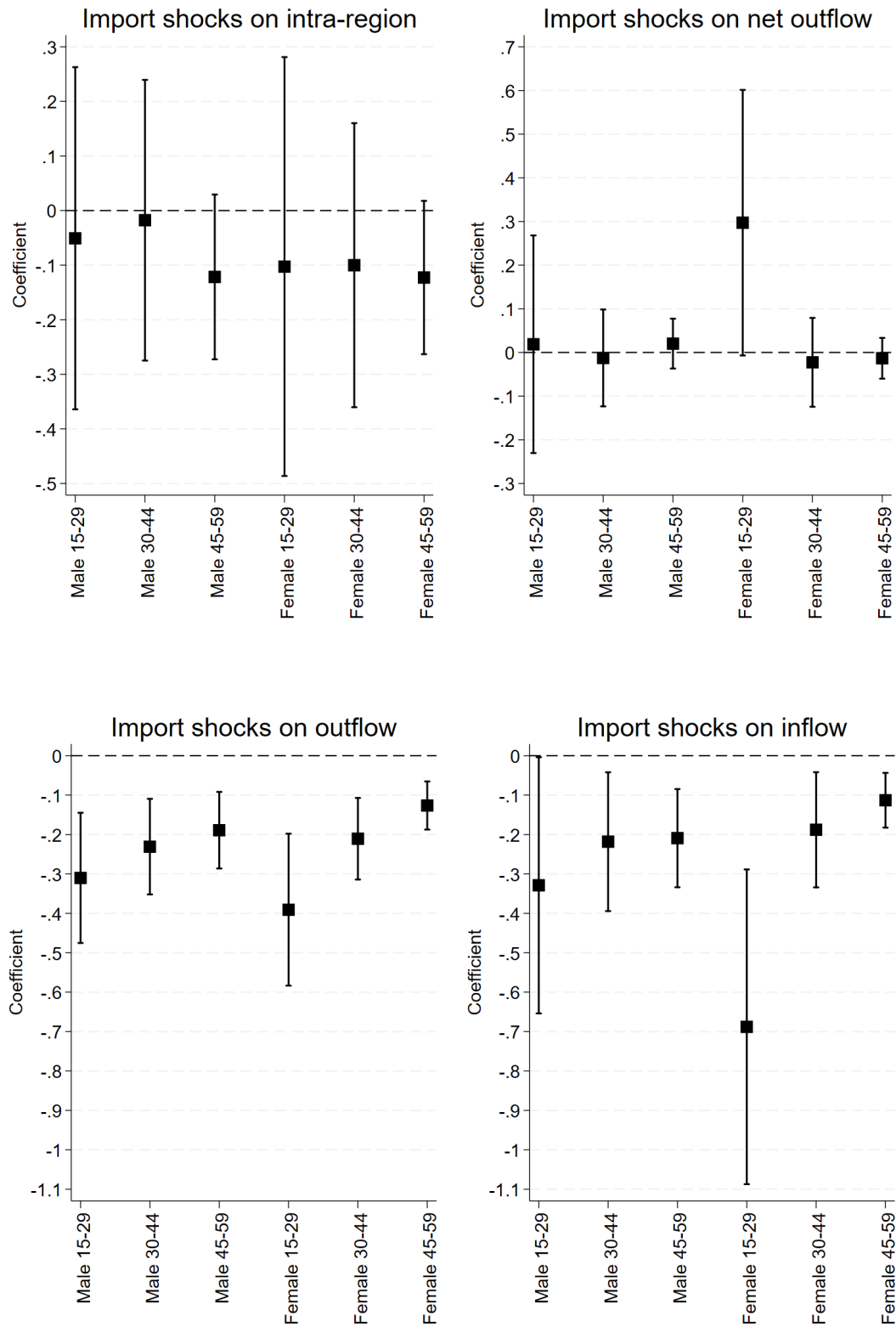
Figure 1. Intra-regional and outflow migration ratios



Note: The ratios are presented for four periods: 1995–2000, 2005–2010, 2010–2015, and 2015–2020. Each ratio is weighted by the total population of the corresponding group in each commuting zone at the start of each period.

Source: Same as Table 1.

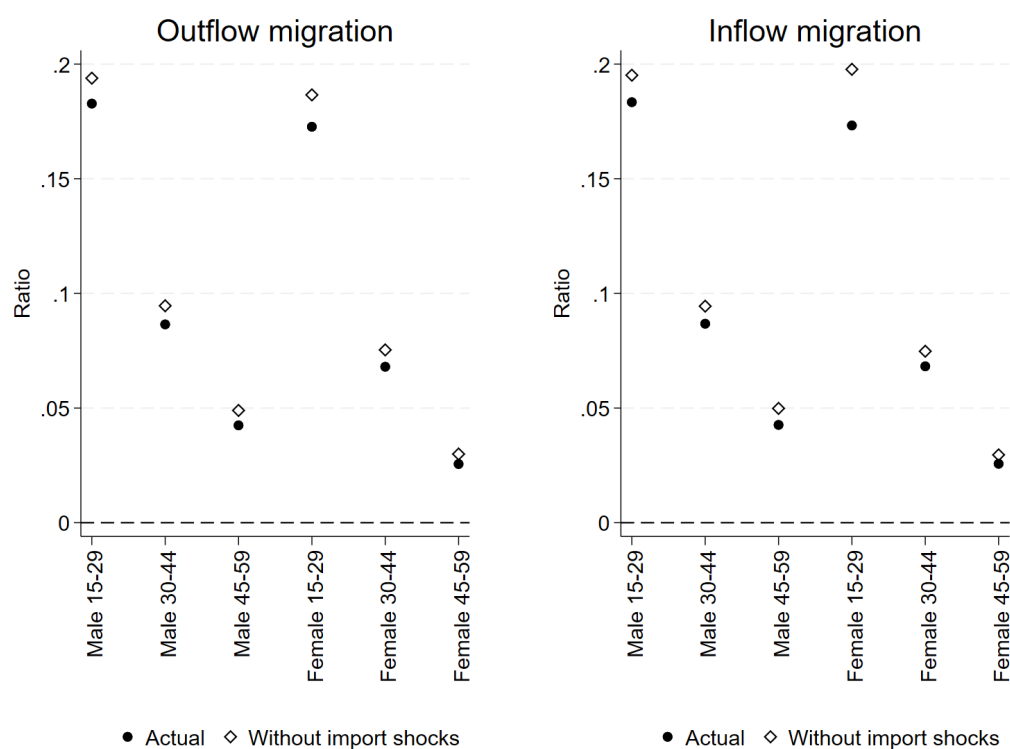
Figure 2. Import shocks on age–gender groups



Note: Four panels show the estimated coefficient of $\Delta IP_{r,t+5}$ and its 95% confidence interval for each age–gender group.

Source: Authors' calculation.

Figure 3. Actual and hypothetical migration ratios



Note: When calculating hypothetical outflow and inflow ratios in the absence of import shocks from China, the constraint that their weighted mean values across commuting zones should be equal, by definition, is not taken into account.

Source: Authors' calculation.