Labor Market Implications of Taiwan's Accession to the WTO: A Dynamic Quantitative Analysis
Online Appendix

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A Calibration: Alternative Specifications

In estimating the labor transition elasticity in the main text, we have assumed the transition costs to follow the specification in equation (33). We also consider alternative specifications where the transition costs across sectors differ conditional on the origin-skill type. In particular, the transition cost function is assumed to be:

$$\begin{aligned} \rho^{js,ki} &= 0 \text{ if } k = j, i = s; \\ &= \rho_1^{s,i} \text{ if } k = j, i \neq s; \\ &= \rho_{2,s}^{j,k} \text{ if } k \neq j, i = s; \\ &= \rho_1^{s,i} + \rho_{2,s}^{j,k} + \rho_{3,s} \text{ if } k \neq j, i \neq s. \end{aligned} \tag{A.1}$$

The alternative estimation results are reported in Table A.1. In Stage 1, based on estimations of equation (32) and the switching-cost specification in equation (A.1), we find that as in the benchmark result, the skill-upgrading cost is higher from low to middle skill than

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from middle to high skill, but the difference is not statistically significant. Figures A.1–A.3 summarize the sector-to-sector switching costs (origin-sectors on the rows and destination-sectors on the columns) conditional on the origin-skill type, where the magnitudes reported reflect the average sector-switching costs with or without skill upgrading. By conditioning on the origin-skill type, there are more missing entries when there are no observations for the corresponding sectors and skill type. Overall, the switching costs across sectors tend to be higher for low-skilled workers and lower for middle- and high-skilled workers. It is relatively less costly for high-skilled workers to switch within service, while it is relatively costly for all skill types to switch from service to manufacturing sectors (as in the benchmark).

Column (2) of Table A.1 then reports the Stage-2 estimation results. The estimate of the labor market transition elasticity (corresponding to $\beta\delta/\nu$) is 1.284 and significant at 1%. This is larger than the benchmark estimate (0.738) and implies a correspondingly smaller estimate of $\nu \simeq 0.751$ (relative to 1.306 in the benchmark). This set of estimates of transition elasticity and ν is closer to that of Artuç and McLaren (2015), where $\nu = 0.62$. Given smaller ν, the labor market will tend to be more responsive to economic shocks and hence we can expect greater quantitative effects for given simulated shocks with the alternative value of ν.

B Counterfactual Simulation Results: Alternative Scenarios of Tariff Concessions

In this appendix, we provide the figures for the three alternative scenarios of tariff concessions, in parallel to those in the main text (on Taiwan's WTO accession). In the first alternative scenario, we assess the effects of China's WTO accession on Taiwan's labor market dynamics: in the counterfactual, China's import tariffs and foreign tariffs on China's exports are rolled back to their levels in 1995. The results are summarized in Figures B.1–B.13.

In the second alternative scenario, we study the combined effects of WTO accessions by both Taiwan and China: in the counterfactual, both Taiwan's and China's import tariffs and foreign tariffs on Taiwan's and China's exports are set to their levels in 1995. The outcomes are summarized in Figures B.14–B.26.

In the third alternative scenario, we evaluate the effects of the tariff concessions between Taiwan and China during this period. In particular, in the counterfactual, only the bilateral tariff concessions between the two economies are rescinded and set to their levels in 1995. The findings are summarized in Figures B.27–B.39.

C Alternative Framework with Time-varying Sector-Skill Transition Costs

We have assumed the sector-skill transition costs to be time-invariant in the benchmark. This appendix shows that the dynamic hat algebra can be generalized to allow for time-varying sector-skill transition costs. This alternative framework can be used to accommodate changes to the sector-skill transition costs in a counterfactual such as that analyzed in Section 6.2 of the paper. In general, it can also be used to study the effects of supply-side shocks such as education reforms that change the costs of skill upgrading.

Let an individual's objective function be given by:

$$v_t^{njs} = \ln C_t^{njs} + \max_{\{k,i\}_{k=0,i=1}^{J,3}} \left\{ \beta\delta V_{t+1}^{nki} - \rho_t^{njs,nki} + \nu\epsilon_t^{ki} \right\}.$$

The objective function is similar to (1) in the benchmark except that the transition cost $\rho_t^{njs,nki}$ is now time-varying. The assumption that ϵ is drawn *i.i.d.* from the Type-I extreme value distribution implies that the value function and transition probability are respectively given by:

$$V_t^{njs} = \ln C_t^{njs} + \nu \ln \sum_{\mathrm{K}=0}^{J} \sum_{\mathrm{I}\geq s}^{3} e^{\frac{\beta\delta V_{t+1}^{n\mathrm{KI}} - \rho_t^{njs,n\mathrm{KI}}}{\nu}},$$

$$\mu_t^{njs,nki} = \frac{e^{\frac{\beta\delta V_{t+1}^{nki} - \rho_t^{njs,nki}}{\nu}}}{\sum_{\mathrm{K}=0}^{J} \sum_{\mathrm{I}\geq s}^{3} e^{\frac{\beta\delta V_{t+1}^{n\mathrm{KI}} - \rho_t^{njs,n\mathrm{KI}}}{\nu}}}.$$

The laws of motion for the labor pool in each sector-skill combination are unaffected. As the conditions on the production side remain the same, Proposition 1 is also unaffected.

Both $\dot{\mu}_{t+1}^{njs,nki}$ and $\dot{u}_{t+1}^{njs}$ are derived using exactly the same technique as for (18) and (19) in the benchmark. Let $\varrho_t^{njs,nki} \equiv e^{\rho_t^{njs,nki}}$. It can be readily checked that both the changes in utility and in transition probability are otherwise identical to the benchmark model up to the inclusion of the change in $\varrho_t^{njs,nki}$:

$$\dot{u}_{t+1}^{njs} = \dot{\omega}_{t+1}^{njs} \left[\sum_{\mathrm{K}=0}^{J} \sum_{\mathrm{I}\geq s}^{3} \mu_t^{njs,n\mathrm{KI}} \left(\dot{u}_{t+2}^{n\mathrm{KI}}\right)^{\frac{\beta\delta}{\nu}} \left(\dot{\varrho}_{t+1}^{njs,n\mathrm{KI}}\right)^{-\frac{1}{\nu}} \right]^{\nu},$$

$$\dot{\mu}_{t+1}^{njs,nki} = \frac{\left(\dot{u}_{t+2}^{nki}\right)^{\frac{\beta\delta}{\nu}} \left(\dot{\varrho}_{t+1}^{njs,nki}\right)^{-\frac{1}{\nu}}}{\sum_{\mathrm{K}=0}^{J} \sum_{\mathrm{I}\geq s}^{3} \mu_t^{njs,n\mathrm{KI}} \left(\dot{u}_{t+2}^{n\mathrm{KI}}\right)^{\frac{\beta\delta}{\nu}} \left(\dot{\varrho}_{t+1}^{njs,n\mathrm{KI}}\right)^{-\frac{1}{\nu}}}.$$

The dynamic hat algebra can also be derived with the same technique as for (22) and (23). For $t > 1$, we have:

$$\widehat{\mu}_{t+1}^{njs,nki} \equiv \frac{\dot{\mu}_{t+1}^{\prime njs,nki}}{\dot{\mu}_{t+1}^{njs,nki}}$$

$$= \frac{\left(\widehat{u}_{t+2}^{nki}\right)^{\frac{\beta\delta}{\nu}} \left(\widehat{\varrho}_{t+1}^{njs,nki}\right)^{-\frac{1}{\nu}}}{\sum_{\mathrm{K}=0}^{J} \sum_{\mathrm{I}\geq s}^{3} \mu_t^{\prime njs,n\mathrm{KI}} \dot{\mu}_{t+1}^{njs,n\mathrm{KI}} \left(\widehat{u}_{t+2}^{n\mathrm{KI}}\right)^{\frac{\beta\delta}{\nu}} \left(\widehat{\varrho}_{t+1}^{njs,n\mathrm{KI}}\right)^{-\frac{1}{\nu}}},$$

and

$$\widehat{u}_{t+1}^{njs} \equiv \frac{\dot{u}_{t+1}^{\prime njs}}{\dot{u}_{t+1}^{njs}},$$

$$= \widehat{\omega}_{t+1}^{njs} \left[\sum_{\mathrm{K}=0}^{J} \sum_{\mathrm{I}\geq s}^{3} \mu_t^{\prime njs,n\mathrm{KI}} \dot{\mu}_{t+1}^{njs,n\mathrm{KI}} \left(\widehat{u}_{t+2}^{n\mathrm{KI}}\right)^{\frac{\beta\delta}{\nu}} \left(\widehat{\varrho}_{t+1}^{njs,n\mathrm{KI}}\right)^{-\frac{1}{\nu}} \right]^{\nu}.$$

Since the path of counterfactual fundamentals is observed only at $t = 1$ while the decisions are made in $t = 0$, we need to derive $\mu_1^{\prime njs,nki}$ and $\widehat{u}_1^{njs}$ differently from the general case of $t > 1$. Recall that the allocations at $t = 0$ are such that $\widehat{u}_0^{njs} = 1$, $\mu_0^{\prime njs,nki} = \mu_0^{njs,nki}$ and $L_1^{\prime njs} = L_1^{njs}$. Also note that $\varrho_0^{\prime njs,nki} = \varrho_0^{njs,nki}$ since we assume that the shocks to the fundamentals occur unexpectedly at $t = 1$. Following the approach for Proposition 3 as detailed in Appendix A of the paper yields:

$$\widehat{u}_1^{njs} = \widehat{\omega}_1^{njs} \left[\sum_{\mathrm{K}=0}^{J} \sum_{\mathrm{I}\geq s}^{3} \upsilon_0^{njs,n\mathrm{KI}} \left(\widehat{u}_2^{n\mathrm{KI}}\right)^{\frac{\beta\delta}{\nu}} \left(\widehat{\varrho}_1^{njs,n\mathrm{KI}}\right)^{-\frac{1}{\nu}} \right]^{\nu},$$

$$\mu_1^{\prime njs,nki} = \frac{\upsilon_0^{njs,nki} \left(\widehat{u}_2^{nki}\right)^{\frac{\beta\delta}{\nu}} \left(\widehat{\varrho}_1^{njs,nki}\right)^{-\frac{1}{\nu}}}{\sum_{\mathrm{K}=0}^{J} \sum_{\mathrm{I}\geq s}^{3} \upsilon_0^{njs,n\mathrm{KI}} \left(\widehat{u}_2^{n\mathrm{KI}}\right)^{\frac{\beta\delta}{\nu}} \left(\widehat{\varrho}_1^{njs,n\mathrm{KI}}\right)^{-\frac{1}{\nu}}},$$

where $\upsilon_0^{njs,n\mathrm{KI}} \equiv \mu_1^{njs,n\mathrm{KI}} \left(\widehat{u}_1^{n\mathrm{KI}}\right)^{\frac{\beta\delta}{\nu}}$.

D Extension: Skill-Job Disparity

In the paper, we have assumed that jobs and skills are paired perfectly, such that a worker with a given skill level always does a job that requires exactly the skill level. Therefore, a high-skilled worker is always assigned to an occupation that requires a high skill level. In this appendix, we consider setups where workers might not end up with jobs that match their skill levels. For example, a middle-skilled worker may choose to upgrade his skill level but end up doing a job that requires a low skill level in the next period. The following analysis aims to generalize the model by allowing workers to undertake jobs with lower skill requirement than the worker's current skill level.

When a worker of a given skill level can choose a job of lower skill requirement, the number of jobs that requires the given skill level to perform does not necessarily equals the number of workers of that skill level. We therefore need to distinguish between skill requirement of jobs and skill attainment of workers. Let a_t denotes the skill attainment of an individual at time t, and s_t denotes the skill requirement of the individual's job at time t. We assume that $a_t \geq s_t$ holds for each individual so that workers can "match downwards" to jobs in terms of skill level. The Bellman equation becomes:

$$v_t^{njs;a_t \geq s} = \ln C_t^{njs;a_t \geq s} + \max_{\{k,i\}_{k=0,i=1}^{J,3}} \left\{ \beta\delta V_{t+1}^{nki;a_{t+1}=\max\{a_t,i\}} - \rho^{njs,nki;a_t \geq s} + \nu\epsilon_t^{ki} \right\},$$

such that:

$$\begin{aligned} \rho^{njs,nki;a_t \geq s} &= \rho_{job}^{njs,nki;a_t \geq s} + \rho^{a_t,i} \\ \rho^{a_t,i} &= 0 \text{ if } a_t \geq i. \end{aligned}$$

The parameter $\rho_{job}^{njs,nki;a_t \geq s}$ governs the cost to choose a job in sector k that requires skill level i given the worker's skill attainment as a_t. The parameter $\rho^{a_t,i}$ is the cost of *skill cultivation*, which occurs when the worker chooses a job that requires a *higher* skill level than his current skill attainment. In other words, if a worker with a skill attainment a_t chooses a job with a skill requirement $i > a_t$, then he bears an additional cost to upgrade his skill attainment to i in the next period. Note that the setup reduces to the benchmark case when $\rho_{job}^{njs,nki;a_t \geq s} = \infty$ for $s \neq a_t$ and $i < s$.

Following similar analysis as in the main text, the probability of switching between sector-job combinations and the lifetime utility are, respectively:

$$\mu_t^{njs,nki;a_t \geq s} = \frac{e^{\frac{\beta\delta V_{t+1}^{nki;a_{t+1}=\max\{a_t,i\}} - \rho^{njs,nki;a_t \geq s}}{\nu}}}{\sum_{\mathrm{K}=0}^{J}\sum_{\mathrm{I}=1}^{3} e^{\frac{\beta\delta V_{t+1}^{n\mathrm{KI};a_{t+1}=\max\{a_t,\mathrm{I}\}} - \rho^{njs,n\mathrm{KI};a_t \geq s}}{\nu}}}, \tag{D.2}$$

$$V_t^{njs;a_t \geq s} = \ln C_t^{njs;a_t \geq s} + \nu \ln \sum_{\mathrm{K}=0}^{J}\sum_{\mathrm{I}=1}^{3} e^{\frac{\beta\delta V_{t+1}^{n\mathrm{KI};a_{t+1}=\max\{a_t,\mathrm{I}\}} - \rho^{njs,n\mathrm{KI};a_t \geq s}}{\nu}}. \tag{D.3}$$

Equations (D.2) and (D.3) are pretty much the same as those in the benchmark model, except that workers can do jobs with lower skill requirements than the agent's skill attainment.

Because skill attainment is weakly greater than the skill requirement of jobs, the number of workers choosing a *sector-job combination* js is no longer identical to the workers with skill attainment a in sector j. The laws of motion (4) and (5) need to be replaced by equations (D.4)–(D.7) below. In particular, the laws of motion for the numbers of workers choosing a sector-job combination js, with skill attainment a_{t+1} in the next period are given by:

$$\begin{aligned} L_{t+1}^{njs;a_{t+1}>s} &= \delta \sum_{k=0}^{J} \sum_{i=1}^{i<a_t} \mu_t^{nki,njs;a_t>i}|_{s<a_t} L_t^{nki;a_t>i} \\ &\quad + \delta \sum_{k=0}^{J} \mu_t^{nki,njs;a_t=i}|_{s<a_t} L_t^{nki;a_t=i} \end{aligned} \tag{D.4}$$

$$\begin{aligned} L_{t+1}^{njs;a_{t+1}=s} &= \delta \sum_{k=0}^{J} \sum_{i=1}^{i<a_t} \mu_t^{nki,njs;a_t>i}|_{s\geq a_t} L_t^{nki;a_t>i} \\ &\quad + \delta \sum_{k=0}^{J} \mu_t^{nki,njs;a_t=i}|_{s\geq a_t} L_t^{nki;a_t=i} \end{aligned} \tag{D.5}$$

$$L_{t+1}^{n01;a_{t+1}=1} = \delta \sum_{k=0}^{J} \mu_t^{nk1,n01;a_t=1} L_t^{nk1;a_t=1} + (1-\delta) L^n \tag{D.6}$$

$$L_{t+1}^{njs} = \sum_{a_{t+1}>s}^{3} L_{t+1}^{njs;a_{t+1}>s} + L_{t+1}^{njs;a_{t+1}=s}. \tag{D.7}$$

Equation (D.4) governs the motion of workers with skill attainment a_t that eventually choose a sector-job combination js with a lower skill requirement than his skill attainment. There are two possibilities: the worker with a skill attainment a_t currently taking a job with a skill requirement $i < a_t$, and the worker with a skill attainment a_t currently taking a job with exactly the same skill requirement $i = a_t$. These workers choose the sector-job combination js where s is still lower than their own skill attainment a_t with a probability $\mu_t^{nki,njs;a_t>i}|_{s<a_t}$, and $\mu_t^{nki,njs;a_t=i}|_{s<a_t}$, respectively. There are $L_t^{nki;a_t>i}$ and $L_t^{nki;a_t=i}$ of these types of workers, respectively.

Equation (D.5) refers to the case where the worker chooses to take a sector-job combination js in the next period, with the skill requirement (weakly) greater than his current skill attainment. In this case, this worker experiences a skill upgrading and his skill attainment improves from a_t to s in the next period. The probability for this worker to do so is $\mu_t^{nki,njs;a_t>i}|_{s\geq a_t}$ when the worker's skill attainment is strictly higher than the skill requirement of his current job, and $\mu_t^{nki,njs;a_t=i}|_{s\geq a_t}$ when his skill attainment is exactly the same as the skill requirement of his current job.

Equations (D.4) and (D.5) characterize the labor supply to sector-job combination js

in the *next* period conditional on the worker's *current* skill attainment. For labor market clearing, we require equation (D.7), where the LHS denotes the total labor demand of sector-job combination js in the *next* period, and the RHS corresponds to the total labor supply to sector-job combination js in the *next* period with agents of skill attainment a_{t+1} in the *next* period.

Equation (D.6) plays the same role as (5) in the benchmark model. The second term follows from our setting that the population growth rate is zero and all newborns begin with skill attainment 1 and start with sector-job combination 01. The first term represents the mass of agents with skill attainment 1 in the current period who decide to take sector-job combination 01 for the next period. Since skill attainment is nondecreasing, we do not need to worry about other possibilities of a_t in this case. Therefore, (D.6) and (5) are equivalent.

We can also characterise the laws of motion in terms of worker skill attainment a_t for each sector. Let $M_t^{nj;a_t=s}$ be the number of workers currently working in sector j with a skill attainment $a_t = s$. From (D.4)–(D.7), it follows that:

$$
\begin{aligned}
M_{t+1}^{nj;a_{t+1}=s} \quad = \quad & \delta \left[\sum_{k=0}^{J} \mu_t^{nki,njs;a_t=i}|_{s>a_t} L_t^{nki;a_t=i} + \sum_{k=0}^{J} \sum_{i=1}^{i<a_t} \mu_t^{nki,njs;a_t>i}|_{s>a_t} L_t^{nki;a_t>i} \right] \\
& + \delta \left[\sum_{k=0}^{J} \sum_{i=1}^{i<a_t} \mu_t^{nki,njs;a_t>i}|_{s=a_t} L_t^{nki;a_t>i} + \sum_{k=0}^{J} \sum_{i=1}^{i<a_t} \mu_t^{nki,njh;a_t>i}|_{h<s=a_t} L_t^{nki;a_t>i} \right] \\
& + \delta \left[\sum_{k=0}^{J} \mu_t^{nks,njs;a_t=s}|_{s=a_t} L_t^{nks;a_t=s} + \sum_{k=0}^{J} \mu_t^{nks,njh;a_t=s}|_{h<s=a_t} L_t^{nks;a_t=s} \right]. \quad \text{(D.8)}
\end{aligned}
$$

The first line represents the agents that experience skill upgrading from $a_t < s$ to $a_{t+1} = s$ by taking a job of skill requirement s in sector j, who currently work in sector k with a skill requirement $i \leq a_t$. The second line and third lines denote agents who already have the skill attainment $a_t = s$ in the current period and do not experience skill upgrading. In particular, the second line consists of agents who take jobs with skill requirements strictly less than s currently, but choose to take jobs with skill requirements either equal or less than s for the next period. The third line sums up agents who currently have jobs with exactly skill requirement s, but choose jobs that require either equal or less than s in the next period.

Equations (6)–(11) in the paper continue to hold in this alternative setup. Therefore, the same temporary equilibrium conditions (12)–(17) continue to hold, except that L_t^{njs} is now governed by (D.7) and that the wage now depends on skill requirement instead of skill attainment. For the sequential equilibrium, equations (18) and (19) remain to hold but with an additional superscript $a_t \geq s$. The skill attainment a_t does not affect the derivation, as can be verified following the proof in Appendix A of the paper. The laws of motion are replaced by (D.4)–(D.6). Because the techniques of derivation are unaffected by the superscript a_t, it is obvious that the dynamic hat algebra (22)–(31) continues to hold here except for the laws of motion (24) and (25). The laws of motion are replaced by the counterfactual versions of (D.4)–(D.6).

The above discussion shows that we can solve for the entire path of equilibrium once initial points are given. This gives us the demand for jobs of different skill requirement in different sectors and countries. These information allows us to obtain the skill attainment in each country-sector-job combination by plugging the equilibrium outcome into (D.8). The probability for an agent with a given skill attainment to "under match" with a job that requires a lower skill level can also be obtained in the same manner as for (D.8).

References

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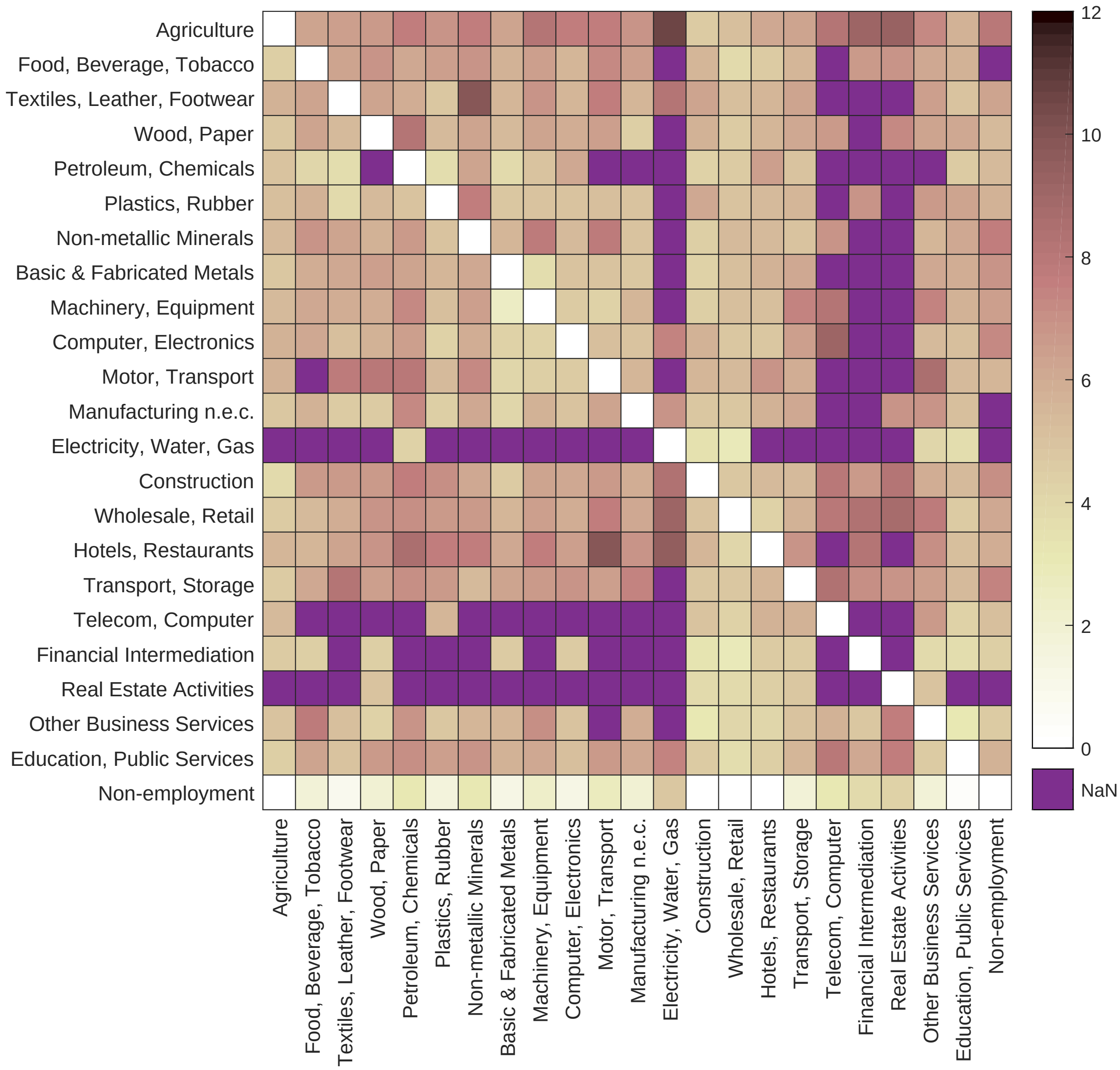
Karabarbounis, Loukas and Brent Neiman, "The Global Decline of the Labor Share," *Quarterly Journal of Economics*, 2014, *129* (1), 61–103.

Table A.1: Estimation of labor market transition elasticity $\beta\delta/\nu$—Alternative setups

	(1) Stage 1 Estimation $L_t^{js,ki}$		(2) Stage 2 Estimation ϕ_t^{js}
$\rho_1^{low,mid}$	4.901***	$\ln w_{t+1}^{js}$	**1.284*****
	(0.147)		(0.0357)
$\rho_1^{mid,high}$	4.742***	$\eta_2^{middle} \times t$	-0.0147***
	(0.140)		(0.00349)
constant	11.68***	$\eta_2^{high} \times t$	-0.00679*
	(0.0229)		(0.00354)
Origin-Sector-Skill-Year FE (α_t^{js})	Yes	Year FE (ζ_t)	Yes
Destination-Sector-Skill-Year FE (λ_t^{ki})	Yes	Origin-Skill FE (η_1^s)	Yes
Sector-to-Sector FE	Yes		
No. of Observations	47112	No. of Observations	37220
R^2	0.826	R^2	0.334

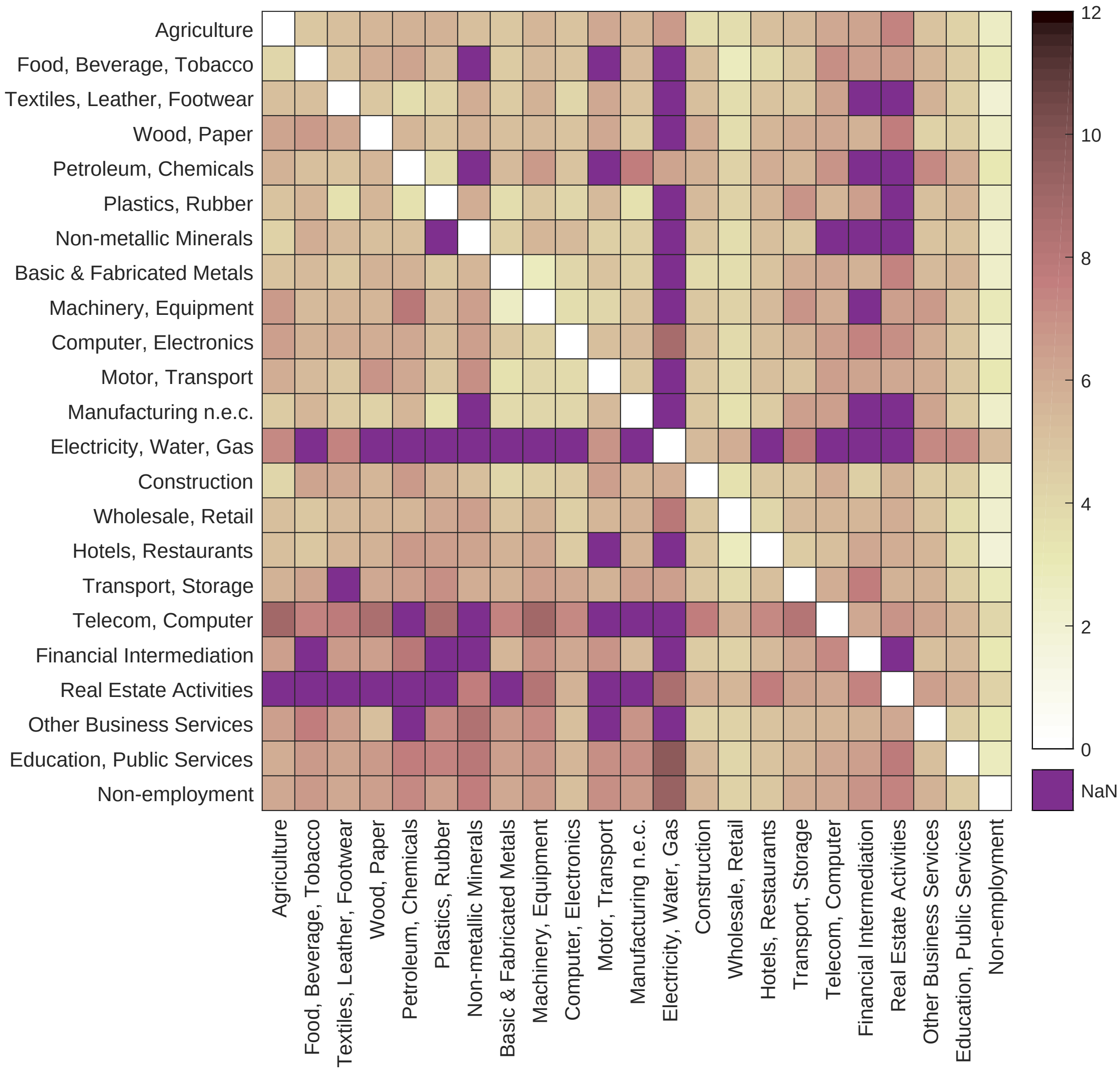
Notes: Estimation results of equations (32) and (34), based on the switching-cost specification in equation (A.1). In Stage 1, the base category omitted is the non-employed-low-skill group, such that $\lambda_t^{ki} = 0$ for this category. In Stage 2, the time trend for the origin-low-skill group is omitted, as it is absorbed by the year FEs (ζ_t).

Figure A.1: Sector-to-Sector Switching Cost for Low-Skilled Workers



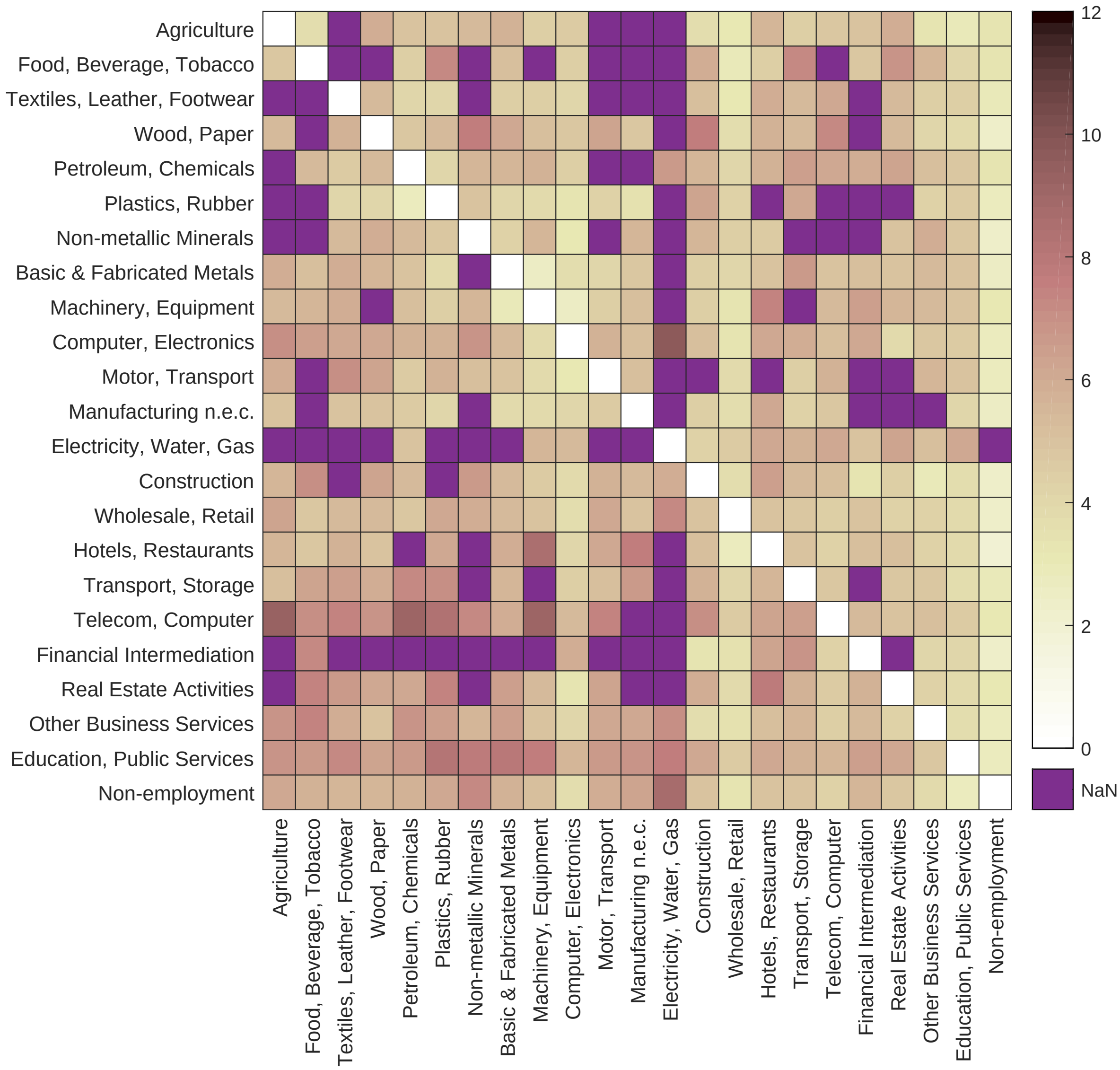
Notes: The figure shows the sector-to-sector switching costs for low-skilled workers based on estimations of Stage-1 equation (32) and the switching-cost specification in equation (A.1). The origin-sectors are in the rows and the destination-sectors in the columns. The magnitudes reported above reflect the average sector-switching costs with or without skill upgrading.

Figure A.2: Sector-to-Sector Switching Cost for Middle-Skilled Workers



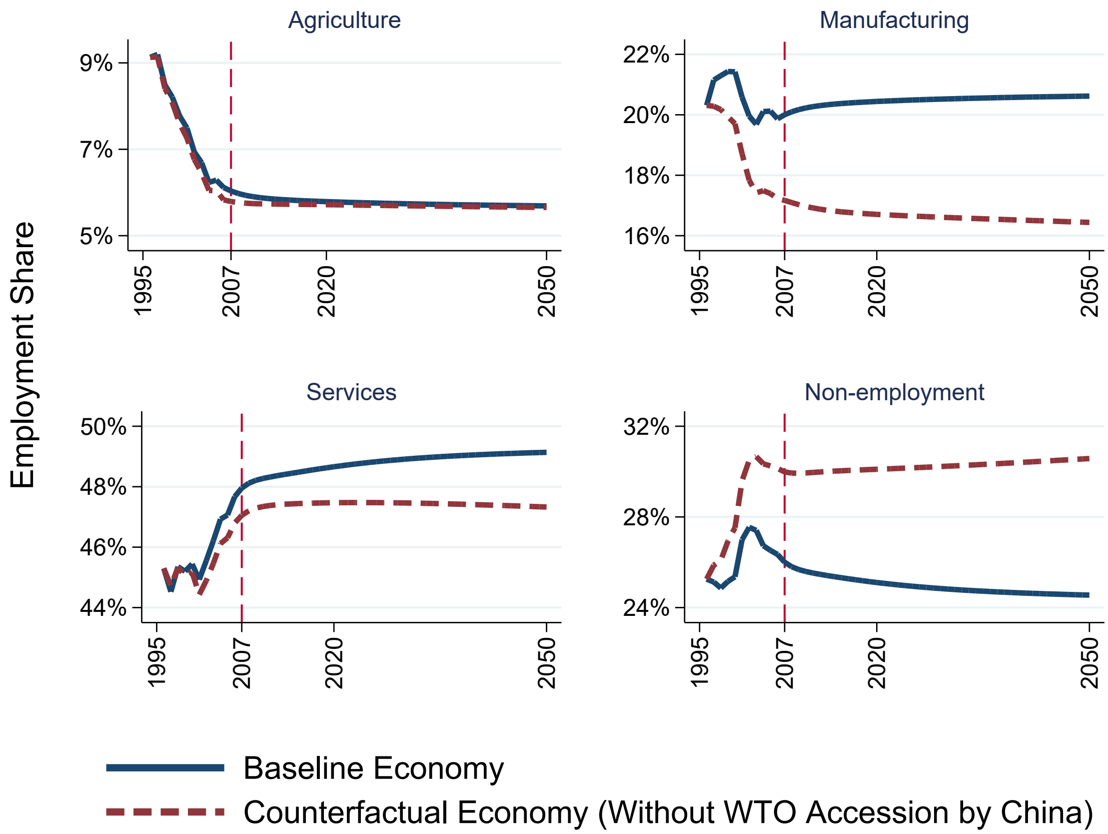
Notes: The figure shows the sector-to-sector switching costs for middle-skilled workers based on estimations of Stage-1 equation (32) and the switching-cost specification in equation (A.1). The origin-sectors are in the rows and the destination-sectors in the columns. The magnitudes reported above reflect the average sector-switching costs with or without skill upgrading.

Figure A.3: Sector-to-Sector Switching Cost for High-Skilled Workers



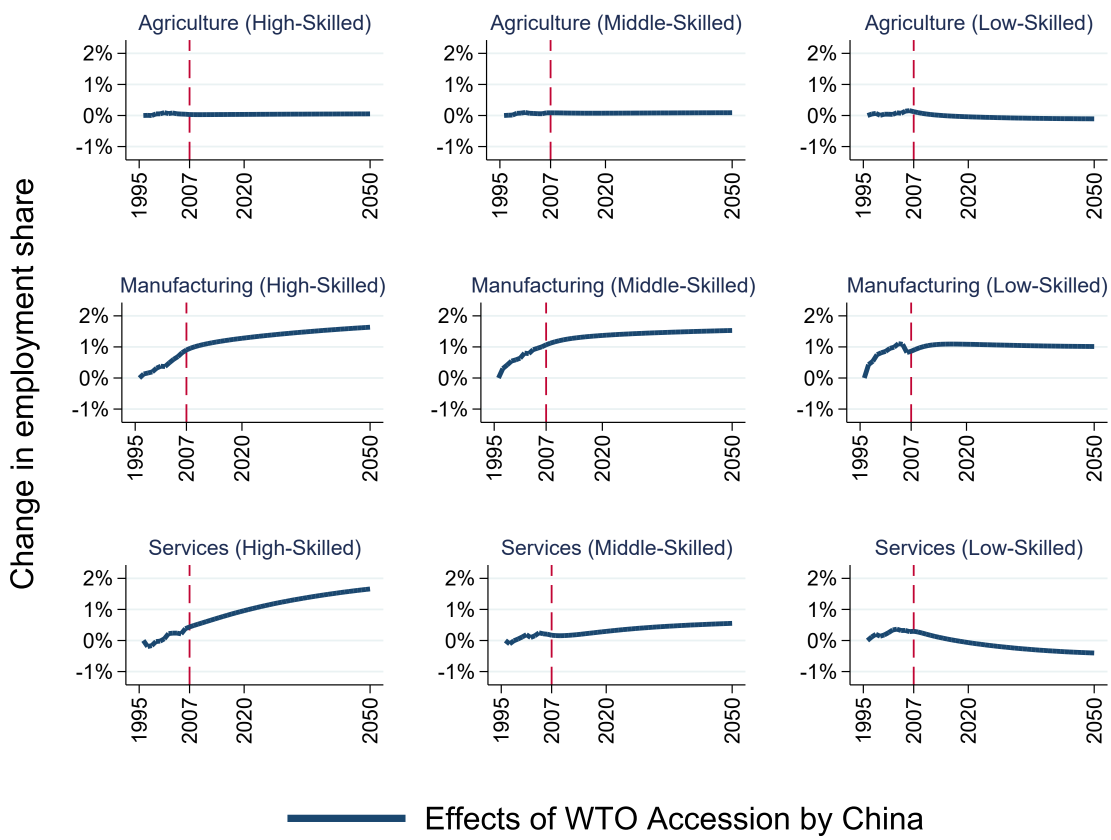
Notes: The figure shows the sector-to-sector switching costs for high-skilled workers based on estimations of Stage-1 equation (32) and the switching-cost specification in equation (A.1). The origin-sectors are in the rows and the destination-sectors in the columns. The magnitudes reported above reflect the average sector-switching costs with or without skill upgrading.

Figure B.1: Transition dynamics of employment shares in Taiwan — effects of China's WTO entry



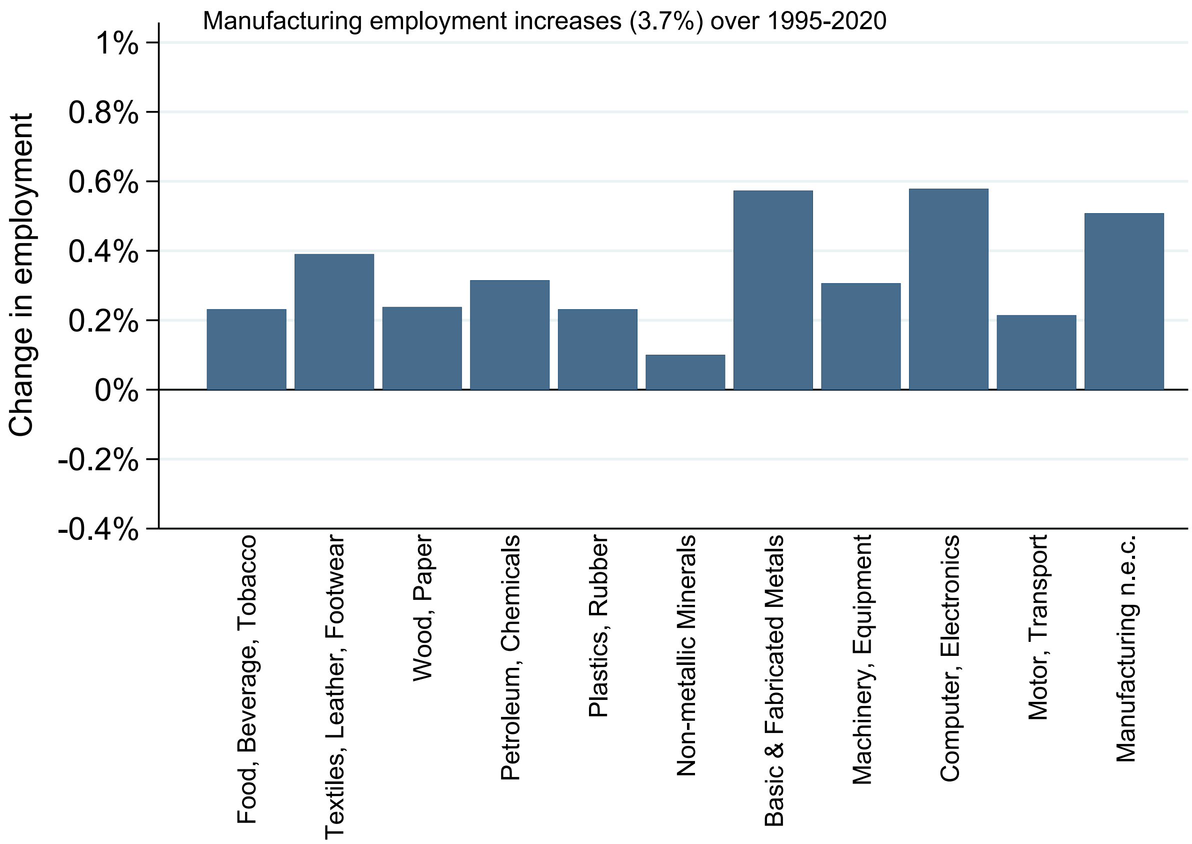
Notes: The figure shows the effect of China's WTO entry on employment shares in Taiwan by aggregate sectors. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The baseline economy shows the path of employment shares with all time-varying fundamentals evolving as in the data from 1995 to 2007 and constant fundamentals after 2007. The counterfactual economy is the same except that China's tariffs on imports and foreign tariffs on China's exports are set to their levels in 1995. We simulate the model until 3000.

Figure B.2: Transition dynamics of employment shares in Taiwan by skill groups — effects of China's WTO entry



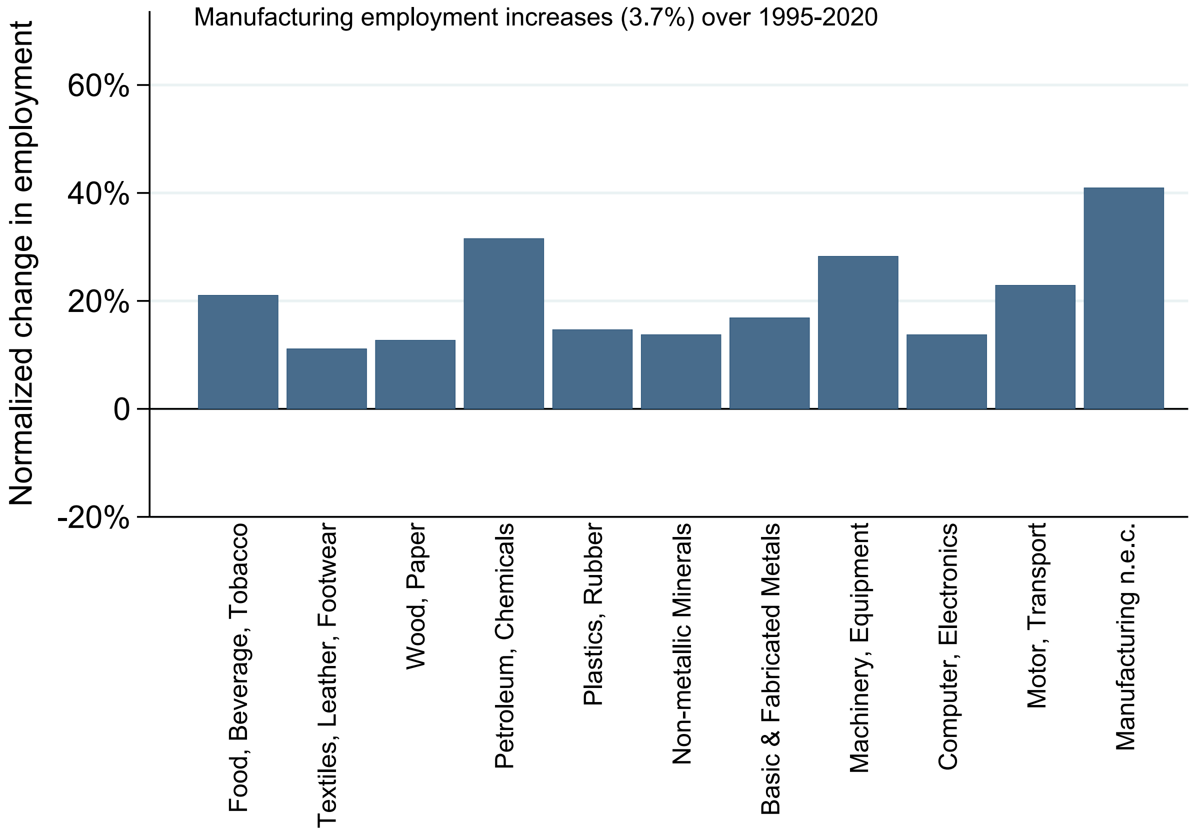
Notes: The figure shows the effect of China's WTO entry on employment shares in Taiwan by aggregate sectors and skill groups. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The effect is calculated to be the difference between the baseline economy and the counterfactual economy. The baseline economy shows the path of employment shares with all time-varying fundamentals evolving as in the data from 1995 to 2007 and constant fundamentals after 2007. The counterfactual economy is the same except that China's tariffs on imports and foreign tariffs on China's exports are set to their levels in 1995. We simulate the model until 3000.

Figure B.3: Effects of China's WTO entry on the employment shares of manufacturing sectors in Taiwan



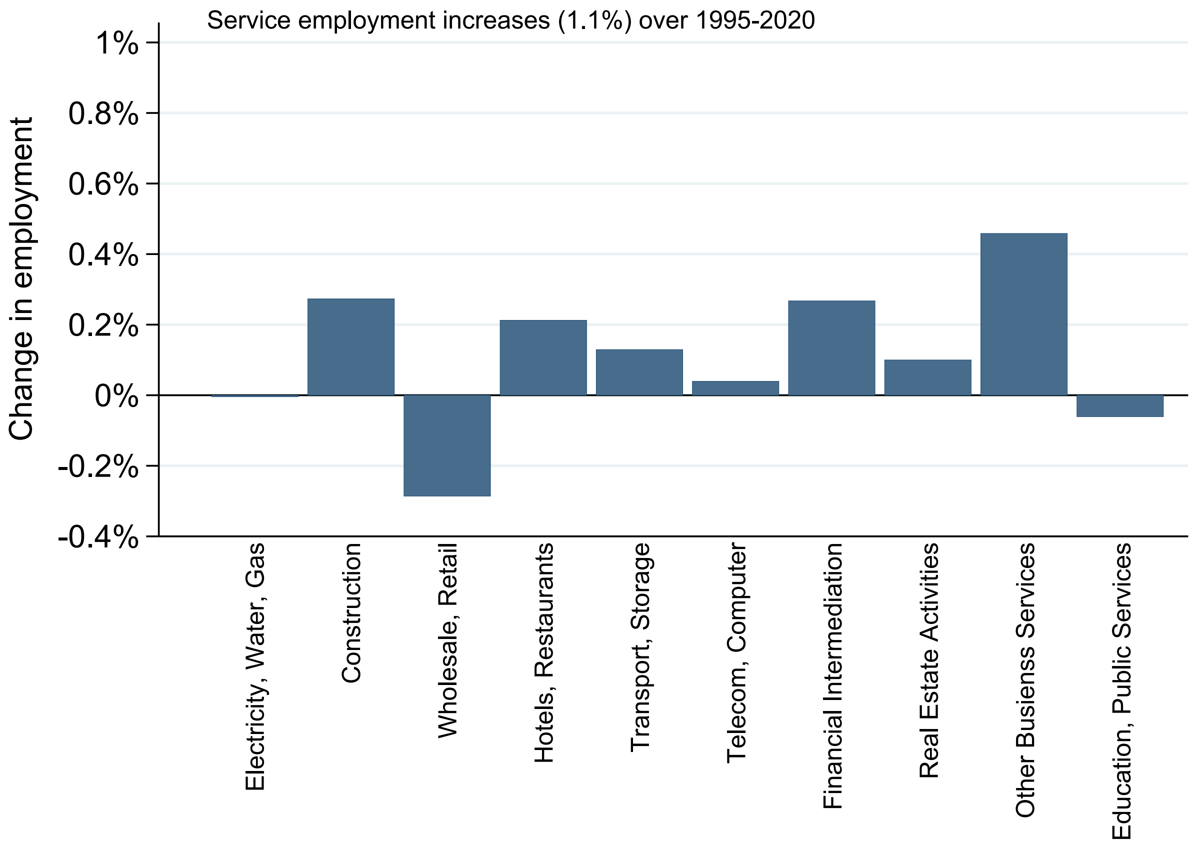
Notes: The figure shows the change in employment share for each manufacturing sector in Taiwan over the period of 1995–2020, due to China's WTO entry. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.1 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.4: Effects of China's WTO entry on the employment shares of manufacturing sectors in Taiwan — normalized by sector size



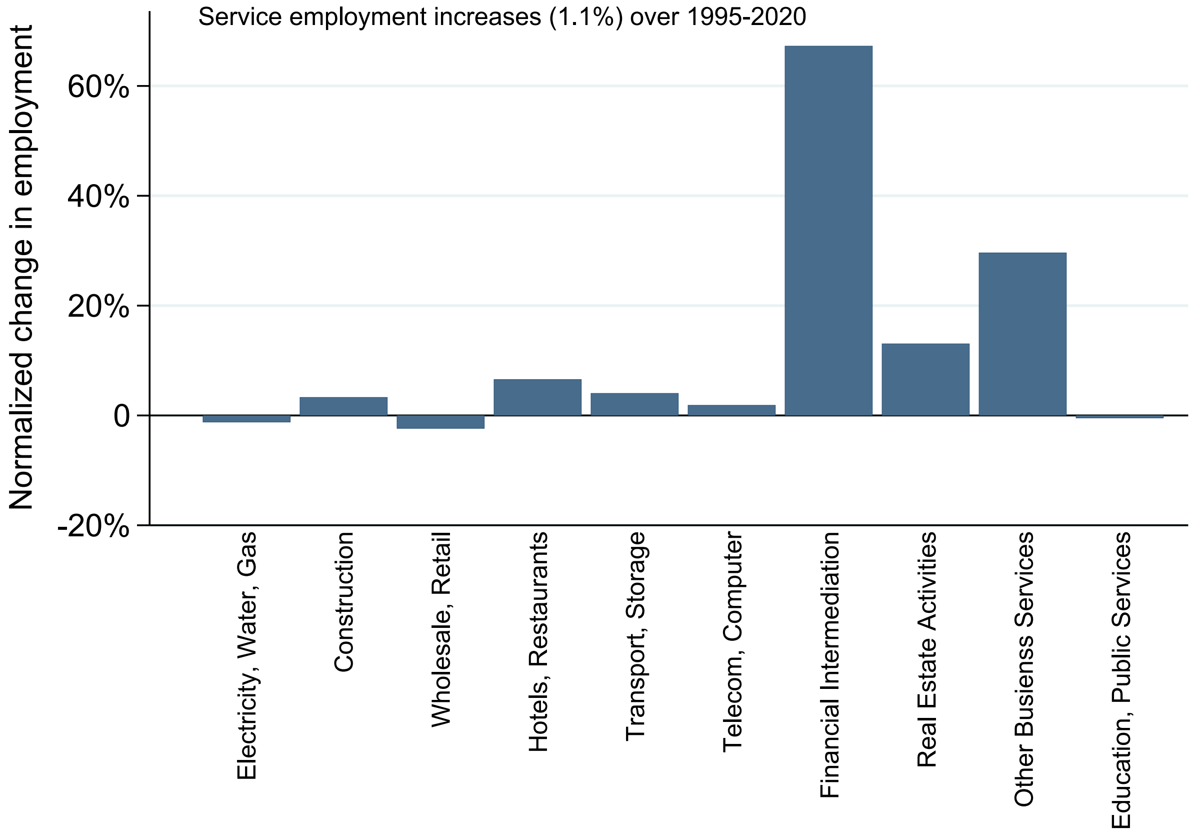
Notes: The figure shows the normalized change in employment share for each manufacturing sector in Taiwan over the period of 1995–2020, due to China's WTO entry. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force) and normalized by the sectoral employment share in year 1995. The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.1 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.5: Effects of China's WTO entry on the employment shares of service sectors in Taiwan



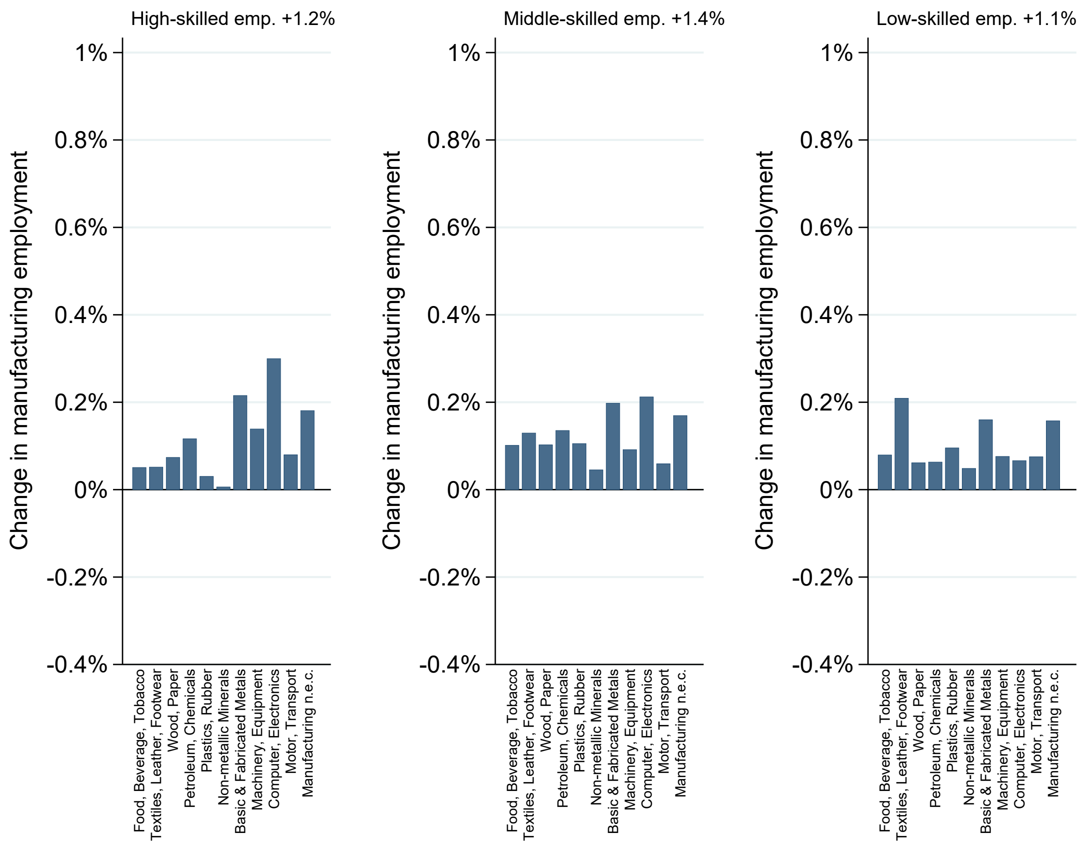
Notes: The figure shows the change in employment share for each service sector in Taiwan over the period of 1995–2020, due to China's WTO entry. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.1 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.6: Effects of China's WTO entry on the employment shares of service sectors in Taiwan — normalized by sector size



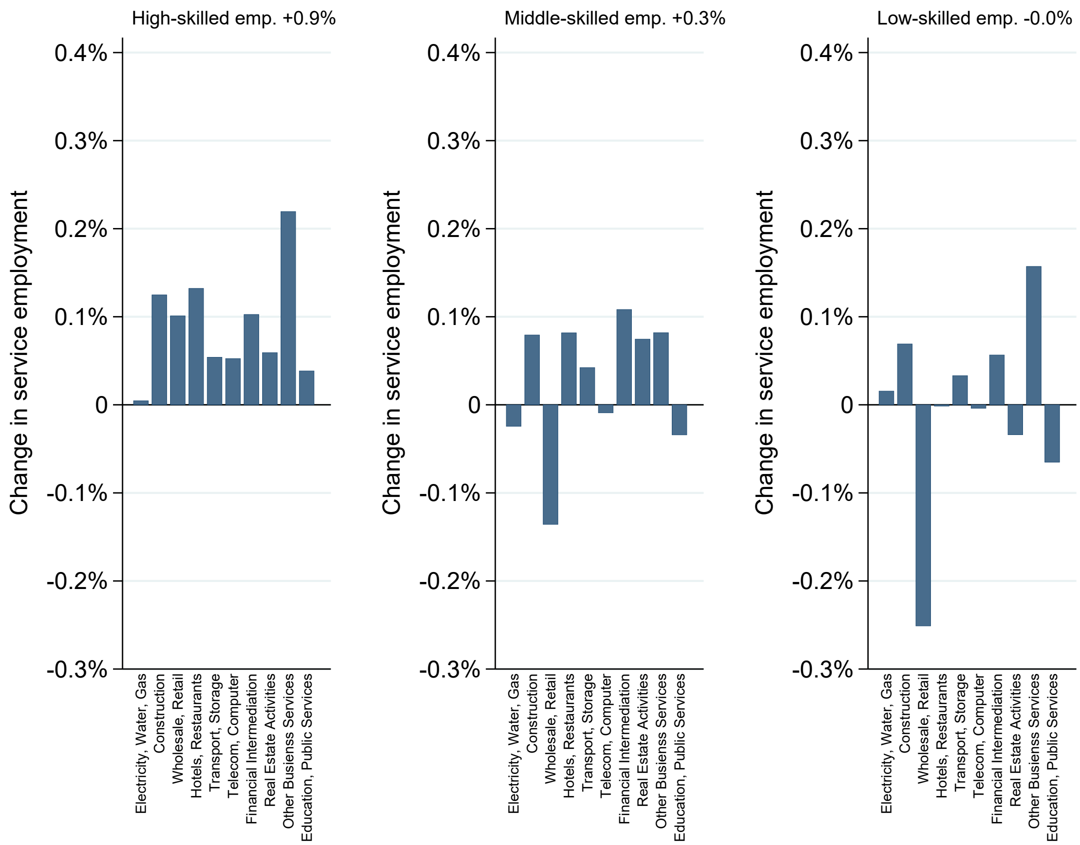
Notes: The figure shows the normalized change in employment share for each service sector in Taiwan over the period of 1995–2020, due to China's WTO entry. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force) and normalized by the sectoral employment share in year 1995. The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.1 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.7: Effects of China's WTO entry on the employment shares of manufacturing sectors in Taiwan by skill groups



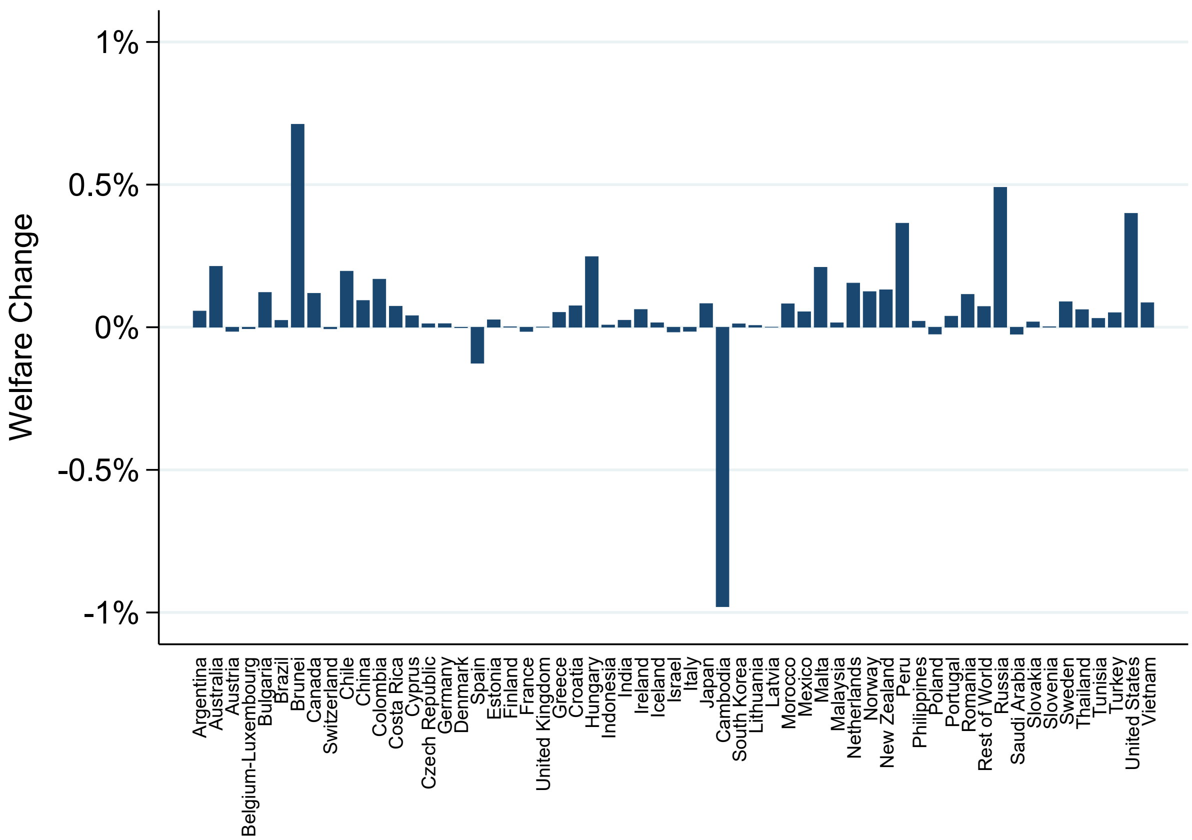
Notes: The figure shows the change in employment share by skill groups for each manufacturing sector in Taiwan over the period of 1995–2020, due to China's WTO entry. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.1 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.8: Effects of China's WTO entry on the employment shares of service sectors in Taiwan by skill groups



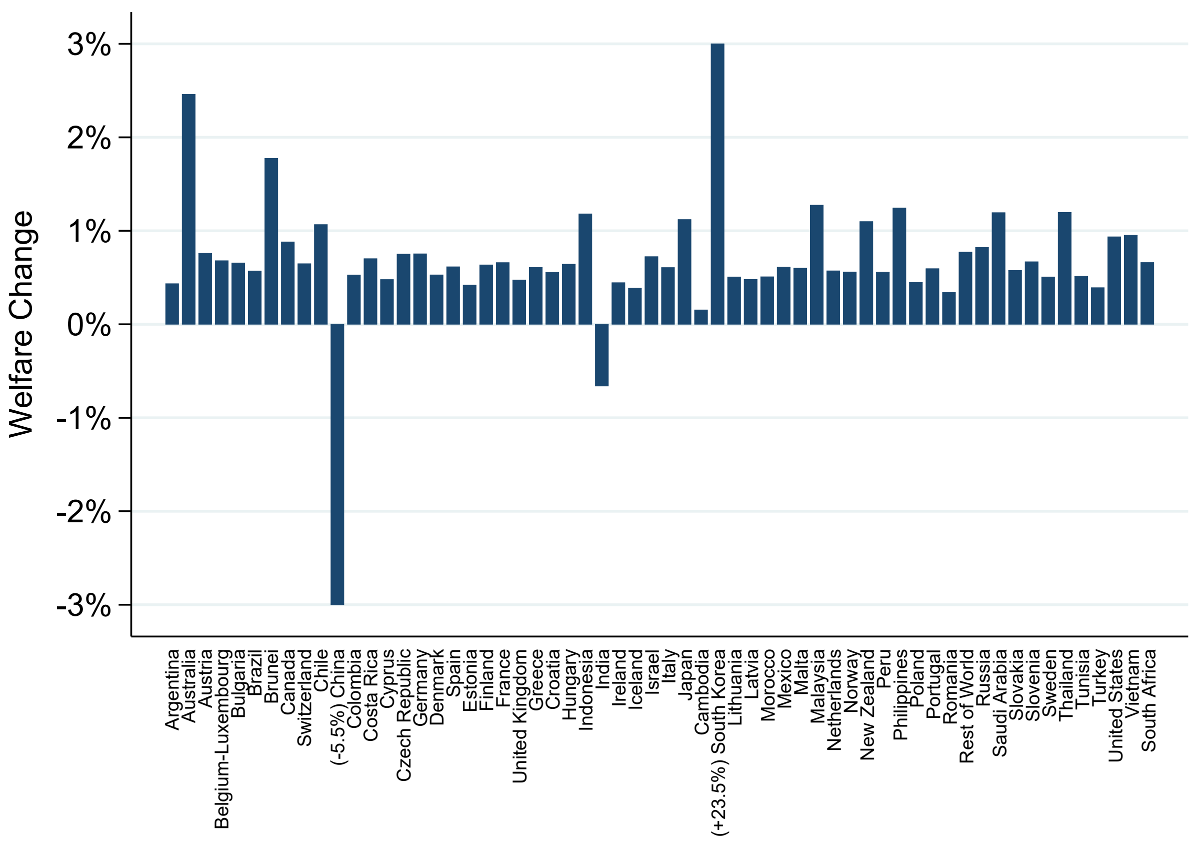
Notes: The figure shows the change in employment share by skill groups for each service sector in Taiwan over the period of 1995–2020, due to China's WTO entry. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.1 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.9: Welfare effects of China's WTO entry across economies — aggregate



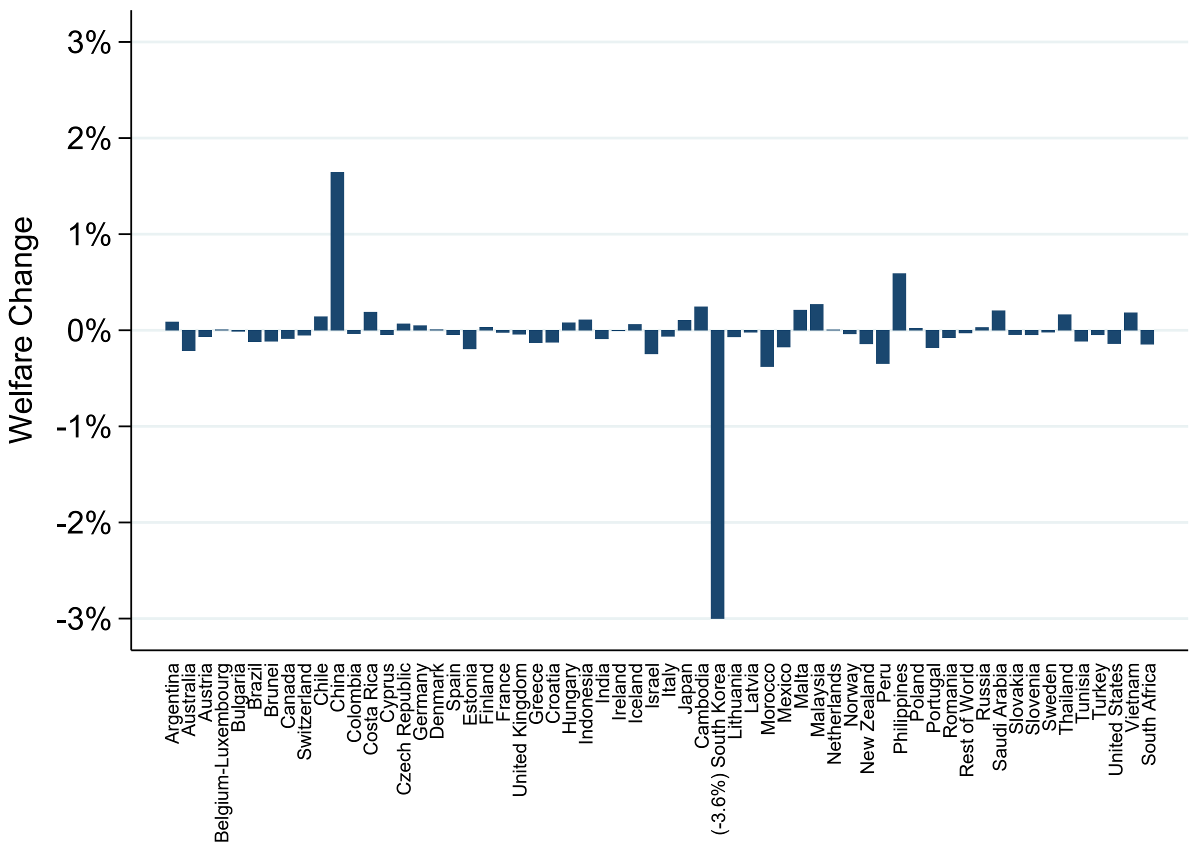
Notes: The figure shows the aggregate welfare effect of China's WTO entry on workers in economies other than Taiwan over the period of 1995–2020. The labor markets in economies other than Taiwan are country-sector specific. We aggregate the welfare effect across different sectors for each economy by using sectoral labor value added as weights. Data on value added are based on TiVA 2016, and data on labor share of value added are from Karabarbounis and Neiman (2014).

Figure B.10: Welfare effects of China's WTO entry across economies — agriculture



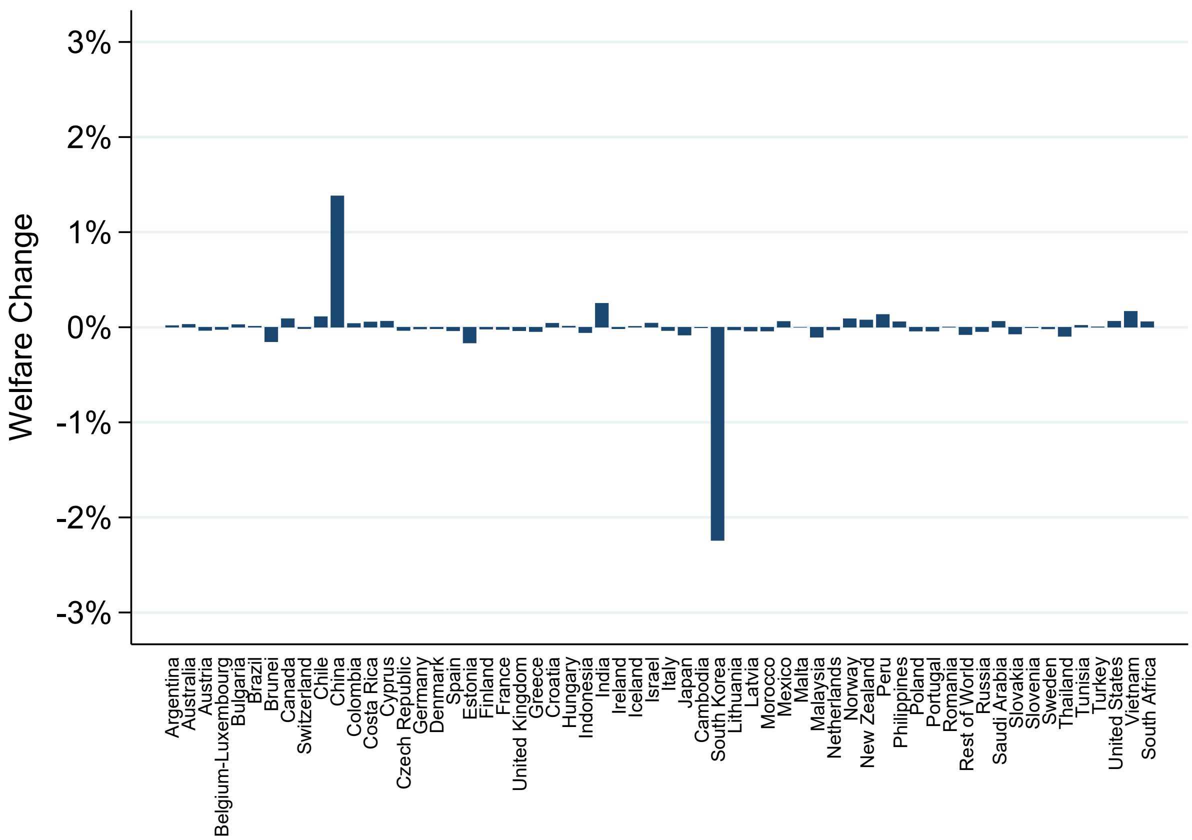
Notes: The figure shows the welfare effect of China's WTO entry on workers in the agriculture sector in economies other than Taiwan over the period of 1995–2020. The labor markets in economies other than Taiwan are country-sector specific.

Figure B.11: Welfare effects of China's WTO entry across economies — manufacturing



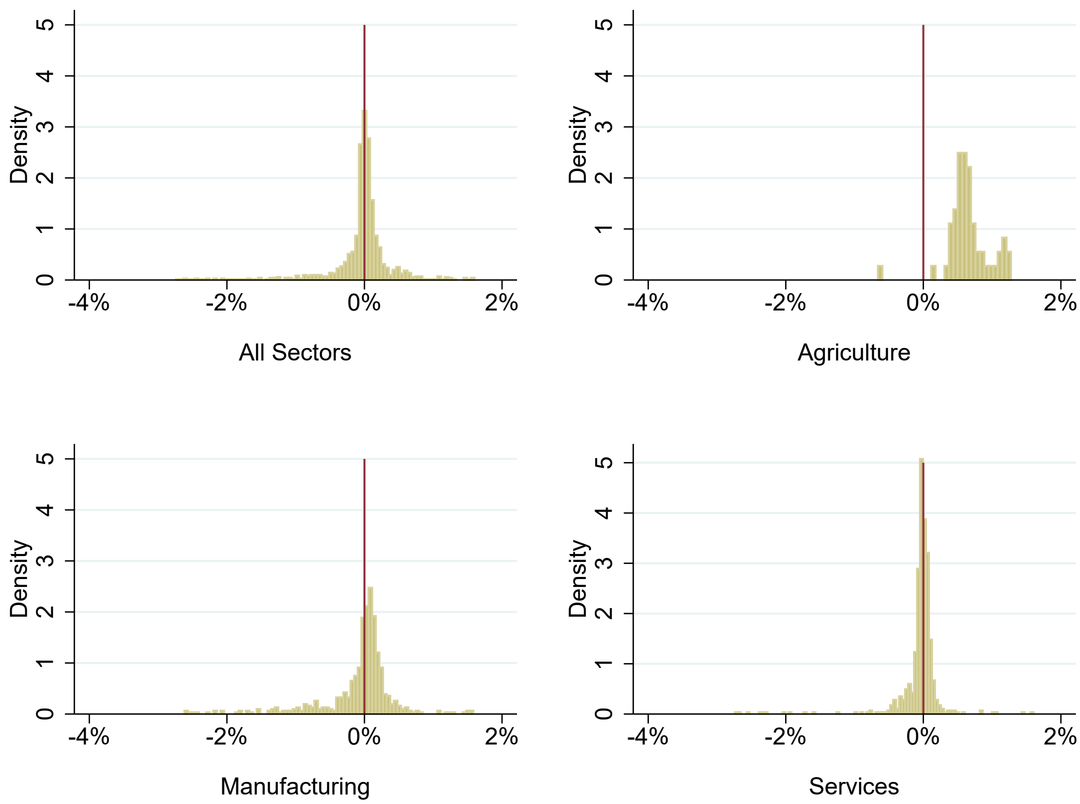
Notes: The figure shows the aggregate welfare effect of China's WTO entry on workers in the manufacturing sectors in economies other than Taiwan over the period of 1995–2020. The labor markets in economies other than Taiwan are country-sector specific. We aggregate the welfare effect across different sectors for each economy by using sectoral labor value added as weights. Data on value added are based on TiVA 2016, and data on labor share of value added are from Karabarbounis and Neiman (2014).

Figure B.12: Welfare effects of China's WTO entry across economies — services



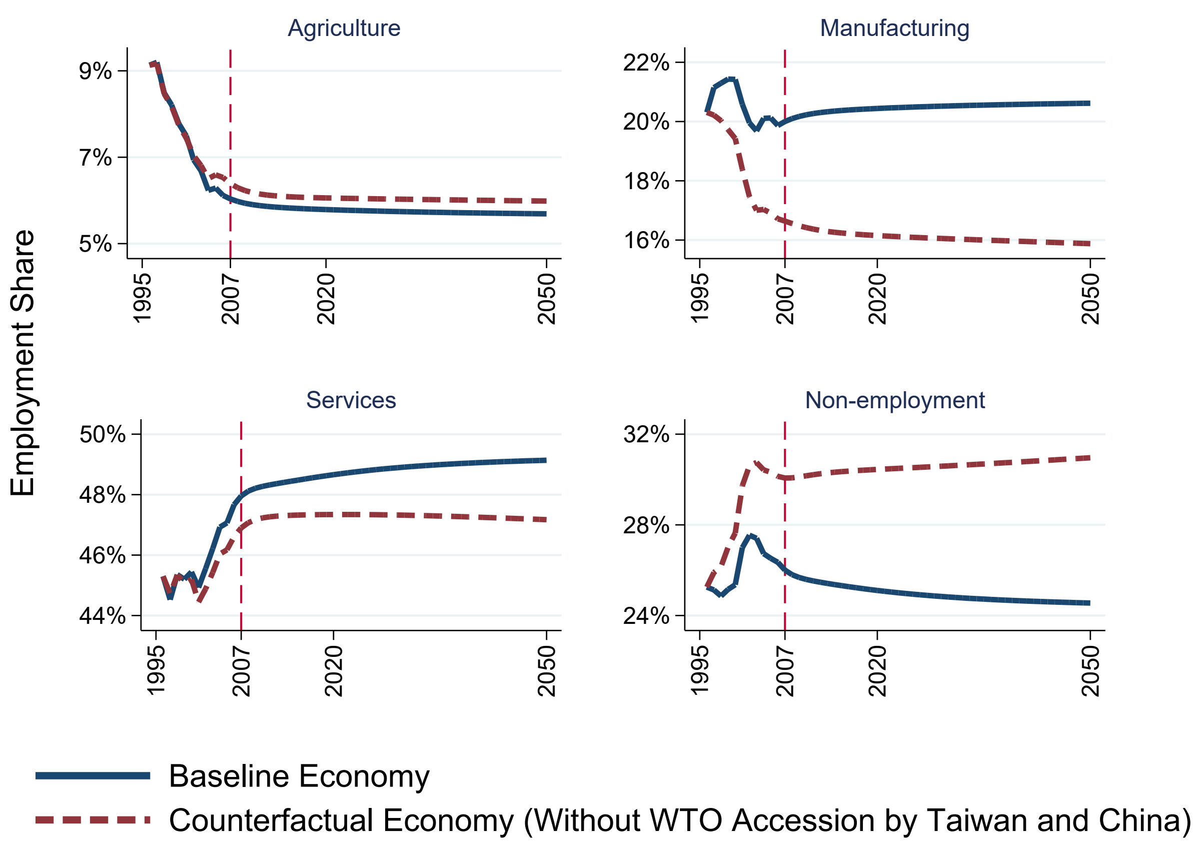
Notes: The figure shows the aggregate welfare effect of China's WTO entry on workers in the service sectors in economies other than Taiwan over the period of 1995–2020. The labor markets in economies other than Taiwan are country-sector specific. We aggregate the welfare effect across different sectors for each economy by using sectoral labor value added as weights. Data on value added are based on TiVA 2016, and data on labor share of value added are from Karabarbounis and Neiman (2014).

Figure B.13: Distribution of the welfare effects of China's WTO entry across economies and sectors



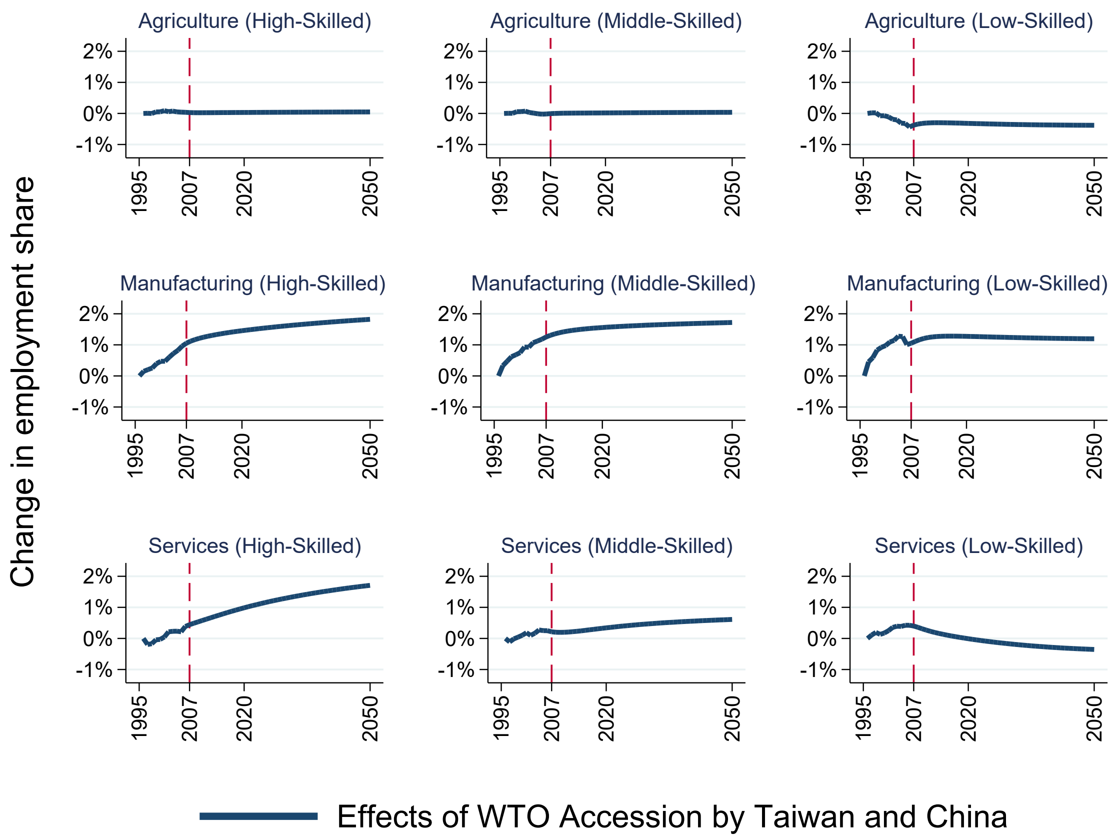
Notes: The figure shows the distribution of the welfare effects of China's WTO entry on workers across sectors and economies (other than Taiwan) over the period of 1995–2020. The labor markets in economies other than Taiwan are country-sector specific. In total, there are 1,320 such labor markets across economies (other than Taiwan). Labor markets with the largest and smallest changes in welfare due to China's WTO entry (above the 99th percentile and below the 1st percentile cutoffs) are dropped in each sub-figure.

Figure B.14: Transition dynamics of employment shares in Taiwan — combined effects of Taiwan's and China's WTO entry



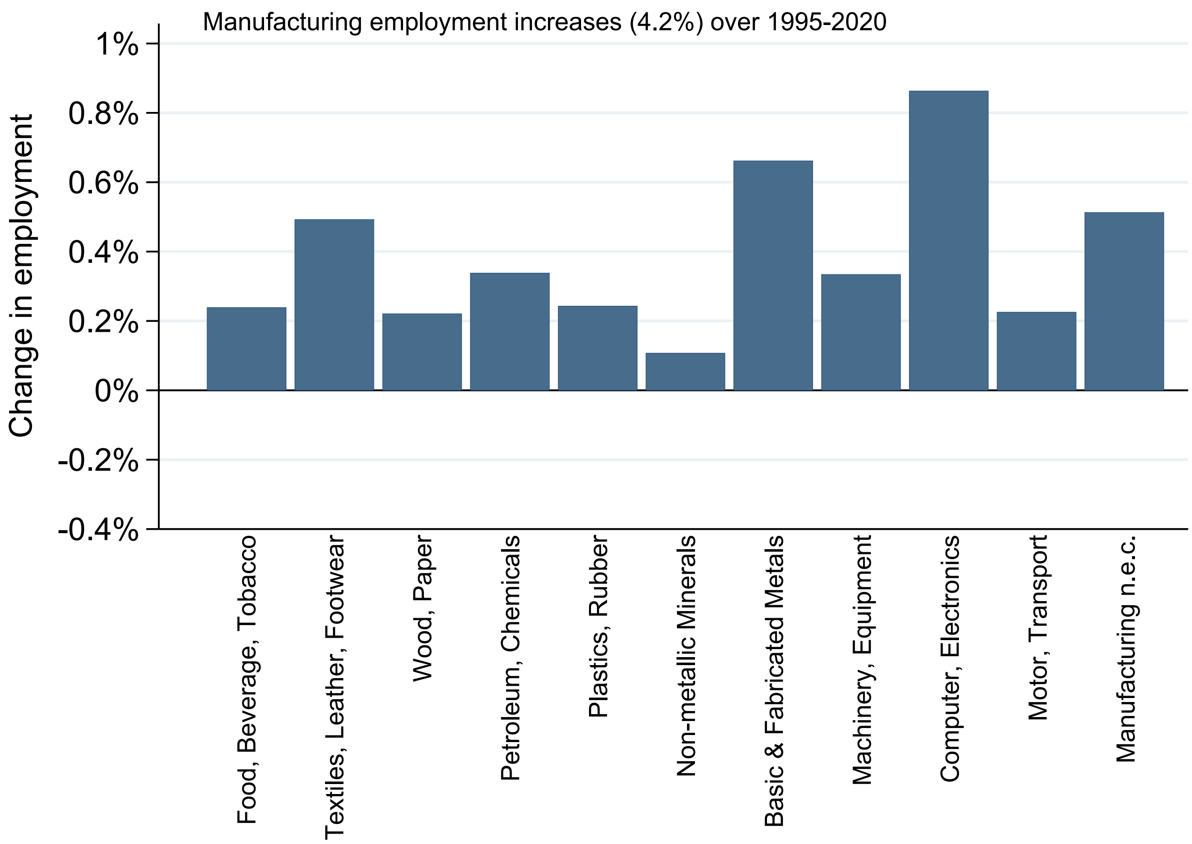
Notes: The figure shows the combined effects of Taiwan's and China's WTO entry on employment shares in Taiwan by aggregate sectors. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The baseline economy shows the path of employment shares with all time-varying fundamentals evolving as in the data from 1995 to 2007 and constant fundamentals after 2007. The counterfactual economy is the same except that Taiwan's and China's tariffs on imports and foreign tariffs on Taiwan's and China's exports are set to their levels in 1995. We simulate the model until 3000.

Figure B.15: Transition dynamics of employment shares in Taiwan by skill groups — combined effects of Taiwan's and China's WTO entry



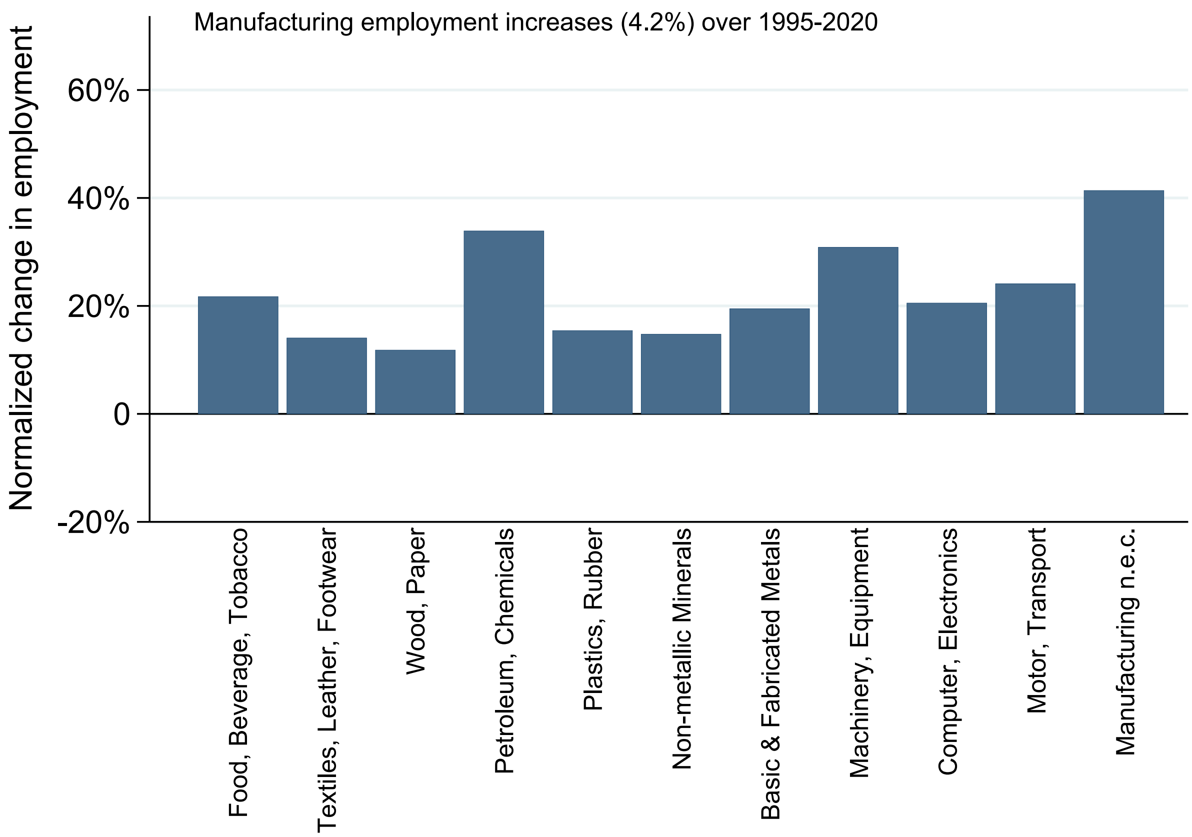
Notes: The figure shows the combined effects of Taiwan's and China's WTO entry on employment shares in Taiwan by aggregate sectors and skill groups. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The effect is calculated to be the difference between the baseline economy and the counterfactual economy. The baseline economy shows the path of employment shares with all time-varying fundamentals evolving as in the data from 1995 to 2007 and constant fundamentals after 2007. The counterfactual economy is the same except that Taiwan's and China's tariffs on imports and foreign tariffs on Taiwan's and China's exports are set to their levels in 1995. We simulate the model until 3000.

Figure B.16: Effects of Taiwan's and China's WTO entry on the employment shares of manufacturing sectors in Taiwan



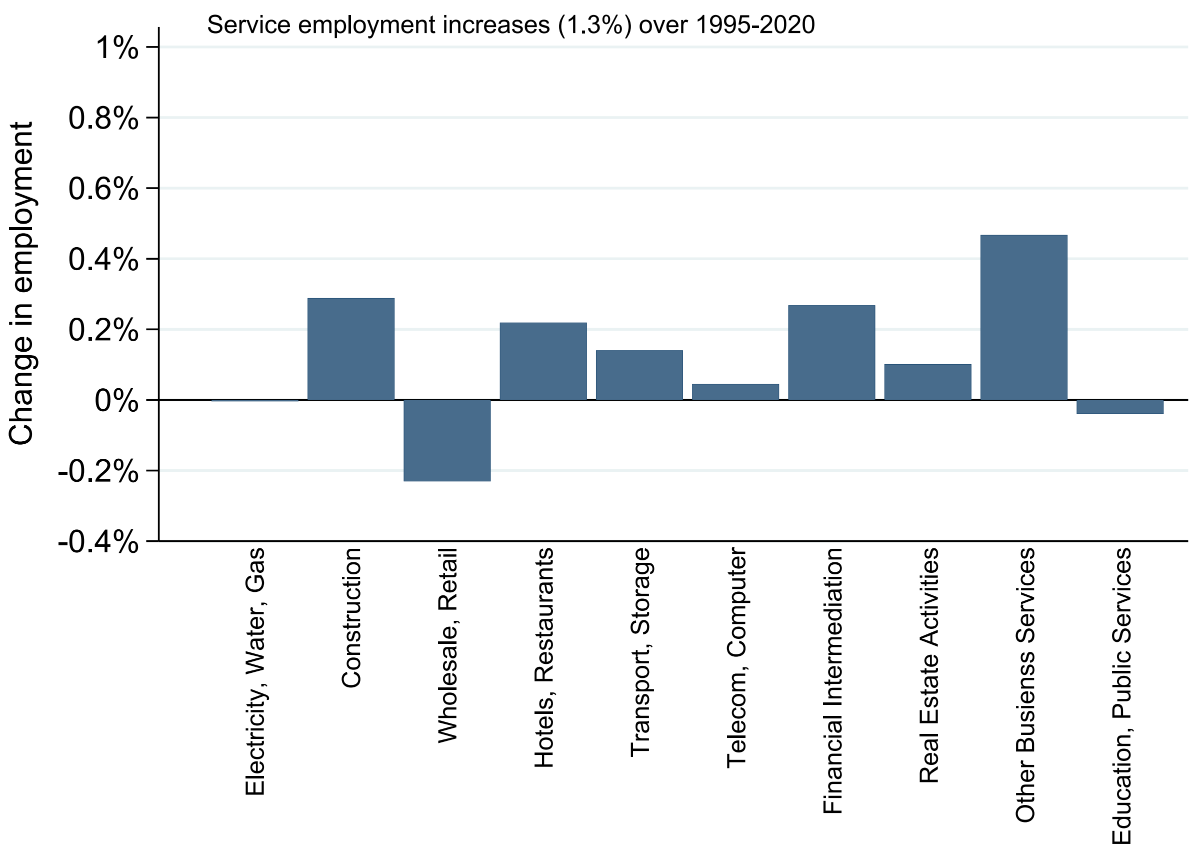
Notes: The figure shows the change in employment share for each manufacturing sector in Taiwan over the period of 1995–2020, due to both Taiwan's and China's WTO entry. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.14 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.17: Effects of Taiwan's and China's WTO entry on the employment shares of manufacturing sectors in Taiwan — normalized by sector size



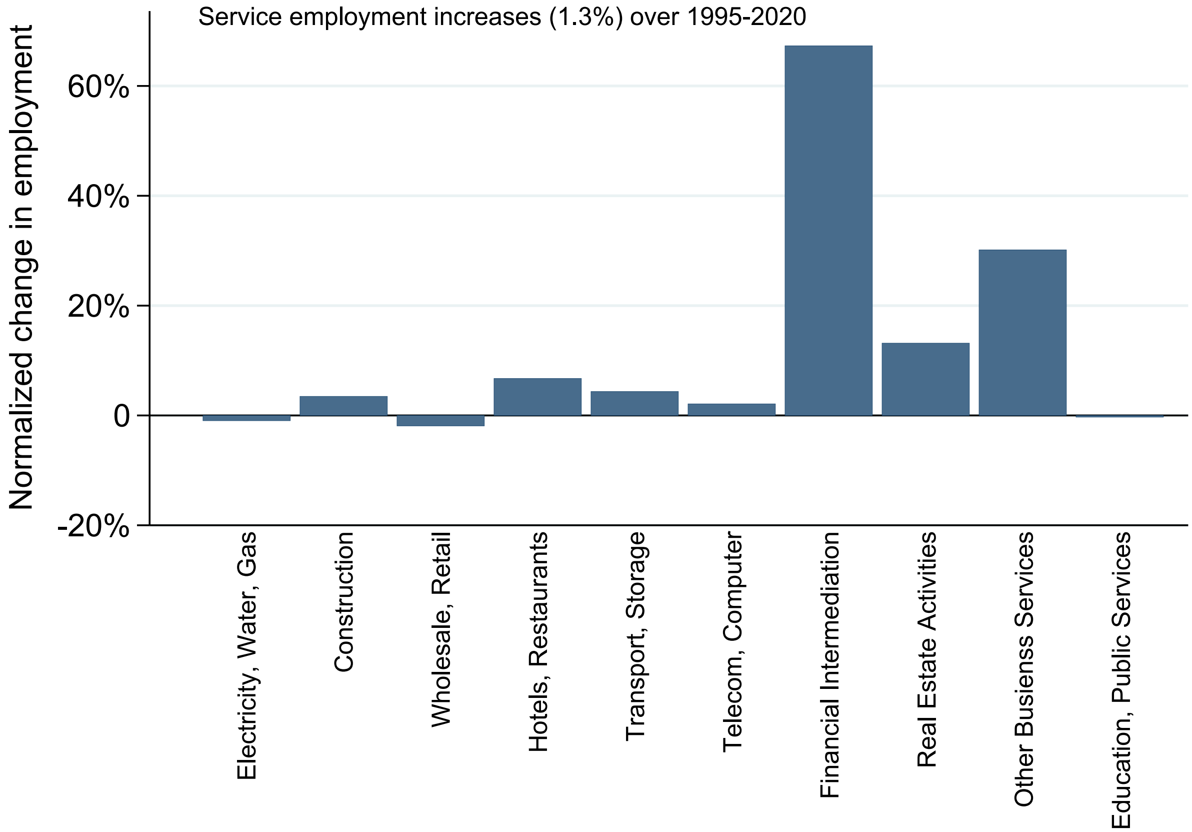
Notes: The figure shows the normalized change in employment share for each manufacturing sector in Taiwan over the period of 1995–2020, due to Taiwan's and China's WTO entry. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force) and normalized by the sectoral employment share in year 1995. The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.14 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.18: Effects of Taiwan's and China's WTO entry on the employment shares of service sectors in Taiwan



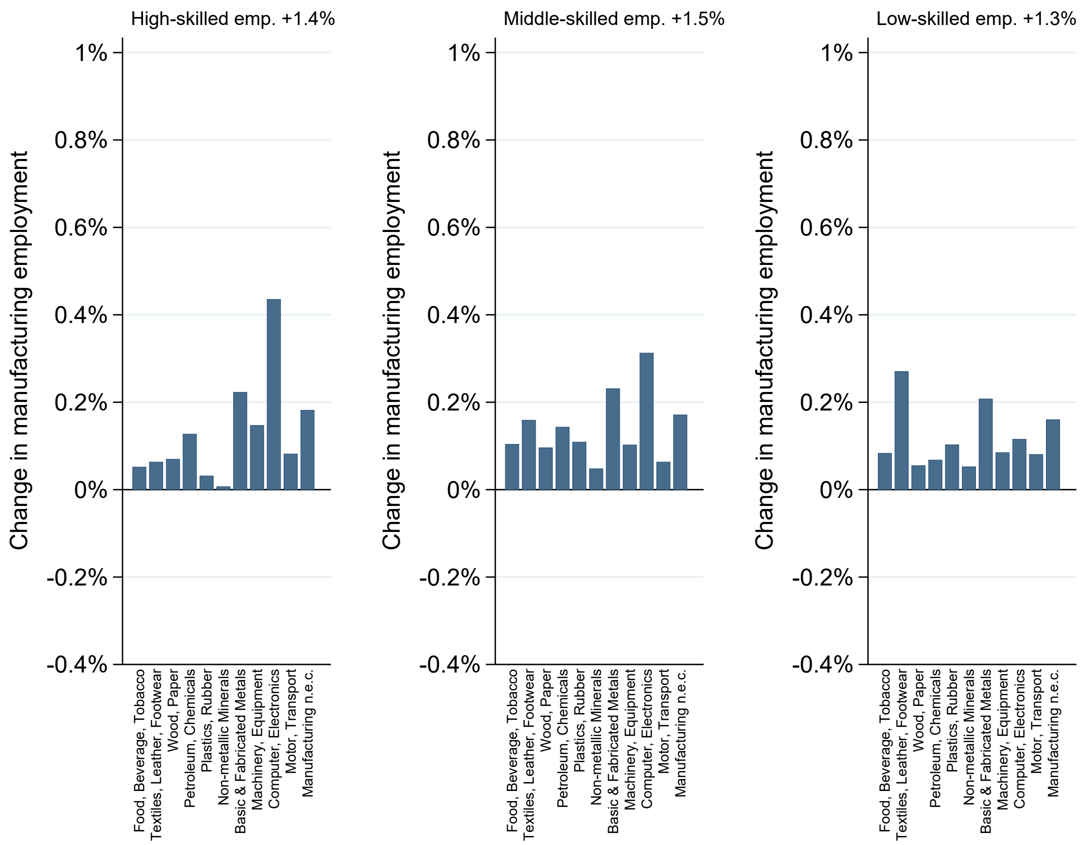
Notes: The figure shows the change in employment share for each service sector in Taiwan over the period of 1995–2020, due to both Taiwan's and China's WTO entry. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.14 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.19: Effects of Taiwan's and China's WTO entry on the employment shares of service sectors in Taiwan — normalized by sector size



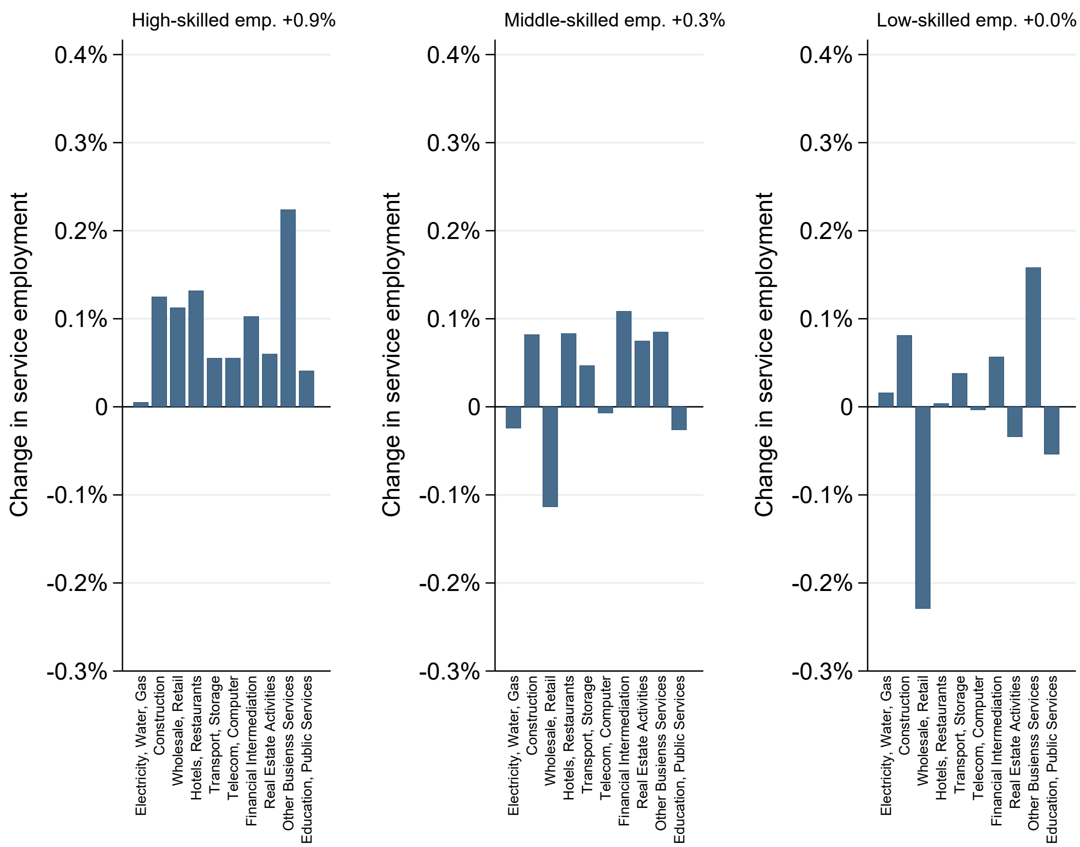
Notes: The figure shows the normalized change in employment share for each service sector in Taiwan over the period of 1995–2020, due to both Taiwan's and China's WTO entry. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force) and normalized by the sectoral employment share in year 1995. The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.14 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.20: Effects of Taiwan's and China's WTO entry on the employment shares of manufacturing sectors in Taiwan by skill groups



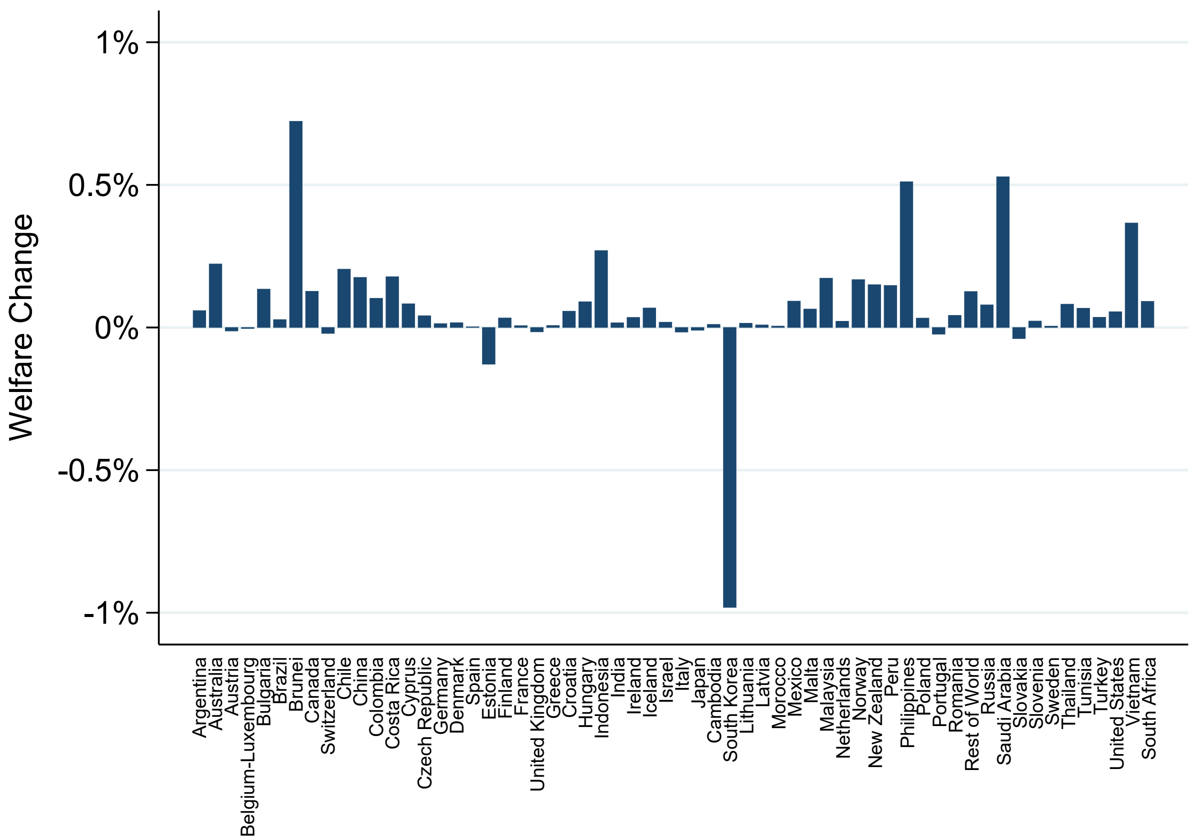
Notes: The figure shows the change in employment share by skill groups for each manufacturing sector in Taiwan over the period of 1995–2020, due to both Taiwan's and China's WTO entry. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.14 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.21: Effects of Taiwan's and China's WTO entry on the employment shares of service sectors in Taiwan by skill groups



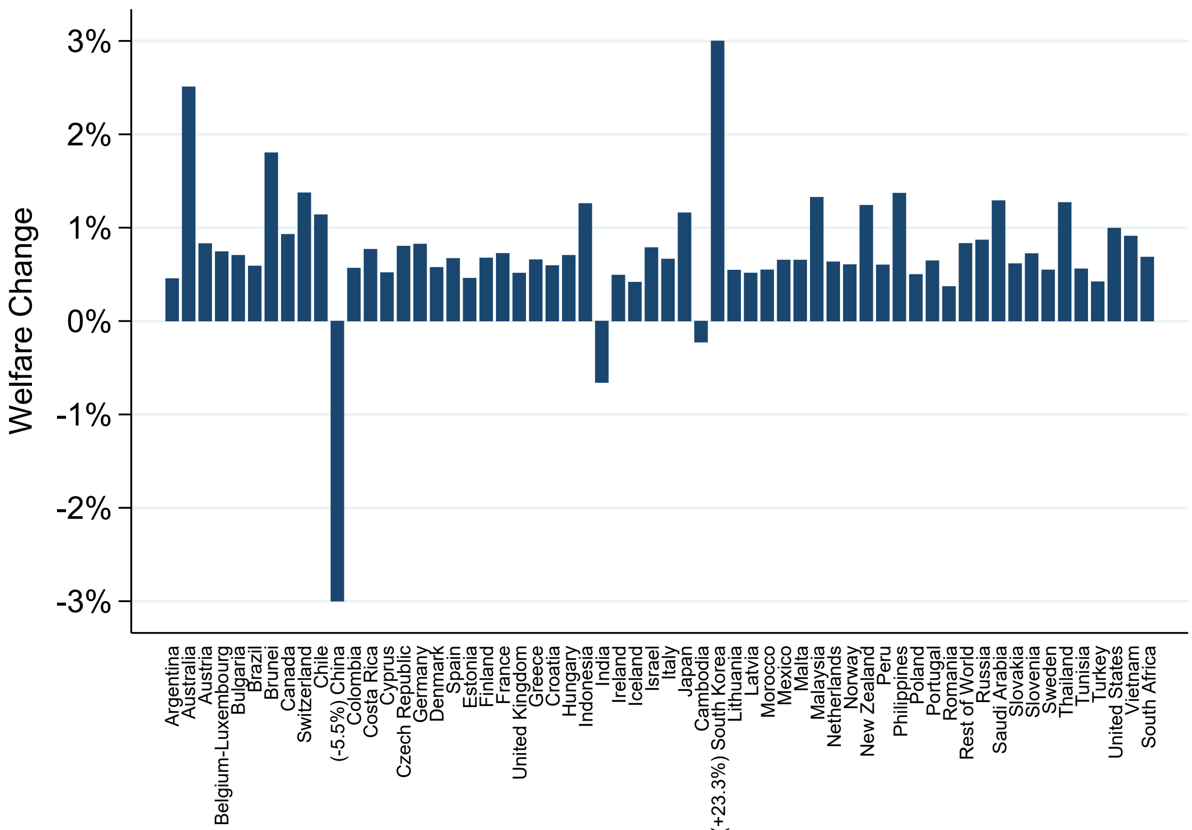
Notes: The figure shows the change in employment share by skill groups for each service sector in Taiwan over the period of 1995–2020, due to both Taiwan's and China's WTO entry. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.14 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.22: Welfare effects of Taiwan's and China's WTO entry across economies — aggregate



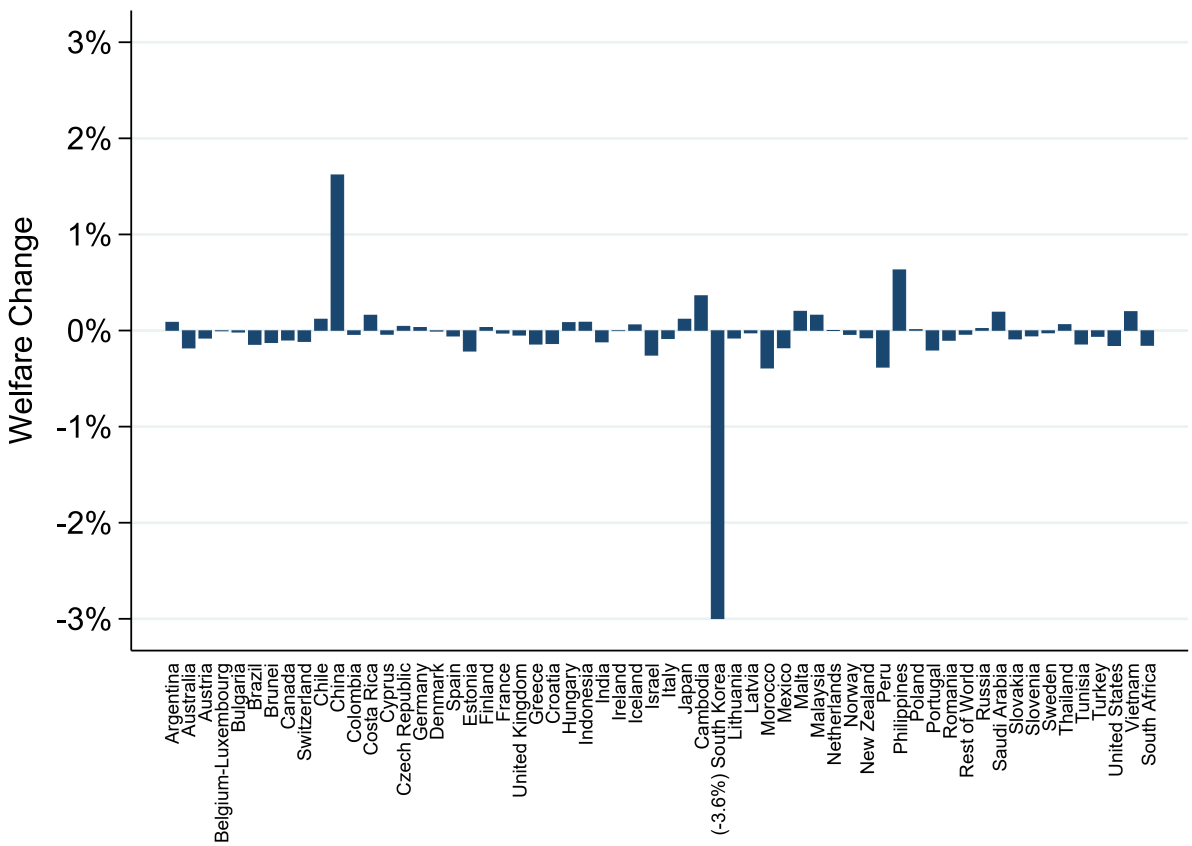
Notes: The figure shows the aggregate welfare effect of Taiwan's and China's WTO entry on workers in economies other than Taiwan over the period of 1995–2020. The labor markets in economies other than Taiwan are country-sector specific. We aggregate the welfare effect across different sectors for each economy by using sectoral labor value added as weights. Data on value added are based on TiVA 2016, and data on labor share of value added are from Karabarbounis and Neiman (2014).

Figure B.23: Welfare effects of Taiwan's and China's WTO entry across economies — agriculture



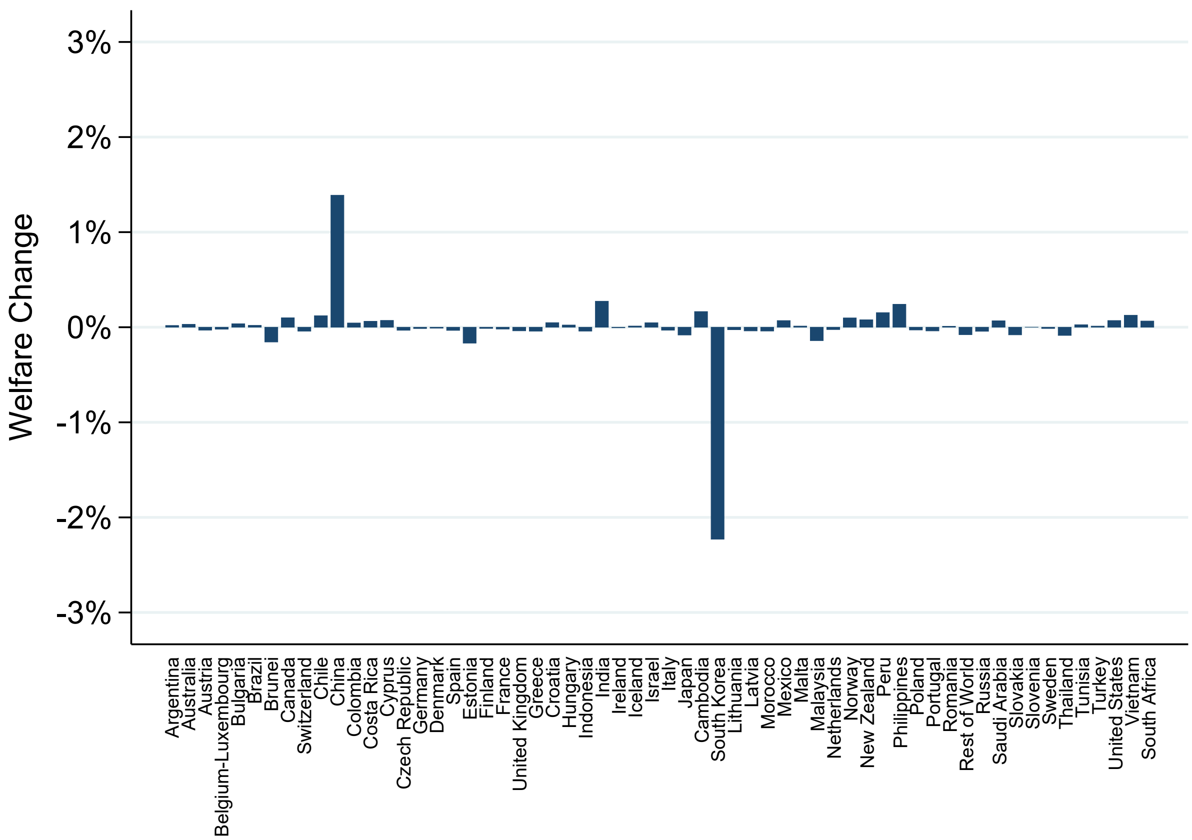
Notes: The figure shows the welfare effect of Taiwan's and China's WTO entry on workers in the agriculture sector in economies other than Taiwan over the period of 1995–2020. The labor markets in economies other than Taiwan are country-sector specific.

Figure B.24: Welfare effects of Taiwan's and China's WTO entry across economies — manufacturing



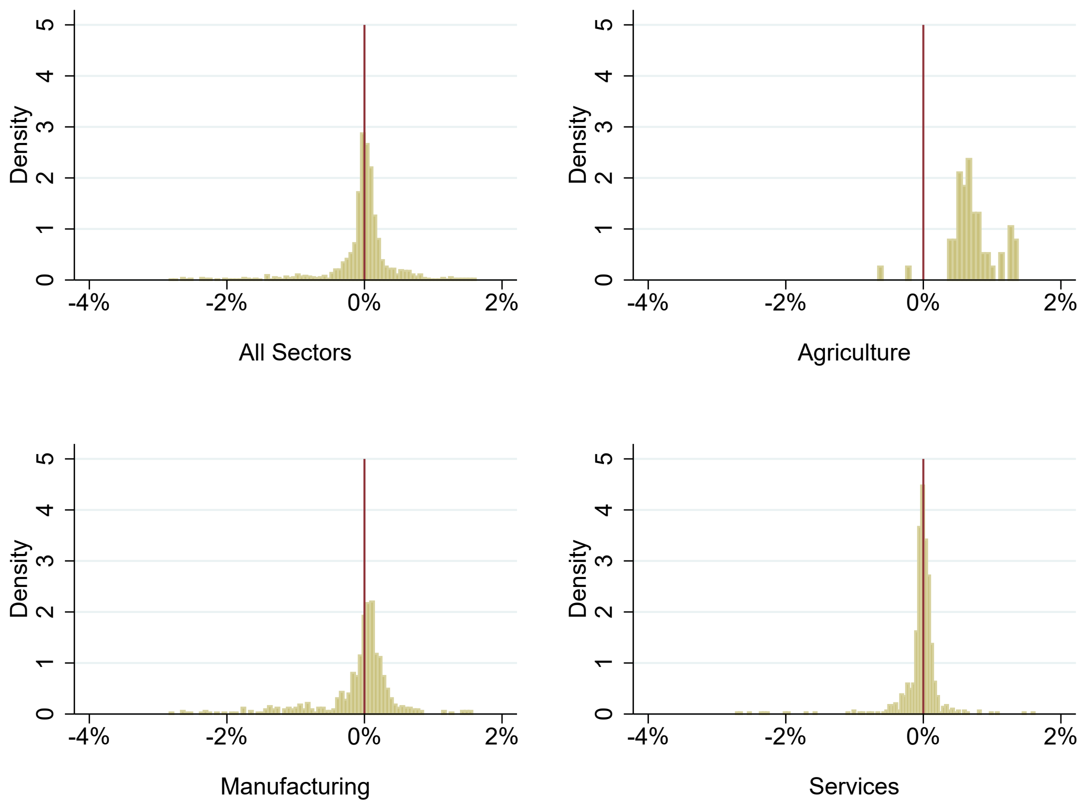
Notes: The figure shows the aggregate welfare effect of Taiwan's and China's WTO entry on workers in the manufacturing sectors in economies other than Taiwan over the period of 1995–2020. The labor markets in economies other than Taiwan are country-sector specific. We aggregate the welfare effect across different sectors for each economy by using sectoral labor value added as weights. Data on value added are based on TiVA 2016, and data on labor share of value added are from Karabarbounis and Neiman (2014).

Figure B.25: Welfare effects of Taiwan's and China's WTO entry across economies — services



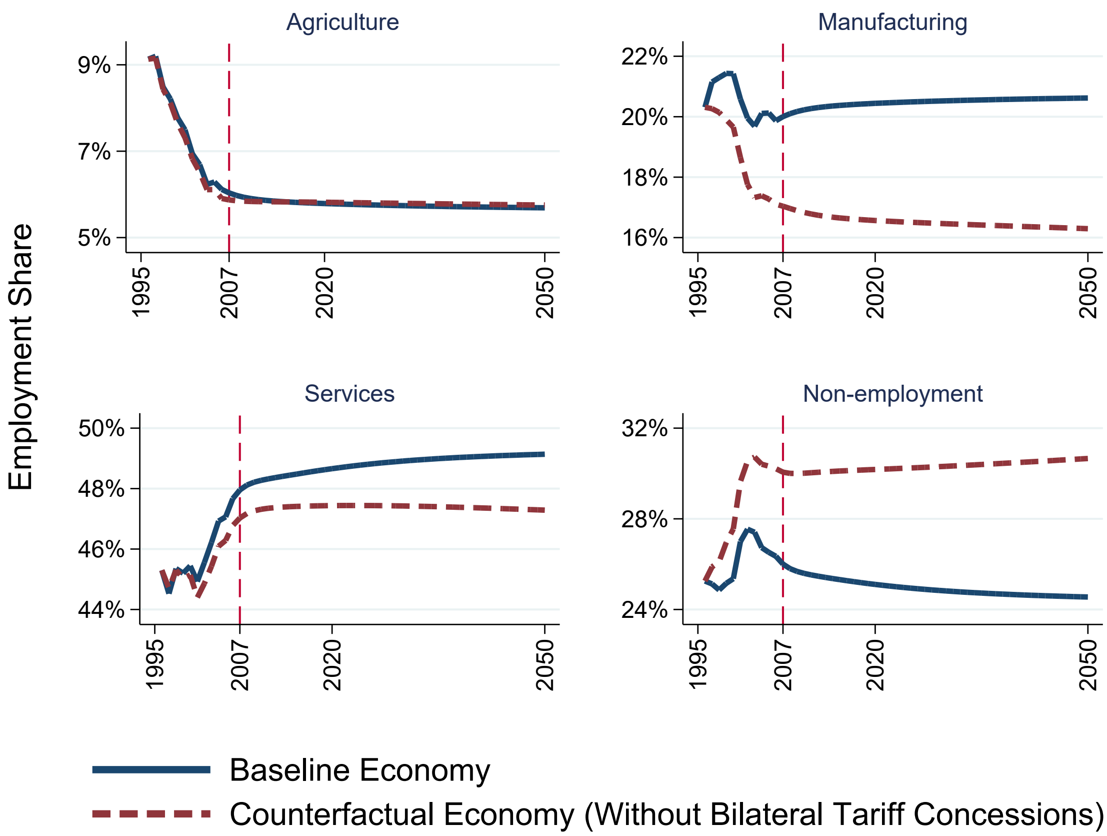
Notes: The figure shows the aggregate welfare effect of both Taiwan's and China's WTO entry on workers in the service sectors in economies other than Taiwan over the period of 1995–2020. The labor markets in economies other than Taiwan are country-sector specific. We aggregate the welfare effect across different sectors for each economy by using sectoral labor value added as weights. Data on value added are based on TiVA 2016, and data on labor share of value added are from Karabarbounis and Neiman (2014).

Figure B.26: Distribution of the welfare effects of Taiwan's and China's WTO entry across economies and sectors



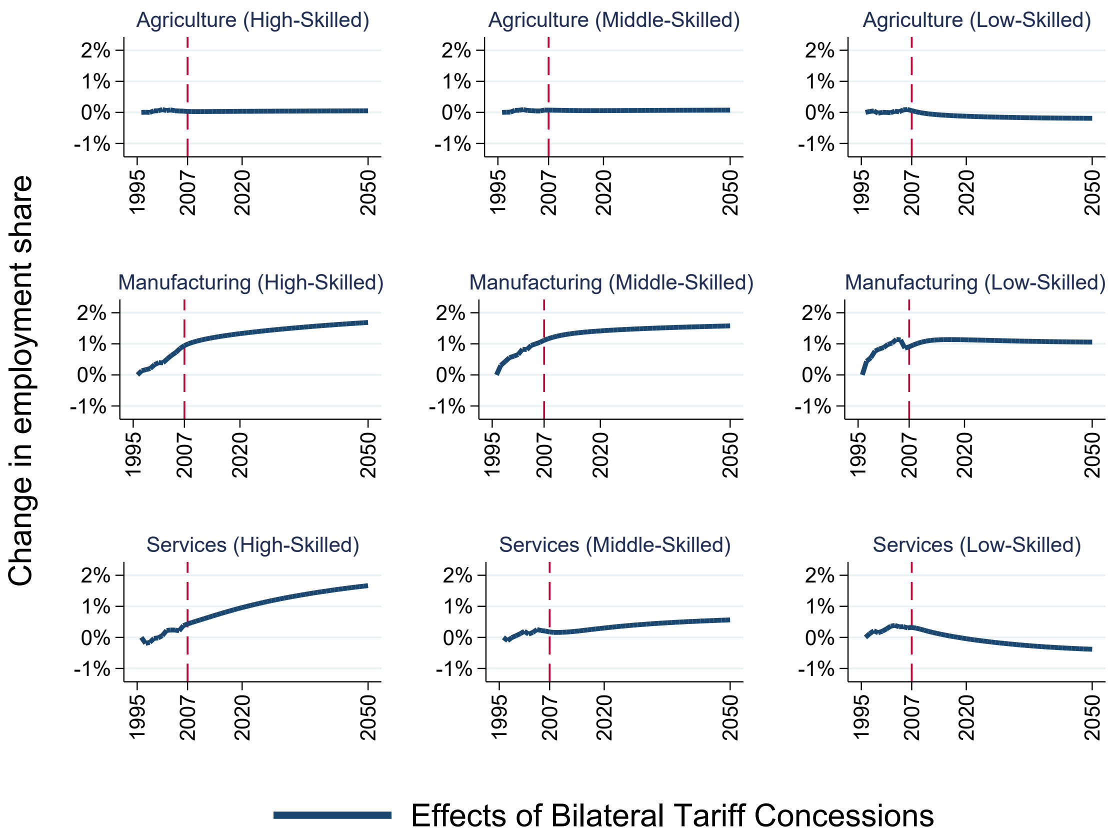
Notes: The figure shows the distribution of the welfare effects of Taiwan's and China's WTO entry on workers across sectors and economies (other than Taiwan) over the period of 1995–2020. The labor markets in economies other than Taiwan are country-sector specific. In total, there are 1,320 such labor markets across economies (other than Taiwan). Labor markets with the largest and smallest changes in welfare due to Taiwan's and China's WTO entry (above the 99th percentile and below the 1st percentile cutoffs) are dropped in each sub-figure.

Figure B.27: Transition dynamics of employment shares in Taiwan — effects of bilateral tariff concessions



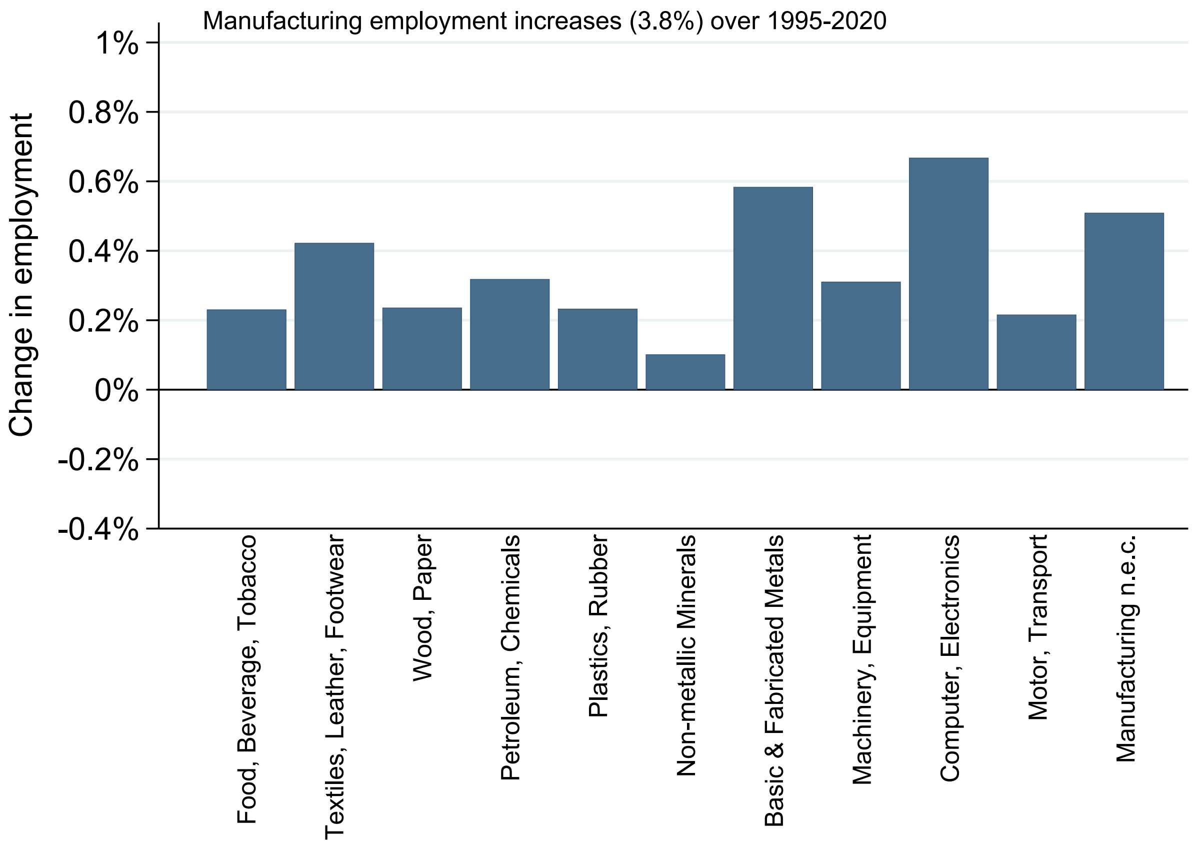
Notes: The figure shows the effect of bilateral tariff concessions between Taiwan and China on employment shares in Taiwan by aggregate sectors. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The baseline economy shows the path of employment shares with all time-varying fundamentals evolving as in the data from 1995 to 2007 and constant fundamentals after 2007. The counterfactual economy is the same except that China's tariffs on imports from Taiwan and Taiwan's tariffs on imports from China are set to their levels in 1995. We simulate the model until 3000.

Figure B.28: Transition dynamics of employment shares in Taiwan by skill groups — effects of bilateral tariff concessions



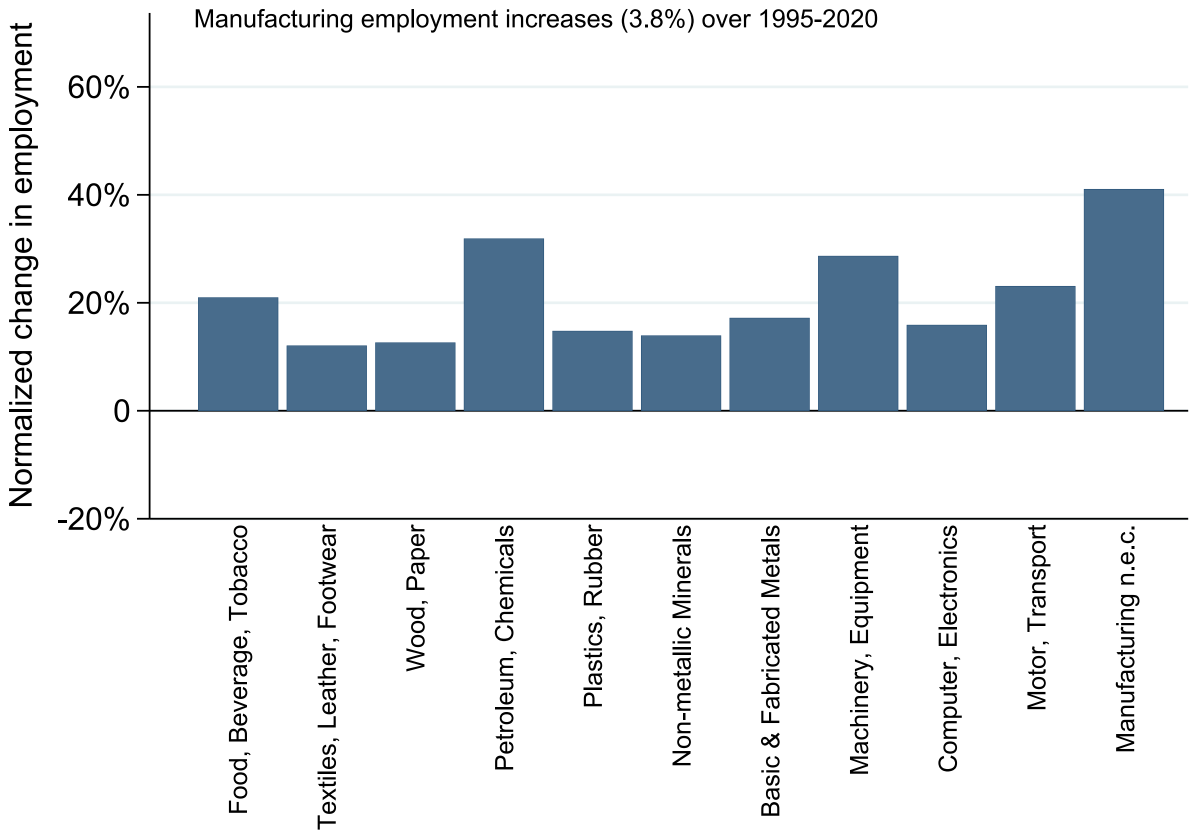
Notes: The figure shows the effect of bilateral tariff concessions between Taiwan and China on employment shares in Taiwan by aggregate sectors and skill groups. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The effect is calculated to be the difference between the baseline economy and the counterfactual economy. The baseline economy shows the path of employment shares with all time-varying fundamentals evolving as in the data from 1995 to 2007 and constant fundamentals after 2007. The counterfactual economy is the same except that China's tariffs on imports from Taiwan and Taiwan's tariffs on imports from China are set to their levels in 1995. We simulate the model until 3000.

Figure B.29: Effects of bilateral tariff concessions on the employment shares of manufacturing sectors in Taiwan



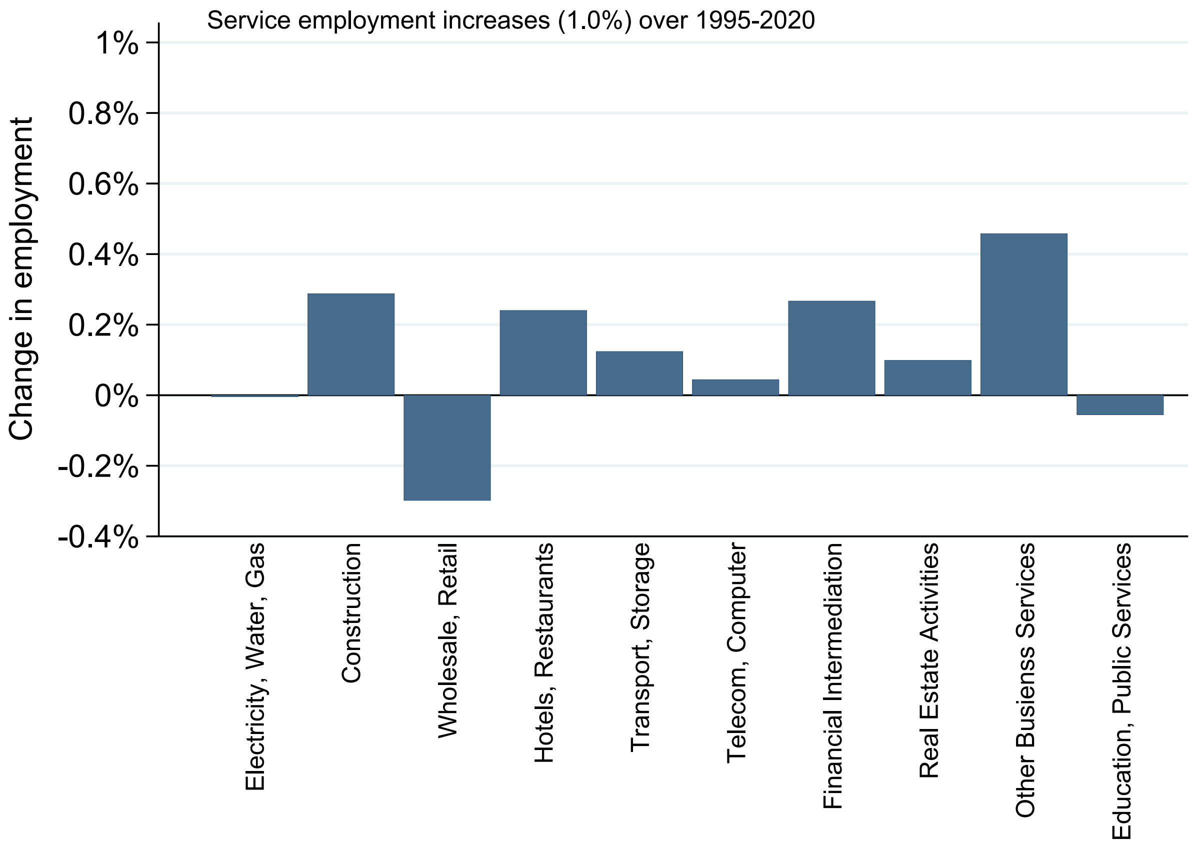
Notes: The figure shows the change in employment share for each manufacturing sector in Taiwan over the period of 1995–2020, due to bilateral tariff concessions between Taiwan and China. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.27 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.30: Effects of bilateral tariff concessions on the employment shares of manufacturing sectors in Taiwan — normalized by sector size



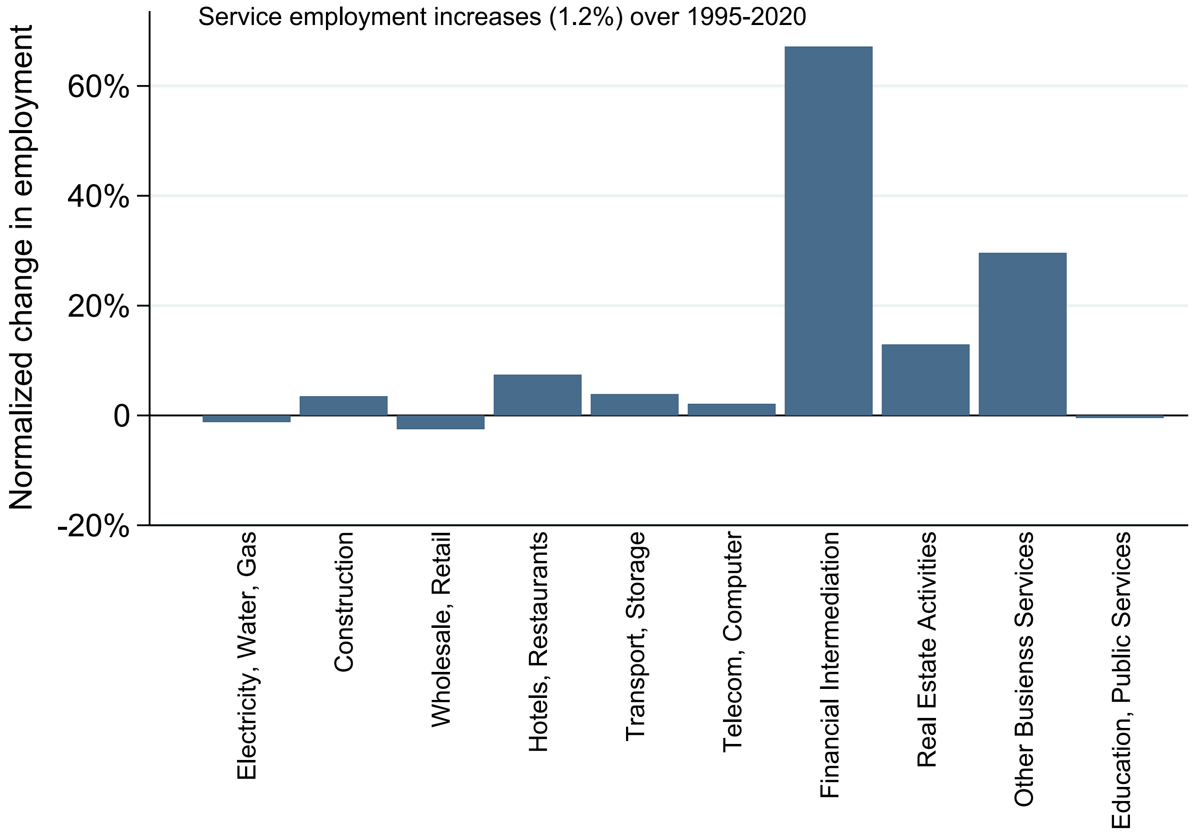
Notes: The figure shows the normalized change in employment share for each manufacturing sector in Taiwan over the period of 1995–2020, due to bilateral tariff concessions between Taiwan and China. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force) and normalized by the sectoral employment share in year 1995. The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.27 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.31: Effects of bilateral tariff concessions on the employment shares of service sectors in Taiwan



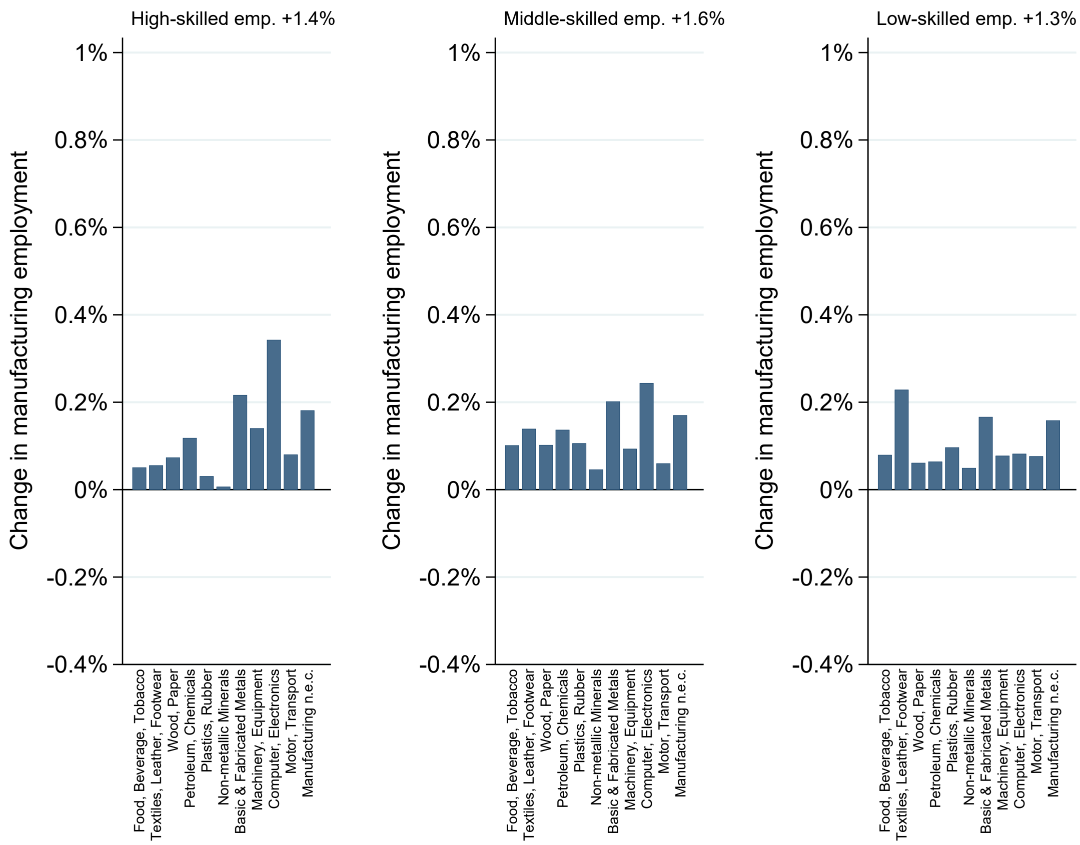
Notes: The figure shows the change in employment share for each service sector in Taiwan over the period of 1995–2020, due to bilateral tariff concessions between Taiwan and China. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.27 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.32: Effects of bilateral tariff concessions on the employment shares of service sectors in Taiwan — normalized by sector size



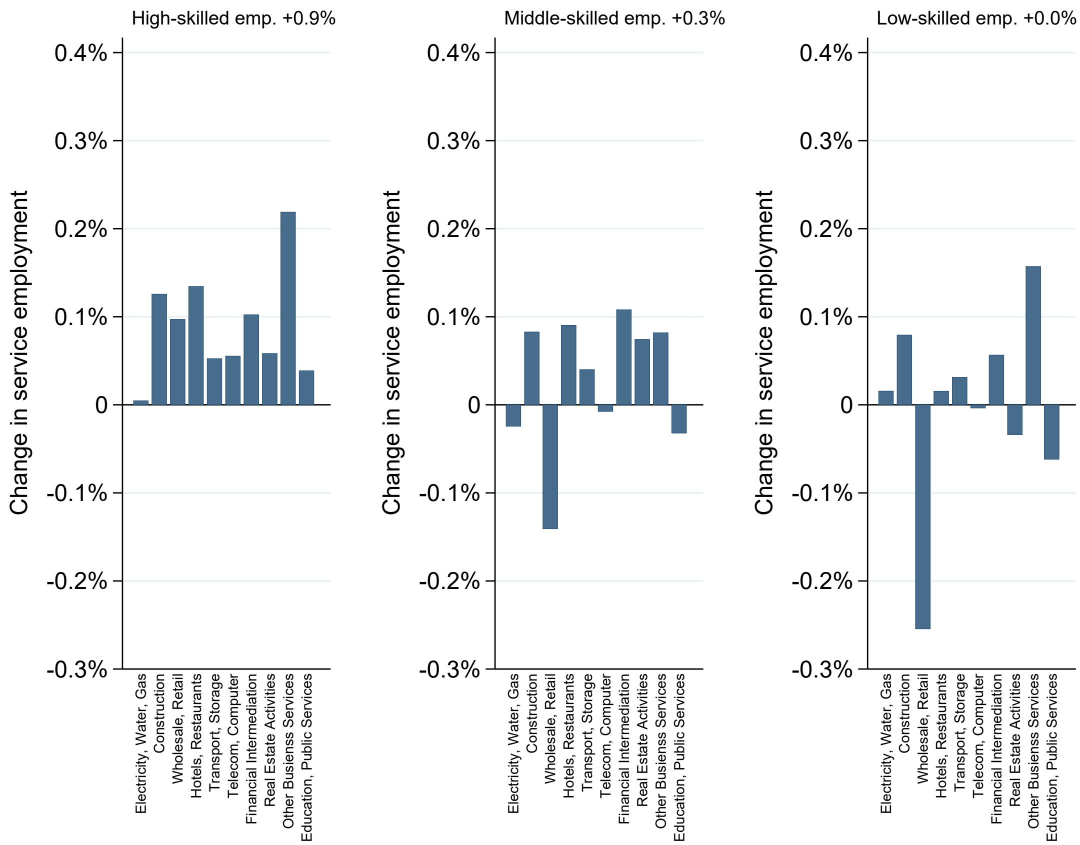
Notes: The figure shows the normalized change in employment share for each service sector in Taiwan over the period of 1995–2020, due to bilateral tariff concessions between Taiwan and China. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force) and normalized by the sectoral employment share in year 1995. The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.27 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.33: Effects of bilateral tariff concessions on the employment shares of manufacturing sectors in Taiwan by skill groups



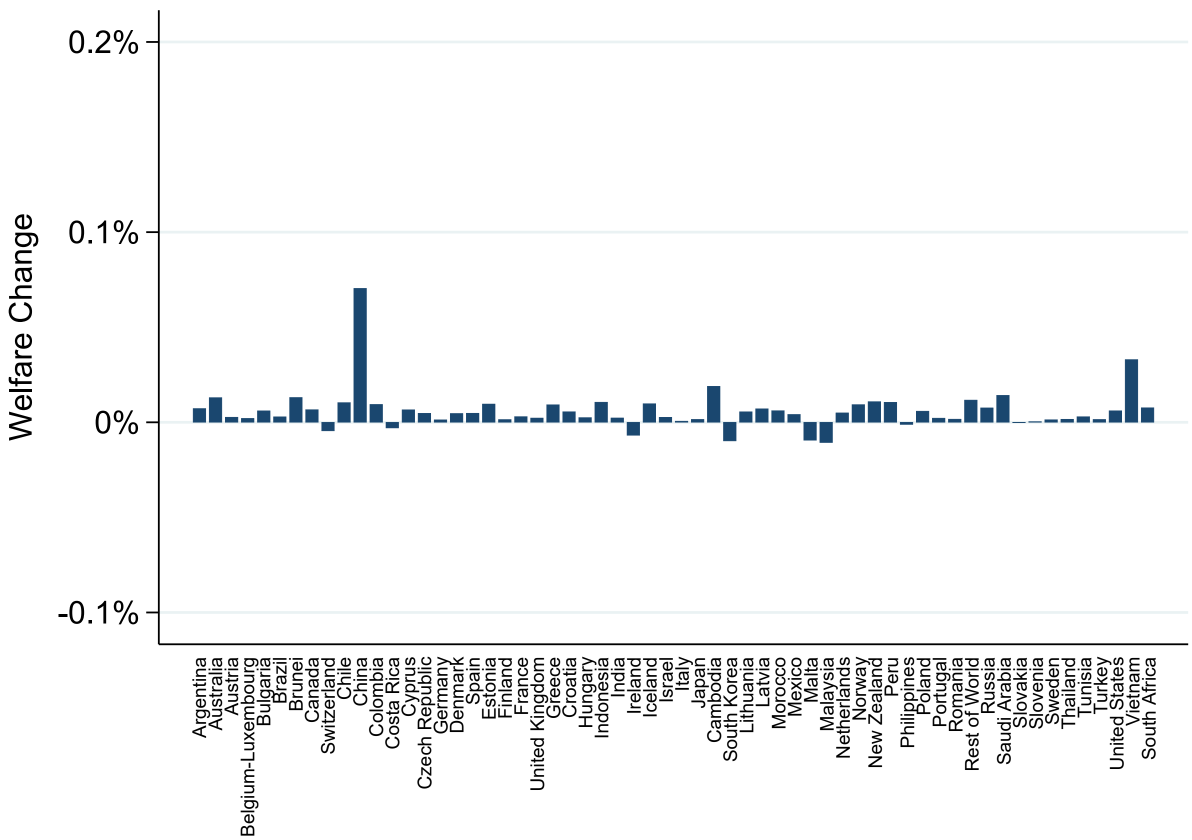
Notes: The figure shows the change in employment share by skill groups for each manufacturing sector in Taiwan over the period of 1995–2020, due to bilateral tariff concessions between Taiwan and China. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.27 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.34: Effects of bilateral tariff concessions on the employment shares of service sectors in Taiwan by skill groups



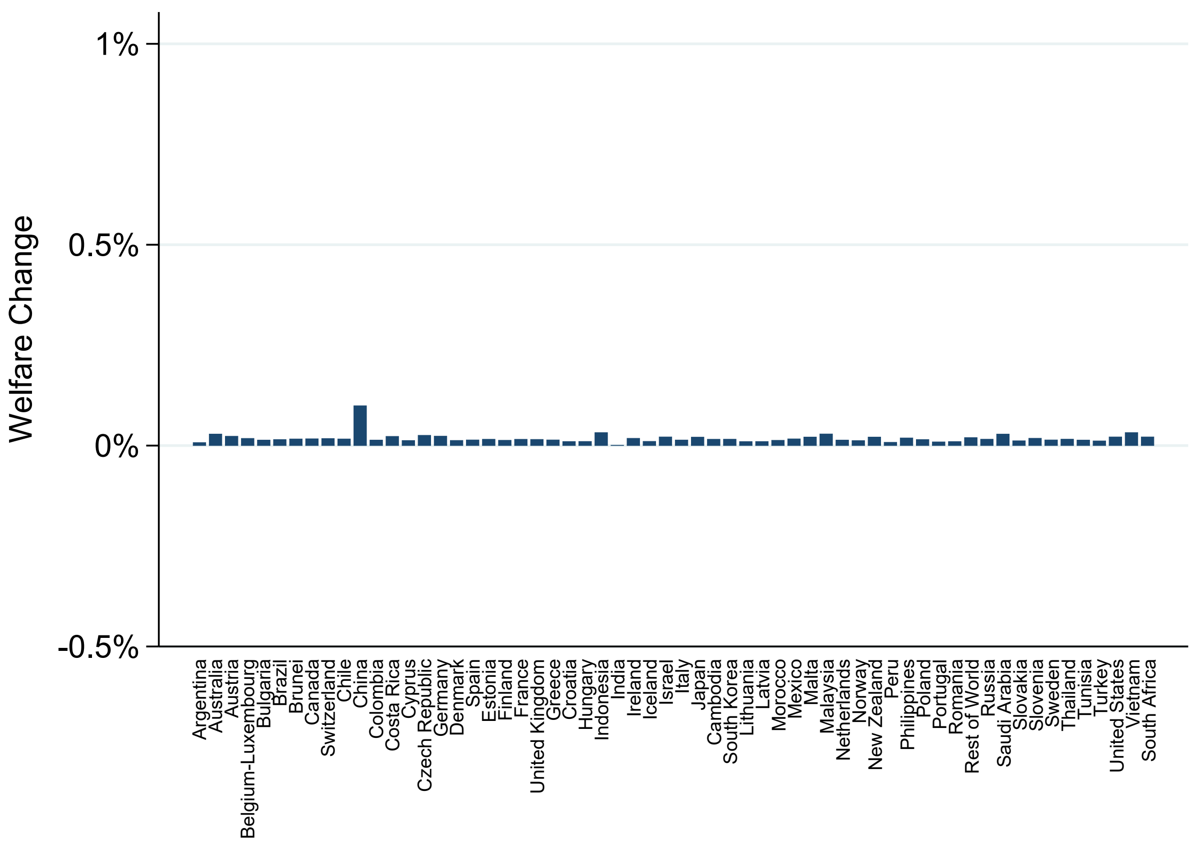
Notes: The figure shows the change in employment share by skill groups for each service sector in Taiwan over the period of 1995–2020, due to bilateral tariff concessions between Taiwan and China. The change in employment shares is measured in terms of shares of total population (employed, unemployed, plus not-in-labor-force). The effect is calculated to be the difference between the baseline economy and the counterfactual economy. See Figure B.27 footnote for the definitions of the baseline and the counterfactual economy.

Figure B.35: Welfare effects of bilateral tariff concessions across economies — aggregate



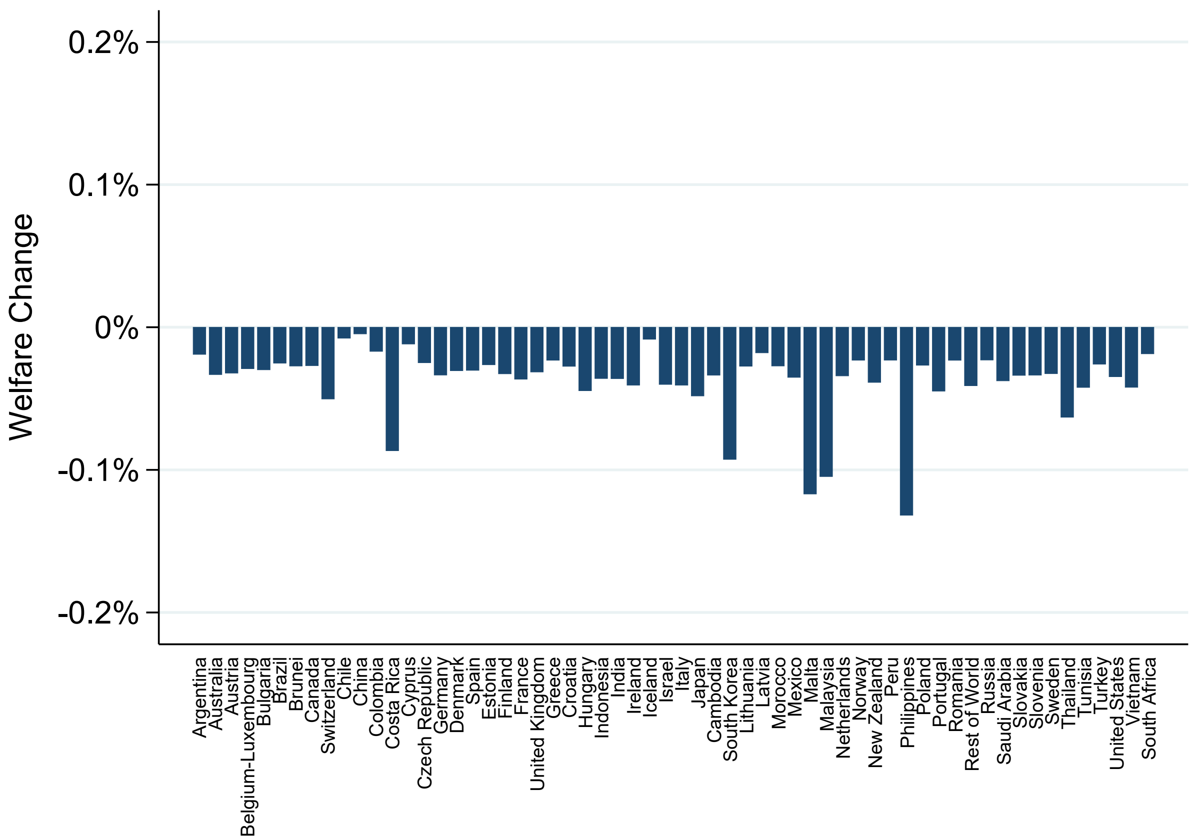
Notes: The figure shows the aggregate welfare effect of bilateral tariff concessions between Taiwan and China on workers in economies other than Taiwan over the period of 1995–2020. The labor markets in economies other than Taiwan are country-sector specific. We aggregate the welfare effect across different sectors for each economy by using sectoral labor value added as weights. Data on value added are based on TiVA 2016, and data on labor share of value added are from Karabarbounis and Neiman (2014).

Figure B.36: Welfare effects of bilateral tariff concessions across economies — agriculture



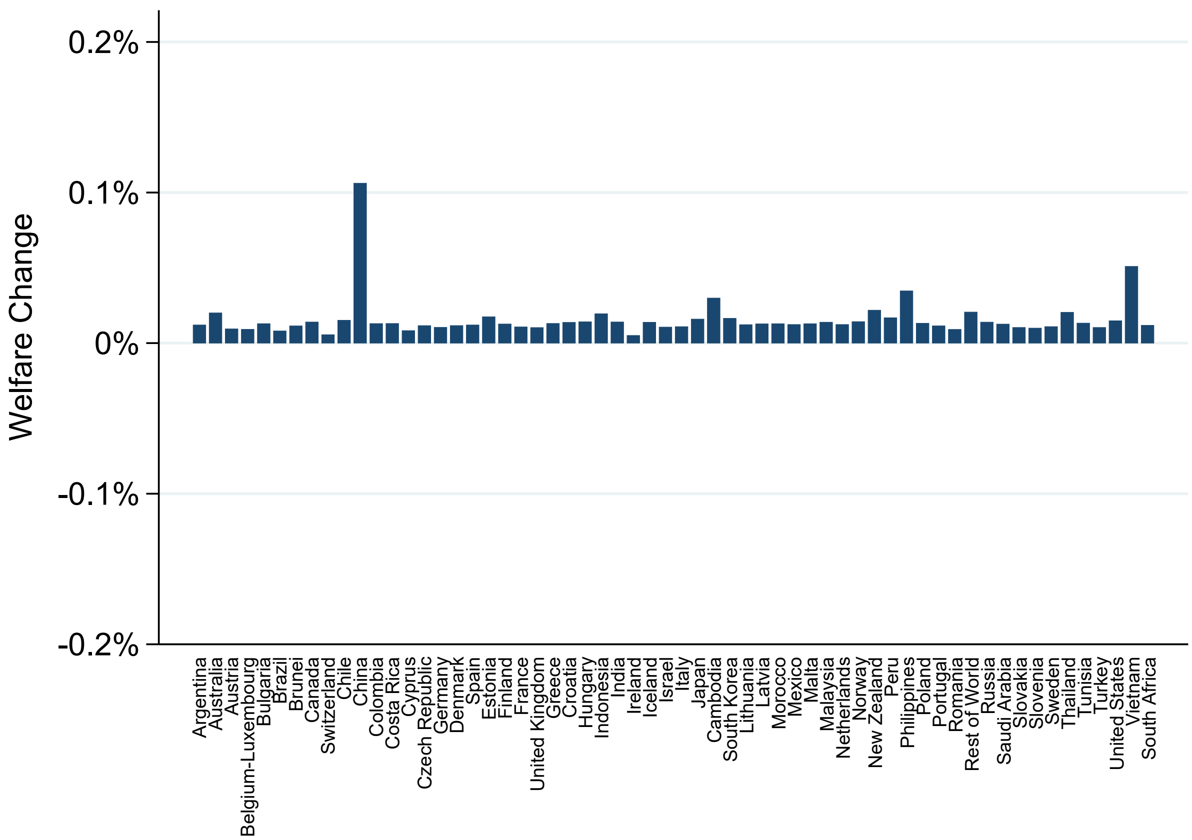
Notes: The figure shows the welfare effect of bilateral tariff concessions between Taiwan and China on workers in the agriculture sector in economies other than Taiwan over the period of 1995–2020. The labor markets in economies other than Taiwan are country-sector specific.

Figure B.37: Welfare effects of bilateral tariff concessions across economies — manufacturing



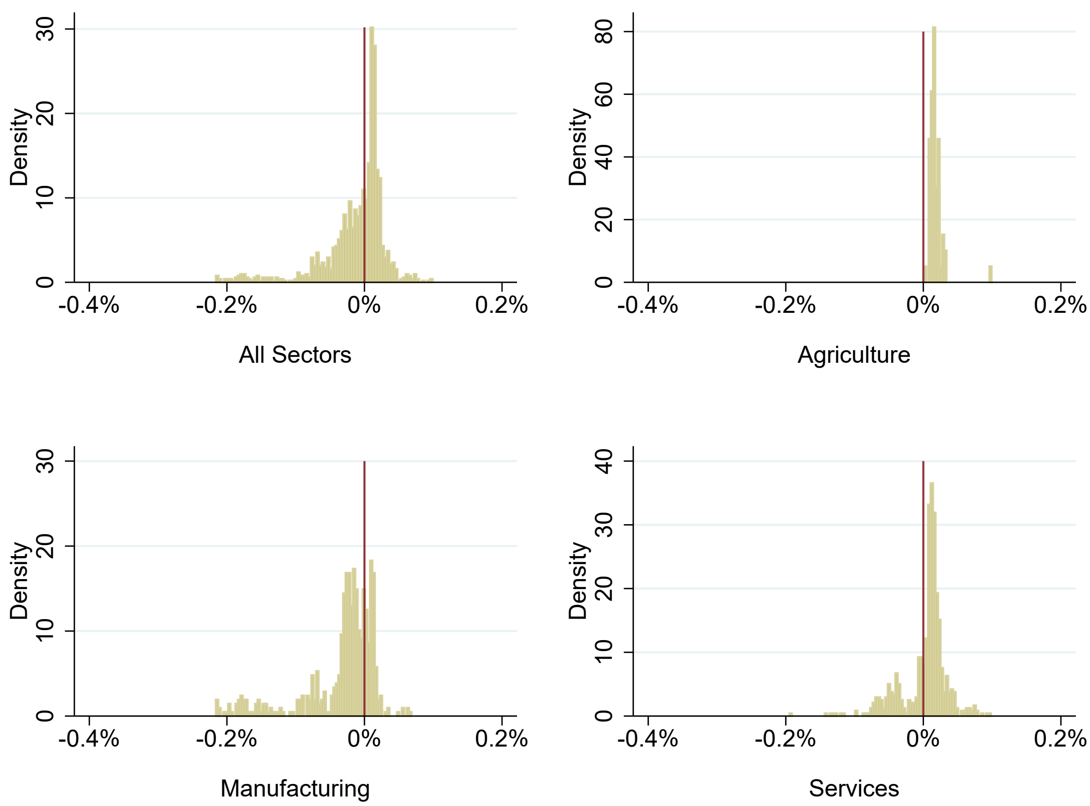
Notes: The figure shows the aggregate welfare effect of bilateral tariff concessions between Taiwan and China on workers in the manufacturing sectors in economies other than Taiwan over the period of 1995–2020. The labor markets in economies other than Taiwan are country-sector specific. We aggregate the welfare effect across different sectors for each economy by using sectoral labor value added as weights. Data on value added are based on TiVA 2016, and data on labor share of value added are from Karabarbounis and Neiman (2014).

Figure B.38: Welfare effects of bilateral tariff concessions across economies — services



Notes: The figure shows the aggregate welfare effect of bilateral tariff concessions between Taiwan and China on workers in the service sectors in economies other than Taiwan over the period of 1995–2020. The labor markets in economies other than Taiwan are country-sector specific. We aggregate the welfare effect across different sectors for each economy by using sectoral labor value added as weights. Data on value added are based on TiVA 2016, and data on labor share of value added are from Karabarbounis and Neiman (2014).

Figure B.39: Distribution of the welfare effects of bilateral tariff concessions across economies and sectors



Notes: The figure shows the distribution of the welfare effects of bilateral tariff concessions between Taiwan and China on workers across sectors and economies (other than Taiwan) over the period of 1995–2020. The labor markets in economies other than Taiwan are country-sector specific. In total, there are 1,320 such labor markets across economies (other than Taiwan). Labor markets with the largest and smallest changes in welfare due to bilateral tariff concessions between Taiwan and China (above the 99th percentile and below the 1st percentile cutoffs) are dropped in each sub-figure.