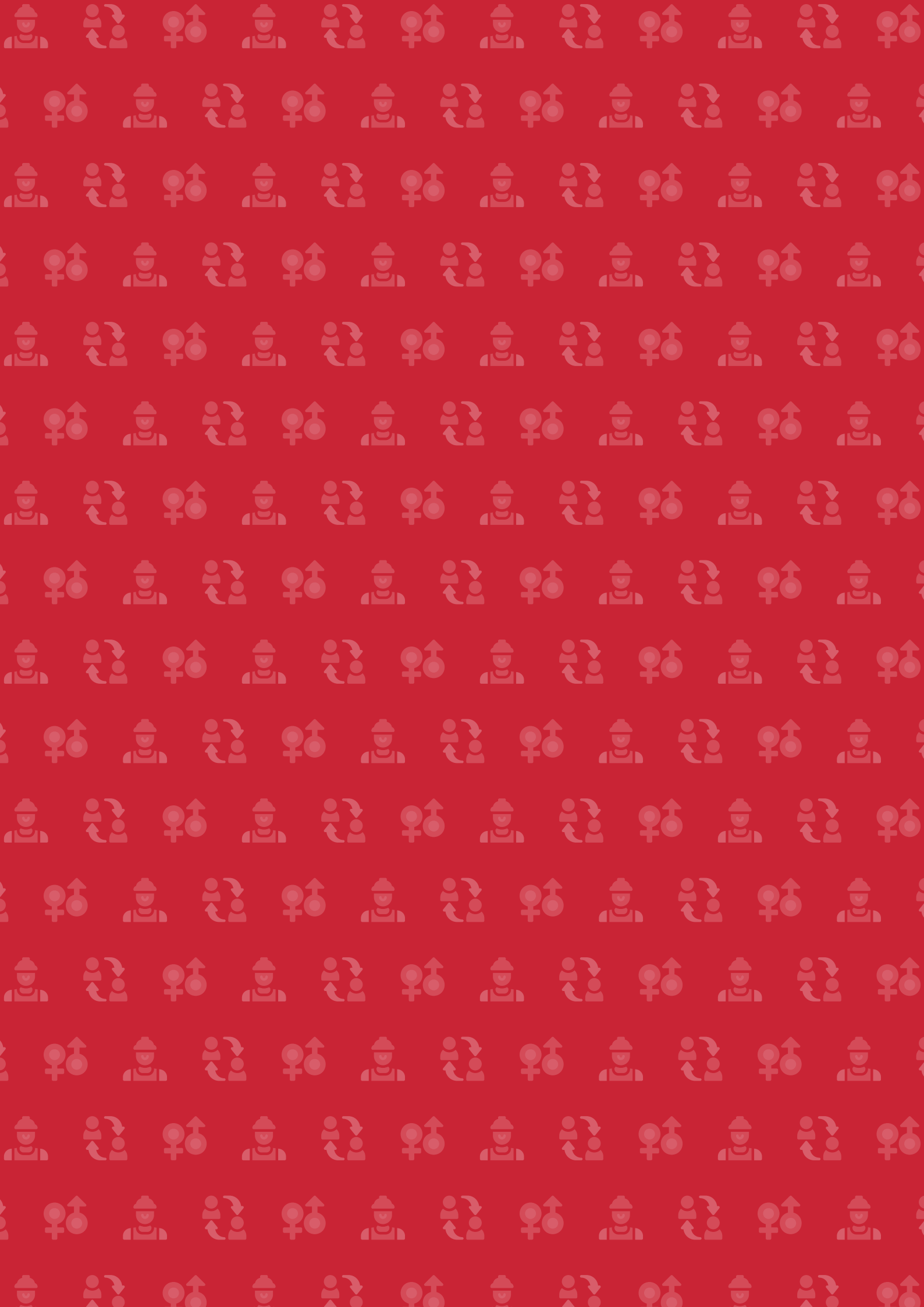
CIPS
Center for Indonesian Policy Studies

WORKING PAPER NO. 3

Trade and Gendered Labor Outcomes: Evidence from Changing Export Demand in Indonesia

by **Donny Pasaribu**, **Ridho Al Izzati**, and **Joseph Marshan**

www. cips-indonesia.org



Working Paper No. 3

Trade and Gendered Labor Outcomes: Evidence from Changing Export Demand in Indonesia[1]

Authors:

Donny Pasaribu (Center for Indonesian Policy Studies)

Ridho Al Izzati (SMERU Research Institute)

Joseph Marshan (Australian National University and University of Canberra)

Jakarta, Indonesia

November, 2024

[1] This publication is based on research supported by the Templeton World Charity Foundation, Inc. (funder DOI 501100011730) under the grant https://doi.org/10.54224/30486. This paper does not reflect the view of the Templeton World Charity Foundation or CIPS. We thank Firman Kartaadiepoetra, Jahen Rezki, Ying-Min Kuo, and all participants of the CIPS Round Table Discussion, Asian Economic Development Conference 2024 for their valuable input. All errors are our own. Corresponding author email: joseph.marshan@canberra.edu.au.

Acknowledgement:

We thank the Templeton World Charity Foundation, Inc. (funder DOI 501100011730) for its financial support (for the grant details, see doi.org/10.54224/30486). We thank Firman Kartaadiepoetra, Jahen Rezki, Ying-Min Kuo, and all participants of the CIPS Round Table Discussion, Asian Economic Development Conference 2024 for their valuable input. This paper does not reflect the view of the Templeton World Charity Foundation or CIPS. All errors are our own.

Cover:
ILO Asia-Pacific - flickr.com

ABSTRACT

We present new evidence on the gendered consequences of trade, explicitly examining shifts in foreign demand. We construct mean-aggregated local labor-market outcomes for women at the provincial level. Our two-stage least-squares (2SLS) approach suggests that an increase in foreign demand shock has a limited impact on reducing gender gaps and minor adverse effects on total employment. Resource-based sectors, typically male-dominant sectors, primarily drive this adverse employment effect. Further investigation reveals that the most affected women workers are characterized as married and less educated. These results offer crucial insights into trade and women's empowerment: relying on resource-based commodities does little to empower women, and trade policies should not focus solely on export activities in their narratives.

Keywords:
foreign demand shock, export exposure, female employment, gender gap, local labor market

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

Gender equality in the Indonesian labor market remains a significant concern. According to the World Bank's World Development Indicators, the disparity between male and female labor-force participation (FLFP) has averaged around 30 percentage points over the past decades. Additionally, regarding the wage gap, women earn approximately 30% less than men, irrespective of whether they are in paid employment or self-employment (Sohn, 2015). This economic gender disparity is inefficient and requires attention.

The prevailing narrative in the trade policies of many developing countries, including Indonesia, has been centered since the early 1980s on the belief that trade gains primarily stem from export activities. The idea is that fostering manufacturing growth through an export-oriented strategy will boost the demand for labor in related sectors. However, despite numerous studies demonstrating a positive relationship between trade liberalization and socioeconomic indicators, the impact of trade on gender equality, particularly concerning export performance, remains relatively unexplored. Our research underscores the need for a shift in this narrative, emphasizing the importance of trade policies that address gender equality in Indonesia.

A foreign demand shock could yield gendered consequences through two primary channels. First, the shock may drive the adoption of new technologies, leading to the expansion of capital-intensive sectors. These sectors might necessitate fewer gender-specific skills, potentially increasing women's participation in the labor market. Second, foreign demand may selectively target sectors with a higher concentration of female or male workers. For example, suppose foreign demand disproportionately affects female-dominant sectors. In that case, one might anticipate an increase in the wage level for women, consequently reducing the female-male wage gap in those sectors. At the household level, this shock could influence intrahousehold bargaining power for women, potentially resulting in more women choosing to participate in the labor market.

Empirical evidence on the impact of trade liberalization on women's employment in developing countries, primarily measured through tariff reduction, presents ambiguous results. In some instances, tariff reduction is associated with lower FLFP, as observed in Uganda (Giovannetti et al., 2022), Mexico (Saure & Zoabi, 2014), and Brazil (Gaddis & Pieters, 2017). Conversely, other studies have found that trade liberalization creates opportunities for women to enter the labor market, as seen in Egypt (Robertson et al., 2021), Turkey (Başlevent & Onaran, 2004), and China (Dai et al., 2021).

The empirical evidence on welfare gains is also inconclusive. Some literature suggests that exposure to trade liberalization opens opportunities for women to participate in the formal economy (Conolly, 2022; Brussevich, 2018; Bussmann, 2009; Ben Yahmed & Bombarda, 2020). Regarding the wage gap, there is evidence indicating that trade liberalization helps women secure higher-paying jobs, thereby reducing the gender wage gap (Besedeš et al., 2021; Benguria & Ederington, 2023), but contradictory findings also exist (Juhn et al., 2014). Additionally, other studies highlight unintended consequences of trade liberalization, including reduced schooling (Atkin, 2016), increased deaths of despair (Pierce & Schott, 2020), lower fertility (Do et al., 2016), and heightened domestic violence (Erten & Keskin, 2021; Chong & Velásquez, 2024).

However, the literature suggests that these ambiguous results are primarily driven by the sectors most benefit from trade liberalization. If tariff reductions benefit sectors with a higher proportion of female employees or favor labor-intensive sectors, positive employment and earning effects may emerge (Busse & Spielmann, 2006).

We contend that understanding the impact of trade on the local labor market through a gender lens is crucial in Indonesia for at least three reasons. First, the low level of women's participation in the labor market presents a significant challenge to boosting economic productivity. FLFP in Indonesia has remained stagnant at around 55% over the last two decades, while trade engagement and activities have undergone more dramatic changes. Between 1990 and 2020, the average Most Favored Nation (MFN) tariff rate declined from 25.7% to 8.7%.

Second, the recent development of technology provides opportunities for women, especially in shifting towards capital-intensive sectors. However, Indonesian exports largely depend on resource-based, predominantly male-dominant, and more labor-intensive sectors. Thus, export growth does not necessarily improve opportunities for women.

This paper focuses on two essential questions. First, does a change in foreign demand affect the demand for female labor, potentially reducing the gap between female and male labor-market participation? Our primary interest is understanding how a change in foreign demand in the local labor market might affect the female and male employment ratio, total female employment, FLFP, and the wage gap. Second, what potential mechanisms exist behind the relationship between a change in foreign demand and the demand for female workers?

To address these inquiries, we utilize yearly labor-market survey data, known as Survei Angkatan Kerja Nasional (SAKERNAS), spanning 1995 to 2015, to create a panel of province-level observations. SAKERNAS is a comprehensive, individual-level labor-market survey encompassing critical information for our study, including occupational sectors up to two digits of ISIC, wages, and demographic status. We extract export data from UNCOMTRADE, excluding services, covering approximately 200 partner countries. Subsequently, we merge our aggregated labor-market data at the Indonesian provincial level with trade data to construct a balanced panel dataset encompassing 26 provinces in Indonesia.

We employ a two-stage least-squares (2SLS) estimation of female labor-market outcomes on export exposure outcomes to respond to our research questions, utilizing our treatment variable. We construct our export exposure variable from sectoral shift-shares interacted with the volume of exports by sectors. The instrumental variable is the interaction between the share of a country's partner in total exports and the GDP from each country. The validity of our instrumental variable relies on the assumption that the GDP of country partners is exogenous to local labor-market shocks. Additionally, as Indonesia is a small economy concerning trade, it has limited power to affect world prices of tradable goods.

To the best of our knowledge, this paper is the first effort to investigate the gendered impact of trade on the local labor market using changes in foreign demand in Indonesia. There have been previous studies on the effects of trade on aggregate local socioeconomic outcomes, such as child labor (Kis-Katos & Sparrow, 2011), poverty rates (Kis-Katos & Sparrow, 2015), and nutrition intakes (Montolalu et al., 2022). Kis-Katos et al. (2018) provide an empirical study design that

is closest to our study. They find that tariff reduction may increase FLFP. However, their study focuses on changes in the tariff regime in Indonesia that operate via input and output, affecting household decisions. Our study directly tests whether trade, measured by changes in foreign demand, affects local labor-market outcomes. Our study is also closely related to Chesnokova et al. (2019), who constructed an export exposure index at the individual level based on distance weight to major cities and provincial export data. They find that women opt to take up more homework as households become more exposed to exports. Their idea relies on the assumption of women's comparative advantage in housework. As export exposure increases, the gender wage gap widens, prompting women members of households to take up more housework while male members take up more labor work.

Our findings suggest that changes in foreign demand did not reduce the gap in labor-market outcomes between men and women within the study period. We find evidence that indicates an increase in foreign demand has a negative employment effect on women. An increase in our foreign-demand-shock measure corresponds to 7,180 fewer women employed, on average, in the local labor market. Further investigation reveals that men also experienced similar adverse effects, thus explaining the null effect on gender-gap outcomes.

We contribute to the existing literature in three ways. First, unlike Kis-Katos et al. (2018), we find a null effect of trade exposure on women's participation in the labor market. Although our Ordinary Least Square (OLS) estimate shows a positive and statistically significant correlation between the change in foreign demand and FLFP, our 2SLS estimate confirms otherwise.

Second, our study reveals a negative employment effect for women, primarily driven by the expansion of resource-based sectors. Our data confirm that between 1995 and 2015, the change in foreign demand was largely dominated by resource-based sectors, typically male-dominant sectors. These results support previous studies (Başlevent & Onaran, 2004; Juhn et al., 2014) that suggest trade liberalization positively affects female employment only if female-dominated sectors benefit from lower tariffs.

Third, we contribute to the existing literature by identifying which group of women is most affected by foreign demand shocks. We find that women with only primary education are disproportionately more likely to lose their jobs compared to those with secondary education. We observe a positive employment effect for highly educated women. Our results also suggest that married women are more affected than those who are single. This finding supports previous individual-level analyses that suggest intrahousehold dynamics as a possible mechanism. As foreign demand shocks favor male-dominant sectors, women opt to drop out of the labor market (Chesnokova et al., 2019).

We use three methods to test the sensitivity of our results. First, we modify our main specification to estimate our outcome variables on changes in import goods. This serves as a falsification test, as we expect that changes in import exposure interacting with country partners' GDP as an instrument should not affect our outcomes. We find that none of the estimation results are statistically significant. Second, in a similar spirit, we check the validity of our results by estimating lagged outcome variables for one and two years prior to the treatment variable. Again, we expect null effects in any outcomes, as future changes in foreign demand should not affect previous-year, local labor-market outcomes. We find null effects in all outcomes estimations. Third,

one potential concern for our results is the mismeasurement as in 1995, the SAKERNAS was replaced by an intercensal survey (SUPAS). Dropping observations from 1995, we find our results to be robust. Finally, given the large disparities in terms of economic size and infrastructure between Java and non-Java provinces in Indonesia, results could be related to region-specific characteristics. We split our estimation into Java and non-Java to find no significant difference between the results in Java and non-Java provinces.

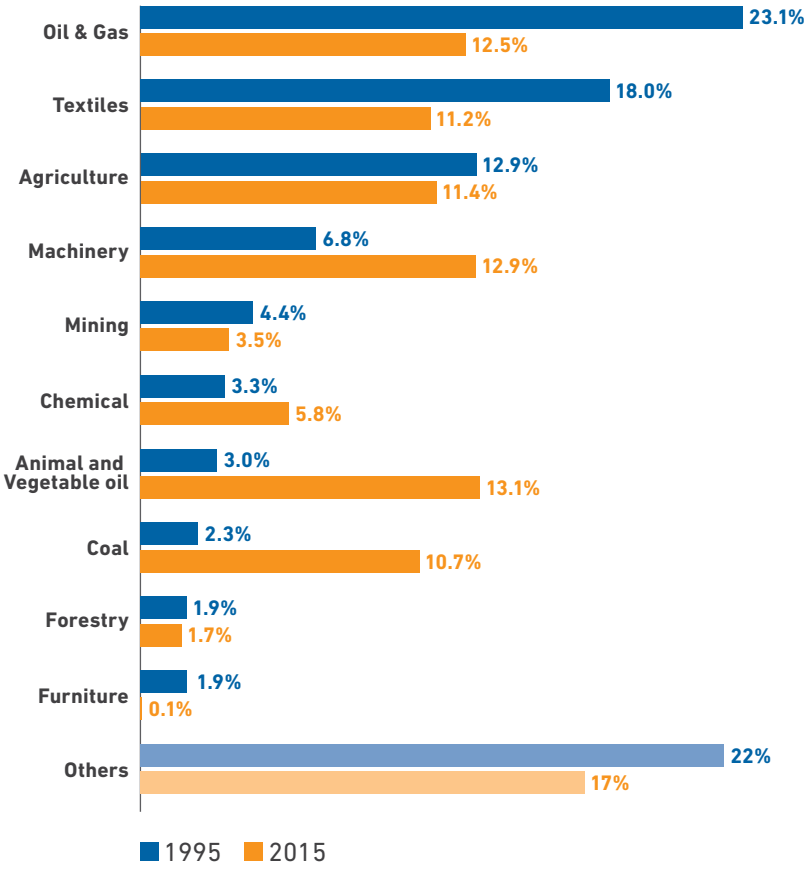
The remainder of our paper is organized as follows: Section 2 provides a brief overview of the development of the export pattern in Indonesia and the corresponding trade policy over the last decade. Our estimation strategy is presented in Section 3. Section 4 details the data used in this paper and provides summary statistics. Section 5 presents the results and offers our interpretation of the findings. Sensitivity tests are summarized in Section 6. Finally, we conclude our paper in Section 7 and provide policy implications.

CONTEXT

Recent trends in trade in Indonesia

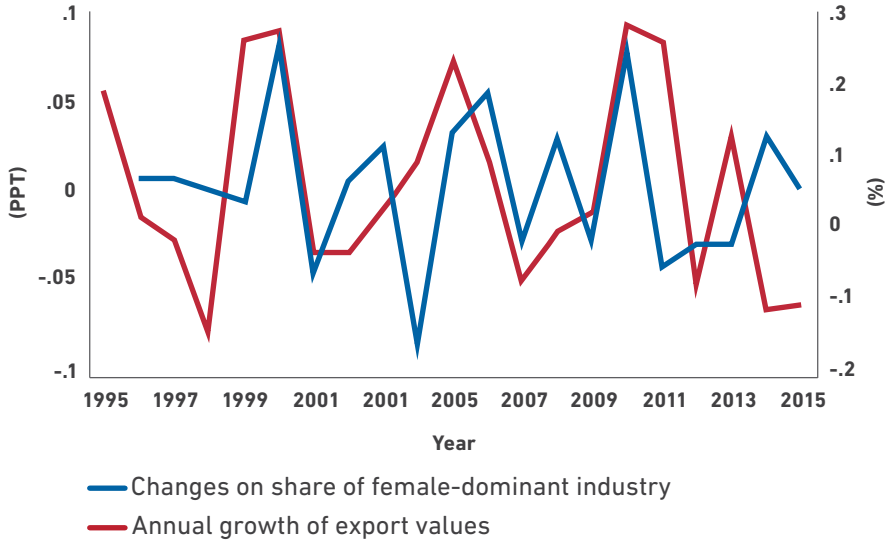
Between 1995 and 2015, as depicted in Figure 1, Indonesia's export composition underwent a significant shift from being predominantly dominated by oil, gas, and textiles in 1995 to palm oil (vegetable oil), machinery, and coal in 2015. This transformation mirrors both the development and diversification of Indonesia's economy over the twenty years and changes in its export demand. The timeframe also aligns with a major regime change in 1998–99—transitioning from a centralized, authoritarian regime to a democratic, decentralized regime—and a natural resource boom (2004–15), characterized by high natural resource prices in the international market (Hill & Pasaribu, 2022). From 2000 to 2015, China's economy experienced an average annual growth rate of 9.7%. China's rapid economic growth simultaneously heightened competition in the global manufacturing-output market, supported the rise of production networks in East and Southeast Asia, and triggered a substantial increase in global commodity demand (Pasaribu, 2019).

Figure 1.
Share of export by commodities 1995 and 2015



Source: UNCOMTRADE. Author calculations.

Figure 2.
Export growth and share of female-dominant sectors



Source: SAKERNAS and UNCOMTRADE. Author calculations.

Changes in the global economy impact various sectors differently. Increased export demand in certain sectors results in a higher number of employed workers, and conversely a decrease in demand may lead to reduced employment. Specific sectors, such as textiles, are predominantly staffed by female workers, while others, such as coal, are primarily male dominated. When categorized based on the dominance of female workers within an industry, the share of female-dominant sectors within Indonesia's exports fluctuates over the observed period.

As depicted in Figure 2, the graphical illustration fails to find convincing co-movement between changes in export value growth and changes in the share of female-dominant sectors. Here, female-dominant sectors are defined as those with a female-to-male employment ratio greater than one (see Table A8). Between 2003 and 2005, there was a significant increase in the annual growth of export values, but the share of female-dominant sectors dropped. However, between 2009 and 2011, a substantial increase in annual growth of export values coincided with a positive spike of changes in the share of the female-dominant industries Overall, Figure 2 suggests there is no clear evidence that export growth in Indonesia is predominantly driven by sectors that have the potential to attract more female workers, such as high-technology manufacturing.

Trade policies in Indonesia

The transition to democracy in 1998 added complexity to Indonesia's trade policymaking, as public perception and political interests became central to the process (see Figure A1). On the one hand, the risk of heightened protectionism through trade barriers, particularly for food and industrial products, has increased in response to political demands for popular policies (Basri & Patunru, 2012).

On the other hand, trade policy continues to be influenced by global economic changes and trade agreements. The post-1998 crisis period saw Indonesia actively engaging in the Association of Southeast Asian Nations (ASEAN) regional community. Free trade agreements with ASEAN and Indonesia's commitment to the World Trade Organization (WTO) have maintained Indonesia's relatively open stance toward international trade (Pangestu et al., 2015).

ESTIMATION STRATEGY

Baseline estimation

We closely follow Góes et al. (2023), who provide a theoretical framework (see Appendix B) and empirical strategy to estimate the change in foreign demand to local labor-market outcomes. We start with the following baseline setup.

$$\Delta Outcome_{p,t} = \alpha + \beta \Delta X_{p,t} + \zeta W'_{p,t} + \pi_p + \theta_t + \epsilon_{p,t} \quad (1)$$

Where $\Delta Outcome$ is a change in local, aggregated mean-average labor-market outcomes for women at the province p in time t. This paper focuses on several indicators, including total female employment, the female-male employment ratio, the female-male wage gap, the female unemployment rate, share of female-dominant industries, female working hours, and FLFP. Our main coefficient of interest is β, which captures the effect of $\Delta X_{p,t}$, a variable that represents changes in exposure to foreign-demand exports at the provincial level. We then control for a vector of covariates at the provincial level W that includes the aggregate-mean of total labor-force participation (LFP) and the share of higher-educated individuals at the provincial level. By controlling total LFP, we anticipate the local labor-market conditions that might affect the performance of sectors. Controlling the share of higher education is also necessary to rule out that our potential results are driven by selection bias that might affect the location of exporting firms across provinces. We also control for province-fixed effect π and year-fixed effect θ. We apply a robust standard error that considers variation within the province and across years. Our treatment variable $\Delta X_{p,t}$ was constructed by weighing changes in exports from sector s at year t with a share of labor working in the corresponding sectors at the same period in the province p over national employment in the sector in the same period. The construction of export exposure is summarized as follows:

$$\Delta X_{p,t} = \sum_{s \in S} \frac{L_{p,s,t}}{L_{s,t}} \cdot \Delta X_{s,t} \quad (2)$$

It is important to note that our labor-share construction differs from the previous literature on trade in Indonesia (Kis-Katos & Sparrow, 2011; Kis-Katos & Sparrow, 2015; Kis-Katos et al., 2018; Montolalu et al., 2022). Those studies predominantly use a share of the total employment of a sector to total employment within the same province instead of using the sector as a reference. Our shift-shares also differ, as we do not necessarily have a fixed-share variable for a baseline year. In this paper, our shift-share is fixed on the provincial level, as also used in some other studies, such as Autor et al. (2013) and Dix-Carneiro and Kovak (2015). For further discussion of the equivalence of the two approaches, see Borusyak et al. (2022)

There are several threats to the baseline identification. The share of labor supply by sector in the local market $(L_{s,p}/L_s)$ potentially correlates with local labor-market conditions. For instance, a province with a low level of investment in education might have a shortage of skilled labor, which is less likely to attract capital-intensive sectors—and this is also related to the opportunity for women to be employed. Next, significant disparities in economic development and technological dispersion across regions in Indonesia affect both women's participation in the labor market, demand for women's labor, and the growth of potential sectors in the region.

Two-stage least squares estimation

Góes et al. (2023) propose an instrumental variable strategy to purge local-labor-market endogenous relationships to respond to the identification threats. We follow literature to instrument the exposure to foreign demand using change in the GDP of the country k at time t. In the first stage, we estimate the following:

$$\Delta X_{p,t} = \kappa + \eta \Delta Z_{p,t} + \lambda W'_{p,t} + \pi_p + \theta_t + \upsilon_{p,t} \quad (3)$$

Where instrument variable $\Delta Z_{p,t}$, constructed as the interaction between shift-share industry structures and changes in the GDP of country partner k at year t.

$$\Delta Z_{p,t} = \sum_{s \in S} \frac{L_{p,s,t}}{L_{s,t}} \cdot \sum_{s \in S} \frac{X_{k,t}}{X_{s,t}} \cdot GDP_{k,t} \quad (4)$$

Finally, we estimate the following in the second stage:

$$\Delta Outcome_{p,t} = \alpha + \beta \Delta \hat{X}_{p,t} + \zeta W'_{p,t} + \pi_p + \theta_t + \epsilon_{p,t} \quad (5)$$

We argue that our instrument is valid for three reasons. First, our instrument was constructed using the GDP of country partners. Indonesia's trade partners' economic growth represents their demand power toward exports. As shown by Autor et al. (2013), a country's GDP is a good indicator of trade activities, especially in export capacity. This improves our confidence in the relevance aspect of our instrument. Second, the GDP of a country partner is likely to affect one country's socioeconomic outcome predominantly via trade and less likely in a direct way. It is possible that this GDP might affect investment or cause a financial crisis. Third, assuming Indonesia has a small, open economy in terms of trade, it is unlikely that local sectors would affect the world prices of demanded goods.

DATA

As previously noted, we matched local labor-market data drawn from the official labor-market survey called SAKERNAS and the total value of exports by sectors from UNCOMTRADE. [2]The matching process relies on a two-digit ISIC and observation period. We then construct a balanced panel of 26 provinces over 15 years of observation, aggregating labor-market outcomes at the provincial level, weighted by individual sampling weights. The details of the data used in this paper are as follows.

Labor-market data

We utilize the National Labor Force Survey of Indonesia, known as SAKERNAS, spanning 1995 to 2015. SAKERNAS gathers information annually on LFP, employment, wages, working hours, and employment sectors. The SAKERNAS dataset is representative at the provincial level. Our sample includes individuals aged 15 to 65, covering the productive age group. We employ the KBLI (Kode Baku Lapangan Industri) 2000[3], matched with ISIC3[4], for categorizing sectors.[5] The administrative boundaries of 26 provinces in 1990 were utilized to establish a balanced panel of data for each province. It is important to note that the province of Maluku was excluded from the data set we obtained in 2001. We employ data imputation using a linear observation trend for 2000 and 2002.

We have 546 province-year observations in total. To account for heterogeneity, we aggregate outcomes into four categories: married females, single females, less-educated females, and more-educated females. *Less educated* pertain to completing primary school or less, while *more educated* pertain to completing junior high school or higher.

Trade data

We use trade data from UNCOMTRADE (UNCOMTRADE, 2023) to calculate the value of Indonesia's merchandise imports and exports by trade partner and industry using the ISIC Rev.3 classification. The database aggregates detailed global trade statistics, covers approximately 200 countries, and represents more than 99% of the world's merchandise trade. ISIC Rev.3 classification is used to maintain consistency from 1995 to 2015.

The trade data contains four-digit sectors, and then we collapse the data into two-digit ISIC codes. We use GDP data from Wor ld Development Indicators of the World Bank.[6] All trade and GDP data use constant prices (2015 USD).

[2] For details, see https://comtradeplus.un.org/TradeFlow.
[3] See https://oss.go.id/informasi/kbli-berbasis-risiko.
[4] The full document on ISIC3 can be retrieved here: https://unstats.un.org/unsd/classifications/Econ/Download/In%20Text/ISIC_Rev_3_English.pdf.
[5] For some sectors in some provinces, the data recorded zero female employment. As we would not know whether actually there are no female workers in that sector in the corresponding provinces, we dropped the observation for the corresponding sector and province.
[6] See https://databank.worldbank.org/source/world-development-indicators.

We then collect outcome variables that cover the female-male employment ratio, the female-male wage gap, the number of female employments, female average working hours, share of female-dominant sectors[7], female unemployment rate, and FLFP, as summarized in Table 1.

Table 1.
Outcome Variables Definition and Construction

Variable	Definition (how to construct variable)	Unit measurement (ratio, hours, etc.)
Female-male employment ratio	Number of female employees divided by number of male employees	Ratio
Female wage gap	Average wage of female workers divided by average wage of male workers	Ratio
Number of female employments	Total females who worked at least one hour in the past week or have a job but are temporarily not working	Number of individuals
Female working hours	Average weekly working hours	Hours per week
Share of female-dominant sectors	Female-dominant sectors (share of female employment >50% in the sector)	Percentage
Female unemployment	Number of unemployed females divided by the number of females in the labor force	Percentage
FLFP	Number of females in the labor force divided by total working age population (15–65 years old)	Percentage

We delve into several insights from the summary statistics presented in Table 2. From our data, we have 546 panel observations of province-year. In Indonesia, about 17.6% of sectors employ more women than men workers. The ratio of female to male employment by sectors and province is 0.97, meaning that women and men are hired almost in the same proportion. However, women earn 20% less, on average, than men. The data also shows that, on average, FLFP is 53.7%—dramatically lower than male LFP, which is about 80% (Cameron et al, 2019, not shown in table).

Table 2.
Summary Statistics

Variables	N	Mean	SD	Min.	Max.
	(1)	(2)	(3)	(4)	(5)
Share of female-dominant sectors	546	0.1765	0.1147	0.0000	0.6667
Female-male employment ratio	546	0.9714	1.0965	0.2379	14.6402
Total female employment (000)	546	43.4912	45.0632	5.9817	281.0700
Female labor-force participation rate	546	0.5371	0.0862	0.3429	0.7494
Female-male wage gap	543	0.7996	0.2306	0.3544	3.3647
Female average working hours	546	35.6962	4.6674	21.9446	47.9724
Female unemployment rate	546	0.0915	0.0507	0.0108	0.3060
Export exposure (changes in export demand/shift weighted by sectors share)	546	-1.0119	2.9391	-26.3951	3.6243
Instrument (changes in GDP of destination countries/shift weighted by sectors share)	546	74.4415	125.4793	-12.4954	1,081.1600

Source: Author calculations using SAKERNAS and UNCOMTRADE.

[7] We define a *female-dominant sector* as a sector that has a ratio of female-to-male workers greater than one. Please see Table A8 in Appendix A for a further description of male-dominant sectors. Source: Author.

RESULTS AND DISCUSSION

Foreign demand shock and gender gap

Our study reveals that a foreign demand shock during the observed period has a limited impact on reducing gender gaps in employment outcomes as well as the aggregate female labor-market outcomes at the provincial level. Initially, according to the OLS estimation presented in Table 3, Panel A, Column 1, there appears to be an increase in the female-male employment ratio in response to a foreign demand shock. However, this correlation loses statistical significance once covariates are considered and controlled for, as demonstrated in Panel B. Our preferred specification, employing 2SLS, suggests that, while positive, the relationship between the female-male employment ratio is not statistically significant (see Table A1 for first-stage regression).

Given our observation that the female-to-male employment ratio remains unaffected by changes in export exposure, several interpretations can be drawn. First, a change in foreign demand shock affects men and women equally, resulting in an unchanged ratio between the two genders. Second, positive export activities may selectively benefit sectors that traditionally employ more men than women (male-dominant sectors).

The former hypothesis is confirmed by negative employment results for the male subsample, as presented in Table A4, Column 1 in the Appendix. Meanwhile, our results in Table A7 present supporting evidence for the latter hypothesis. Focusing on the male-dominant sectors, we find that a positive change in export exposure worsens the female-male employment ratio (see Column 1). This result is driven by a relatively larger negative employment effect experienced by women and men (see Columns 2 and 5). This result aligns with previous literature, such as the findings of Juhn et al. (2014), which show no evidence of an improvement in relative employment for those impacted by trade liberalization unless the increase in export activities specifically benefits female-dominant sectors (Başlevent & Onaran, 2004).

Next, we examine the impact of foreign demand shocks on the female-male wage gap, as presented in Table 3, Column 2. Across various specifications, our results consistently fail to reject the null hypothesis that the correlation coefficient between the female-male wage gap and foreign demand shock is not different from zero. In other words, during the study period, the gender wage gap remained unchanged despite the potential influence of trade on the number of women employed. Similar null effects on gender wage gaps have been observed in previous studies, such as those conducted in Mexico (Juhn et al., 2014) and the United States (Besedeš et al., 2021).

These results suggest several potential interpretations. First, if foreign demand shocks lead sectors to hire fewer women workers, the gender wage gap may be primarily driven by taste-based discrimination. This implies that irrespective of the number of women hired, firms may prefer hiring men. It may also indicate that foreign demand shocks only affect sectors where women are employed in low-paying jobs, resulting in sticky wages and no improvement for a given level of position.

How does a foreign demand shock impact the total employment of women? Our estimation indicates that a positive foreign demand shock has adverse consequences for total employment (refer to Table 3, Column 3). The OLS estimate suggests that a one-unit increase in foreign demand shock corresponds to approximately 5,700 fewer women on average being employed. Controlling for covariates significantly diminishes this correlation. Our 2SLS estimate suggests a similar negative employment effect, with approximately 5,700 fewer women being employed. This decline in the number of women employed is substantial, covering 13% of the average number of women employed. Our finding supports previous studies in Indonesia by Chesnokova et al. (2019), who also find a negative employment effect of export-activities exposure at the individual level.

Given the negative employment effect, one would anticipate a decline in the female-to-male ratio. However, as observed in the previous discussion, export exposure has no impact on such relative employment. One plausible explanation is that the change in foreign demand drives out female-dominant sectors. Further investigation in the next section aims to test our hypothesis that the reduction in the number of women employed is related to the type of industry affected.

From an intensive margin perspective, as illustrated in Table 3, Column 4, we find no evidence that a foreign demand shock improved working hours. The OLS estimation in Panel A reveals a negative correlation between increased foreign demand and average working hours for women, with a statistically significant coefficient. However, after controlling for covariates, the direction of the relationship is reversed, though it remains statistically significant. In the 2SLS specification, we observe a positive correlation, but it is not statistically significant.

If a foreign demand shock results in fewer women being employed, could this be reflected in a decline in the share of female-dominant sectors? This scenario could occur if the reduction in women employed leads to changes in the gender distribution of labor within certain sectors. Our results do not support this proposition. In Column 5 of Table 3, the OLS estimation shows a positive and statistically significant correlation between foreign demand shock and the share of female-dominant sectors. Our 2SLS estimate confirms the results—an increase of one unit in foreign demand shock causes the share of female-dominant sectors to increase by 1.2 percentage points, albeit not statistically significant. This finding suggests that negative employment cannot alter the composition of the labor force. Alternatively, the reduced number of women employed might also indicate a contraction in those female-dominant sectors.

Finally, we do not find sufficient evidence to suggest changes in foreign demand shock within the study period. We observe a null effect of foreign demand shock on FLFP. In the OLS specification, with and without covariates, we find a positive, statistically significant, and small correlation between an increase in foreign demand shock and FLFP. However, as is also found in other labor-market outcomes, the 2SLS specification suggests there is no causal relationship between increased foreign demand and FLFP.

Given that FLFP seems immune to changes in foreign demand, we would expect a similar relationship to emerge in relation to the female's unemployment rate. Table 3, Column 6 confirms this hypothesis. While OLS results suggest a negative correlation, after controlling for covariates, such a relationship is no longer significant. The 2SLS result agrees that there is not enough evidence to show a causal relationship between foreign demand shock and the unemployment rate.

How do these results align with previous findings? First, Kis-Katos et al. (2018) discovered that trade liberalization enhances women's participation in the labor market. In terms of their estimation strategy, our paper isolates the trade effect on the local labor market, affecting it solely through export performance. In contrast, Kis-Katos et al. (2018) demonstrate that lower tariffs improved female participation via an interconnected market encompassing both tradable and non-tradable goods. Our findings do not necessarily contradict theirs; instead, they contribute to a deeper understanding of how trade liberalization can benefit the economy.

Chesnokova et al. (2019) present an alternative explanation of how exports in Indonesia might influence women's lower attachment to the labor market. Improved exports might increase the gender wage gap, a phenomenon not observed in our study, leading to more men participating while women opt out of the labor market after evaluating their comparative advantage within the household. Our results complement their findings by overlooking the demand-side story, utilizing aggregated province-level data.

Table 3.
Main Results

	Effect of foreign demand shock on:						
	Female-male employment ratio	Female-male wage gap	Total female employment (000)	Female average working hours	Share of female-dominant sectors	Female unemployment rate	Female labor-force participation rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A OLS with no covariates	0.0325***	0.0012	-5.7195***	-0.2795***	0.0031**	-0.0015**	0.0046***
	(0.0059)	(0.0023)	(1.5913)	(0.0605)	(0.0012)	(0.0007)	(0.0011)
Panel B OLS with covariates	0.0056	0.0031	-0.2834	0.0470	0.0017	-0.0004	0.0007*
	(0.0049)	(0.0031)	(0.5497)	(0.0441)	(0.0011)	(0.0004)	(0.0004)
Panel C IV	0.0200	0.0146	-5.6982*	0.1365	0.0118	0.0007	0.0038
	(0.0301)	(0.0201)	(2.9479)	(0.1894)	(0.0076)	(0.0013)	(0.0027)
Panel D reduced form	0.0002	0.0001	-0.0427**	0.0010	0.0001**	0.0000	0.0000
	(0.0002)	(0.0002)	(0.0143)	(0.0015)	(0.0000)	(0.0000)	(0.0000)
N	546	543	546	546	546	546	546
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean dependent variables	0.971	0.800	43.490	35.700	0.176	0.092	0.537

Source: Author calculations. **p<0.1, **p<0.05, ***p<0.01*. Coefficients represent the estimated coefficient of export exposure to the outcome variable indicated in columns. Panel A estimates Equation 1 without covariates. Panel B estimates Equation 1 with covariates. Paneal C depicts stage-two results from 2SLS estimation (Equation 5). Panel D reports the estimation of outcome variables on the instrument variable. Labor-market data is aggregated at the provincial level by year from SAKERNAS, 1995–2015. Export data sourced from UNCOMTRADE. The specification includes average total labor-force participation and share of individuals with at least a junior high school degrees at the provincial level. Unit observation is province-by-years of observation. Robust standard error in parentheses.

Who are the gainers (and losers) of export growth?

This section identifies a group of women negatively affected by changes in foreign demand shock within the study period. Previous literature suggests that if foreign demand shock affects male-dominant and labor-intensive sectors, exports can adversely affect women's employment (Busse & Spielmann, 2006; Başlevent & Onaran, 2004; Giovannetti et al., 2022). We find weak suggestive evidence indicating a predominantly negative female employment effect driven by resource-based sectors.

As illustrated in Table 4, Column 1, the negative employment effect occurs specifically in resource-based sectors. Furthermore, we confirm that the magnitude of the negative employment effect is larger than the total effect. This confirms our hypothesis that export growth driven by resource-based sectors, which are predominantly male-dominated, leads to a decrease in demand for women workers.

One may suspect that the decline in resource centers occurs indiscriminately. Our estimation of the male subsample in Table A4, Columns 2 and 3, could not provide strong evidence for this hypothesis. Our results show a negative but not significant change in male employment in resource sectors. In contrast, Table A4, Column 3, suggests a significant increase of male workers in non-resource sectors. Altogether, we find this supporting our claim that, during the study period, export growth was driven by resource sectors that disproportionately have negative employment effects on women.

We then delve into the individual characteristics of female workers that may influence their susceptibility to negative impacts from a foreign demand shock. We posit that intrahousehold decision-making processes could elucidate why married women might refrain from participating in the labor market. Since foreign demand shocks tend to favor male-dominant sectors, the gender wage gap within households widens, prompting women to focus on household duties where they possess a comparative advantage.

First, we scrutinize marital status. A comparison between married and single workers reveals that foreign demand shocks disproportionately affect married women, as illustrated in Table 5, Columns 5–6. This finding aligns with previous research that employed more detailed individual-level data and found that export exposure, measured through geographical distance, negatively impacts women's employment (Chesnokova et al., 2019).

We find inconclusive evidence on whether a shift in export exposure affects different age groups differently. Younger female workers may benefit from a change in export exposure during our study period. Table A5 in Appendix A summarizes that for workers aged 15–26, the female-male employment ratio improved as a positive change in export exposure (see Column 1). Similar results also emerge for wage-gap outcomes (see Column 2). However, notice that we find a significant negative employment effect on young female workers (see Table A6, Column 1), with a null effect on male workers (Column 5).

Considering education level as essential to understanding the relationship between foreign demand shock and adverse employment effects for women, we hypothesize that, as non-resource-based sectors stagnate, it would disproportionately affect less-educated women. Our

investigation, summarized in Table 5, Columns 7–8, provides evidence supporting this hypothesis. Comparing coefficients between less-educated women and more-educated women reveals a contrasting pattern. An increase in foreign demand shock correlates with fewer employed and low-educated women, while the opposite effect is evident for highly educated women. However, one should carefully interpret the results as evidence of a converging gap between women and men in higher-skilled positions. We find that male workers also experience the same fate as depicted in Table A4, Columns 6–7, in Appendix A. These findings suggest that during our period of study, it is likely that overall increased engagement in export activities attracted more high-skilled workers.

Table 4.
Export Exposure and Female Employment and Working Hours by Type of Sectors

	Female-male employment ratio		Female employment (000)		Female average working hours	
	Resource sectors	Non-resource sectors	Resource sectors	Non-resource sectors	Resource sectors	Non-resource sectors
	(1)	(2)	(3)	(4)	(5)	(6)
Export exposure	-0.0022	0.0510	-17.2395**	-0.4168	-0.6233	0.3960*
	(0.0187)	(0.0322)	(7.5754)	(1.2260)	(0.4112)	(0.2141)
N	546	546	546	546	546	546
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Mean dependent variable	0.877	1.027	111.000	15.260	32.290	37.310

Source: Author calculations. **p<0.1, **p<0.05, ***p<0.01*. Results from the second stage of 2SLS specification, as in Equation (5). Labor-market data is aggregated at the provincial level by year from SAKERNAS, 1995–2015. Export data sourced from UNCOMTRADE. Resource-based is defined as all non-manufacturing sectors from two-digit ISIC classifications, excluding IT-related sectors and services. The specification includes average total labor-force participation and the share of individuals with at least a junior high school degrees at the provincial level. Unit observation is province-by-years of observation. Robust standard error in parentheses.

Table 5.
Changes in Export Exposure and Female Employment by Demographic Characteristics

	Female-male employment ratio				Female employment (000)			
	Married	Single	Less education	More education	Married	Single	Less education	More education
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Export exposure	-0.0049	-0.0221	-0.0265	-0.0172*	-3.6449*	-2.0533**	-7.2761**	1.8577**
	(0.0105)	(0.0136)	(0.0174)	(0.0098)	(1.9676)	(1.0217)	(3.2866)	(0.6935)
N	546	546	546	546	546	546	546	546
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean dependent variables	0.837	0.852	1.005	0.550	31.960	11.530	32.700	10.360

Source: Author calculations. **p<0.1, **p<0.05, ***p<0.01*. Results from the second stage of 2SLS specification, as in Equation (5). Labor-market data is aggregated at the provincial level by year from SAKERNAS, 1995–2015. Export data sourced from UNCOMTRADE. The specification includes average total labor-force participation and the share of individuals with at least a junior high school degrees at the provincial level. Unit observation is province-by-year of observation. Robust standard error in parentheses.

SENSITIVITY CHECK

We conduct sensitivity checks in various ways. First, as mentioned in Section 4, we are concerned about potential mismeasurement issues, as SAKERNAS in 1995 was drawn from SUPAS. We dropped the 1995 observation from our sample to address this and re-estimated our main 2SLS specification. Table A2, Panel A, summarizes the results, indicating that our findings remain robust even with a smaller sample.

Second, changes in imports to the export country's partner in the same sectors should not be affected by the economic size of the country partner; hence, the export country's partner should not correlate with female employment in Indonesia. To test this, we construct a new instrumental variable by substituting the share of export terms in Equation 5 with the share of import terms. From Table A2, Panel D, we find a null effect of our "placebo" variable on every outcome variable. This supports our main findings, suggesting that unobservable confounding factors do not drive our main estimation.

Third, we acknowledge the disparities in economic development in Indonesia. By splitting the sample into Java and non-Java, we test whether there are differences in how foreign demand shocks affect gendered labor-market outcomes. As shown in Table A2, Panels B and C, the results indicate no statistically significant difference between the results from Java and non-Java observations. While the negative employment effect persists, the coefficient is less precisely estimated, potentially due to the smaller sample size in non-Java regions.

Finally, we test whether changes in foreign demand at a certain time affect the outcomes of the previous year. This also tests if we have potential autocorrelation problems in the estimation. To do so, we estimate Equation 5 using time-lagged shift-share export exposure variables. As presented in Table A3, we do not detect any statistically significant results for both the share of female-dominant sectors and total female employment.

CONCLUSION

Our paper presents novel evidence on the impact of foreign demand shocks, mediated by export exposure at the provincial level, on local labor-market outcomes for women in Indonesia. We hypothesize that if a foreign demand shock favors female-dominated sectors, such as resource-based sectors, female employment might experience a decline. This effect could extend to the female-to-male employment ratio and a further reduction in the share of female-dominated sectors. To test this hypothesis, we closely follow Góes (2023)'s specification by creating a measure of export exposure at the provincial level based on the contribution of employment in each sectors at the provincial level to the national level. Acknowledging that this measurement might be endogenous to local labor-market characteristics, we introduce an instrumental variable: changes in the share of employment weighted by the GDP of export-partner countries.

Our findings reveal that trade has a null effect on gender-gap convergence; in fact, it has a small negative employment effect on women. Our 2SLS estimation suggests that changes in foreign demand are only statistically significant in reducing women's employment by approximately six thousand people. However, the reduction in total employment does not alter the female-to-male ratio at the aggregate level, nor does it impact the gender wage gap, LFP, and unemployment rate. Nevertheless, we observe a slight shrinkage in the share of women-dominated sectors due to the positive demand shock. Foreign demand shocks do not affect total working hours on the intensive margin.

Further investigation reveals that resource-based sectors drive the negative employment effect. A favorable foreign demand shock has a null employment effect for women in non-resource-based sectors. Resource-based sectors are likely to be male-dominated and may demand physical requirements without requiring higher education. From an intrahousehold dynamics perspective, a positive foreign demand shock may increase the within-household gender wage gap, leading female household members to increase their labor supply in household-related work. As expected, we find that those affected were married women with less education.

We interpret the null results on the effect of change in export demand on gender gap outcome as follows. First, our results primarily reflect the preexisting gender dynamics within the workforce. This relates to the fact that sticky gender norms define the composition of hired female labor in the workforce over time. Second, over our study period, there is no unambiguous change in export demand favoring a particular female-dominant and male-dominant industry. As shown in Figure 1, for example, coal exports grew significantly at the same time that oil and gas exports dropped. Although both were resource-based commodities, the former tended to be less female-friendly, while the latter was the other way around.

We acknowledge several caveats to our study that potentially encourage further studies. First, SAKERNAS has limited number of observations with two-digit ISIC sectors, which does not allow us to provide analysis at a finer level. Further study could take advantage of the industrial census dataset, if available, to test the impact of changes in export demand at lower level. Second, our study lacks an understanding of the potential mechanism behind our results. Further studies could focus on either labor-supply decisions at the household level or hiring decisions at companies.

Our findings provide two important insights into policymaking discourses. First, focusing on resource-based sectors as a trade strategy is unsustainable and ineffective in improving gender gaps. Second, trade-policy narratives are often simplified to support export performance. Our results suggest that the potential gains of trade liberalization on socioeconomic factors, as described in existing literature (Kis-Katos & Sparrow, 2011; Kis-Katos et al., 2018), do not solely operate through exports but also involve import activities and interindustry linkages.

REFERENCES

Atkin, D. (2016). Endogenous skill acquisition and export manufacturing in Mexico. *American Economic Review, 106*(8), 2046–2085.

Autor, D. H., Dorn, D., & Hanson, G. H. (2013). The China syndrome: Local labor market effects of import competition in the United States. *American Economic Review, 103*(6), 2121–2168.

Başlevent, C., & Onaran, O. (2004). The effect of export-oriented growth on female labor market outcomes in Turkey. *World Development, 32*(8): 1375–1393.

Basri, M. C., & Patunru, A. A. (2012). How to keep trade policy open: The case of Indonesia. *Bulletin of Indonesian Economic Studies, 48*(2), 191–208. https://doi.org/Doi 10.1080/00074918.2012.694154

Ben Yahmed, S., & Bombarda, P. (2020). Gender, informal employment and trade liberalization in Mexico. *The World Bank Economic Review, 34*(2), 259–283.

Benguria, F., & Ederington, J. (2023). Decomposing the effect of trade on the gender wage gap. *Canadian Journal of Economics/Revue canadienne d'Economique, 56*(3), 1082–1120.

Besedeš, T., Lee, S. H., & and Yang, T. (2021). Trade liberalization and gender gaps in local labor market outcomes: Dimensions of adjustment in the United States. *Journal of Economic Behavior & Organization, 183*, 574–588.

Borusyak, K., Hull, P., & Jaravel, X. (2022). Quasi-experimental shift-share research designs. *The Review of Economic Studies*, *89*(1), 181–213.

Brussevich, M. (2018). Does trade liberalization narrow the gender wage gap? The role of sectoral mobility. *European Economic Review, 109*, 305–333.

Busse, M., & Spielmann, C. (2006). Gender inequality and trade. *Review of International Economics, 14*(3), 362–379.

Bussmann, M. (2009). The effect of trade openness on women's welfare and work life. *World Development, 37*(6), 1027–1038.

Cameron, L., Suarez, D. C., & Rowell, W. (2019). Female Labour Force Participation in Indonesia: Why Has it Stalled?. *Bulletin of Indonesian Economic Studies*, *55*(2), 157-192.

Carbonero, F., Devicienti, F., Manello, A., & Vannoni, D. (2021). Women on board and firm export attitudes: Evidence from Italy. *Journal of Economic Behavior & Organization, 192*, 159–175.

Chesnokova, T., Rupa, J. & Sim, N. (2019). Gender specific effects of exports on work decisions in Indonesia. *The Journal of International Trade & Economic Development, 28*(6), 686–711.

Chong, A., & Velásquez, D. (2024). Does trade liberalization foster intimate partner violence? *Economic Development and Cultural Change, 72*(2), 563–602.

Connolly, L. (2022). The effects of a trade shock on gender-specific labor market outcomes in Brazil. *Labour Economics, 74*, 102085.

Dai, M, Huang, W., & Zhang, Y. (2021). How do households adjust to tariff liberalization? Evidence from China's WTO accession. *Journal of Development Economics, 150*, 102628.

Dix-Carneiro, R., & Kovak, B. K. (2015). Trade reform and regional dynamics: Evidence from 25 years of Brazilian matched employer-employee data. National Bureau of Economic Research (No. w20908).

Do, Q.-T., Levchenko, A. A., & Raddatz, C. (2016). Comparative advantage, international trade, and fertility. *Journal of Development Economics, 119,* 48–66.

Erten, B, & Keskin, P. (2021). Trade-offs? The impact of WTO accession on intimate partner violence in Cambodia. *Review of Economics and Statistics*, 1–40.

Gaddis, I., & Pieters, J. (2017). The gendered labor market impacts of trade liberalization: Evidence from Brazil. *Journal of Human Resources, 52*(2), 457–490.

Giovannetti, G., Sanfilippo, M., & Vivoli, A. (2022). Import tariff liberalization, employment, and gender in Ethiopia. *The Journal of Development Studies, 58*(11), 2366–2392.

Góes, C., Lopez-Acevedo, G., & Robertson, R. (2023). Gender-segmented labor markets and trade shocks. *IZA Discussion Paper No. 15892*.

Hakobyan, S., & McLaren, J. (2018). NAFTA and the wages of married women. *National Bureau of Economic Research*.

Hill, H., & Pasaribu, D. H. (2022). Avoiding the resource curse. *Journal of Southeast Asian Economies, 39*(3), 225–250. https://doi.org/10.1355/ae39-3a

Juhn, C., Ujhelyi, G., & Villegas-Sanchez, C. (2014). Men, women, and machines: How trade impacts gender inequality. *Journal of Development Economics, 106*, 179–193.

Kis-Katos, K., Pieters, J., & Sparrow, R. (2018). Globalization and social change: Gender-Specific effects of trade liberalization in Indonesia. *IMF Economic Review, 66*, 763–793.

Kis-Katos, K., & Sparrow, R. (2011). Child labor and trade liberalization in Indonesia. *Journal of Human Resources, 46*(4), 722–749.

Kis-Katos, K., & Sparrow, R. (2015). Poverty, labor markets and trade liberalization in Indonesia. *Journal of Development Economics, 117*, 94–106.

Montolalu, M. H., Ekananda, M., Dartanto, T., Widyawati, D., & Panennungi, M. (2022). The analysis of trade liberalization and nutrition intake for improving food security across districts in Indonesia. *Sustainability, 14*(6), 3291.

Pangestu, M., Rahardja, S., & Ing, L. Y. (2015). Fifty years of trade policy in Indonesia: New world trade, old treatments. *Bulletin of Indonesian Economic Studies, 51*(2), 239–261. https://doi.org/10.1080/00074918.2015.1061915

Pasaribu, D. H. (2019). *The Dutch disease, natural resource booms and policy adjustments: The case of Indonesia* (Unpublished doctoral dissertation). Australian National University, Canberra, Australia.

Pierce, J. R., & Schott, P. K. (2020). Trade liberalization and mortality: Evidence from US counties. *American Economic Review: Insights, 2*(1), 47–63.

Robertson, R., Bahena, M. A. V., Kokas, D., & Lopez-Acevedo, G. (2021). *International trade and labor markets: Evidence from the Arab Republic of Egypt*. Policy Research Working Paper Series 9668, The World Bank.

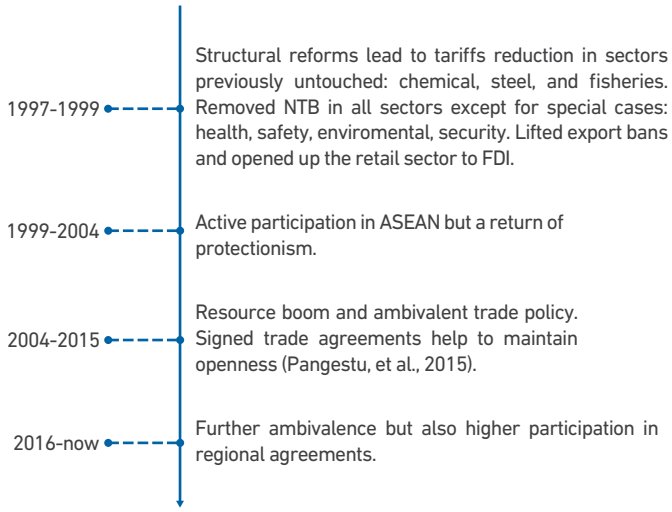
Sauré, P., & Zoabi, H. (2014). International trade, the gender wage gap and female labor force participation. *Journal of Development Economics*, *111*, 17-33.

Sohn, K. (2015). Gender discrimination in earnings in Indonesia: A fuller picture. *Bulletin of Indonesian Economic Studies*, *51*(1), 95–121.

United Nations. (2023). *UN Comtrade database*. Retrieved from https://comtrade.un.org/

APPENDIX A. TABLES AND FIGURES

Figure A1.
Export growth and share of female-dominant sectors



Note: Authors' based on Basri & Patunru, (2012) and Pangestu et al. (2015)

Table A1.
First-Stage Regression

	Shift-share	Shift-share (without 1995)
	(1)	(2)
GDP (Instrument)	0.0075***	0.0079***
	[2.79]	[2.79]
	(0.0027)	(0.0028)
Kleibergen-Paap F-stat	7.81	8.11
Kleibergen-Paap rk LMstat	7.14	7.21
P-value	0.0075	0.0073
Obs	546	520
R2	0.4088	0.4103
Mean dependent var.	-1.0118	-1.0274
Province fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
Clustered standard error	Province-year	Province-year

Source: Author calculations. **p<0.1, **p<0.05, ***p<0.01*. Results from second stage of 2SLS specification, as in Equation (3). Labor-market data is aggregated at the provincial level by year from SAKERNAS, 1995–2015. Export data sourced from UNCOMTRADE. The specification includes average total labor-force participation and share of individuals with at least a junior high school degree at the provincial level. Unit observation is province-by-year of observation. Robust standard error in parentheses.

Table A2.
Sensitivity Check

	Female-male employment ratio	Female-male wage gap	Total female employment (000)	Female average working hours	Share of female-dominant sectors	Female un-employment rate	Female labor-force participation rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. Dropping observation of the year 1995							
Export exposure	0.0196	0.0127	-5.2041*	0.2021	0.0098	0.0007	0.0032
	(0.0282)	(0.0197)	(2.8026)	(0.1965)	(0.0070)	(0.0013)	(0.0025)
N	520	517	520	520	520	520	520
Mean dependent var.	0.964	0.804	43.680	35.840	0.177	0.091	0.538
B. Java							
Export exposure	-0.4090	-0.1727	-8.7264	-3.1026	0.0317	-0.0104	-0.0011
	(3.9120)	(1.7421)	(86.0161)	(31.0754)	(0.3271)	(0.0916)	(0.0396)
N	105	105	105	105	105	105	105
Mean dependent var.	0.647	0.852	96.180	39.280	0.166	0.092	0.536
C. Outside Java							
Export exposure	-0.0964	-0.0447	-5.2789	1.5536	-0.0056	0.0049	0.0000
	(0.2158)	(0.0673)	(6.3429)	(1.8794)	(0.0353)	(0.0084)	(0.0114)
N	441	438	441	441	441	441	441
D. Falsification—import exposure							
Import exposure	0.1082	0.0378	-10.9912*	0.2619	0.0378*	-0.0007	0.0185
	(0.0765)	(0.0353)	(6.4172)	(0.2824)	(0.0226)	(0.0023)	(0.0114)
N	546	543	546	546	546	546	546
Mean dependent var.	0.971	0.800	43.490	35.700	0.176	0.092	0.537
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Author calculations. **p<0.1, **p<0.05, ***p<0.01*. Results from second stage of 2SLS specification, as in Equation (5). Labor-market data is aggregated at the provincial level by year from SAKERNAS, 1995–2015. Export data sourced from UNCOMTRADE. The specification includes average total labor-force participation and share of individuals with at least a junior high school degree at the provincial level. Unit observation is province-by-year of observation. Robust standard error in parentheses.

Table A3.
Effect of Foreign Demand Shock by Lag of Shift-Share

	Female-male employment ratio	Female-male wage gap	Total female employment (000)	Female average working hours	Share of female-dominant sectors	Female un-employment rate	Female labor-force participation rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. t+2 shift-share							
Export exposure	0.1111*	-0.0056	-5.7403	0.3839	0.0212*	0.0028	0.0033
	(0.0638)	(0.0166)	(3.5620)	(0.2454)	(0.0119)	(0.0026)	(0.0028)
N	494	491	494	494	494	494	494
Mean dependent var.	0.972	0.797	44.550	35.780	0.179	0.094	0.538
B. t+1 shift-share							
Export exposure	-0.0108	-0.0144	-2.9931	0.2407	0.0034	0.0021	0.0008
	(0.0499)	(0.0237)	(2.6080)	(0.2493)	(0.0100)	(0.0026)	(0.0039)
N	520	517	520	520	520	520	520
Mean dependent var.	0.972	0.799	44.050	35.710	0.177	0.093	0.537
C. t-1 shift-share							
Export exposure	0.0473	-0.0229	-1.1739	0.1824	0.0042	-0.0015	0.0043
	(0.0553)	(0.0334)	(2.2538)	(0.2260)	(0.0083)	(0.0019)	(0.0035)
N	520	517	520	520	520	520	520
Mean dependent var.	0.964	0.804	43.680	35.840	0.177	0.091	0.538
D. t-2 shift-share							
Export exposure	0.0059	0.0565	0.7229	0.0752	0.0328	-0.0067	0.0125
	(0.0563)	(0.0637)	(2.9878)	(0.2947)	(0.0301)	(0.0065)	(0.0103)
N	494	491	494	494	494	494	494
Mean dependent var.	0.947	0.811	42.9	35.96	0.176	0.0922	0.538
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Author calculations. **p<0.1, **p<0.05, ***p<0.01*. Results from second stage of 2SLS specification, as in Equation (5). The specification includes time-lagged, shift-share export exposure variables. In Panels A and D, we also include one-year-lagged and two-year-lagged shift-share variables as covariates. Labor-market data is aggregated at the provincial level by year from SAKERNAS, 1995–2015. Export data sourced from UNCOMTRADE. The specification includes average total labor-force participation and share of individuals with at least a junior high school degree at the provincial level. Unit observation is province-by-year of observation. Robust standard error in parentheses.

Table A4.
2SLS Estimate: Effect of Foreign Demand Shock on Male Employment

	Male employment (000)						
	Total male employment	Resource sector	Non-resource sector	Married	Single	Less education	More education
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Export exposure	-1.2608	-5.4830	4.4442**	-1.7150	0.4541	-6.0766**	5.1090**
	(2.2342)	(4.0550)	(1.7640)	(1.7794)	(0.5933)	(3.0565)	(1.8289)
N	546	546	546	546	546	546	546
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean dependent var.	54.750	128.500	19.270	41.140	13.620	34.810	19.660

Source: Author calculations. **p<0.1, **p<0.05, ***p<0.01*. Results from second stage of 2SLS specification, as in Equation (5). Labor-market data is aggregated at the provincial level by year from SAKERNAS, 1995–2015. Sample restricted to males. Export data sourced from UNCOMTRADE. The specification includes average total labor-force participation and share of individuals with at least a junior high school degrees at the provincial level. Unit observation is a province-by-year of observation. Robust standard error in parentheses.

Table A5.
2SLS Estimate: Effect of Foreign Demand Shock on Employment Gender Gap by Age Groups

	Female-male employment ratio	Female-male wage gap	Share of female-dominant sectors
	(1)	(2)	(3)
A. Age 15-25			
Export exposure	0.0751*	0.0492*	0.0055
	(0.0443)	(0.0255)	(0.0083)
N	546	534	546
Mean dependent var.	0.950	0.942	0.260
B. Age 26–45			
Export exposure	0.0306	0.0058	0.0089
	(0.0319)	(0.0247)	(0.0060)
N	546	540	546
Mean dependent var.	0.898	0.822	0.175
C. Age 46–65			
Export exposure	-0.0000	-0.0086	0.0006
	(0.0388)	(0.0334)	(0.0049)
N	546	484	546
Mean dependent var.	0.823	0.756	0.196
Prov FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Source: Author calculations. **p<0.1, **p<0.05, ***p<0.01*. Coefficients represent the estimated coefficient of export exposure to outcome variables indicated in columns. Results from second stage of 2SLS specification, as in Equation (5). Labor-market data is aggregated at the provincial level by year from SAKERNAS, 1995–2015. Export data sourced from UNCOMTRADE. The specification includes average total labor-force participation and share of individuals with at least a junior high school degree at the provincial level. Unit observation is province-by-year of observation. Robust standard error in parentheses.

Table A6.
2SLS Estimate: Effect of Foreign Demand Shock on Female and Male Employment by Age Groups

	Total employment	Average working hours	Unemployment rate	Labor-force participation rate	Total employment	Average working hours	Unemployment rate	Labor-force participation rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Women				Men			
A. Age 15–25								
Export exposure	-1.9963**	0.1334	-0.0005	0.0098**	-1.0748	0.0202	0.0046	0.0050*
	(0.9373)	(0.2274)	(0.0024)	(0.0044)	(0.8198)	(0.1633)	(0.0032)	(0.0030)
N	545	546	546	546	545	546	546	546
Mean dependent var.	9.494	36.020	0.224	0.426	11.950	41.720	0.163	0.643
B. Age 26–45								
Export exposure	-2.4209*	-0.1510	0.0016	0.0038	0.2959	-0.1469	0.0014*	0.0008*
	(1.3358)	(0.1875)	(0.0015)	(0.0030)	(1.0264)	(0.1213)	(0.0008)	(0.0004)
N	545	546	546	546	545	546	546	546
Mean dependent var.	22.220	35.150	0.055	0.593	27.500	44.380	0.028	0.979
C. Age 46–65								
Export exposure	-1.3198*	0.4324	0.0007	-0.0036	-0.5123	0.2255	0.0023*	0.0003
	(0.7742)	(0.3140)	(0.0017)	(0.0029)	(0.6363)	(0.1554)	(0.0014)	(0.0010)
N	545	546	546	546	545	546	546	546
Mean dependent var.	11.790	31.510	0.022	0.577	15.340	41.910	0.013	0.915
Prov FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Author calculations. **p<0.1, **p<0.05, ***p<0.01*. Coefficients represent the estimated coefficient of export exposure to outcome variables indicated in columns. Results from second stage of 2SLS specification, as in Equation (5). Labor-market data is aggregated at the provincial level by year from SAKERNAS, 1995–2015. Export data sourced from UNCOMTRADE. The specification includes average total labor-force participation and share of individuals with at least a junior high school degree at the provincial level. Unit observation is province-by-year of observation. Robust standard error in parentheses.

Table A7.
2SLS Estimate: Effect of Foreign Demand Shock on Female and Male Employment by Dominant Sectors

	Female-male employment ratio	Female-male wage gap	Total female employment	Female average working hours	Total male employment	Male average working hours
	A. Female dominant sectors					
Export exposure	0.1106	0.1076	5.2431	0.0304	3.5136	0.2193
	(0.1209)	(0.0665)	(5.2341)	(0.2459)	(4.1150)	(0.3318)
N	500	443	501	501	501	501
Mean dependent var.	2.892	0.751	36.160	35.490	22.900	43.700
	B. Male dominant sectors					
Export exposure	-0.0105*	0.0074	-6.9210**	0.1659	-7.3189*	0.1039
	(0.0063)	(0.0234)	(3.3741)	(0.2189)	(4.2378)	(0.1074)
N	545	541	546	546	546	546
Mean dependent var.	0.557	0.807	48.810	35.420	86.020	42.790

Source: Author calculations. **p<0.1, **p<0.05, ***p<0.01*. Coefficients represent the estimated coefficient of export exposure to outcome variables indicated in columns. Results from second stage of 2SLS specification, as in Equation (5). Female-dominant sectors is defined as a sector that has a ratio of female to male workers greater than one. Labor-market data is aggregated at the provincial level by year from SAKERNAS, 1995–2015. Export data sourced from UNCOMTRADE. The specification includes average total labor-force participation and share of individuals with at least a junior high school degree at the provincial level. Unit observation is province-by-year of observation. Robust standard error in parentheses.

Table A8.
Share of Female Workers by Sectors

Sectors	Share of female workers
Manufacture of textiles	0.676
Manufacture of apparel	0.630
Manufacture of tobacco products	0.565
Manufacture of food products and beverages	0.523
Manufacture of medical, precision, and optical instruments	0.426
Tanning and dressing of leather, manufacture of luggage, handbags	0.407
Manufacture of office, accounting, and computing	0.405
Manufacture of radios, televisions and other communication devices	0.398
Agriculture and hunting	0.386
Manufacture of chemicals	0.348
Manufacture of rubber and plastics products	0.339
Manufacture of electrical machinery	0.338
Manufacture of machinery and equipment	0.319
Manufacture of wood, except furniture	0.317
Extraterritorial organizations and bodies	0.315
Manufacture of paper	0.314
Other service activities	0.308
Recreational, cultural, and sporting activities	0.301
Manufacture of other non-metallic mineral products	0.290
Manufacture of coke and refined petroleum products	0.282
Other business activities	0.271
Publishing, printing, and reproduction of recorded media	0.255
Mining of coal and lignite	0.206
Other mining and quarrying	0.200
Manufacture of furniture	0.199
Forestry and logging	0.196
Manufacture of basic metals	0.174
Manufacture of motor vehicles	0.169
Extraction of crude petroleum and natural gas	0.165
Electricity, gas, steam, and hot water supply	0.144
Manufacture of other transport equipment	0.140
Manufacture of fabricated metal products, except machinery	0.129
Mining of metal ores	0.124
Fishing	0.095
Mining of uranium and thorium ores	0.000

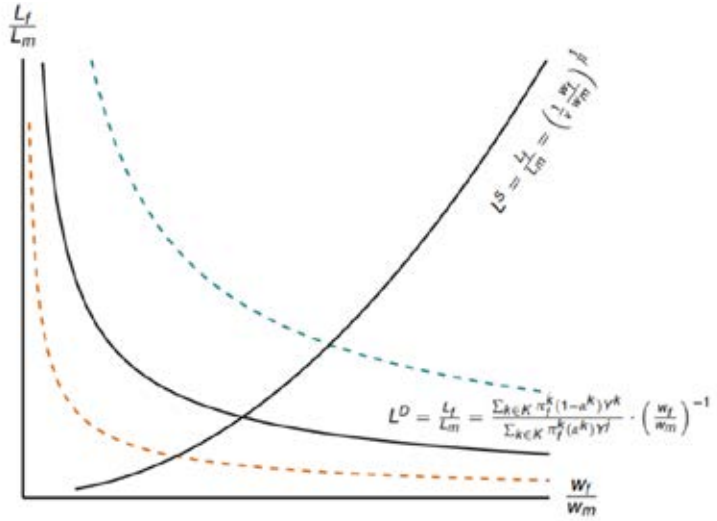
Source: Author's calculations using SAKERNAS, 1995–2015. The statistics presented are 20-year averages.

APPENDIX B. THEORETICAL FRAMEWORK

This theoretical framework is a summary version of Góes (2023). In this model, demand for female and male labor $(L_D = L_f/L_m)$ is a function of preference of the export of goods (π) with regard to a particular gender. The demand for gendered laborlso depends on the relative cost of female to male workers—i.e., the gender wage gap and the income of the export partner (Y^k) . On the other hand, the decision to supply labor $(L_D = L_f/L_m)$ depends on the relative wage between women and men with factor-cost elasticity η_0 and preference towards to work υ_o.

Simply put, this model predicts that the demand for female workers will increase $(\Delta \frac{L_f}{L_m} > 0)$ if there is a positive change in a country's partner income (Y^k) and demand for products from a female-dominant industry, π_f^k. On the other hand, demand might decrease (see the dashed, red line in Figure B1) if there is a change in the preference towards work and a reduction in GDP. The change in preference towards work r is unlikely to happen within a short period.

Figure B1.
Illustration of Change in Foreign Demand and Labor Demand



ABOUT THE AUTHORS

Donny Pasaribu is the Director of Data and Analytics at Skills Canberra, focusing on skills, vocational education and training, and skilled migration issues. He earned his PhD from the Australian National University with a dissertation on Indonesia's natural resource policy. Dr. Pasaribu has published articles and reports in development economics, international trade, and public policy, and serves as an Associate Researcher at the Centre for Indonesian Policy Studies.

Ridho Al Izzati is a researcher at The SMERU Research Institute, specializing in quantitative analysis of development issues. His current research projects are related but not limited to poverty, inequality, and social protection. Some of his work has been published in the Oxford Development Studies and the European Journal of Political Economy.

Joseph Marshan is a PhD candidate at the Research School of Economics, Australian National University. He also a Lecturer at University of Canberra. His research interests cover labor economics, gender economics, trade, poverty and development economics.

Explore other paper published by Center for Indonesian Policy Studies

A Tale of Two Liberalization Episodes with China: Impact on Poverty in a Developing Nation

Export Expansion and Labor Market Dynamics in Indonesia

Co-Regulation in Protecting Personal Data: The Role of Industry Associations as Potential Self-Regulatory Organizations

Go to our website to access more titles:
www.cips-indonesia.org/publications

The Center for Indonesian Policy Studies invites those interested to support our advocacy by joining one of our Donor Circles.

If you or your organization is interested to cooperate and engage more closely with the work of CIPS, please contact:

Anthea Haryoko
Chief Innovation and Development Officer
Anthea.haryoko@cips-indonesia.org

ABOUT THE CENTER FOR INDONESIAN POLICY STUDIES

Center for Indonesian Policy Studies (CIPS) is a strictly non-partisan and non-profit think tank providing policy analysis and practical policy recommendations to decision-makers within Indonesia's legislative and executive branches of government.

CIPS promotes social and economic reforms that are based on the belief that only civil, political, and economic freedom allows Indonesia to prosper. We are financially supported by donors and philanthropists who appreciate the independence of our analysis.

KEY FOCUS AREAS:

Food Security & Agriculture: To enable low-income Indonesian consumers to access more affordable and quality staple food items, CIPS advocates for policies that break down the barriers for the private sector to openly operate in the food and agriculture sector.

Education Policy: The future of Indonesia's human capital need to be prepared with skills and knowledge relevant to the 21st century. CIPS advocates for policies that drive a climate of healthy competition amongst education providers. Such competition will drive providers to constantly strive to innovate and improve education quality for the children and parents they serve. In particular, CIPS focuses on the improvement of operational and financial sustainability of low-cost private schools who serve the poor.

Economic Opportunities: CIPS advocates for policies that expand economic involvement and opportunities for Indonesian entrepreneurs and businesses; as well as for policies that open wider opportunities for lowincome Indonesians to access decent incomes and create wealth.

www.cips-indonesia.org

facebook.com/cips.indonesia
@cips_id
@cips_id
Center for Indonesian Policy Studies
CIPS Learning Hub

Jalan Terogong Raya No. 6B
Cilandak, Jakarta Selatan 12430
Indonesia