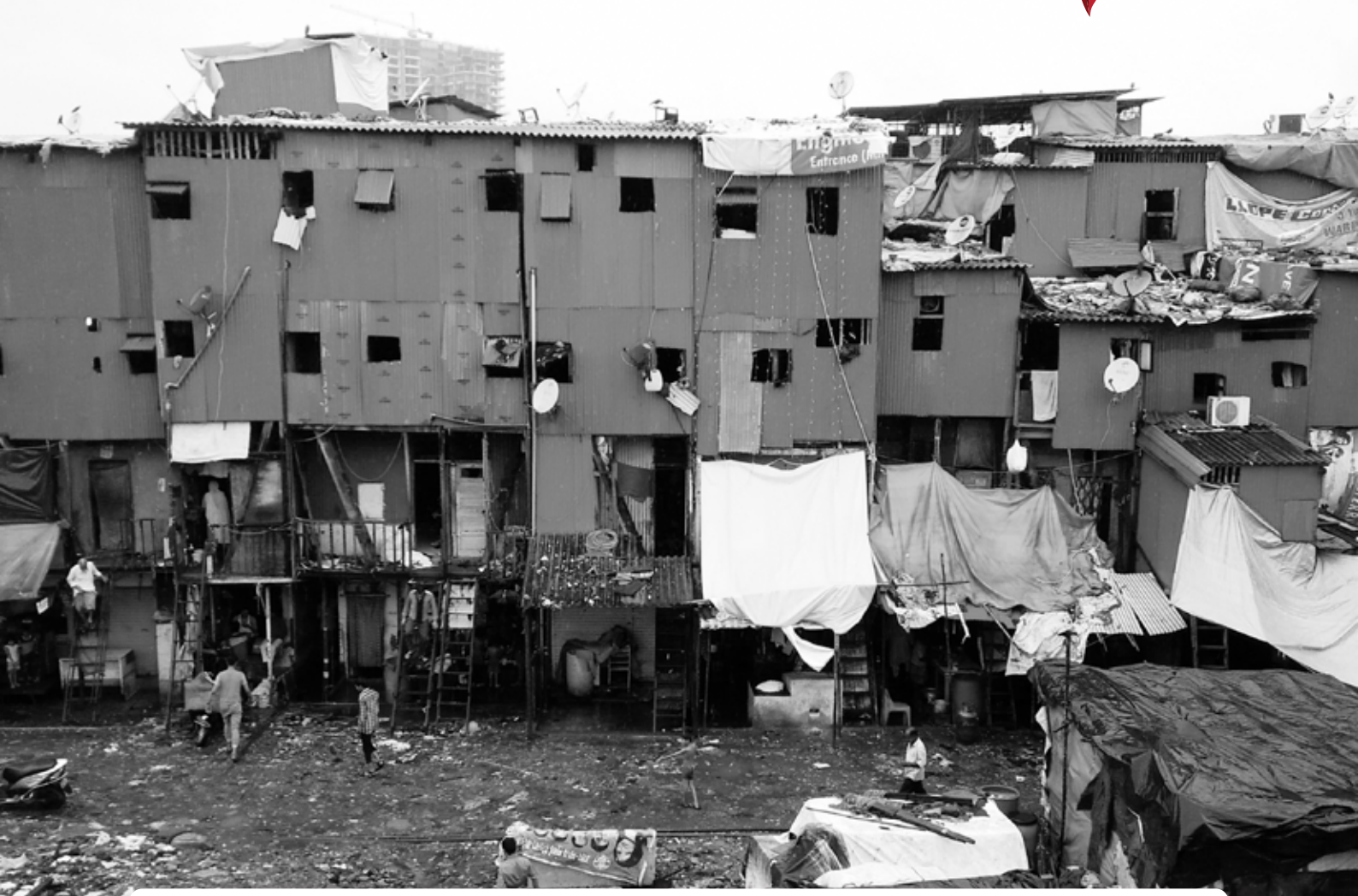
CIPS
Center for Indonesian Policy Studies



WORKING PAPER NO. 1

A Tale of Two Liberalization Episodes with China:

Impact on Poverty in a Developing Nation

by **Deasy Pane (Center for Indonesian Policy Studies)** and
Natanael Waraney Gerald Massie (Universitas Indonesia)

www. cips-indonesia.org

Working Paper No. 1

A Tale of Two Liberalization Episodes with China: Impact on Poverty in a Developing Nation[1]

Authors:

Deasy Pane (CIPS)

Natanael Waraney Gerald Massie (Universitas Indonesia)

Jakarta, Indonesia

October, 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". We gratefully acknowledge Krisztina Kis-Katos, Arianto Patunru, Rainer Heufers, and other participants at the Center for Indonesian Policy Studies (CIPS) dissemination session for providing constructive comments and feedback on this work. We also specifically thank Arianto Patunru for the initial provision of data access that greatly facilitated this research endeavor. Finally, we wish to express our sincere appreciation to Albert Ludi Angkawibawa for his excellent data management assistance. The careful contributions of all these individuals measurably strengthened the quality of this paper. All remaining errors are our own.

Acknowledgement:

This publication is based on research supported by the Templeton World Charity Foundation, Inc. (funder DOI 501100011730) under the grant doi.org/10.54224/30486. We gratefully acknowledge Krisztina Kis-Katos, Arianto Patunru, Rainer Heufers, and other participants at the Center for Indonesian Policy Studies (CIPS) dissemination session for providing constructive comments and feedback on this work.

We also specifically thank Arianto Patunru for the initial provision of data access that greatly facilitated this research endeavor. Finally, we wish to express our sincere appreciation to Albert Ludi Angkawibawa for his excellent data management assistance. The careful contributions of all these individuals measurably strengthened the quality of this paper. All remaining errors are our own.

Cover:
EyeEm - Freepik.com

ABSTRACT

We investigate the impact of increased trade with China on poverty in Indonesia, focusing on two key liberalization phases: China's WTO entry in 2001 and the ASEAN-China Free Trade Agreement (ACFTA) implementation in 2010. Using district-level trade exposure and an instrumental variable approach, we find that regions facing greater import competition post-ACFTA experienced faster poverty reduction, particularly driven by increased imports of raw materials and intermediate goods. However, expanded market access to China had limited poverty impact. Regional disparities, shaped by urbanization, education, and literacy, underscore the need for targeted policies to ensure equitable distribution of trade benefits.

Keywords: Trade liberalization, China, Indonesia, FTAs, poverty

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

China's expansion into the global market has been remarkable (Baláž et al., 2019; Husted & Nishioka, 2013; Li & Jiang, 2018). The combination of impressive economic growth, increasing engagement in international trade, and abundant labor, land, and capital reserves have resulted in economic shocks with worldwide effects. Researchers are keenly examining the global ramifications of China's expanding influence, exploring a wide array of impacts across both developed and developing nations, and considering effects on firms, labor markets, and various socioeconomic dimensions.[2] For instance, U.S. labor markets exposed to heightened import competition from China experienced increased plant closures, substantial reductions in manufacturing employment, employment-population ratios, and earnings for low-wage workers, along with declines in housing prices and tax revenues (Autor et al., 2021). In Mexico, though there is evidence of industrial upgrading, China's expansions negatively impacted employment, plant growth, and the entry and survival of firms (Utar & Ruiz, 2013). In Brazil, regions benefiting from rising Chinese commodity demand saw faster wage growth, whereas areas facing increased manufacturing competition experienced slower wage growth, and negative effects persisted in the long term (Costa et al., 2016; Dix-Carneiro & Kovak, 2017). In Africa, increased exports to China reduced poverty and imports led to short-term livelihood improvements, but competition drove down profit margins (Lyons & Brown, 2010; Saibu & Akinyele, 2020). Despite this growing body of research, there remains a notable gap in our understanding of the socioeconomic impacts of China's rise on other Asian developing countries, particularly those in close geographic proximity to China.

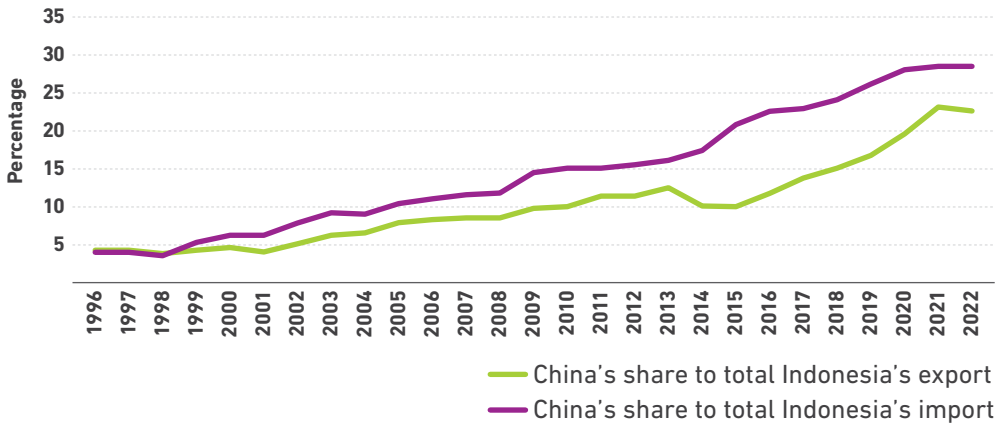
This study aims to fill the above-mentioned gap in the literature by providing a developing country perspective on the impact of trade liberalization with China, focusing specifically on Indonesia's socioeconomic outcomes, with particular emphasis on poverty dynamics. While heightened import competition from China has been cited as a cause of premature deindustrialization in Indonesia (Ing et al., 2018), the distributional impacts of increased trade with China have not been thoroughly examined. As both countries are developing, many import-competing sectors in Indonesia faced increased competition, while exporting sectors benefited from access to China's large economy and lower tariffs. Our study leverages regional variations within Indonesia to assess the differential impacts of this trade relationship on poverty indicators. Specifically, we analyze regional employment variations to determine if regions with higher employment in sectors experiencing greater trade increases with China exhibit significantly different changes in poverty indicators.

To contextualize our study, it's crucial to understand the evolution of trade relations between China and Indonesia. The liberalization between China and Indonesia began when China joined the World Trade Organization (WTO) in 2001, allowing both countries to benefit from MFN tariffs for market access. This initial phase set the stage for deeper

[2] See studies from Autor et al. (2013), Autor et al. (2016), Autor et al. (2021), Itakura (2020) for developed countries, and from Costa et al. (2016), Dix-Carneiro & Kovak (2017), He (2013), Utar & Ruiz (2013), Wood & Mayer (2011) for developing countries.

economic integration, which intensified with the signing of the ASEAN-China Free Trade Agreement (ACFTA), reducing tariffs to nearly zero. By 2010, the ACFTA had become the world's largest free trade area by population and the third largest by nominal GDP, ranking third in trade volume behind the European Economic Area and the North American Free Trade Area. The ACFTA has significantly increased trade between ASEAN and China, enhancing trade patterns at both industry and country levels (Alleyne et al., 2020). This broader trend is mirrored in Indonesia-China trade, where total trade increased by approximately 42% in the first year following the agreement and continued to grow, reaching 134 trillion USD in 2022, about a quarter of Indonesia's total trade. These dramatic shifts in trade dynamics form the backdrop for our analysis of poverty impacts in Indonesia.

Figure 1.
Indonesia's trade with China 1996-2022



Source: WITS, calculated by authors

Building on the context of China-Indonesia trade liberalization, our study focuses on Indonesia as a particularly compelling case for examining the impact of China's economic rise on poverty in developing countries. This choice is motivated by several unique factors that set Indonesia apart in the landscape of China's trading partners. Firstly, China's significant role in Indonesia's import and export activities has experienced notable growth. In 2000, China accounted for merely 6.1 per cent of Indonesia's imports and received 4.5 per cent of its exports; by 2022, these figures had surged to 28.5 per cent and 22.6 per cent, respectively, underscoring China's increasing economic importance to Indonesia.

Secondly, Indonesia's export pattern to China differs from that of neighboring countries in Southeast Asia, where manufacturing goods like electronics and machinery dominate due to established production networks with China (Athukorala, 2016). In contrast, Indonesia's exports to China are still predominantly focused on extractive sectors and resource-based manufacturing.

Thirdly, Indonesia's status as the largest country in Southeast Asia, coupled with its diverse geography, results in highly varied local labor markets with distinct comparative advantages. This factor suggests the importance of identifying the heterogeneous effects of trade with China at a more granular level without relying solely on cross-country regression. Additionally, as an archipelagic nation, Indonesia exhibits regional variations in conducting trade with China, both directly and indirectly. Some regions have direct access to international ports, while others need to rely on intermediate regions for product transportation. These variations in trade patterns can potentially influence the outcomes of trade with China. This aligns with our earlier mentioned focus on regional variations and heterogeneous effects.

Lastly, the socio-political relationship between Indonesia and China has been dynamic for decades, with Indonesians historically displaying ambivalence toward China (Anwar, 2019). While economic ties between the two countries have strengthened across various sectors, anti-Chinese sentiments in Indonesia often raise questions about the benefits of these increasing relations. This study aims to empirically assess whether such concerns are justified, contributing to the broader discourse on the impacts of trade with China on poverty indicators.

Our study contributes to a rich body of literature that has discussed the uneven distribution of trade impacts across regions within countries. Existing literature indicate that trade impacts are unevenly distributed across regions within countries, as certain areas have a higher concentration of import-competing sectors or export-oriented industries. The effects of trade are often localized within specific labor markets, primarily due to limited worker mobility between regions and sectors.[3] Building on the expanding body of literature, our study investigates the local labor market implications of trade liberalizations. Following methodologies from McCaig (2011), Autor et al. (2013), and Costa et al. (2016), we create regional measures of trade exposure based on pre-liberalization labor force structures and sectoral trade sizes. Our research broadens the scope by examining both import-competing and exporting sectors. We focus on the period from 2008-2012 to assess the impact of FTA implementation, incorporating two liberalization stages into our analysis, both China's accession to the WTO and the ACFTA.

In line with Autor et al. (2013), our research employs an identification strategy that integrates district-level labor structure data prior to liberalization with the increase in trade size between Indonesia and China. This method allows us to create district-level trade exposure variables, which we use to evaluate the FTA's impact on poverty. We include controls for time and district, as well as variables such as education rates, literacy rates, and the rural population share. Our estimates are based on changes in real trade activities between China and Indonesia. To ensure the robustness of our findings and eliminate potential biases from Indonesia-specific shocks or global pricing changes unrelated to China, we use instrumental variables for these measures.

[3] Several studies explain this phenomenon. Firstly, the cost of relocation presents a barrier, as individuals may face challenges in financing the expenses associated with moving. Imperfect capital markets further hinder individuals from borrowing funds to facilitate relocation (Topalova, 2010). Additionally, workers who lose jobs in import-competing industries may not possess the skills required by industries and regions experiencing expanding employment opportunities (Dix-Carneiro, 2014). The presence of match and search frictions in labor markets, along with housing costs, can also impede labor mobility (Pavcnik, 2017).

We utilize local labor structures from the base year 2008 to assess the impact of the ACFTA compared to the situation just before its implementation. However, the 2008 labor structure might already reflect the influence of China's earlier liberalization stage following its WTO accession in 2001, which significantly impacted global trade.[4] To account for potential pre-existing effects of Chinese trade on the Indonesian labor market, we conduct additional analysis using alternative labor force concentration measures. We also utilize labor structures from the initial year 2000 to better capture the global effects of China's trade influence and to observe how the results differ.

To support our argument regarding the pre-existing effects of Chinese trade on the Indonesian labor market, we examine changes in labor force concentration between 2000 and 2008. Our analysis reveals a negative association between labor force concentration and increased imports from China. Specifically, sectors that experienced a rise in imports from China during this period tend to have a more dispersed labor force across regions. This finding further motivates the need to add the 2000 labor force concentration for our analysis, as it may uncover significant impacts that are more apparent when considering the period before China's WTO accession.

To evaluate the impact on poverty, we calculate three poverty measures: the poverty headcount ratio (P0), which represents the proportion of people living below the poverty line; the poverty gap (P1), which measures the aggregate income gap of the poor relative to the total income required to reach the poverty line; and the squared poverty gap (P2), which indicates the depth of poverty by summing the squared deviations of individuals living below the poverty line from the poverty line income and normalizing it by the squared value of the poverty line income.

The findings of this study demonstrate a robust and consistent relationship between increased trade with China and poverty reduction in Indonesia. Regions with significant employment in sectors where imports from China surged tend to exhibit better poverty-related outcomes. This effect is particularly evident when using 2008 as the base year, suggesting that further liberalization under the ACFTA accelerated poverty reduction in regions with higher imports from China. Notably, the increased importation of inputs from China appears to reduce poverty, aligning with Kis-Katos & Sparrow (2015), who found that poverty reductions in Indonesia were most pronounced in districts with greater exposure to input tariff liberalization. Conversely, further liberalization of China's export market did not significantly impact poverty in Indonesia. However, comparing the 2008 baseline with the 2000 labor structure reveals a significant reduction in poverty gaps and severity for the latter. This finding suggests that the early 2000s China boom, which triggered demand shocks for countries supplying inputs to Chinese industrialization, had a more substantial effect on raising income levels in Indonesia, even though it did not significantly reduce the overall number of people in poverty. This observation is consistent with Costa et al. (2016), who found that China's early 2000s demand shocks led to increased wages and employment in Brazil.

[4] See studies by Alleyne et al. (2020), Autor et al. (2013), Autor et al. (2016), Autor et al. (2021), Cabral et al. (2020), Caliendo et al. (2015), Costa et al. (2016), He (2013), Itakura (2020), Mirza et al. (2014), Pavcnik (2017), Thewissen & Vliet (2017).

We also examine potential heterogeneous effects by checking whether the results differ based on regional characteristics such as urbanization, education, and literacy levels. While the overall effects are consistent across regions, the significance and magnitude of these effects differ. The impact of increased imports from China on the poverty rate (P0) is more pronounced in regions that are more urbanized, educated, and literate. This suggests that literacy and education play a crucial role in enabling regions to capitalize on the benefits of trade liberalization, fostering income growth among the poor and aiding in their escape from poverty. However, regions with lower literacy and education levels also see reductions in the poverty gap (P1) and poverty severity (P2). This indicates that even the poorest populations in these areas may experience income growth, which helps narrow poverty gaps, though it may not be sufficient to lift them out of poverty entirely.

This study contributes to the growing literature on the global repercussions of China's ascent by addressing gaps related to the social and economic consequences from a developing-country perspective. While China's economic power and integration into the global economy have had widespread impacts, research focusing on the effects on developing countries is relatively rare. This study fills that gap, adding to the body of work on this aspect. Additionally, it expands the literature on the influence of FTA implementation and trade liberalization on poverty in developing countries (Chamarbagwala, 2006; Cruzatti, 2021; Gourdon et al., 2006; McCaig, 2011). Additionally, it offers new perspectives on how different phases of liberalization can variably influence socioeconomic outcomes, providing a more nuanced understanding of these processes.

This paper is structured as follow. We continue this introductory section with a concise summary of the existing literature on the relationship between China trade shocks, poverty, and the effects of changes in market access on labor demand. It then delves into a comprehensive examination of the trade liberalization episodes, providing a detailed analysis of its key aspects. The subsequent sections of the paper outline the data sources employed and describe the empirical methodology adopted for the study. The findings from the regression analysis are presented and discussed, shedding light on the relationships under investigation. Finally, the paper concludes with a summary of the main findings and offers concluding remarks.

BACKGROUND

Over the years, China has become a major player in global trade thanks to its large manufacturing base, low labor costs, and competitive pricing. China's share of world exports grew from 1.3 percent in 1985 to 2.2 percent in 1995, 6.2 percent in 2005, 12 percent in 2015, and 14.5 percent in 2023. China's accession to the WTO in 2001 has played a role in these figures as it granted China access to international markets with significantly lower tariffs compared to the early 1990s. While consumers benefit from the availability of cheaper products and a wider selection of goods due to China's global market presence, domestic manufacturers in many countries face considerable challenges due to intense competition. The expansive growth of Chinese exports has resulted in significant costs of adjustment and distributional consequences in numerous nations. The impact is particularly evident in local labor markets, which concentrate on industries that are exposed to competition from China (Autor et al., 2016).

While extensive research has been conducted on the impact of China's rise on developed countries, the effects on developing countries warrant closer examination. China's ascent influences international trade and the domestic economies of developing countries through two primary channels: increased demand for commodities and intensified import competition (Pavcnik, 2017). The expansion of China's domestic economy has led to a higher demand for commodities, thereby impacting the international trade of numerous resource-rich developing countries (Hanson, 2012; Costa et al., 2016). Concurrently, China's manufacturing sector has intensified import competition for goods produced by other developing countries, both in external markets such as the United States and within their own domestic markets (Utar and Ruiz, 2013; Costa et al., 2016).

Meanwhile, changes in foreign trade policy, such as implementing an FTA, can significantly affect poverty levels and living standards within a country (McCaig, 2011). Over the past few decades, economic growth has lifted many people out of extreme poverty and contributed to the rise of middle-class populations. Recent micro-level studies show that the effects of trade liberalization on poor households vary widely, depending on factors like the specific trade policies liberalized and household income sources. Individuals employed in the export sector tend to benefit, while those in the import-competing sector often face losses. This is supported by research on the impact of liberalization on wages (Winters and Martuscelli, 2014).

Initial discussions on the impact of international trade on socioeconomic outcomes initially centered on the mechanisms within the simplified Heckscher-Ohlin (H-O) model, a widely used theory in international trade based on comparative advantage. According to this model, countries export goods that use their relatively abundant production factors and import goods that use their relatively scarce factors. Trade liberalization is thought to increase returns to the relatively abundant factor, such as unskilled labor, as the prices of goods intensive in unskilled labor rise, potentially reducing inequality and poverty. The H-O model assumes perfect mobility of production factors, with returns equalized across sectors. Hence, price changes affect economy-wide returns rather

than sector-specific ones. It is the movement of labor and capital across sectors that allows countries to benefit from trade openness in this classical trade framework.

Meanwhile, international trade has varied effects on the earnings of individuals across different local labor markets. Some regions specialize in industries facing import competition, while others focus on export-oriented sectors or industries gaining access to foreign markets. Consequently, trade policies or shocks are expected to impact wages differently across regional labor markets. Regional wage changes reflect a weighted average of national price changes, with industries employing more labor and having more elastic labor demand carrying greater influence (Kovak, 2013). A national trade-induced price change is anticipated to more significantly affect wages in local labor markets where the affected industries represent a larger share of total employment.

Residents in regions with high concentrations of industries facing import competition typically experience lower earnings compared to those in less exposed areas. This observation is consistent with existing research highlighting the geographically concentrated negative effects of import competition on local labor markets (Autor et al., 2013 for the U.S.; Topalova, 2010 for India; Kis-Katos and Sparrow, 2015 for Indonesia). Similarly, residents in regions with a high concentration of industries benefiting from reduced export costs or increased export demand tend to have higher earnings compared to individuals in less exposed regions (McCaig, 2011 for Vietnam; Costa et al., 2016 for Brazil; Chiquiar, 2008 for Mexico; Erten and Leight, 2017 for China).

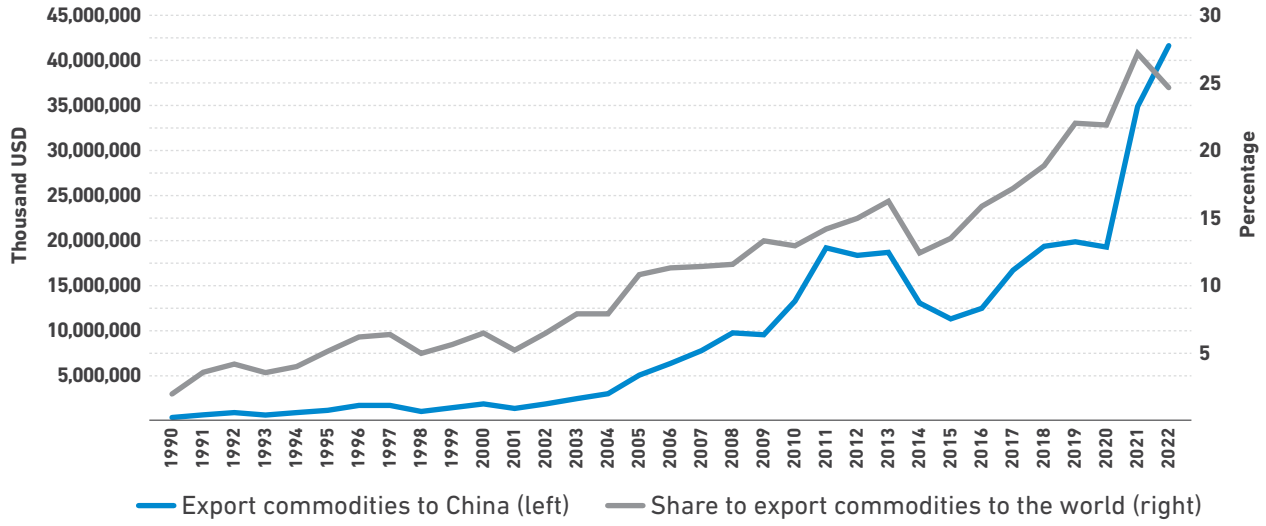
Government Support to Enhance Private Investment

Much of the attention regarding the impact of China on other countries' economies have been centered around the effect of increased competition in manufacturing due to China's significant growth in various sectors. However, it is important to note that China has also emerged as a substantial consumer of goods produced abroad. Therefore, in addition to being a source of supply shock, China has also generated a significant demand shock. In the case of developing countries, the China demand shock has manifested in a distinct manner. China has become the world's largest factory, leading countries in East and Southeast Asian regions to establish regional production networks to cater to global markets. This has resulted in a close integration of production activities among these countries. For other developing nations, the goods being exported to China primarily comprise products for industrial inputs including from the agricultural and extractive sectors. These countries have tapped into China's growing demand for commodities, such as agricultural products and raw materials.

Despite Indonesia's geographical location within the Southeast Asian region, its trade relationship with China differs from that of its ASEAN neighboring countries and aligns more closely with resource-rich nations. The trade dynamics between Indonesia and China are characterized by a complementary pattern of exports and imports. Indonesia mainly exports commodities like coal, palm oil, rubber, and minerals to China. Indonesia's commodity exports have dramatically expanded, with China absorbing around 25 per cent of Indonesia's commodities by 2022 (Figure 2). In contrast, China predominantly exports a diverse range of manufactured goods,

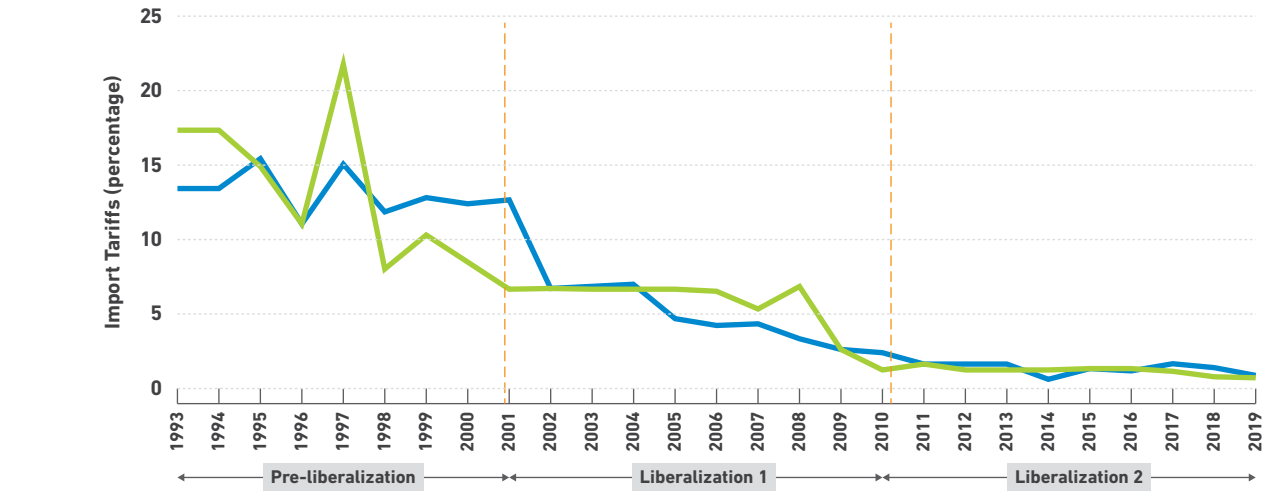
machinery, electronics, and textiles to Indonesia. The trade ties between Indonesia and China have experienced substantial growth, particularly following the establishment of the ACFTA in 2010. As of 2022, China has emerged as Indonesia's foremost trading partner, surpassing Japan and the United States.

Figure 2.
Indonesia export of commodities to China



Source: WITS, calculated by authors

Figure 3.
Applied tariff data between China and Indonesia (in percentage)

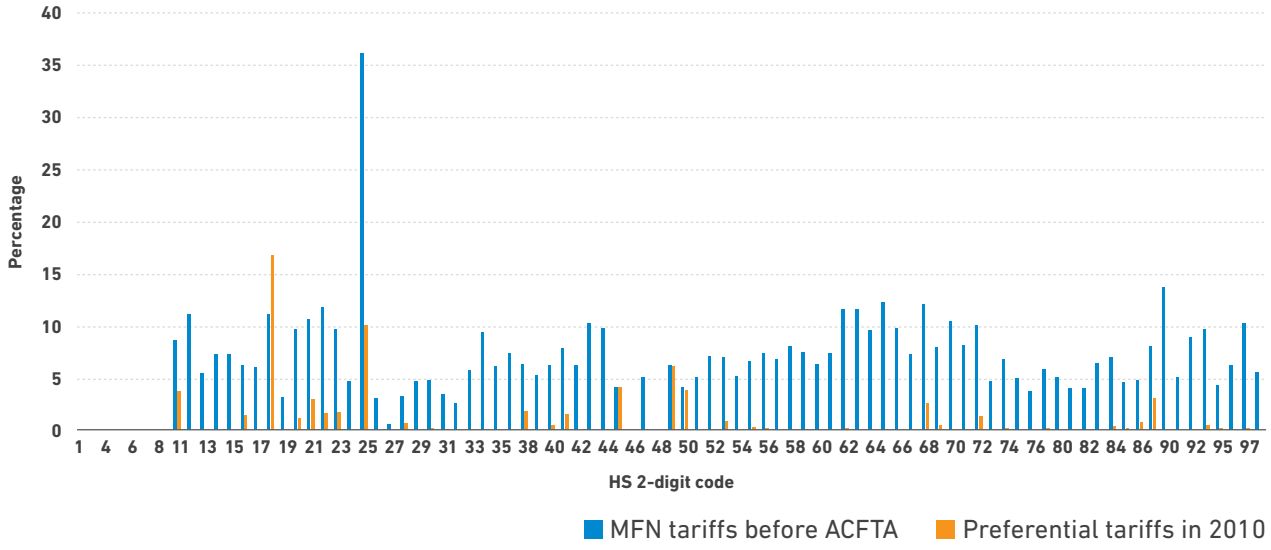


	Pre-liberalization	Liberalization 1	Liberalization 2
Indonesia tariffs for China products	13.7	6.1	1.2
China tariffs for Indonesia products	13.2	5.8	1.4

Source: TRAINS database, calculated by authors

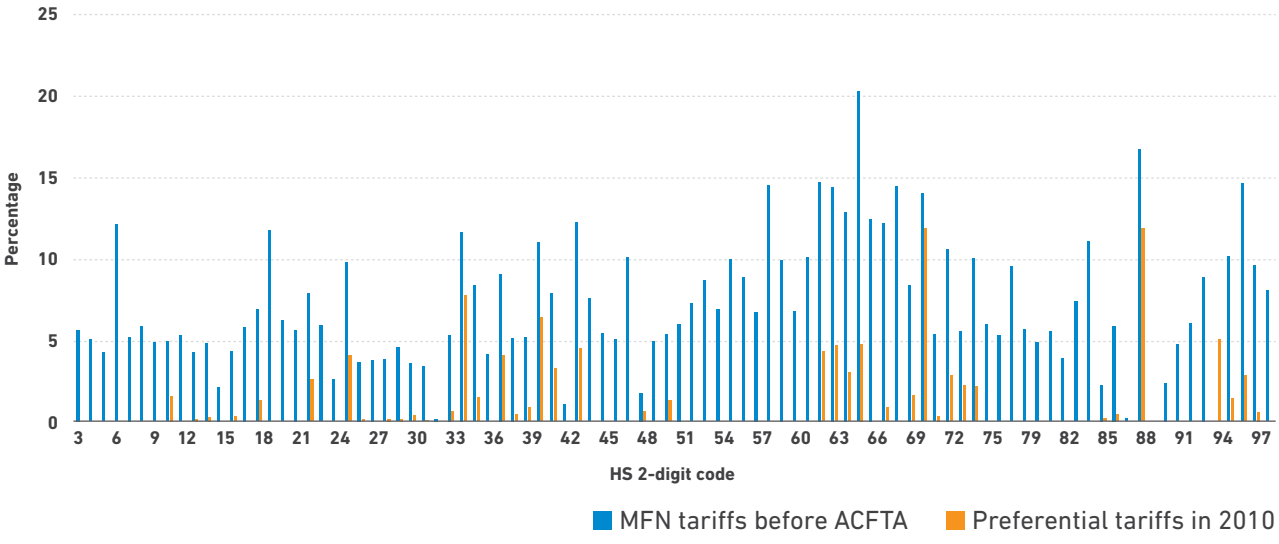
Both China and Indonesia reduced their tariffs on each other's products. Since China entered the WTO in 2001, it has benefited from MFN tariffs implemented by all WTO members, including Indonesia. Similarly, Indonesia can benefit from decreasing tariffs in the Chinese market. Since the two countries joined ACFTA in 2010, applied tariffs have been significantly reduced to 1.2 per cent in Indonesia and 1.4 per cent in China (Figure 3). When we look at detailed tariffs for HS 2-digit products, we can find that numerous product categories have been fully liberalized at zero per cent (Figures 4 and 5).

Figure 4.
Import tariffs in China for HS 2-digit products from Indonesia (in percentage)



Source: TRAINS database, calculated by authors

Figure 5.
Import tariffs in Indonesia for HS 2-digit products from China (in percentage)



Source: TRAINS database, calculated by authors

DATA AND METHODOLOGY

This section details the methodology and data employed in the study, focusing on assessing the impact of trade liberalization with China on poverty at the subnational level in Indonesia. We adopt the small open economy model proposed by Autor et al. (2013), defining trade exposure as changes in trade flows between Indonesia and China. While some studies, such as Kis-Katos & Sparrow (2015) and McCaig (2011) arguing that price changes rather than trade flows influence subnational markets and using tariff schedule changes to induce price shocks, our primary approach aligns with Costa et al. (2016), who assert that factors beyond tariff schedules, such as productivity growth in China, also impact the Indonesian subregional market.

Our research design leverages the variation in trade exposure across Indonesian districts to identify the causal effects of increased trade with China on local poverty outcomes. We examine two critical periods of trade liberalization: China's accession to the WTO in 2001 and the implementation of the ASEAN-China Free Trade Agreement (ACFTA) in 2010.

Our methodology section is structured as follows: First, we describe our data sources and preparation, detailing how we construct our dataset from various surveys and trade statistics. Next, we explain our approach to calculating exposure-related measures, including our use of both 2000 and 2008 as base years for labor force ratios. We then present our main model estimation, which links poverty indicators to trade exposures using a specification consistent with Bartik's shift-share approach. Following this, we discuss our instrumental variable strategy, designed to address potential endogeneity issues and ensure our results are not influenced by Indonesia-specific shocks or unrelated global price changes.

This comprehensive methodological approach enables us to conduct a nuanced analysis of how trade liberalization with China has affected poverty across different regions of Indonesia, accounting for local economic structures and initial conditions. By combining detailed trade data with local socioeconomic indicators, we can identify both the direct effects of trade exposure and potential spillover effects on poverty reduction. We now turn to a detailed description of our data sources and preparation.

Data

Our study combines a multi-source dataset that combines trade statistics with detailed local labor market and socioeconomic information. The primary independent variables are measures of trade exposure, specifically trade size per worker, calculated for each district (*kabupaten/kota*) in Indonesia. This approach builds on methodologies introduced by Autor et al. (2013), with changes tailored to the Indonesian context.

We construct our dataset from three main sources. First, we leverage annual trade statistics from the World Integrated Trade Solution (WITS), which provides detailed

information on Indonesia's trade flows with China at the sector and product levels. Second, we utilize the National Labor Force Survey (SAKERNAS) conducted by BPS (Statistics Indonesia) to obtain district-level labor force information. This allows us to create precise measures of local labor market exposure to trade shocks. Third, we utilize data from the National Socio-Economic Survey (SUSENAS), also conducted by BPS and released annually, provides us with a range of socioeconomic indicators at the district level, including our key poverty measures.

Our dataset encompasses approximately 288 districts in Indonesia, consistently tracked from 2000 onwards. To ensure comparability over time and prevent bias from administrative changes, we adjust all data to align with the district boundaries established in 2000. This adjustment accounts for the creation of new regions and other administrative changes that occurred during our study period.

We aggregate household and respondent-level data from SUSENAS into percentages to provide a district-level overview of socioeconomic conditions. All socioeconomic indicators are adjusted to reflect the 2000 district boundaries, ensuring consistency across our study period.

This harmonized dataset allows us to construct precise measures of trade exposure at the district level and link them to local poverty outcomes. By integrating trade data with local labor market information and socioeconomic indicators, we can examine both the direct effects of trade exposure and potential spillover effects on poverty reduction, while accounting for local economic structures and initial conditions. In the following subsections, we detail our methodological approach to calculating these exposure measures, estimating their impacts on poverty, and addressing potential endogeneity concerns through instrumental variable techniques.

Methodology

Calculating exposure-related measures

To calculate exposure-related measures, we follow established methodologies from the literature. Specifically, we disaggregate national-level trade data to understand trade dynamics at the sector and product levels. For instance, we use data on trade with China, broken down by sectors and products, and then adjust this data to reflect the labor force distribution in each district corresponding to these sectors. The goal is to derive a weighted trade measure at the regional level that mirrors the national-level data while incorporating appropriate adjustments. This process entails calculating exposure using a fixed ratio of labor force share from a base year, which we trace consistently across subsequent years. Essentially, we use the same labor force ratio from the base year for each subsequent year, ensuring that our measure is anchored in a consistent baseline.

We follow Autor et al. (2013) and adapt their method to suit the Indonesian context. Our methodology integrates both static and dynamic components: a fixed labor force share ratio from a base year, which remains constant across all years, and annually updated trade data encompassing exports and imports per worker. By combining these

elements, we constructed a measure of trade exposure per worker that accounts for evolving trade dynamics while anchoring it to a consistent labor force baseline. This approach enables us to track changes in trade dynamics over time while maintaining a stable reference point for the labor force. In essence, our exposure-related measures are derived by disaggregating national trade data by sectors and products, adjusting for district-level labor force distributions, applying a fixed base-year labor force ratio annually, updating trade data annually to reflect changes in exports and imports per worker, and integrating the static labor force ratio with dynamic trade data to capture both foundational and evolving dimensions of trade exposure. We define the exposure per worker as.

$$TPW_{d,t} = \sum_{S}^{S} \frac{L_{d,s,t_0}}{L_{d,t_0}} \frac{(T_{s,t}^{IDN,CHN} - T_{s,t-1}^{IDN,CHN})}{L_{d,s,t}} \quad (1)$$

$TPW_{d,t}$ is trade per worker in district d at year t, where L represents the labor force size and T denotes trade. L_{d,s,t_0} refers to the labor force size in district d, sector s, at the base year t_0 and L_{d,t_0} represents the total labor force in district d at the base year t_0. The term $\frac{L_{d,s,t_0}}{L_{d,t_0}}$ on the left side of the equation represents the proportion of the labor force in sector s relative to the total labor force in district d at the base year t_0. This static component allows us to anchor our analysis in the labor force distribution of the base year, providing a consistent baseline across all years.

$T_{s,t}^{IDN,CHN}$ indicates trade between Indonesia and China for sector s and year t. The right side of the equation, $\frac{T_{s,t}^{IDN,CHN} - T_{s,t-1}^{IDN,CHN}}{L_{d,s,t}}$, represents the change in trade from Indonesia to China in sector s between year t and the previous year $t-1$, adjusted per worker in sector s at time t. This dynamic component captures the annual fluctuations in trade, reflecting the evolving economic interactions between Indonesia and China and how these changes impact the labor force in each sector.

Taking the summation over all sectors s in the equation aggregates these exposure measures across different sectors within a district. This summation allows us to account for the overall trade exposure at the district level, considering the combined effect of trade changes in all sectors. This formula captures the trade per worker in each district over time by using a combination of static labor force ratios from the base year and dynamic trade data updated annually.

Using 2000 and 2008 as base year

In our main model, we use 2008 as the base year for the labor force ratio, analyzing data through 2012, which covers the full trade liberalization period. However, we also examine the impact of using the labor force data from 2000, the year before China joined the WTO. The rationale for including the year 2000 is that, while the ACFTA increased trade between Indonesia and China, by 2008, there was already significant Chinese influence. Using 2000 as the base year allows us to assess the sensitivity of our results to labor force conditions prior to China's WTO ascension, providing a clearer picture of the pre-WTO environment.

Table 1 shows the estimation results on the impact of increased trade with China on district-level labor force share. The dependent variable is the change in labor force share, while the independent variables are changes in exports and imports with China (in logarithms). The results reveal a significant negative association between labor structure changes and imports. Sectors with increased imports from China between 2000 and 2008 tend to have lower labor force shares. This indicates that rising Chinese imports correlate with a decrease in labor force share in these sectors, likely due to increased competition or shifts in production processes.

Table 1.
Estimated association between change in labor force and Chinese trade

	(1)	(2)
	% Labor force difference	% Labor force difference
Ln Diff Export IDN, CHN	0.02	
	(0.02)	
Ln Diff Import IDN, CHN		-0.12***
		(0.01)
Constant	-0.12	0.01
	(0.09)	(0.05)
Observations	6989	6989

Standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

Given these findings, we consider the potential relationship between trade activities with China and pre-existing labor force conditions. This justifies our decision to include the year 2000 as an additional base year in our analysis, as discussed previously. By comparing the results using both 2000 and 2008 labor force data, we aim to capture the broader impacts of trade exposure on labor market dynamics over time, offering a more comprehensive understanding of the socio-economic effects of increased trade with China.

Main model Estimation

Our identification strategy produces a specification linking poverty to trade exposures, resulting in an empirical strategy consistent with Bartik's shift share approach (1991). Our baseline specification is thus as follows:

$$\Delta Pov_{dt}^{k} = \alpha_j + \beta_1 TPW_{d,t}^{IDN,CHN} + \sum_j^J \gamma_j \mathbf{C}_{d,t-0}^{j} + \delta_d + \epsilon_t \quad (2)$$

The model suggests that the changes in trade exposure (both import or export) between Indonesia and China in the district d and period t affect the changes in poverty indicators (P0, P1, and P2) in the district d and period t. The goal is to assess whether regions with higher exposure to Chinese trade experience accelerated reductions in poverty indicators, specifically P0, P1, and P2.

Instrument Variables

There have been extensive discussions on the relationship between trade liberalization and poverty, with the former often recognized as a catalyst for inclusive economic growth and poverty reduction. However, empirical evidence does not consistently show significant improvements in well-being following liberalization (Winters & Martuscelli, 2014). Investigating the causal effects of trade liberalization on poverty across different districts, as we propose, is challenging since regional poverty levels may also impact the population's ability to engage in trade. While the one-way relationship of liberalization affecting poverty is more pronounced, the reverse relationship may also exist. To mitigate endogeneity issues, we employ instrumental variables.

Our measures of trade liberalization shocks rely on changes in trade flows between China and Indonesia. We use instrumental variables to reduce potential reverse causality and to ensure our results are not influenced by Indonesia-specific shocks or unrelated global price changes. To address potential endogeneity, we follow Costa et al. (2016) and instrument our trade exposure variable with trade between China and the rest of the world, excluding Indonesia. This approach helps mitigate the impact of Indonesia-specific commodities like coal and CPO, which might be affected by local supply shocks or global price fluctuations. Additionally, we lag the instrument to capture delayed effects and ensure the exogeneity of the instruments. The instrumented variable is constructed as follows:

$$TPW_{d,t}^{IV} = \sum_{S}^{S} \frac{L_{d,s,t_0}}{L_{d,t_0}} \frac{(T_{s,t}^{IV} - T_{s,t-1}^{IV})}{L_{d,s,t}} \tag{3}$$

We then model the first-stage estimates into the following:

$$TPW_{d,t}^{IDN,CHN,IV} = \beta_0 + \beta_1 TPW_{d,t-0}^{IV} + \sum_{j}^{J} \gamma_j \mathbf{C}_{d,t-0}^{j} + \delta_d + \epsilon_t \tag{4}$$

In the second stage, we incorporate the instrumented variables into a panel regression model, using poverty indicators as the dependent variables. Our estimation strategy includes controls for various socio-economic factors, such as the proportion of urban population, high school education levels, and literacy rates at the regional level. These controls help account for changes in socio-economic conditions that could affect the outcomes, ensuring a more accurate analysis of the impact of trade exposure on poverty.

$$\Delta Pov_{dt}^{k} = \beta_0 + \beta_1 TPW_{d,t}^{IDN,CHN,IV} + \sum_{j}^{J} \gamma_j \mathbf{C}_{d,t}^{j} + \delta_d + \epsilon_t \tag{5}$$

We estimate our models by distinguishing between imports and exports per worker, consistently using the same control variables to isolate the effects of trade exposure on poverty reduction. To robustly estimate the causal impact of trade exposure on socio-economic outcomes, we also employ alternative instrumental variable specifications by including an Indonesia-US trade exposure variable to validate our findings.

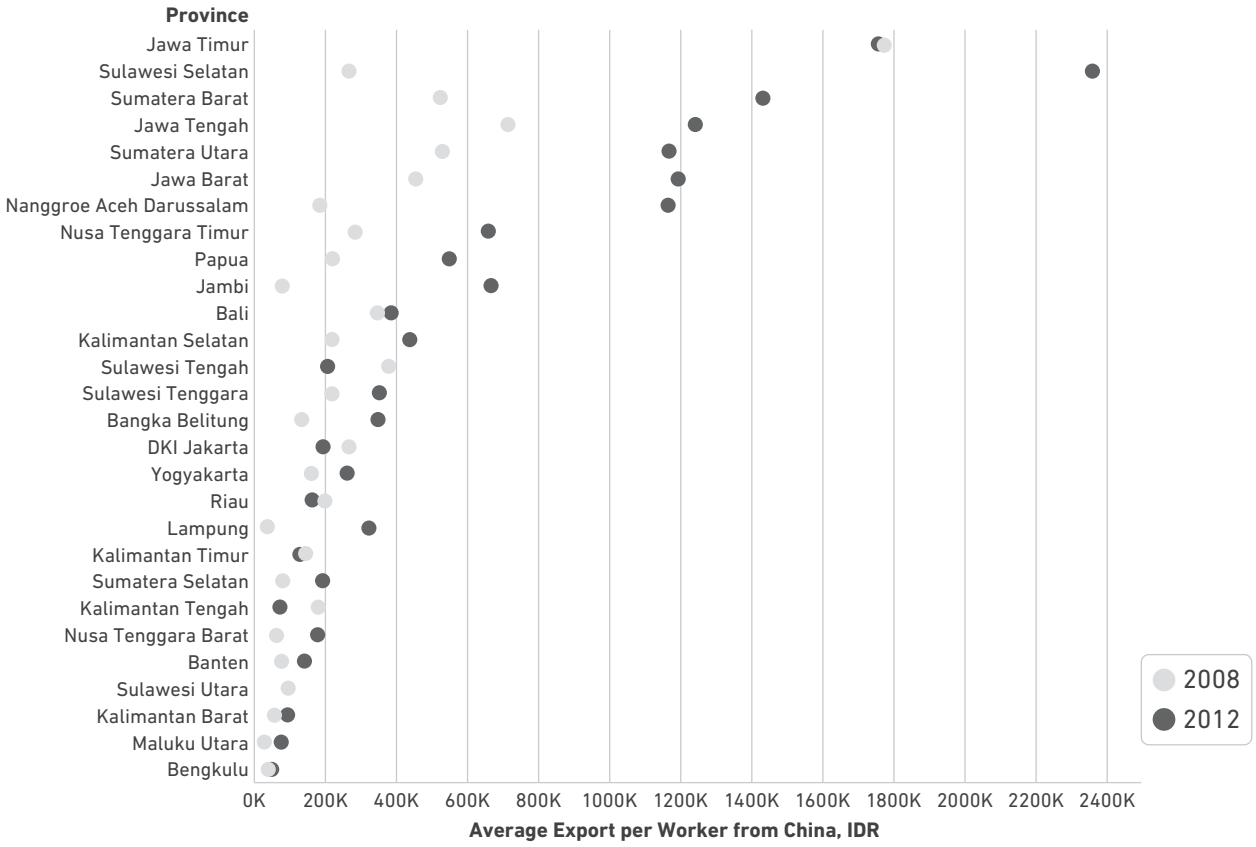
RESULT AND DISCUSSION

Descriptive statistics

Trends of Indonesia and China trade

To provide a comprehensive overview of the data, we present the descriptive statistics for regional trade exposure to China in Indonesia. Figures 6 and 7 illustrate the average export and import exposure per worker across various provinces. Notably, some provinces exhibit higher average export and import figures per worker, indicating significant engagement in trade activities and dependency on China. This suggests that certain regions are more integrated into trade networks with China, potentially benefiting from increased economic activity and related growth. High import figures also suggest strong local demand for Chinese products, which can significantly influence local markets and economies.

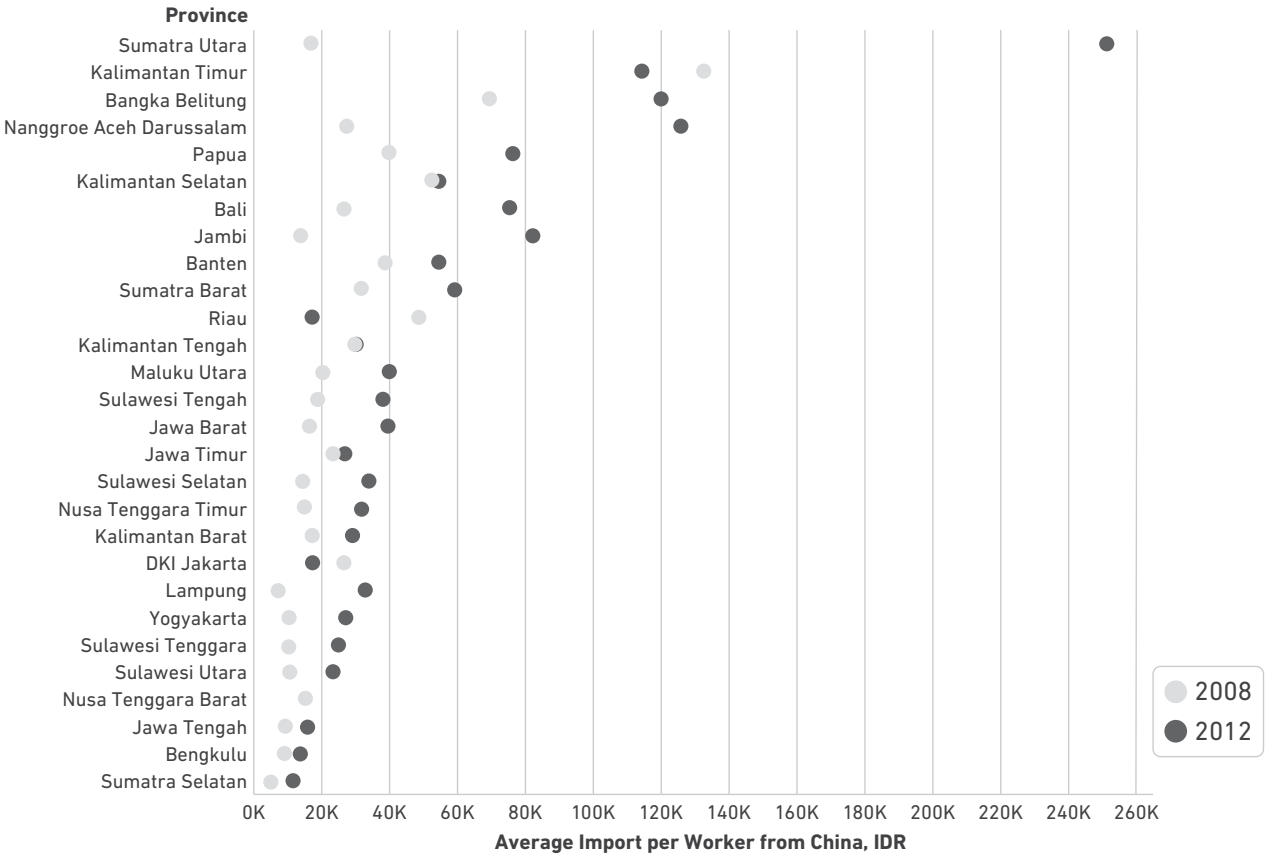
Figure 6.
Average trade exposure with China per worker, export side



The increase in Chinese trade is observed across almost all Indonesian regions, making the use of a shift-share analysis method appropriate. This widespread increase allows us to examine whether regions with larger increases or higher exposure to Chinese

trade experience more significant decreases in poverty indicators. By analyzing both export and import exposure, we aim to uncover how varying levels of trade engagement with China impact regional economic outcomes.

Figure 7.
Average trade exposure with China per worker, import side



Descriptive statistics of variables

Table 2.
Descriptive statistics

	2008-2009	2010-2012	Total
P0 (%)	15.72 (13.53)	14.98 (13.20)	15.27 (13.33)
P1 (%)	3.71 (3.92)	2.92 (3.16)	3.24 (3.51)
P2 (%)	1.29 (1.66)	0.86 (1.08)	1.03 (1.36)
Ln Export per worker; 2000 LF as base	19.07 (1.06)	19.73 (1.07)	19.47 (1.11)
Ln Export per worker; 2008 LF as base	19.03 (0.85)	19.67 (0.92)	19.41 (0.94)
Ln Import per worker; 2000 LF as base	19.36 (1.15)	20.00 (1.16)	19.74 (1.20)
Ln Import per worker; 2008 LF as base	19.35 (0.98)	19.97 (1.07)	19.73 (1.08)
% literate, 18+ y.o. pop	90.14 (8.62)	91.08 (8.10)	90.70 (8.32)
% HS+ educated, 18+ y.o. pop	39.48 (12.23)	40.24 (13.05)	39.93 (12.73)
% living in urban area	43.42 (32.05)	44.58 (31.92)	44.12 (31.96)
N	584	876	1460

Note: All figures show average of variables at district-level observations. Standard deviations are shown in brackets. P0, P1, and P2 are all expressed in ranges 0-100. Export and import per worker are all expressed in Ln. Control variables are all expressed in percentage from 0-100.

Table 2 presents descriptive statistics for the variables used in this study, covering the periods pre-ACFTA (2008-2009), post-ACFTA (2010-2012), and all observation years. These statistics offer a snapshot of the socio-economic conditions and trade exposure across Indonesian districts during the study period. The poverty indicators, P0, P1, and P2, represent different measures of poverty. Notably, the average poverty rate (P0) decreased during the period, with an overall average of 15.27%. In line with the headcount ratio variable, the table also indicates that the depth (P1) and severity (P2) of poverty slightly decreased.

The key explanatory variables are export and import exposure per worker, calculated using labor force data from the base years 2000 and 2008. Each variable is represented twice, corresponding to the respective base year. Both export and import exposure per worker show an upward trend, indicating increased trade activities with China over the period. The control variables include literacy rate, high school education rate, and urban population proportion, all of which have shown an increase over the period.

Main Results

Table 3 presents the impact of increased import liberalization with China following the implementation of ACFTA on changes in poverty rates. The first and second columns use the base year 2000, while the third and fourth columns use the base year 2008. We first conduct OLS estimations followed by IV estimations. The OLS results show no significant effect of increased trade with China on poverty. However, the IV results indicate that regions with a substantial number of workers in sectors with high imports from China tend to see accelerated poverty reduction as trade increases. This effect is more pronounced when using the base year 2008, suggesting that further liberalization to near-zero tariffs accelerate poverty reduction in regions with higher imports from China. The findings also show that increased literacy rates and urban population proportions do not affect poverty, but increased high school education significantly reduces poverty. Additionally, the consistent results from all control variables in both OLS and IV estimations indicate that our findings are robust.

Table 3.
Main estimation results, increased import competition from China on P0

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
	P0 difference	P0 difference	P0 difference	P0 difference
Import exposure per worker	0.01	-0.16	-0.40	-2.02***
	(0.19)	(0.51)	(0.29)	(0.73)
% literate 18+ y.o. pop (diff)	-0.02	-0.31	-0.01	-0.30
	(0.20)	(0.20)	(0.20)	(0.20)
% HS+ educated 18+ y.o. pop (diff)	-0.35***	-0.43***	-0.36***	-0.47***
	(0.08)	(0.08)	(0.08)	(0.09)
% living in urban area (diff)	-0.04	-0.02	-0.04	-0.01
	(0.04)	(0.05)	(0.04)	(0.05)
Observations	1168	876	1168	876
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
VCE clustered at district-level	Yes	Yes	Yes	Yes
Base year for LF share	2000	2000	2008	2008
Kleibergen-Paap rk LM-stat		6.57		48.25
Cragg-Donald Wald F-stat		222.91		96.56

Standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

Tables 4 and 5 present results for changes in poverty gap and poverty severity, respectively. The OLS estimations in Table 4 suggest that increased imports from China are correlated with wider poverty gaps, indicating an unequal distribution of trade impacts. However, addressing potential biases with IV estimations reveals that higher imports from China, due to further liberalization, actually accelerates the reduction of poverty gaps, indicating a more equitable distribution of trade benefits. This effect is more pronounced when using the 2008 labor structure compared to 2000, suggesting that labor conditions in 2008 were better prepared for full liberalization. Consistent results for all control variables across all specifications further support these findings.

Similarly, Table 5 demonstrates that trade liberalization with China accelerates the reduction of poverty severity. While the OLS regression results are mixed, the IV results consistently indicate that increased trade with China accelerates poverty reduction across all indicators. This suggests that, contrary to some other studies finding negative impacts from increased import competition with China, Indonesia experiences positive effects, with import liberalization reducing poverty. Factors such as greater availability of goods, lower consumer prices, and the stimulation of economic activity driven by import-related industries may explain these findings. Further analysis will explore these channels in detail.

Table 4.
Main estimation results, increased import competition from China on P1

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
	P1 difference	P1 difference	P1 difference	P1 difference
Import exposure per worker	0.07	-0.07	0.16*	-0.60***
	(0.06)	(0.12)	(0.09)	(0.21)
% literate 18+ y.o. pop (diff)	-0.06	-0.10	-0.07	-0.10
	(0.05)	(0.08)	(0.05)	(0.08)
% HS+ educated 18+ y.o. pop (diff)	-0.08***	-0.12***	-0.08***	-0.14***
	(0.02)	(0.03)	(0.02)	(0.03)
% living in urban area (diff)	-0.02	0.00	-0.02	0.01
	(0.01)	(0.02)	(0.01)	(0.02)
Observations	1168	876	1168	876
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
VCE clustered at district-level	Yes	Yes	Yes	Yes
Base year for LF share	2000	2000	2008	2008
Kleibergen-Paap rk LM-stat		6.57		48.25
Cragg-Donald Wald F-stat		222.91		96.56

Standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

Table 5.
Main estimation results, increased import competition from China on P2

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
	P2 difference	P2 difference	P2 difference	P2 difference
Import exposure per worker	-0.05**	-0.03	0.05	-0.22***
	(0.03)	(0.04)	(0.04)	(0.09)
% literate 18+ y.o. pop (diff)	-0.04	-0.04	-0.04*	-0.04
	(0.02)	(0.04)	(0.02)	(0.04)
% HS+ educated 18+ y.o. pop (diff)	-0.03**	-0.05***	-0.03**	-0.05***
	(0.01)	(0.01)	(0.01)	(0.01)
% living in urban area (diff)	-0.01	0.00	-0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Observations	1168	876	1168	876
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
VCE clustered at district-level	Yes	Yes	Yes	Yes
Base year for LF share	2000	2000	2008	2008
Kleibergen-Paap rk LM-stat		6.57		48.25
Cragg-Donald Wald F-stat		222.91		96.56

Standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

The findings from Column 4 in Tables 3 to 5 consistently indicate that increased import exposure from China, particularly following the full liberalization under ACFTA, has contributed to poverty reduction in Indonesia, as measured by P0, P1, and P2. These results imply that rising import competition has helped raise incomes for the poor across various regions, leading to a reduction in both the number of poor people and the overall poverty gaps and severity. This contrasts with the findings of Autor et al. (2013), who observed that increased import competition in the U.S. led to the decline of domestic industries unable to compete with cheaper Chinese products, resulting in wage suppression and job losses for workers in those sectors. In Indonesia, however, the situation appears different, aligning more closely with the Stolper-Samuelson Theorem, which posits that import competition benefits the abundant factor—in this case, labor—leading to wage increases.

One possible explanation for this difference is that certain sectors in Indonesia have expanded due to productivity gains driven by increased competition, which could also stimulate export market growth and job creation (Goldberg & Pavcnik, 2007). Additionally, the downward pressure on prices from import competition has likely increased the purchasing power of consumers, particularly in low-income households, thereby contributing to poverty reduction (Dollar & Kraay, 2004). This effect is particularly significant for the poorest groups, who spend a larger portion of their income on basic goods; as prices decline, the poverty gap narrows, potentially lifting the poorest individuals closer to the poverty line. Later, we explore potential explanations by examining the impact of increased import competition across specific product groups and different types of regions.

Table 6 presents the results of the impact of increased exports to China after full liberalization on the poverty headcount ratio (P0). All specifications show a negative correlation but no significant effect of increased market access to China on changes in P0. The robustness of these results is indicated by the consistent outcomes for all control variables across specifications. This finding is intriguing because typically, increased market access has positive impacts on labor outcomes and poverty reduction in exporting countries, as seen in Vietnam (McCaig, 2011) and Brazil (Costa et al., 2016). Despite China being a large country that has created a massive demand shock to the global economy, and the noticeable increase in Indonesian exports shown in Figures 1 and 2, this increase does not appear to have led to a corresponding reduction in poverty rates.

Table 6.
Main estimation results, increased market access to China on P0

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
	P0 difference	P0 difference	P0 difference	P0 difference
Export exposure per worker	-0.24	-0.40	-0.30	-0.67
	(0.19)	(0.41)	(0.27)	(0.65)
% literate 18+ y.o. pop (diff)	-0.01	-0.31	-0.01	-0.30
	(0.20)	(0.20)	(0.20)	(0.20)
% HS+ educated 18+ y.o. pop (diff)	-0.35***	-0.43***	-0.35***	-0.42***
	(0.08)	(0.08)	(0.08)	(0.08)
% living in urban area (diff)	-0.04	-0.02	-0.04	-0.02
	(0.04)	(0.05)	(0.04)	(0.05)
Observations	1168	876	1168	876
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
VCE clustered at district-level	Yes	Yes	Yes	Yes
Base year for LF share	2000	2000	2008	2008
Kleibergen-Paap rk LM-stat		31.58		41.13
Cragg-Donald Wald F-stat		210.35		245.50

Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Tables 7 and 8 present the results of increased market access to China on changes in P1 and P2. The results show mixed significance across various specifications but generally indicate that increasing exports to China accelerates the reduction in poverty gaps and severities. Specifically, the results using the base year 2000 are significant, while those using the base year 2008 are not. This suggests that the further liberalization under ACFTA in China's export market did not significantly impact poverty in Indonesia. However, the significant reduction in poverty gaps and severity when using initial comparative advantage sectors from 2000 indicates that China's economic boom in the early 2000s, which created demand shocks for input-supplying countries, may have had a greater effect on poverty reduction in Indonesia than the tariff cuts following the FTA implementation. This aligns with Costa et al. (2016), which found that China's early 2000s demand shocks increased wages and employment in Brazil. Enhanced market access to China after full liberalization may have had little additional impact on poverty reduction because most gains had already been realized due to rising Chinese demand after its unilateral liberalization.

Table 7.
Main estimation results, increased market access to China on P1

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
	P1 difference	P1 difference	P1 difference	P1 difference
Export exposure per worker	-0.10*	-0.18*	0.06	-0.22
	(0.05)	(0.10)	(0.08)	(0.18)
% literate 18+ y.o. pop (diff)	-0.06	-0.10	-0.06	-0.10
	(0.05)	(0.08)	(0.05)	(0.08)
% HS+ educated 18+ y.o. pop (diff)	-0.08***	-0.12***	-0.08***	-0.12***
	(0.02)	(0.03)	(0.02)	(0.03)
% living in urban area (diff)	-0.02	0.00	-0.02	0.00
	(0.01)	(0.02)	(0.01)	(0.02)
Observations	1168	876	1168	876
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
VCE clustered at district-level	Yes	Yes	Yes	Yes
Base year for LF share	2000	2000	2008	2008
Kleibergen-Paap rk LM-stat		31.58		41.13
Cragg-Donald Wald F-stat		210.35		245.50

Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8.
Main estimation results, increased market access to China on P2

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
	P2 difference	P2 difference	P2 difference	P2 difference
Export exposure per worker	-0.05**	-0.08*	0.05	-0.08
	(0.03)	(0.04)	(0.04)	(0.07)
% literate 18+ y.o. pop (diff)	-0.04	-0.04	-0.04*	-0.04
	(0.02)	(0.04)	(0.02)	(0.04)
% HS+ educated 18+ y.o. pop (diff)	-0.03**	-0.05***	-0.03**	-0.05***
	(0.01)	(0.01)	(0.01)	(0.01)
% living in urban area (diff)	-0.01	0.00	-0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Observations	1168	876	1168	876
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
VCE clustered at district-level	Yes	Yes	Yes	Yes
Base year for LF share	2000	2000	2008	2008
Kleibergen-Paap rk LM-stat		31.58		41.13
Cragg-Donald Wald F-stat		210.35		245.50

Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

While increasing exports often leads to poverty reduction, the findings in Tables 6 to 8 reveal scenarios where export growth does not translate into significant poverty alleviation. These unexpected results warrant careful analysis, as they challenge conventional assumptions. Several factors might explain why increasing exports does not necessarily reduce poverty. One possibility is that the gains from export growth may be cozncentrated in specific sectors, regions, or among particular groups, such as large firms or wealthier individuals, while bypassing poorer segments of the population (Goldberg & Pavcnik, 2007; Winters et al., 2004). This situation can occur when the sectors benefiting from export growth do not employ a significant portion of the poor or when the wealth generated from exports is not adequately redistributed through wages, taxes, or public services. Additionally, if the expanding export sectors are capital-intensive rather than labor-intensive, the benefits may primarily accrue to capital owners rather than workers, limiting poverty reduction, especially if the poor are not employed in these sectors (Pasaribu, 2020). Furthermore, if export growth mainly benefits sectors that require skilled labor, the less educated and less skilled poor may not gain from the new job opportunities created, leading to a scenario where the benefits of export growth do not reach the most impoverished. Reliance on exports, particularly in commodities, also exposes countries to global price volatility, which can lead to economic instability, potentially undermining poverty reduction efforts. To further investigate these dynamics, we examine the impact of export growth across specific product groups and different regional conditions.

Discussions and Extensions

Exploring Channels

While our main results show that increased import competition with China following full liberalization under ACFTA accelerates poverty reduction, and increased market access to China does not have an additional impact on poverty reduction, they do not clarify the underlying mechanisms driving these outcomes. In this section, we seek to uncover these mechanisms by closely analyzing the trade exposure variables. Whereas the main estimations considered total imports and exports, we now disaggregate these using UNCTAD product groupings into several categories: raw materials, intermediate goods, capital goods, and consumer goods. For each product category, we conduct IV regressions on P0, P1, and P2, using both the 2000 and 2008 baseline labor structures. This more granular analysis allows us to identify the specific channels through which increased trade with China influences poverty indicators in Indonesia.

Table 9 highlights the impact of increased import competition from China on P0 across different product categories. Our primary variable of interest shows a highly significant effect at the 1 percent level for raw materials and intermediate goods, while consumer goods are significant at 10 percent, and capital goods show no significant impact. Similarly, Table 10, which presents the results for P1 and P2, reveals consistent patterns. These findings suggest potential mechanisms through which increased imports from China contribute to poverty reduction.

Despite both being developing countries, Indonesia and China engage in trade due to their differing comparative advantages, which drive distinct production and export

capabilities. Our results indicate that importing inputs from China is beneficial, as it leads to higher incomes, subsequently reducing poverty rates, gaps, and severity. Pane & Patunru (2023) demonstrate that Indonesian firms importing inputs experience increased productivity and improved export performance. Access to a broader range of cheaper inputs enables firms to operate more efficiently, boosting productivity and competitiveness in export markets. As these firms expand, they can afford to pay higher wages to their workers. Our findings suggest that this overall income increase significantly helps lift poor groups out of poverty, leading to observed reductions in poverty rates, gaps, and severity.

Given that the majority of imports from China are raw materials and intermediate goods, our findings align with Kis-Katos & Sparrow (2015), who argue that poverty reductions in Indonesia primarily occurred in districts with greater exposure to input tariff liberalization. Although we did not directly assess the impact on wages, our results may correspond with the findings of Kasahara et al. (2016) and Yasar & Rejesus (2020), who suggest that imports contribute to wage increases through skill upgrading, thereby reducing poverty. This may also explain the potential channels through which trade liberalization with China, particularly via imported inputs, leads to poverty reduction.

Table 9.
Results for product categories, increased import competition from China on P0

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	P0 difference							
Product categories	Raw materials		Intermediate goods		Consumer goods		Capital goods	
Import exposure per worker	0.08	-2.41***	-0.34	-1.96***	0.35	-0.99*	0.08	-0.13
	(0.23)	(0.59)	(0.54)	(0.69)	(0.40)	(0.52)	(0.20)	(0.25)
% literate 18+ y.o. pop (diff)	-0.32	-0.29	-0.31	-0.30	-0.31	-0.32*	-0.32	-0.31
	(0.20)	(0.20)	(0.20)	(0.20)	(0.19)	(0.19)	(0.20)	(0.20)
% HS+ educated 18+ y.o. pop (diff)	-0.42***	-0.48***	-0.43***	-0.46***	-0.43***	-0.44***	-0.42***	-0.42***
	(0.08)	(0.09)	(0.08)	(0.09)	(0.09)	(0.08)	(0.08)	(0.08)
% living in urban area (diff)	-0.02	-0.01	-0.02	-0.00	-0.03	-0.02	-0.02	-0.02
	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)	(0.06)	(0.05)	(0.05)
Observations	876	876	876	876	876	876	876	876
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VCE clustered at district-level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Base year for LF share	2000	2008	2000	2008	2000	2008	2000	2008
Kleibergen-Paap rk LM-stat	4.00	49.41	9.25	42.15	20.26	51.68	17.74	15.44
Cragg-Donald Wald F-stat	265.01	119.52	198.42	82.17	163.97	102.86	141.21	243.14

Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Furthermore, increased imports of consumer goods also reduce P0, P1, and P2, although the magnitude and significance are lower than for the other two groups. Since globalization can impact individuals via changes in relative prices that affect consumption patterns (Goldberg & Pavcnik, 2007), our results suggest that the availability of cheaper goods from China may also contribute to reducing poverty rates, gaps, and severity. As import competition drives down prices, the purchasing power of consumers increase, the benefits can be particularly pronounced for poor households who spend a larger share of their income on basic goods. The reduction in the cost of essentials can reduce the poverty gap by bringing the poorest closer to the poverty line.

Meanwhile, the results from Tables 9 and 10 indicate that while increased imports of capital goods are negatively associated with poverty, the relationship is not statistically significant, suggesting that these imports do not effectively reduce poverty. While the importation of capital goods can drive economic growth by boosting productivity, it may not always lead to poverty reduction, particularly if the gains from these imports are not widely distributed across the economy (Kraay, 2006). The shift towards a more capital-intensive production process, which often accompanies the import of capital goods, typically increases reliance on machinery rather than human labor. This can enhance productivity and output but may not result in substantial job creation, especially for unskilled or low-skilled workers, who represent the most impoverished segments of the population. Furthermore, the use of advanced capital goods generally requires skilled labor, which may leave unskilled workers—who are often the poorest—without significant benefits from these economic changes.

Notably, our results, similar to our main findings, are only significant when using the 2008 baseline. These findings strengthen our argument that further liberalization to near-zero tariffs positively impact poverty indicators in Indonesian regions. Since our 2008 labor structure is partly affected by the first phase of liberalization, we infer that the 2008 labor structure was prepared to benefit from full liberalization.

Table 10.
Results for product categories, increased import competition from China on P1 and P2

Product categories	Raw materials		Intermediate goods		Consumer goods		Capital goods	
Base year for LF share	2000	2008	2000	2008	2000	2008	2000	2008
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	P1 difference							
Import exposure per worker	0.02	-0.61***	-0.13	-0.59***	0.07	-0.33**	-0.01	-0.03
	(0.05)	(0.17)	(0.13)	(0.20)	(0.10)	(0.16)	(0.05)	(0.06)
Kleibergen-Paap rk LM-stat	4.00	49.41	9.25	42.15	20.26	51.68	17.74	15.44
Cragg-Donald Wald F-stat	265.01	119.52	198.42	82.17	163.97	102.86	141.21	243.14
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	P2 difference							
Import exposure per worker	0.01	-0.21***	-0.05	-0.21***	0.02	-0.12*	-0.01	-0.00
	(0.02)	(0.07)	(0.05)	(0.08)	(0.04)	(0.06)	(0.02)	(0.03)
Kleibergen-Paap rk LM-stat	4.00	49.41	9.25	42.15	20.26	51.68	17.74	15.44
Cragg-Donald Wald F-stat	265.01	119.52	198.42	82.17	163.97	102.86	141.21	243.14

Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: The table only reports results for the main variable of interest and IV statistics. All controls, district and year fixed effects are included in all specifications. VCE is clustered at district level.

Tables 11 and 12 analyze the effects of increased market access to China on poverty indicators (P0, P1, and P2) across different product categories. Although the overall results show no significant effect on P0, a closer examination by product category reveals mixed outcomes. Generally, exports to China contribute to poverty reduction for raw materials and intermediate goods, though the impact is of low significance. This suggests that further liberalization, using the 2008 baseline, is particularly beneficial for regions with labor structures that are heavily oriented towards raw materials and intermediate goods. The findings imply that export growth is concentrated in these areas, leading to income gains for certain workers, which in turn reduces the poverty rate. However, the effects on P1 and P2 are not significant when using the 2008 baseline, indicating that the income gains from increased market access in these sectors are limited to specific groups of workers. As a result, there is no significant reduction in poverty gaps and severity, suggesting potential distributional issues in how the benefits of export growth are shared.

Table 11.
Results for product categories, increased market access to China on P0

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Base year for LF share	2000	2008	2000	2008	2000	2008	2000	2008
	P0 difference							
Product categories	Raw materials		Intermediate goods		Consumer goods		Capital goods	
Export exposure per worker	0.32	-1.29**	-0.38	-0.96*	-0.36	-0.87	0.10	-0.20
	(0.21)	(0.62)	(0.33)	(0.54)	(0.40)	(0.61)	(0.18)	(0.24)
% literate 18+ y.o. pop (diff)	-0.33*	-0.30	-0.31	-0.29	-0.31	-0.29	-0.31	-0.31
	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.19)	(0.20)
% HS+ educated 18+ y.o. pop (diff	-0.42***	-0.45***	-0.43***	-0.42***	-0.42***	-0.42***	-0.42***	-0.41***
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.09)
% living in urban area (diff)	-0.03	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02	-0.03
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)
Observations	876	876	876	876	876	876	876	876
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VCE clustered at district-level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Base year for LF share	2000	2008	2000	2008	2000	2008	2000	2008
Kleibergen-Paap rk LM-stat	4.94	36.61	37.88	41.31	32.10	43.86	22.94	27.61
Cragg-Donald Wald F-stat	216.86	153.29	211.84	258.68	179.86	230.01	193.41	286.14

Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The findings for P1 and P2 in Table 12 suggest that further liberalization of Chinese markets across various product groups does not significantly affect poverty gaps and severity, particularly when using the 2008 baseline. While increased income from exports contributes to poverty reduction, it does not seem to impact inequality. Our primary findings showed significant results with the 2000 baseline, but significance here is limited to intermediate and consumer goods. This suggests that the notable poverty reductions may be more attributable to the increased Chinese demand following its WTO accession in 2001 rather than further liberalization efforts. Both of these product categories involve processed goods, indicating that the inequality-reducing effects of increased exports are likely due to the expansion of labor-intensive manufacturing sectors to meet growing Chinese demand.

The significance of P1 and P2, but not P0, when using the 2000 baseline, implies that export growth has led to wage increases in export-oriented sectors that employ a large portion of the poor. These wage gains have helped lift some individuals out of extreme poverty and reduce overall poverty gaps by bringing the incomes of the poorest closer to the poverty line, although not enough to completely eliminate poverty. This may also be due to spillover effects in other sectors. As exports grow, they can stimulate the domestic economy through backward and forward linkages, increasing economic activity in other sectors and creating jobs and income opportunities for poor or marginalized groups, as noted by Maertens & Swinnen (2009).

It is also important to highlight that crude palm oil (CPO), one of Indonesia's major export products, is classified as an intermediate good under the UNCTAD framework. This likely influences our results, as CPO has consistently been one of Indonesia's top exports for decades. As Pasaribu (2020) notes, many regions in Indonesia produce CPO, with China serving as a key export market. The expansion of market access to China has therefore broadened the market for CPO, leading to reduced poverty rates in regions where the labor structure is competitive in CPO production. The reduction in poverty rates observed using the 2008 baseline suggests that increased market access has indeed been beneficial. However, the significant effects on P1 and P2 in the intermediate goods category are only evident with the 2000 baseline, indicating that these impacts may be more attributable to heightened Chinese demand for CPO rather than further liberalization under ACFTA. Given that much of Indonesia's CPO production is managed by smallholders, the surge in exports driven by increased Chinese demand has raised incomes, though not sufficiently to lift smallholders out of poverty entirely, thereby primarily contributing to reductions in poverty gaps and severity.

Similarly, coal, another major Indonesian export to China, is classified as a raw material by UNCTAD. As with CPO, greater market access to China has expanded the coal market in regions where coal production is competitive. However, the impact on P1 and P2, using both the 2000 and 2008 baselines, is insignificant, suggesting that the income generated from coal exports is not evenly distributed within these regions. As discussed in Pasaribu (2020), most coal production is controlled by large, capital-intensive companies, meaning that the benefits of increased exports largely accrue to higher-skilled workers within the sector. Consequently, the positive effects on poverty reduction are limited and not as broadly shared as in the case of CPO. Interestingly, as shown in Table 11, the impact on P0 for raw material exports is significant when using the 2008 baseline. This supports the argument that capital-intensive sectors like coal may lift certain skilled workers out of poverty, benefiting from the increase in exports, while the broader effects on poverty reduction remain constrained.

Table 12.
Results for product categories, increased market access to China on P1 and P2

Product categories	Raw materials		Intermediate goods		Consumer goods		Capital goods	
Base year for LF share	2000	2008	2000	2008	2000	2008	2000	2008
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	P1 difference							
Export exposure per worker	0.09	-0.30	-0.16**	-0.24	-0.17*	-0.24	-0.01	-0.05
	(0.06)	(0.19)	(0.08)	(0.17)	(0.10)	(0.18)	(0.04)	(0.06)
Kleibergen-Paap rk LM-stat	4.94	36.61	37.88	41.31	32.10	43.86	22.94	27.61
Cragg-Donald Wald F-stat	216.86	153.29	211.84	258.68	179.86	230.01	193.41	286.14
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	P2 difference							
Import exposure per worker	0.03	-0.10	-0.06*	-0.07	-0.07*	-0.08	-0.01	-0.01
	(0.02)	(0.08)	(0.03)	(0.07)	(0.04)	(0.08)	(0.02)	(0.03)
Kleibergen-Paap rk LM-stat	4.94	36.61	37.88	41.31	32.10	43.86	22.94	27.61
Cragg-Donald Wald F-stat	216.86	153.29	211.84	258.68	179.86	230.01	193.41	286.14

Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Note: The table only reports results for the main variable of interest and IV statistics. All controls, district and year fixed effects are included in all specifications. VCE is clustered at district level.

Heterogenous Impacts

Next, we examine the heterogeneous effects within our model by conducting estimations using different subsets of our data based on relevant groupings. Specifically, we divided the regions according to key control variables: the proportion of people living in urban areas, literacy rate, and high school education level. For this analysis, we categorized regions based on whether, in the base year of 2008, their proportions of urban population, literacy rate, and high school education were above or below the median. By doing so, we aim to understand how different socio-economic contexts might influence the relationship between trade exposure and poverty outcomes. We tracked these subsets across the observation period from 2008 to 2012 and ran separate regressions for each group. This approach allows us to assess whether the effects of trade exposure on poverty reduction vary depending on the socio-economic characteristics of the regions.

The results presented in Tables A.1 and A.2 in the appendix indicate that the impact of increased imports from China on the poverty rate (P0) is more significant in regions that are more urbanized, educated, and literate. This suggests that literacy and education are essential for harnessing the benefits of trade liberalization, enabling income growth among the poor and helping lift them out of poverty. Additionally, urban regions perform better across all measures—P0, P1, and P2—indicating that factors such as improved infrastructure and access to services, including financial facilities, may help these areas capitalize on liberalization.

Interestingly, the results for P1 and P2 show a different pattern. While the effects on more educated regions are also significant, they are more pronounced in less literate and less educated areas. This suggests that increased import competition from China improves economic conditions in these regions, reducing the severity of poverty but not sufficiently lifting people out of poverty. This trend also indicates a more equitable income distribution, where trade with China provides greater benefits to the poorest individuals compared to others below the poverty line, thereby narrowing the poverty gap without significantly reducing the overall number of poor.

The results of increased market access to China, as shown in Table A.2, align with the main findings. The impact on P0 is not significant across various subgroups, indicating that increased exports to China do not effectively lift people out of poverty, as the overall number of poor remains unchanged. However, the results for P1 and P2 reveal that regions with less educated populations and those that are less urbanized experience a reduction in poverty gaps and severity. This suggests that increased exports to China raise the income levels of the poorest individuals in these regions without necessarily lifting them above the poverty line. Additionally, this pattern may indicate that the sectors benefiting from increased trade with China rely more on less educated, unskilled labor. This finding aligns with the Heckscher-Ohlin (HO) model and the Stolper-Samuelson theorem, which suggest that a region will specialize in exporting goods that make intensive use of its most abundant resource—in this case, less educated workers—and that trade liberalization will primarily benefit these workers, particularly in less educated regions.

Table 9 highlights the impact of increased import competition from China on P0 across different product categories. Our primary variable of interest shows a highly significant effect at the 1 percent level for raw materials and intermediate goods, while consumer goods are significant at 10 percent, and capital goods show no significant impact.

Robustness checks

We conduct robustness checks by using an alternative instrument in our analysis. Instead of relying on China's trade with the world, excluding Indonesia, we use trade between Indonesia and the United States. Given that the United States is Indonesia's second-largest trading partner and the world's largest economy influencing China's trade, we argue that US-Indonesia trade relations can effectively predict China-Indonesia trade. The results, presented in Table A.3 in the Appendix, echo the main findings from Tables 3 to 8.

The findings indicate that regions experiencing increased imports from China see a faster reduction across all poverty indicators. This effect is significant when using the 2008 baseline, suggesting that further liberalization leading to near-zero tariffs accelerates poverty reduction in regions with higher Chinese imports. Additionally, using this instrument, we find that expanded market access to China after the full liberalization phase does not yield additional benefits for poverty reduction. The significant results appear only in P1 and P2 when using the 2000 baseline, implying that China's demand shocks, rather than tariff cuts, may be driving the positive effects on these indicators. While increased market access may raise income levels among the poor in these regions, thereby reducing poverty gaps and severity, the sectors benefiting from this access are not sufficient to lift people out of poverty entirely.

CONCLUSION

This study has provided insights into the effects of trade liberalization with China on poverty in Indonesia, shedding light on the complexities and regional disparities in these outcomes. Through a detailed analysis of district-level trade exposure and its correlation with poverty indicators, significant links between increased trade with China and poverty reduction in certain regions were identified. The findings reveal that regions with higher exposure to Chinese imports, particularly those in sectors facing intensified import competition, experienced more notable improvements in poverty-related outcomes. These effects were especially pronounced when using the 2008 labor structure as a baseline, underscoring the accelerated impact of the ASEAN-China Free Trade Agreement (ACFTA) on poverty alleviation.

Furthermore, the study demonstrates that imports of inputs and consumer products from China significantly contribute to poverty reduction, suggesting that a broader range of cheaper inputs enables firms to operate more efficiently, boosting productivity and competitiveness in export markets, thereby raising incomes in labor-intensive sectors and increasing purchasing power. However, the enhanced market access to China post-full liberalization had limited effects on poverty reduction. While some commodity-exporting regions experienced a decline in poverty rates, the impact on poverty gaps and severity was minimal, likely due to the concentration of capital-intensive sectors that benefited from increased exports and underlying issues with income distribution.

Additionally, the study highlights the importance of considering regional characteristics such as urbanization, education, and literacy in understanding the varied impacts of trade liberalization. This finding suggests that enhancing literacy and education could be essential for maximizing the poverty-reducing benefits of trade liberalization in developing countries like Indonesia.

The research also underscores the critical role of the initial phase of China's trade liberalization, following its accession to the WTO, in shaping Indonesia's long-term socioeconomic landscape. The observed reduction in poverty gaps and severity, when analyzing the impact of exports using the 2000 labor structure, highlights the significance of early Chinese demand shocks in driving income growth, even if these did not immediately lead to widespread poverty reduction.

This study contributes to the broader discourse on the global implications of China's economic rise, particularly from the perspective of developing countries. By focusing on Indonesia, it fills an important gap in the literature, providing new evidence on the social and economic consequences of trade liberalization with China. Additionally, it offers a nuanced understanding of how different phases of liberalization can variably affect poverty outcomes, emphasizing the need for tailored policy interventions that account for regional diversity.

In conclusion, this study reaffirms the pivotal role of trade in shaping socioeconomic outcomes in developing countries while emphasizing the necessity of targeted policy measures to ensure the equitable distribution of the benefits of trade liberalization. As Indonesia continues to engage with global markets, particularly with China, policymakers must consider the diverse impacts across regions and sectors to promote inclusive growth and sustainable poverty reduction. This study also provides a balanced perspective on trade with China, addressing global concerns regarding China's economic influence.

REFERENCES

Alleyne, A., Zhang, Z., Mu, Y. (2020). Sustaining International Trade with China: Does ACFTA Improve ASEAN Export Efficiency? Sustainability, 12(15).

Anwar, D. F. (2019). Indonesia-China Relations: Coming Full Circle?. Southeast Asian Affairs, 2019(1), 145-161.

Athukorala, P. (2016). Southeast Asian Countries in Global Production Networks. ASEAN Economic Community, 79–100.

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.

Autor, D., Dorn, D., & Hanson, G. H. (2021). On the persistence of the China shock (No. w29401). National Bureau of Economic Research.

Autor, D. H., Dorn, D., and Hanson, G.H. (2016). "The China Shock: Learning from Labor-Market Adjustment to Large Changes in Trade," Annual Review of Economics, 8, 205–240.

Baláž, P., Zábojník, S., & Harvánek, L. (2019). The Growing Importance of China in the Global Trade. Palgrave Macmillan Asian Business Series. https://doi.org/10.1007/978-3-030-21912-3_3.

Bartik, T. J. 1991. Who Benefits from State and Local Economic Development Policies?. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research. https://doi.org/10.17848/9780585223940

Cabral, S., Martins, P., Santos, J., & Tavares, M. (2020). Collateral Damage? Labour Market Effects of Competing with China – At Home and Abroad. Labor: Supply & Demand eJournal. https://doi.org/10.1111/ecca.12355.

Caliendo, L., Dvorkin, M., & Parro, F. (2015). Trade and Labor Market Dynamics: General Equilibrium Analysis of the China Trade Shock. Labor: Supply & Demand eJournal. https://doi.org/10.20955/WP.2015.009.

Chamarbagwala, R. (2006). Economic Liberalization and Wage Inequality in India. World Development, 34, 1997-2015. https://doi.org/10.1016/J.WORLDDEV.2006.02.010.

Chiquiar, D. (2008). Globalization, regional wage differentials and the Stolper–Samuelson Theorem: Evidence from Mexico. Journal of International Economics, 74(1), 70-93.

Costa, F., Garred, J., and Pessoa, J. P. (2016). "Winners and Losers from a Commodities-for-Manufactures Trade Boom," Journal of International Economics, 102, 50–69.

Cruzatti, J. (2021). Free trade agreements and development: A global analysis with local data. Research Papers in Economics. https://doi.org/10.11588/HEIDOK.00030039.

Dix- Carneiro, R. (2014). Trade liberalization and labor market dynamics. Econometrica, 82(3), 825-885.

Dix-Carneiro, R., & Kovak, B. K. (2017). Trade liberalization and regional dynamics. American Economic Review, 107(10), 2908-2946.

Dollar, D., & Kraay, A. (2004). Trade, Growth, and Poverty. The Economic Journal, 114(493), F22-F49.

Erten, B., & Leight, J. (2021). Exporting out of agriculture: The impact of WTO accession on structural transformation in China. The Review of Economics and Statistics, 103(2), 364-380.

Goldberg, P. K., & Pavcnik, N. (2007). Distributional effects of globalization in developing countries. Journal of economic Literature, 45(1), 39-82.

Gourdon, J., Maystre, N., & Melo, J. (2006). Openness, inequality and poverty: Endowments matter. The Journal of International Trade & Economic Development, 17, 343 - 378. https://doi.org/10.1080/09638190802136978.

Hanson, G. (2012). "The rise of Middle Kingdoms: Emerging economics in global trade," Journal of Economic Perspectives, Vol. 26, No. 2, pp. 41–64.

He, Y. (2013). Does China's trade expansion help African development? — an empirical estimation. China Economic Review, 26, 28-38. https://doi.org/10.1016/J.CHIECO.2013.04.001.

Husted, S., & Nishioka, S. (2013). China's fare share? The growth of Chinese exports in world trade. Review of World Economics, 149, 565-585. https://doi.org/10.1007/S10290-013-0149-2.

Ing, L. Y., Hanson, G. H., & Indrawati, S. M. (2018). The Indonesian economy: trade and industrial policies (p. 314). Taylor & Francis.

Itakura, K. (2020). Evaluating the Impact of the US–China Trade War. Wiley-Blackwell: Asian Economic Policy Review. https://doi.org/10.1111/aepr.12286.

Li, K., & Jiang, W. (2018). China's foreign trade: Reform, performance and contribution to economic growth. China's 40 Years of Reform and Development: 1978–2018. https://doi.org/10.22459/CYRD.07.2018.28.

Lyons, M., & Brown, A. (2010). Has Mercantilism Reduced Urban Poverty in SSA? Perception of Boom, Bust, and the China–Africa Trade in Lomé and Bamako. World Development, 38, 771-782. https://doi.org/10.1016/J.WORLDDEV.2009.11.009.

Kasahara, H., Liang, Y., & Rodrigue, J. (2016). Does importing intermediates increase the demand for skilled workers? Plant-level evidence from Indonesia. Journal of International Economics, 102, 242-261.

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

Kovak, B. (2013). "Regional Effects of Trade Reform: What Is the Correct Measure of Liberalization?" American Economic Review, 103(5), 1960–76.

Kraay, A. (2006). When is growth pro-poor? Evidence from a panel of countries. Journal of development economics, 80(1), 198-227.

Maertens, M., & Swinnen, J. F. (2009). Trade, standards, and poverty: Evidence from Senegal. World development, 37(1), 161-178.

McCaig, B. (2011). Exporting out of poverty: Provincial poverty in Vietnam and US market access. Journal of International Economics, 85(1), 102-113.

Mirza, T., Narayanan, B., & Leeuwen, N. (2014). Impact of Chinese growth and trade on labor in developed countries. Economic Modelling, 38, 522-532. https://doi.org/10.1016/J.ECONMOD.2014.01.029.

Pane, D. D., & Patunru, A. A. (2023). The role of imported inputs in firms' productivity and exports: evidence from Indonesia. Review of World Economics, 159(3), 629-672.

Pasaribu, D. P. (2020). "Natural resource prices and welfare: Evidence from Indonesia's coal and palm oil boom," Departmental Working Papers 2020-16, The Australian National University, Arndt-Corden Department of Economics.

Pavcnik, N. (2017). The impact of trade on inequality in developing countries (No. w23878). National Bureau of Economic Research.

Saibu, O., & Akinyele, S. (2020). Immediate and Long-Term Impacts of Africa – China Trade Intensity on Poverty Incidence in Africa. Political Economy - Development: International Development Efforts & Strategies eJournal. https://doi.org/10.2139/ssrn.3562000.

Thewissen, S., & Vliet, O. (2017). Competing With the Dragon: Employment Effects of Chinese Trade Competition in 17 Sectors Across 18 OECD Countries. Political Science Research and Methods, 7, 215 - 232. https://doi.org/10.1017/psrm.2017.35.

Topalova, P. (2010). Factor immobility and regional impacts of trade liberalization: Evidence on poverty from India. American Economic Journal: Applied Economics, 2(4), 1-41.

Utar, H., and Ruiz, L. B. T. (2013). "International Competition and Industrial Evolution: Evidence from the Impact of Chinese Competition on Mexican Maquiladoras." Journal of Development Economics, 105, 267–287.

Winters, L. A., McCulloch, N., & McKay, A. (2004). Trade liberalization and poverty: the evidence so far. Journal of economic literature, 42(1), 72-115.

Winters, L. A., & Martuscelli, A. (2014). Trade liberalization and poverty: What have we learned in a decade? Annu. Rev. Resour. Econ., 6(1), 493-512.

Wood, A., & Mayer, J. (2011). Has China de-industrialised other developing countries?. Review of World Economics, 147, 325-350. https://doi.org/10.1007/S10290-011-0088-8.

Yasar, M., & Rejesus, R. M. (2020). International linkages, technology transfer, and the skilled labor wage share: evidence from plant-level data in Indonesia. World Development, 128, 104847.

Table A.1.
Heterogenous analysis, increased import competition from China on P0, P1 and P2

Product categories	HS Education < median		HS Education > median		Literacy rate < median		Literacy rate > median		Urban < median		Urban > median	
Base year for LF share	2000	2008	2000	2008	2000	2008	2000	2008	2000	2008	2000	2008
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
P0 difference												
Import exposure per worker	2.17	-2.11*	-0.77	-1.90**	-0.73	-2.61*	0.10	-1.22**	-0.12	-2.10	-0.25	-1.70**
	(1.44)	(1.16)	(0.65)	(0.93)	(1.56)	(1.39)	(0.38)	(0.62)	(1.13)	(1.36)	(0.53)	(0.66)
Kleibergen-Paap rk LM-stat	14.98	28.08	4.21	23.38	11.60	41.41	4.10	19.76	5.90	35.55	3.46	18.60
Cragg-Donald Wald F-stat	35.07	46.59	187.65	50.98	42.53	46.16	174.80	49.52	102.74	54.28	115.46	43.28
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
P1 difference												
Import exposure per worker	-0.29	-0.77**	-0.16	-0.50*	-0.35	-1.03**	0.03	-0.15	-0.21	-0.70*	-0.03	-0.40***
	(0.36)	(0.33)	(0.14)	(0.26)	(0.39)	(0.42)	(0.08)	(0.14)	(0.25)	(0.40)	(0.11)	(0.15)
Kleibergen-Paap rk LM-stat	14.98	28.08	4.21	23.38	11.60	41.41	4.10	19.76	5.90	35.55	3.46	18.60
Cragg-Donald Wald F-stat	35.07	46.59	187.65	50.98	42.53	46.16	174.80	49.52	102.74	54.28	115.46	43.28
	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)
P2 difference												
Import exposure per worker	0.03	-0.26**	-0.04	-0.18*	-0.14	-0.41**	0.01	-0.03	-0.12	-0.29*	0.00	-0.11**
	(0.14)	(0.13)	(0.04)	(0.10)	(0.15)	(0.18)	(0.03)	(0.05)	(0.10)	(0.17)	(0.03)	(0.05)
Kleibergen-Paap rk LM-stat	14.98	28.08	4.21	23.38	11.60	41.41	4.10	19.76	5.90	35.55	3.46	18.60
Cragg-Donald Wald F-stat	35.07	46.59	187.65	50.98	42.53	46.16	174.80	49.52	102.74	54.28	115.46	43.28

Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: The table only reports results for the main variable of interest and IV statistics. Controls, district and year fixed effects are included in all specifications. VCE is clustered at district level.

Table A.2.
Heterogenous analysis, increased market access to China on P0, P1 and P2

Product categories	HS Education < median		HS Education > median		Literacy rate < median		Literacy rate > median		Urban < median		Urban > median	
Base year for LF share	2000	2008	2000	2008	2000	2008	2000	2008	2000	2008	2000	2008
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
P0 difference												
Export exposure per worker	-0.55	-1.58	-0.25	0.02	-0.58	-0.66	-0.04	-0.66	-0.64	-0.52	-0.17	-0.57
	(0.65)	(1.04)	(0.53)	(0.82)	(0.70)	(1.49)	(0.48)	(0.47)	(0.63)	(1.22)	(0.51)	(0.55)
Kleibergen-Paap rk LM-stat	13.54	33.30	20.26	19.33	11.94	24.03	22.65	20.84	14.31	34.87	17.98	14.88
Cragg-Donald Wald F-stat	106.20	115.12	101.59	130.98	90.57	93.69	109.92	157.05	107.31	107.31	103.40	145.48
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
P1 difference												
Export exposure per worker	-0.36**	-0.63**	-0.02	0.08	-0.24	-0.31	-0.09	-0.14	-0.33**	-0.17	-0.04	-0.17
	-0.17	-0.28	(0.12)	(0.22)	(0.18)	(0.43)	(0.11)	(0.11)	(0.16)	(0.35)	(0.10)	(0.13)
Kleibergen-Paap rk LM-stat	13.54	33.30	20.26	19.33	11.94	24.03	22.65	20.84	14.31	34.87	17.98	14.88
Cragg-Donald Wald F-stat	106.20	115.12	101.59	130.98	90.57	93.69	109.92	157.05	107.31	107.31	103.40	145.48
	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)
P2 difference												
Export exposure per worker	-0.17**	-0.25**	0.02	0.03	-0.09	-0.13	-0.05	-0.05	-0.15**	-0.08	-0.00	-0.05
	(0.07)	(0.11)	(0.04)	(0.09)	(0.08)	(0.17)	(0.04)	(0.04)	(0.07)	(0.14)	(0.03)	(0.05)
Kleibergen-Paap rk LM-stat	13.54	33.30	20.26	19.33	11.94	24.03	22.65	20.84	14.31	34.87	17.98	14.88
Cragg-Donald Wald F-stat	106.20	115.12	101.59	130.98	90.57	93.69	109.92	157.05	107.31	107.31	103.40	145.48

Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: The table only reports results for the main variable of interest and IV statistics. Controls, district and year fixed effects are included in all specifications. VCE is clustered at district level.

Table A.3.
Robustness checks using the alternative instrument, increased trade with China on P0, P1 and P2

Product categories	P0 difference		P1 difference		P2 difference	
Base year for LF share	2000	2008	2000	2008	2000	2008
	(1)	(2)	(3)	(4)	(5)	(6)
Import exposure per worker	-0.52	-2.16***	-0.14	-0.70***	-0.05	-0.27***
	(0.56)	(0.71)	(0.13)	(0.22)	(0.04)	(0.09)
Kleibergen-Paap rk LM-stat	5.50	33.62	5.50	33.62	5.50	33.62
Cragg-Donald Wald F-stat	258.32	97.02	258.32	97.02	258.32	97.02
	(7)	(8)	(9)	(10)	(11)	(12)
Export exposure per worker	-0.73	-1.36	-0.31**	-0.41*	-0.13**	-0.15
	(0.51)	(0.87)	(0.15)	(0.24)	(0.06)	(0.10)
Kleibergen-Paap rk LM-stat	30.77	33.56	30.77	33.56	30.77	33.56
Cragg-Donald Wald F-stat	146.43	145.73	146.43	145.73	146.43	145.73

Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: The table only reports results for the main variable of interest and IV statistics. Controls, district and year fixed effects are included in all specifications. VCE is clustered at district level.

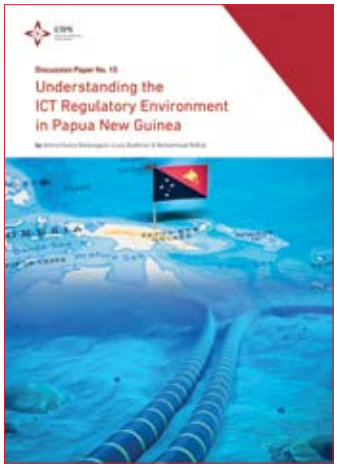
ABOUT THE AUTHORS

Deasy Pane is senior fellow at CIPS. She has been working at the National Development Planning Agency of Indonesia (BAPPENAS) for more than a decade. During her career as a planner, she has been focused on economic issues especially trade policies. Her research interests include development economics, international trade, industry, and public policy. She received her PhD in Economics from the Australian National University and graduated as an engineer from Bandung Institute of Technology

Natanael Waraney Gerald Massie is an Economist at PROSPERA and a Junior Research Associate at the Institute for Economic and Social Research (LPEM FEB UI). He also serves as the managing editor for EFI and JEI journals. With a Master's degree in Computer and Information Technology from the University of Pennsylvania and an Economics degree from Universitas Indonesia, he has expertise in econometrics and impact evaluation methods. His research spans various fields, including economic policy and banking behavior, and he has proficiency in programming languages like R, Python, and SQL.

Explore other paper published by Center for Indonesian Policy Studies

Unpacking The Fintech Regulatory Sandbox Framework in Indonesia: Risks Management and The Data Privacy Imperative



Understanding the Regulatory Environment for ICT Infrastructure in Papua New Guinea

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