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Creating better-paid jobs thanks to trade liberalization? Evidence from Indonesia

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**Creating Better-Paid Jobs Thanks to Trade
Liberalization?**

Evidence from Indonesia

**Esther Delesalle, Florian Mayneris, William
Parienté, et Gonzague Vannoorenberghe**

Avril 2025

Creating better-paid jobs thanks to trade liberalization?

Evidence from Indonesia*

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March 4, 2025

Abstract

The creation of stable and high-paying jobs by private firms is a first-order issue for Low-and-Medium Income Countries (LMICs). Little is known as to whether trade liberalization helps achieve this goal. In this study, we investigate the impact of the ASEAN-China Free Trade Agreement (ACFTA), signed in 2002, on the probability of being a wage-worker in Indonesia, a proxy for better-paid jobs in the Indonesian context. We find no evidence that import and export tariff reductions increased the probability of being a wage-worker, except for those that have more than primary education (less than a quarter of the working-age population). Consistent with this absence of effect at the worker level, we also find no significant changes in employment or value-added in large and medium-sized manufacturing firms, which are the main providers of salaried jobs. Our results call for cautious optimism regarding the potential gains in terms of job quality from further trade liberalization in LMICs, particularly in a global environment where tariffs are already low.

Keywords: Trade liberalization; Salaried jobs; Informality; Manufacturing.

JEL Classification Codes: F14; F16; O10.

*We thank Krisztina Kis-Katos, Brian McCaig, John Morrow and participants at the IELM Seminar in Paris (CES, Paris 1-Sorbonne), at the EOS Conference in Namur, at the ETSG 2022 and at the 2023 ICDE conference in Paris for valuable comments and suggestions. We also thank Massimiliano Cali from the World Bank for sharing with us his data on inputs used by Indonesian firms. This work was supported by the Fonds de la Recherche Scientifique – FNRS/FWO under Grant EOS Project 3078531 “Winners and Losers from Globalization and Market Integration: Insights from Micro-Data.

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1 Introduction

One important challenge identified to fight extreme poverty in Low-and-Medium Income Countries (LMICs) is the creation of stable and sufficiently well-paid jobs by private firms. Although international trade is sometimes pointed as a catalyst of better jobs, the extent to which employment composition is affected by trade liberalization remains an open question. While many studies have investigated the impact of trade liberalization on poverty and inequality (Goldberg & Pavcnik 2007), few have focused on its impact on the quality of jobs available in LMICs (Dix-Carneiro & Kovak 2017, Dix-Carneiro et al. 2024, on informality in Brazil are exceptions). Filling this gap is all the more important that the effects of international trade on national economies are increasingly debated after the disruptions in the global value chains induced by the COVID-19 pandemic and in the context of increased international geopolitical tensions.

In this paper, we make progress in this direction by estimating the impact of the trade liberalization between China and ASEAN countries in the years 2000 and 2010 (ASEAN-China Free Trade Agreement, ACFTA) on the probability of Indonesian workers of being wage-workers, a proxy for occupying more stable and better-paid jobs in the Indonesian context. To understand how this trade liberalization episode affected the labor market, we also examine its impact on the job creation process in big manufacturing firms.

In LMICs, many working-age people are self-employed (often engaged in informal subsistence entrepreneurship), or work as unpaid workers (employed without a regular contract, mostly working in family businesses). In 2010, more than 50% of the working-age population was in this situation in Indonesia. They earn much less than regular wage-workers (workers employed with a regular contract in formal firms): results that we detail later in the paper show that in Indonesia, in 2003, the income of a wage-worker was, all else equal, 10% higher than the income of a self-employed and 40% higher than the income of an occasional worker in the agricultural sector. Those results echo those of Banerjee & Duflo (2008), which, based on household survey data from 13 different LMICs, indicate that people in middle-class households are significantly more likely to be wage-workers than those in poor households. In the context of LMICs, being a wage-worker is thus a first-order dimension of job quality. This is why it is our outcome of interest in this study.

We focus on trade liberalization in the manufacturing sector, tariffs being already quite low in the agricultural sector at the beginning of the years 2000 in Indonesia. We consider separately the impact of input and output tariff cuts granted by Indonesia to China, as well as the tariff cuts granted by China to Indonesian exporters. We find that the trade liberalization between China and ASEAN countries has had, on average, no significant impact on the probability of being a wage-worker in Indonesia. This remains true for various subgroups of the working-age population except the more educated workers (with more than primary education) who benefit on average from overall tariff cuts. However, they account for only 25% of the workforce. Therefore, if anything, the impact of the ACFTA on access to better-paying jobs was regressive. Consistently with this lack

of average effect at the worker-level, we do not find any significant change in the employment and value-added of big (20+ employees) manufacturing firms in Indonesia following the implementation of the ACFTA.

For the purpose of identification regarding worker-level outcomes, we exploit geographical variations in the exposure to the trade liberalization with China across 224 Indonesian districts. These variations come from the fact that output and input tariff reductions vary across sectors, and districts have different mixes of industries at the beginning of the period under study. However, we face the usual challenges related to the possible endogeneity of tariff reductions to local economic conditions: if firms in sectors that face specific economic conditions lobby more for trade protection or trade liberalization, the OLS estimates of tariff variations on worker- and firm- level outcomes will be biased. The agreement between China and ASEAN countries stipulated that for most products, tariffs should be reduced to 0 by 2010. Mechanically, this means that tariff reductions were stronger in sectors where tariffs were initially higher. We thus use the district-level weighted average tariff in 2000, using as weights the 2000 share of sectors in district-level employment, as an instrument for district-level weighted average tariff changes between 2000 and 2010. Recent contributions warn against the pitfalls of shift-share instruments (see, in particular, Borusyak et al. 2022, on the exogeneity of the shift components). We run several of the balance checks they advise as well as placebo tests, and we are confident in the reliability of our results. For some of the analyses based on firm-level data, we are able to directly use sectoral variations in input and output tariffs because, unlike workers, we have detailed information on the sector of activity of firms (which we use, in fact, to build district-level treatment variables in the worker-level analysis).

Several contributions over the past decade have documented a (sometimes massive) effect of the entry of China in the WTO on the local labor markets of countries such as the US (Autor et al. 2013), Mexico (Utar & Ruiz 2013) or Germany (Dauth et al. 2014). We see two main reasons why our results are different. First, we are evaluating the effect of a Free Trade Agreement (FTA) that came into force on top of the preferential access China already benefited from since its entry in the WTO. When signed between WTO members, the effects of such agreements may be more modest as the trade shock they induce is arguably smaller. Understanding the effects of such FTAs with China however remains important as many others are under negotiation and generate heated debates.¹ Second, we analyze the correlation between the structure of Chinese exports and Indonesian exports in terms of product in 2000. We show that it is smaller than the one measured between China and the US, Mexico or Germany. This suggests that at least for the import side, competition between China and Indonesia may have been less intense, mitigating the possible adverse effects on Indonesian local labor markets.

Our paper relates to several strands of the literature. First, it participates in the rich and

¹As per April 2023, China maintained seventeen Free Trade Agreements and was negotiating or implementing an additional eight FTAs. Source: <https://www.trade.gov/country-commercial-guides/china-trade-agreements>. Directly related to the context of our analysis, skepticism against ACFTA was strong in Indonesia as reported by Chandra & Lontoh (2011).

now well-established literature studying the impact of trade liberalization on economic outcomes in both LMICs and high-income countries. We contribute to it in two dimensions. First, most existing papers, including those cited later, analyze unilateral trade liberalization episodes in LMICs, or bilateral trade liberalization experiences between a LMIC and a high-income country. Here, we study the impact of trade liberalization between two LMICs. To our knowledge, only a couple of studies on Latin-American countries have done it so far (see, for example, Bustos 2011, Costa et al. 2016). Moreover, most papers on LMICs generally investigate the effect of trade liberalization on wages and wage inequality (see, e.g., Revenga 1997, Hanson & Harrison 1999, Attanasio et al. 2004, Verhoogen 2008) and on poverty (see, e.g., Topalova 2010, McCaig 2011). The surveys of this literature by Goldberg & Pavcnik (2007) and Pavcnik (2017) suggest that the effects of trade liberalization in LMICs are highly context-specific. In particular, various parameters such as labor mobility across regions and sectors, sectoral specialization, the type of trade liberalization that is implemented and the relative size and productivity of the countries involved are likely to affect both the direction and the magnitude of the effects at play. Our paper offers a different perspective. We do not examine the effect of trade liberalization on individual wage or income. We rather investigate the impact of trade liberalization on a measure of job quality, namely the probability of being a wage-worker. We are in this respect closer to recent papers that revisit the question of the relationship between trade liberalization and informality by discussing the impact of trade liberalization on the reallocation of workers (see, e.g. McCaig & Pavcnik 2018, Dix-Carneiro & Kovak 2019, McMillan & McCaig 2020). The main take away from these papers is that better export opportunities tend to favor the formalization of economic activity, whereas import competition causes an expansion of the informal sector that acts as a buffer against negative economic shocks. Dix-Carneiro et al. (2024) further show that informality acts as an “unemployment buffer” in bad times but not as a “welfare buffer” because informality reduces productivity gains that can be achieved through creative destruction; the productivity gains brought about by trade liberalization are understated when informality is ignored.

We also add to the literature on the effects of trade liberalization in Indonesia. Amiti & Konings (2007) show that input tariff reductions generate firm-level productivity gains that are much larger than output tariff reductions. Amiti & Cameron (2012) find that output tariff reductions had no effect on the wage premium of skilled workers whereas input tariff reductions lowered wage inequality in Indonesia. This latter result suggests that the production of domestic inputs used to be skill-intensive in Indonesia. Closer to us, Kis-Katos & Sparrow (2015) study the effect of trade liberalization on poverty in Indonesian districts. They find a significant effect of trade liberalization on poverty reduction through input tariff reductions mainly, and for the low- and middle-educated workers only. In the same context, Kis-Katos & Sparrow (2018) show that input tariff reductions increased female labor market participation, as expanding sectors were more female-intensive. We differ from these papers along three main dimensions. First, none of them investigates the impact of

trade liberalization on the quality of job opportunities offered to Indonesian workers. Considering that the lack of salaried jobs has been identified as an important impediment to the improvement of living conditions in LMICs (see, e.g., Schoar 2010, Lee 2013, McKenzie 2017), we fill here an important gap. Second, we propose an original articulation between population census data and firm-level balance-sheet data to rationalize our worker-level findings. More precisely, we provide a decomposition of employment growth in Indonesian big manufacturing firms, and we show that the free trade agreement between ASEAN countries and China had no effect overall on the number of manufacturing salaried jobs in Indonesia. Third, instead of evaluating the impact of the entry of Indonesia in WTO in 1995, we focus on the consequences of the ACFTA on the Indonesian local labor markets in the years 2000 and 2010. Given the slowdown of multilateral trade liberalization in the past two decades and the recent rise in protectionist temptations, bilateral and/or regional trade integration will certainly be the most common form of trade liberalization in the years to come. Understanding the consequences of this type of trade integration is thus important. Moreover, compared to the trade liberalization implemented in Indonesia in the 1990s, the fall in tariffs we are evaluating here is less striking (even though quite substantial in some sectors like the textile and the footwear industries). However, most trade liberalization agreements currently occur in an environment where tariffs are already quite low. Measuring the labor-market effects of further trade liberalization episodes is necessary to gauge the costs and benefits we can expect from them. Ooi (2016) is the only paper we are aware of to evaluate the impact of the ACFTA in the Indonesian context. Exploiting sectoral variations in tariff cuts, he shows that the job destructions induced by tougher import-competition are much bigger than the job creations allowed by new export opportunities. We here go beyond the impact evaluation in terms of number of jobs, and on top of the distinction between import competition and export opportunities, we analyze the differentiated impact of output and input tariff cuts.

Finally, by exploiting differences in the mix of manufacturing sectors across regions as a source of variation in the exposure to the trade liberalization with China, we participate in the literature on the China shock initiated by Autor et al. (2013). Most of the subsequent papers deal with the local labor market consequences of direct import competition from China in developed economies (see, e.g. Dauth et al. 2014, Utar 2018, on Germany and Denmark respectively), or with the indirect competition China exerts on other low- and middle- income exporters in third markets (see, e.g., Utar & Ruiz 2013, Branstetter et al. 2019, on Mexico and Portugal respectively). Instead, we analyze the impact of a bilateral free trade agreement between China and another LMIC on labor market outcomes in that LMIC. Moreover, we take into account not only import competition from China, but also easier access to Chinese inputs, as this has been shown to be an important dimension of trade liberalization to deal with (see, e.g. Kis-Katos & Sparrow 2015, Wang et al. 2018, Bown et al. 2024). On top of output and input tariff cuts, we also account for the greater access of Indonesia to the Chinese market offered by the ACFTA.

The rest of the paper is organized as follows. Section 2 provides an overview of the ASEAN-China Free Trade Agreement. The data and descriptive statistics are introduced in Section 3. Section 4 presents the empirical strategy, and the measures of exposure to tariff cuts. Section 5 presents the results of the worker-level analysis, while Section 6 focuses on the results for large and medium-sized manufacturing firms. The robustness of our findings is discussed in Section 7, and Section 8 concludes the paper.

2 The ASEAN-China Free Trade Agreement (ACFTA)

This section discusses the tariff cuts associated with the ACFTA and their effect on the trade patterns of Indonesia. This allows us to highlight some of the sources of variation we exploit for the estimation of the impact of this trade agreement on Indonesian local labor markets.

In 2002, the members of the Association of Southeast Asian Nations (ASEAN) signed the ACFTA with a view to eliminating tariffs on 90% of imports by 2010.² As a member of ASEAN, Indonesia granted substantial tariff reductions to China, which were progressively strengthened over the period 2005-2010.³ As shown in part (a) of Figure 1, this translated into a decrease in the average tariff applied by Indonesia to Chinese imports from above 8% in 2000 to below 2% in 2010.⁴ This is a moderate decrease compared to the fall in tariffs observed after the entry of Indonesia in WTO⁵, but this is the case for most recent trade liberalization episodes. Part (b) of Figure 1 shows that the tariff cuts were comprehensive and covered a wide range of sectors, with some of them such as the textile and footwear products experiencing substantial tariff cuts. More in the details, goods were divided into a “normal track”, for which tariffs would reach zero by 2010 and “sensitive goods”, for which tariffs would be reduced between 0 and 5% by 2018. Table 2 gives the time schedule of the tariff reductions for goods in the normal track. As a consequence of the agreement, goods with a higher initial tariff saw a larger tariff decrease over the period. This is corroborated by Figure 2 which plots the *change* in tariff between 2000 and 2010 as a function of the *level* of the tariff in 2000 for each 6-digit good in the Harmonized System (HS) 1992 classification.⁶ The relationship is very strongly negative, showing that initial tariffs are a very good predictor for the change in tariff.

Two main messages emerge from these descriptive statistics so far. First, tariff cuts were very heterogeneous across products and we use this heterogeneity as a source of variation to estimate the effects of the ACFTA on local labor markets. Second, the design of the agreement is such that

²Source: <https://www.aseanbriefing.com/news/aseans-free-trade-agreements-an-overview/>

³Agricultural goods, as part of the Early Harvest Program, saw an earlier reduction in tariffs, with the bulk of the decrease happening between 2004 and 2006.

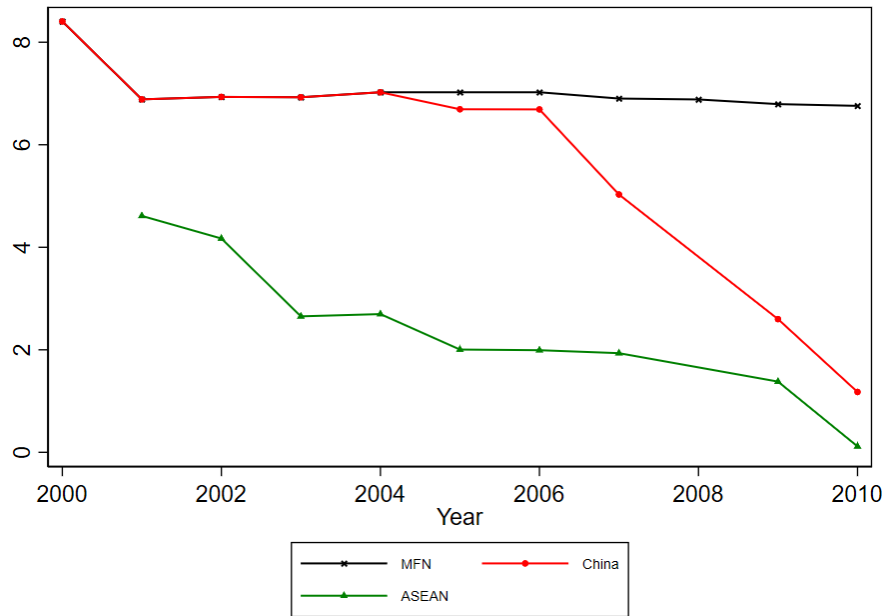
⁴Note that similarly, Chinese tariffs on imports from ASEAN countries, including Indonesia, were reduced substantially (not presented on the graph).

⁵From an average of 20.88% to an average of 8.44% (Amiti & Konings 2007).

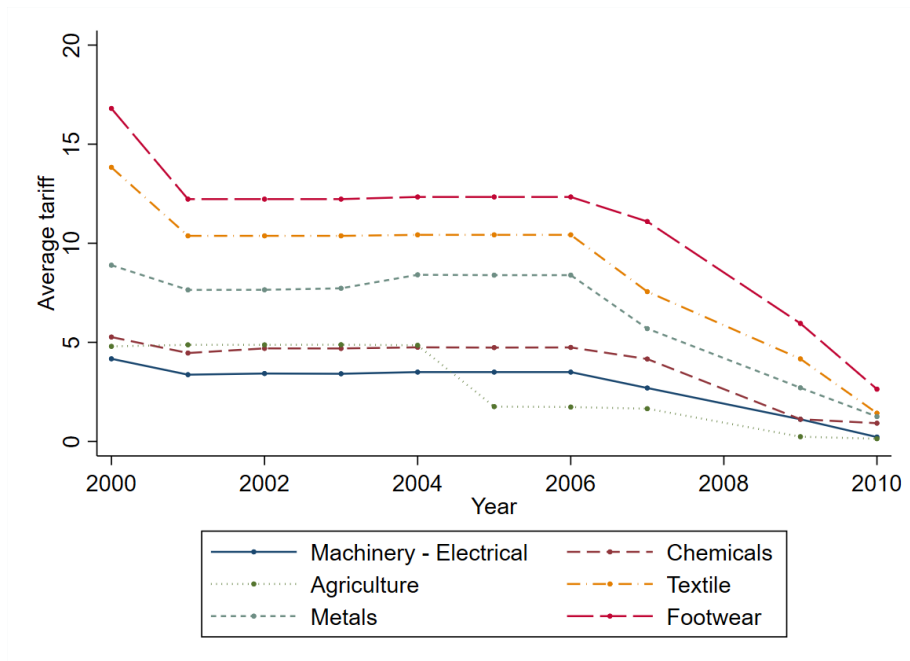
⁶We exclude alcoholic beverages, as specific tariffs on those products have massively increased for all origin countries after a change in Indonesian law in 2010. This does not affect much the analysis since alcoholic beverages were barely imported by Indonesia over the period, with total Indonesian imports of alcoholic beverages amounting to less than 1 million dollars in 2009.

Figure 1: Evolution of Indonesian import tariffs

(a) Indonesian import tariffs by country of origin



(b) Indonesian tariffs on imports from China by type of products



Note: Average tariffs are computed as simple averages of applied tariffs on individual products. Source: UNCTAD-TRAINS data.

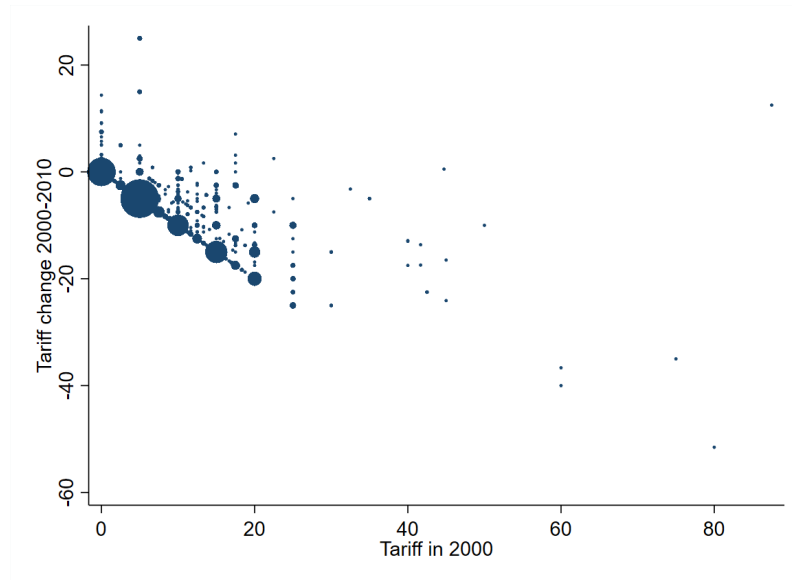
Table 1: Schedule of the implementation of the ACFTA for normal products

MFN Tariff Rate before the ACFTA	ACFTA Preferential Tariff Rate (no later than 1 st of January...)			
	2005*	2007	2009	2010
Higher than 20%	20%	12%	5%	0%
Between 15% and 20%	15%	8%	5%	0%
Between 10% and 15%	10%	8%	5%	0%
Between 5% and 10%	5%	5%	0%	0%
Lower than 5%	Standstill		0%	0%

* The first date of implementation is the 1st of July 2005.

tariff cuts were more important for products that initially benefited from higher protection; we use this for our IV strategy.

Figure 2: Tariff reductions by product during the ACFTA agreement



Note: Each observation is an HS6 product (5,003 products). Dots are weighted by the number of observations (for example, the largest dot shows that many products see their tariff go down from 5% to 0%). Source: TRAINS data.

Before turning to the presentation of the data, we discuss the effect of these tariff reductions on the patterns of Indonesian trade flows. Changes in trade flows represent a natural mechanism through which tariff changes may affect labor market outcomes: higher import competition or stronger export opportunities, by affecting the level and the patterns of trade, may also affect the number and the nature of jobs available on local labor markets. Over the period 2000-2010, the share of China in Indonesian trade has increased markedly. In 2000, China accounted for about 7.6% of Indonesian imports and 4.7% of its exports, ranking fifth for both types of flows. In 2010, these numbers had grown to 15.7 and 9.5% respectively, making of China the largest source of Indonesian imports and its second largest export destination. The share of China in Indonesian trade flows keeps growing over the years 2010 to reach 22.8% for imports and 9.6% for exports

Table 2: Evolution of Indonesian trade with China and tariff changes

	Import growth from CHN, 2000-2010			Export growth to CHN, 2000-2010		
	HS6 (1)	HS4 (2)	ISIC4 (3)	HS6 (4)	HS4 (5)	ISIC4 (6)
Δ tariff, 2000-2010	-0.021*** (0.003)	-0.029*** (0.005)	-0.029*** (0.012)	-0.014*** (0.003)	-0.016*** (0.005)	0.000 (0.011)
Constant	1.227*** (0.024)	1.157*** (0.044)	1.354*** (0.095)	0.259*** (0.061)	0.316*** (0.094)	0.846*** (0.210)
Observations	4284	1173	139	3006	971	133
R-squared	.02	.03	.04	.01	.01	.00

The dependent variable is the mid-point growth between 2000 and 2010 of Indonesian imports from China in the first 3 columns and of Indonesian exports to China in the last 3 columns. One observation corresponds to an HS 6-digit product in columns (1) and (4), an HS 4-digit product in columns (2) to (5) and an ISIC 4-digit industry in columns (3) to (6). Δ tariff, 2000-2010 is the change between 2000 and 2010 of Indonesian import tariffs on products from China in columns (1) to (3) and of Chinese import tariffs on products from Indonesia in columns (4) to (6). We compute trade for a product in a year t (exports or imports) as the average trade in the three year period $t - 1$ to $t + 1$ as reported by the importer in COMTRADE. We exclude alcohol, which exhibits very large swings in tariffs over the period, well over a hundred percentage points ad-valorem ***, **, * mean, respectively, that the coefficient is significantly different from 0 at the 1%, 5% and 10% level.

in 2015. The evolution of these shares is depicted in Figure 3. For both imports and exports, the share of China in Indonesian trade grows faster than its share in world trade, especially after 2005. Hence, the implementation of ACFTA is associated with an increase in Chinese exports to Indonesia that goes beyond its rising importance in world trade over the same period. Since a large chunk of the divergence occurs after 2010, we also use auxiliary datasets (unfortunately limited to to the districts of Java) to investigate the impact of the tariff cuts on Indonesian local labor markets between 2005 and 2015 as an alternative to 2000 and 2010.

Table 2 shows that the surge in Indonesian imports from China has been more pronounced for products where Indonesia implemented greater tariff reductions on China. To measure import growth, we compute the mid-point growth of Indonesian imports from China between 2000 and 2010 for each product at different levels of aggregation (HS 6-digit, HS 4-digit, or ISIC 4-digit, the latter being used for the subsequent analysis). The mid-point growth preserves information about the extensive margin, and we smooth trade flows by using a 3-year window for both 2000 and 2010. Regressing this growth measure on Indonesia's tariff change for Chinese products yields a significant negative coefficient across all levels of aggregation. The last three columns show a similar exercise based on Indonesian exports to China, examining their response to tariff changes in China. The results confirm a negative relationship at most levels, except for ISIC level. Additional, unreported results indicate that these findings remain robust when weighting products by initial trade volumes (in 2000) or when analyzing trade changes between 2005 and 2015 instead of 2000–2010.

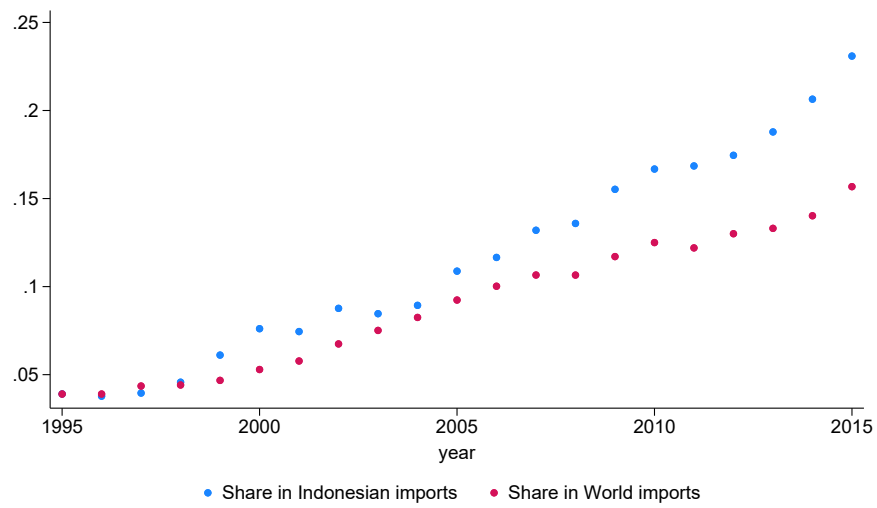
All in all, beyond the growing importance of China in world trade, different elements suggest that the ACFTA significantly shifted Indonesian imports and exports towards China.

3 Data and descriptive statistics

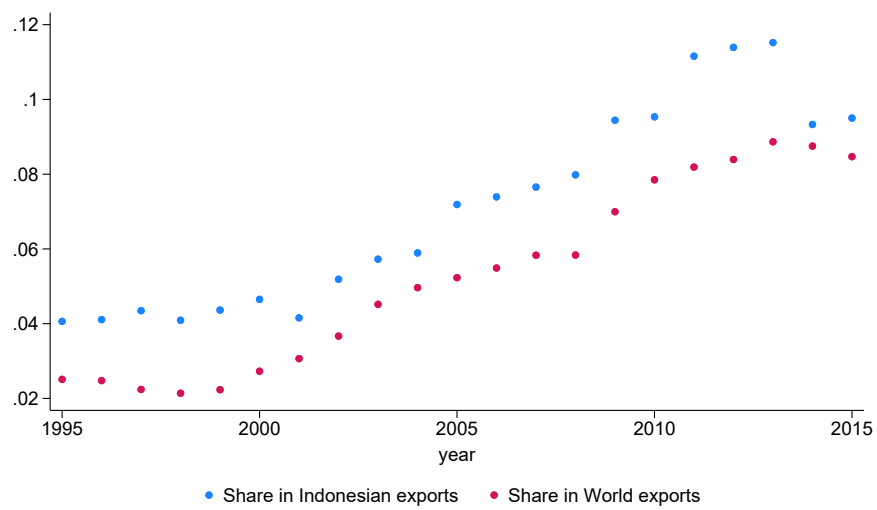
To evaluate the impact of the ACFTA on the quality of jobs occupied by workers in Indonesia, we combine several data sets, including worker-level, firm-level and sector-level data.

Figure 3: Share of China in Indonesian and world trade

(a) In Indonesian imports



(b) In Indonesian exports



Source: BACI.

3.1 Data on workers

The first data source we use is the Integrated Public Use Microdata Series (IPUMS) for the years 2000 and 2010. This is a 10% sample of the Indonesian population survey for these two years. This nationwide data collected by the Central Bureau of Statistics is representative at the district-level. This will be the spatial scale at which we evaluate the impact of the ACFTA on local labor markets. There are 267 districts in the data set. When we focus on the working-age population (aged 16 to 65), the population of interest in this analysis, the IPUMS database contains 13,223,633 observations in 2000 and 15,712,693 in 2010. We do not have individual identifiers so that the data is not a panel at the level of the surveyed residents. However, we use these two repeated cross sections to build a balanced panel for the 267 Indonesian districts. This panel contains information on the type of jobs occupied by the residents of the districts. For this, we refer to the main occupation status declared by each individual working, and we compute the percentage of wage-workers (i.e. workers employed in a firm with a regular contract), the percentage of employers (i.e. people running a formal firms and employing workers), and the percentage of unpaid workers in the working-age population.⁷ Several other variables available in the Census data will be used as control variables in our empirical analysis. We compute in particular the share of the working age population with various levels of educational attainment (less than primary, primary, secondary, university) and with different marital statuses (single, married or consensual union, separated or divorced, widowed), the share of men and the share of rural residents, the average number of children per household and the average age of the residents. We also exploit information on the main sector of activity of the residents to compute the share of the population working in the agricultural, the services and the manufacturing sectors. Table A.1 in Appendix provides various summary statistics on district-level average characteristics of the population computed from the IPUMS sample.⁸ We can see that the average district-level share of wage-workers increases between 2000 and 2010 from 24.7% to 30.6%, whereas the share of unpaid workers decreases from 13.6% to 9.3%. The share of employers slightly increases but remains tiny (2.2% in 2010). The informal employment remains the main form of employment in Indonesia in 2010 implying that most workers benefit from very little social protection, but still, the share of wage-workers in the working age population has significantly increased over the decade 2000-2010. Other notable evolutions include the rising share of manufacturing and trade-related activities at the expense of agriculture and services, the increasing level of education of the population with more working-age people having completed their secondary education, and the declining share of rural population.

To analyze the effects of this trade reform that would materialize after 2010, we also exploit intercensal census data, SUPAS data, in 2005 and 2015. These data, collected by the Central

⁷We also have information on the self-employed. However, in 2010, the information is badly reported for Java (the most populated island) since some people that are certainly not working are registered as self-employed. This is why we do not rely on this employment category for the analysis.

⁸Those summary statistics are provided on 224 districts (and not 267) that will be used for the main analysis given the restriction in firms data explained in Section 3.2

Bureau of Statistics (BPS), collect information on the same variables as the census data, as well as more detailed information on individual activities. Although these data are also representative at the district level, the 2015 SUPAS data cover only the island of Java, limiting the geographical coverage to 103 districts out of the original sample.

3.2 Data on firms

To understand the role of firms in the impact of the ACFTA on the probability of being a wage-worker, in the second part of the paper, we estimate the impact of the trade agreement on the dynamics of job creation in big manufacturing firms, which are the main providers of contract-jobs in the manufacturing sector. The data source we use is the Manufacturing Census of Large and Medium-Sized Firms (Survei Industry, called SI in the following), which surveys all of the Indonesian firms with more than 20 employees. They represent 60 to 70% of the manufacturing employment as measured in the IPUMs data. A compelling advantage of this exhaustive data is that the main sector of activity of the firms is reported at the five-digit level. We use this information to measure the exposure of districts to the ACFTA tariff reductions in the manufacturing industries (see Section 4.2 below). It should be noted, however, that only 241 districts have manufacturing firms with more than 20 employees in the SI data. In addition, some firms in the dataset do not report their industrial sector or report only a two-digit sector. As a result, we are only able to construct district-weighted tariffs for 224 Indonesian districts out of the 267 districts available in the IPUMS data. We restrict the analysis to these districts. The SI data further reports information on the value of firms' production, on the amount of intermediate inputs they use and on their involvement in international trade activities (whether the firms export and the percentage of their inputs they import) as well as on the number of workers they employ. Since firms have a unique identifier, we can track entry, exit and the evolution of incumbents' economic performance across the waves of the survey. Thanks to this panel of firms, we are able to assess the impact of the ACFTA on individual firm performance and on the dynamics of manufacturing employment at the district-level. For the purpose of the analysis, we exploit the 2000 wave, i.e. before the trade agreement under study, which comprises 22,174 firms, and the 2012 one, just two years after the end of the implementation of the ACFTA, which includes 23,591 firms. Table A.2 in the Appendix displays firm-level descriptive statistics. The average size of the firms in our sample was 197 employees in 2000 and increased only slightly to 209 employees in 2012. In terms of exposure to international trade, we can see that, in 2000, 18% of firms imported some inputs and 17% were exporting. Those proportions do not change very much in 2012 (with 21% of firms importing and 16% exporting). Focusing on firms' income, the data reveal a notable increase between the two waves. In monetary terms, the median income in 2000 is estimated at 1,058,682 thousands IDR,⁹ and, when adjusted for an average annual inflation rate of 6.5% between 2000 and 2012,

⁹At an exchange rate of 8422 IDR per 1 USD, this corresponds to 125 704.35 USD in 2000.

the equivalent income in 2012 amounts to roughly 3,113,431 thousands IDR in 2000 terms. The remaining growth can likely be attributed to broader economic expansion and, more plausibly, a composition effect. Finally, it is important to note that for the firms we observe in 2012, only 42% of them were also observed in 2000.

3.3 Sectoral data

The tariff data used to measure tariff cuts are derived from the UNCTAD-TRAINS database. These data are available at the 6-digit level of the Harmonized System nomenclature. However, the SI firm-level data we use to assess the sectoral composition of manufacturing employment in Indonesian districts are available in the third revision of the International Standard Industrial Classification (ISIC, rev 3). In order to obtain consistent tariffs over time, the tariffs are first harmonized by converting them into the HS-1996 nomenclature, and then expressed at the 4-digit level of the ISIC3.1 nomenclature.

3.4 Do wage-workers occupy better jobs?

In the first part of the analysis, the district-level share of wage-workers in the working-age population is the main dependent variable; we take it as a measure of the quality of the jobs available in the district. Indeed, based on the labour force survey Sakernas (Survei Angkatan Kerja Nasional), we are able to compare the income level of workers with different types of jobs for the year 2003 (the available year that is the closest to the population census of 2000). This survey is representative at the province-level (and not at the district-level, which is why we do not use it for the benchmark analysis) and it reports the income of workers¹⁰ as well as several individual characteristics. We are thus able to estimate a Mincer equation where worker-level income is regressed on the number of years of education, age and the square of age, a dummy for men and a dummy for urban workers. On top of these characteristics, we include dummies identifying occasional workers in the agricultural sector, occasional workers in non-agricultural sectors, and wage-workers.¹¹ Table 3 reports the results of the estimation of this Mincer equation. All of the results converge to show that wage-workers constitute the category of workers with the highest income in Indonesia. Compared to self-employed workers, the reference category, the coefficients displayed in column (1) show that wage-workers have a 41% higher individual income, whereas occasional workers have a lower income, especially those in the agricultural sector. This income premium is partly due to the individual characteristics of wage-workers; when we control for these characteristics in column (2), the premium decreases sharply to 17%, but it remains highly significant. Note that all the individual characteristics have the expected sign: individual income increases with education and with age (but the marginal returns to age are decreasing), and men

¹⁰Except for employers who represent a tiny share of the working-age population (see Table A.1 in Appendix).

¹¹The reference category (i.e. the dummy that is excluded to avoid collinearity with the constant) is the self-employed.

have a higher income, all else equal, than women. Controlling for the sector (3-digit level) in which workers are employed and the province in which they live (columns (3) and (4)) further reduces the income premium of wage-workers to 10% compared to the self-employed. We finally control for the fact that workers live in urban areas in column (5) but this does not affect much our coefficient of interest. In the end, the results in Table 3 show that all else equal, the income of wage-workers is 10% higher than the one of the self-employed, 22% higher than the income of occasional workers in the non-agricultural sectors, and 40% higher than the income of occasional workers in the agricultural sector.

In Table A.3 in Appendix, we check whether the wage-workers are more satisfied with their job. A first proxy for job satisfaction is whether an individual is looking for another job. We regress a dummy variable equal to one when a worker declares that she is looking for another job on dummies identifying the type of job she is currently occupying (the self-employed being the reference category again). Wage-workers are significantly less likely to be looking for another job, suggesting that they are more satisfied with their current job. Sakernas data also provide information on how workers perceive the evolution of their working conditions over the past year. Here, we focus on those workers who are currently wage-workers, but have changed job in the past year. We use two measures of job (dis)satisfaction, namely whether the worker declares having a better income or being in a better situation overall than the year before. The sample is small, but the results show that those that were already wage-workers in the previous year are less likely to declare an improvement in their situation, compared to self-employed workers (although the difference is not significant for the dummy identifying overall improvement).

Hence, compared to the other types of workers, wage-workers have a higher income, are less likely to look for another job, and are less likely to declare an improvement in their situation when they switch to a job where they are (again) employees. All this descriptive evidence makes the share of wage-workers in the district a credible measure of the quality of the jobs that are available in that district.

Table 3: Determinants of worker-level income

	(1)	(2)	(3)	(4)	(5)
Wage-worker	0.4086*** (0.0061)	0.170*** (0.006)	0.115*** (0.033)	0.103*** (0.034)	0.097*** (0.034)
Occasional worker in agriculture sector	-0.7711*** (0.0124)	-0.595*** (0.011)	-0.413*** (0.060)	-0.302*** (0.040)	-0.308*** (0.040)
Occasional worker in non-agricultural sectors	-0.1415*** (0.0120)	-0.133*** (0.011)	-0.199*** (0.036)	-0.130*** (0.041)	-0.126*** (0.040)
Education		0.144*** (0.001)	0.120*** (0.004)	0.111*** (0.005)	0.108*** (0.005)
Age		0.046*** (0.001)	0.042*** (0.004)	0.042*** (0.004)	0.042*** (0.004)
Age ²		-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Man		0.345*** (0.005)	0.313*** (0.034)	0.296*** (0.035)	0.297*** (0.035)
Urban					0.076*** (0.012)
R-squared	0.1673	0.3865			
Overall R-squared			0.383	0.428	0.433
Sector FE			×	×	×
Province FE				×	×
Observations	69,345	69,345	69,345	69,345	69,345

Note: the sample is composed of surveyed people that have a job in the 2003 Sakernas data, excluding employers. Robust standard errors are reported in parentheses. ***, **, *, denote significance at, respectively, the 1%, 5% and 10% level.

4 Empirical framework

Here we first discuss the identification strategy to estimate the impact of district-level tariff cuts on the quality of jobs that are available locally. We then detail how we build the measures of district-level import and export tariff cuts. Note that we adopt a local labor market approach here because unlike firm-level data, worker-level data only contain the broad sector of activity of workers (manufacturing, agriculture, services), and not the detailed one.

4.1 Identification strategy

Our approach, close to a difference-in-differences, exploits two sources of variation to evaluate the impact of the tariff cuts associated with the ACFTA agreement on a series of district-level labor market outcomes: (i) a sectoral component - the tariff reductions between 2000 and 2010 (or alternatively between 2005 and 2015) for the various manufacturing sectors as a consequence of the FTA signed in 2002 between the ASEAN countries and China and (ii) a geographical component - the difference across districts in terms of the sectoral composition of their workforce in 2000 (or alternatively in 2005), which translates into different levels of exposure to import and export tariff cuts.

The equation we bring to the data is the following:

$$\Delta y_{d,2000-2010} = \alpha + \beta \Delta \text{tariff}_{d,2000-2010} + \gamma X_{d,2000} + \epsilon_{d,2000-2010}, \quad (1)$$

where $\Delta y_{d,2000-2010}$ is the variation of outcome y in district d between 2000 and 2010, $\Delta \text{tariff}_{d,2000-2010}$ captures the change in manufacturing tariff cuts experienced by district d between 2000 and 2010 (see Section 4.2 for the various measures we consider), and $X_{d,2000}$ is a set of district-level controls measured at the beginning of the period.

In terms of district-level outcome variables, we mainly focus on the impact of the trade agreement on the probability of being a wage-worker, which is a proxy for formal employment and thus for the quality of available jobs (wage-workers having, all else equal, a higher income than the others as shown in Table 3). We also look at the effect of the ACFTA on the probability of being an unpaid worker and an employer, as well as on the size of the active population. Finally, we assess its impact on migration patterns, measured by the share of individuals who, five years ago, resided in a different municipality, province, or abroad.

Our main coefficient of interest is β . Assuming away any control $X_{d,2000}$, it captures the causal impact of the trade agreement if and only if the districts that face different import and export tariff cuts would have experienced, in the absence of trade agreement, similar trends in the outcome variable y (common trend assumption). However, this is unlikely to be the case. For example, in case of convergence between poor and rich districts, poor agricultural districts might experience a higher growth of the formal sector than richer districts. Since agricultural districts face lower

tariff cuts as the greater tariff cuts are in manufacturing sectors (see part (b) of Figure 1 above), this would potentially bias upward the estimate of β . We thus control for several district-level initial characteristics that might be correlated with both the intensity of the tariff cuts and the evolution of the outcome variable y . More precisely, we control for the initial share of workers in the three broad sectors - manufacturing, agriculture and services - so as to ensure that the structural change and convergence process that might be at play across districts is adequately controlled for. We also control for a series of district-level characteristics in 2000 related to: i) the average education-level of the workforce (share of the working age population with less than primary, primary, secondary and university education); ii) the socio-demographic composition of the population (average age, share of men, average number of children per household, share of single, married, divorced and widowed); iii) and the urban/rural nature of the district (share of population living in rural areas). Finally, regional characteristics (such as proximity to transport infrastructure or proximity to markets) could also be correlated with both tariff cuts and the evolution of district-level labor market outcomes. We neutralize them by using dummies for six islands or groups of islands (Sumatra, Java, Tengarra, Kalimantan, Sulawesi, and Maluku/Papua).

In spite of the presence of initial controls and island fixed effects, the estimate of β is biased if some industries that are geographically concentrated in a few districts obtained smaller tariff cuts due to specific trends in their business prospects. For example, if those industries with a lower initial productivity or which faced negative employment shocks at the end of the 1990s-early 2000s are geographically concentrated and obtained more trade protection, this introduces a bias in the estimation of the impact of the tariff cuts. To address this concern, we instrument the variation in the average tariff faced by districts between 2000 and 2010 (or alternatively between 2005 and 2015) by the level of the average tariff in 2000 (or alternatively 2005). Indeed, as discussed in Section 2, the design of the agreement between ASEAN countries and China is such that the sectors that experienced the highest tariff cuts are those with the highest initial level of protection, with an almost linear relationship between tariff cuts and initial tariff. So the level of the average tariff faced by districts in 2000 (or alternatively in 2005) should be a relevant instrument. Conditional on all the controls, it is hard to think of a reason why the initial level of the average tariff faced by districts should be correlated with the evolution of their labor market outcomes between 2000 and 2010 over and beyond the relationship with the tariff cuts decided by the ACFTA. Still, several recent papers discuss the conditions under which Bartik instruments are valid ones. We present in Section 7 several of the balancing and placebo tests they recommend, which confirm that the IV strategy we propose is valid.

4.2 Measures of exposure to import and export tariff cuts

We consider three channels through which Indonesian local labor markets may be affected by the ACFTA agreement: output import tariff cuts (import competition), input import tariff cuts

(access to cheaper inputs), and export tariff cuts (easier access to the Chinese market). The first two channels involve the tariffs applied by Indonesia to Chinese producers while the third one is related to the tariffs applied by China to Indonesian producers.

We measure changes in output import tariffs at the district level as follows:

$$\Delta \text{output import tariff}_{d,2000-2010} = \sum_s \frac{L_{s,d,2000}}{L_{d,2000}} \times \Delta \text{Tariff}_{s,2000-2010}^{Indo}, \quad (2)$$

where $L_{s,d,2000}/L_{d,2000}$ is the share of the working-age population of district d who works in industry s in 2000, and $\Delta \text{Tariff}_{s,t}^{Indo}$ denotes the variation in the tariff applied by Indonesia to China between 2000 and 2010 in sector s . Since the labor shares are defined prior to the trade agreement, they are not affected by the trade agreement itself.

We also account for changes in input import tariffs, capturing the change in the tariffs on the inputs typically used by the industries located in the district. For each industry s , we calculate the cost share of all industries j from which it obtains its inputs $M \left(\frac{M_{j,s,2000}}{M_{s,2000}} \right)$. The weights of these inputs are computed from the input use data reported by firms in the 2000 exhaustive census of firms. These weights, first expressed according to the Indonesian Classification of Commodities (KKI), are then defined at the sectoral level s , based on the ISIC3.1 sectoral classification, at the 4-digit level. Using this source of inputs allows us to construct an input-output matrix with a much more accurate level than the standard World Input-Output Database (WIOD), which is generally used and which contains only 65 sectors. Our district-level measure of changes in input import tariffs is:

$$\Delta \text{input import tariff}_{d,2000-2010} = \sum_s \frac{L_{s,d,2000}}{L_{d,2000}} \times \left(\sum_{j=1}^J \frac{M_{j,s,2000}}{M_{s,2000}} \times \Delta \text{Tariff}_{j,2000-2010}^{Indo} \right). \quad (3)$$

Finally, to account for export tariff cuts, we just replace in the formula of output import tariff the Indonesian tariff by the tariff imposed by China to Indonesian producers:

$$\Delta \text{output export tariff}_{d,2000-2010} = \sum_s \frac{L_{s,d,2000}}{L_{d,2000}} \times \Delta \text{Tariff}_{s,2000-2010}^{China}. \quad (4)$$

Note that $\frac{L_{s,d,2000}}{L_{d,2000}}$ is computed combining two data sources. The IPUMS data contains data on the share of each broad sector (agriculture, manufacturing, etc.) in the total employment of a district. To obtain a more precise composition of employment at the district level, we use the SI data, which provides extensive information about employment in manufacturing firms (exhaustive for firms with 20+ employees) for each district at the 4-digit level of the industrial nomenclature (124 sectors). We can thus compute the share of each manufacturing industry s in the total employment of a district d as the share of manufacturing employment in d accounted for by industry s times the share of manufacturing employment in district d according to IPUMS. Combining it

with the tariff data, we obtain a precise measure of exposure of a given district to changes in manufacturing tariffs.

It is worth pointing out that all our measures of tariff changes are based solely on manufactured goods. There are no tariffs on services and we do not use tariffs on agricultural goods as we lack data on employment per agricultural sub-sector at the district level. Since 90% of the products targeted by the ACFTA are manufacturing goods and since tariffs in the agriculture were already low at the beginning of the period, we are confident that focusing on manufacturing tariffs is most relevant for our purpose. Moreover, we control in all regressions for the share of agricultural employment in the district.

Another point to note is that, for a given initial composition of manufacturing employment in terms of industries, our tariff measures are, given the way we build them, higher (in absolute value) in districts where the share of manufacturing in overall employment is initially higher, and lower in districts where non-traded sectors (mainly found in services) are more prevalent. As already noted by Topalova (2010) or McCaig (2011), this may alter the measure of the intensity of treatment as some of the variation in the treatment variable comes from the share of employment in the traded sector, and not from the heterogeneity of tariff cuts across sectors exposed to trade liberalization. However, we control for the initial share of employment in the broad sectors of activity. Hence, in our setting, the source of variation finally used for the estimation of the impact of tariff cuts is the one stemming from the heterogeneity of tariff cuts across manufacturing sectors.

Although we consider tariff cuts in manufacturing as the treatment variable, our main outcome variable is the district-level share of wage-workers across all sectors. A drop in tariffs on manufactured goods may, of course, directly affect the probability of being a wage-worker in manufacturing and is a stronger shock in districts with a higher share of manufacturing. However, trade liberalization in manufacturing may also affect other sectors through externalities. Manufacturing jobs are generally high-paying jobs, which can positively impact other sectors such as non-traded services through multiplier effects (Moretti 2010).

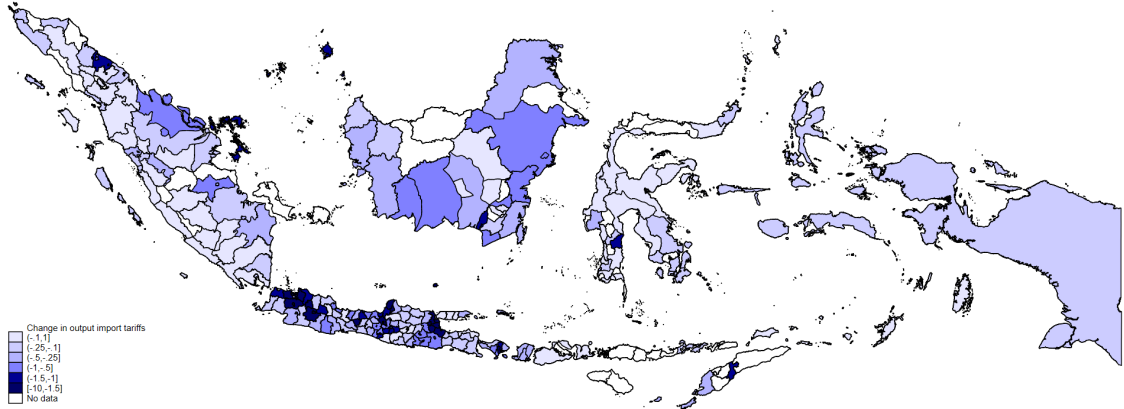
Table 4 shows a sharp decrease between 2000 and 2010 for all three tariff measures at the district level. Figure 4 details these variations from a spatial point of view and shows substantial variations across districts. These variations reflect differences across districts in the share of manufacturing as well as in the industrial composition of local manufacturing employment. We analyze in the next section how these measures relate to the evolution of the district-level share of wage-workers.

Table 4: Change in district-level tariffs, from 2000 to 2010.

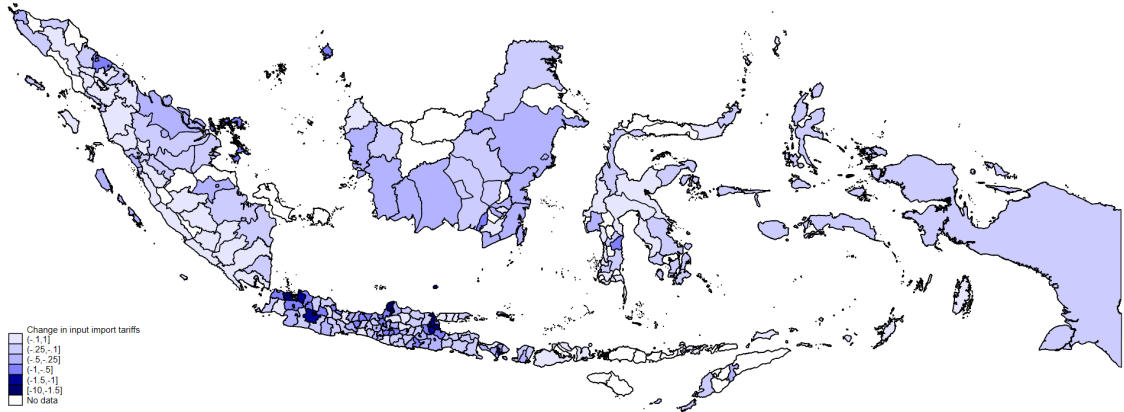
	Mean	Median	Min	Max	S.D	Obs.
Δ output import tariff	-0.55	-0.26	-4.58	0.09	0.71	224
Δ input import tariff	-0.34	-0.13	-2.68	-0.00	0.48	224
Δ output export Tariff	-1.28	-0.85	-7.50	-0.03	1.36	224

Figure 4: Changes in tariffs by Indonesian district, 2000-2010

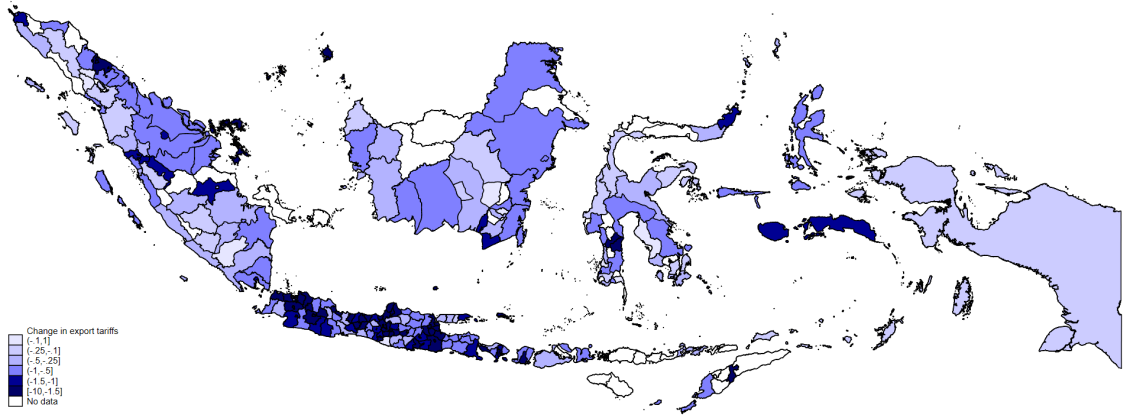
(a) Output import tariffs



(b) Input import tariffs



(c) Export tariffs



5 Worker-level analysis

We here present the worker-level analysis. We first show the results on the probability of being a wage-worker, we then analyze other outcome variables and we finally discuss some robustness checks.

5.1 Probability of being a wage-worker

Table 5 displays the results of OLS and IV regressions where the change in the share of wage-workers in the working-age population of the district is used as the dependent variable. All of the controls mentioned in Section 4.1 are included. In IV regressions, the first-stage notoriously loses power as the number of endogenous variables to be instrumented increases. This is why we present specifications where only import tariffs are included (columns (1) and (3), two endogenous variables), and others where we also control for export tariff cuts (columns (2) and (4), three endogenous variables). Whatever the specification we use, the results are very much the same: none of the dimension of trade liberalization induced by the ACFTA is significantly associated with changes in the probability of being a wage-worker for Indonesian workers. In spite of the significant impact of the agreement on the trade patterns between Indonesia and China (see Section 2), the increased competition from Chinese producers and the improved access to Chinese inputs and Chinese markets do not significantly affect the quality of jobs occupied by Indonesian workers as measured by the probability of being a wage-worker. The comparison of the various specifications brings three notable insights. First, accounting for export tariff cuts on top of import tariff reductions does not change the picture (column (1) *vs* column (2) and column (3) *vs* column (4)). Second, most of the coefficients we obtain are close to 0 and are precisely estimated (the absence of significant results does not simply reflect a lack of statistical power of our estimations). Finally, IV estimates are not significantly different from OLS ones, but as expected, the F-test shows that the first-stage becomes weaker when we account for export tariff reductions on top of import tariff cuts. This is why in the remaining of the paper, we will stick to IV regressions and will keep presenting the results with and without export tariffs.

We replicate the analysis separately for each broad sector of activity. The results in Table 6 show that all the coefficients on tariff cuts are close to zero and insignificant for agricultural workers. Some coefficients are significant in manufacturing, and services activities. However, to get a sense of the magnitude of these effects, we compute the average total effect related to the three types of tariff-changes we are accounting for by multiplying, for each district, the coefficients obtained in Panel B of Table 6 by the tariff cuts it has experienced over the period, and by summing those three products. We find an insignificant overall variation of the probability of being a wage-worker equal to -1 p.p. in manufacturing (for an average probability of 8.5% in 2000), and 0.1p.p. in services (average probability of 22.8% in 2000).

Finally, we investigate potential heterogeneous effects depending on some workers' characteristics, such as gender and educational attainment, distinguishing between individuals with a level of education equivalent to primary school or less, the "non-educated workers", and those with a higher level of education, the "educated workers". Table 7 shows that men and non-educated workers are not significantly affected by any of the dimensions of the trade liberalization related to the ACFTA. Some coefficients are weakly significant for women and educated workers. The cal-

Table 5: Probability of being a wage-worker

	Δ % wage-workers $_{d,2000-2010}$			
	(1)	(2)	(3)	(4)
Δ output import tariff	-0.003 (0.009)	-0.002 (0.009)	-0.004 (0.010)	0.000 (0.010)
Δ input import tariff	-0.004 (0.010)	-0.002 (0.010)	-0.006 (0.010)	0.002 (0.012)
Δ output export tariff		-0.002 (0.005)		-0.006 (0.007)
F-test			302.3	7.533
Δ % wage-workers $_{d,2000-2010}$			0.062	
R-squared	0.436	0.437	n.a.	n.a.
Observations	224	224	224	224
Controls	×	×	×	×
Island dummies	×	×	×	×
IV			×	×

Sample: IPUMS data 2000 and 2010.

Note: Robust standard errors are reported in parentheses. ***, **, * means, respectively, that the coefficient is significantly different from 0 at the level of 1%, 5% and 10%. All of the controls are measured in 2000. They include the district-level employment shares in agriculture, manufacturing and services, the composition of the population in terms of level of education (less than primary, primary, secondary and university education) and in terms of marital status (single, married, divorced, widowed), the share of men, the average age of the population, and the share of the population living in rural areas.

culation of the overall effect shows that on average, the impact is economically very small and/or statistically insignificant for men, women and less-educated workers. It is economically larger and statistically significant for educated workers, with an average increase by 1.9 p.p. (average probability of 17.4% in 2000), but they only account for a quarter of the working-age population. If anything, the ACFTA has thus had a regressive effect on workers' access to salaried jobs.

5.2 Other worker-level outcomes

We now examine the impact of the ACFTA on other labor market outcomes. Table 8 shows that the probability of being an unpaid worker (i.e. a worker without a regular labor contract) significantly increases when output import tariffs decrease, while input import tariff and output export tariff reductions have no significant impact. However, the overall district-level average impact is insignificant. The probability of being an employer is not significantly impacted by tariff reductions (column (2)), nor the size of the active population (column (3)). Finally, while the input import tariff cuts induced by the ACFTA seem to have a positive (but again small) impact on the share migrants (individuals who, five years ago, resided in a different municipality, province, or abroad) when only import tariffs are accounted for, this effect becomes insignificant once export tariff cuts are included in the regression.

Together with those presented in Tables 5 and 6, these results show that the districts which

Table 6: Probability of being a wage-worker in the different sectors of activity

	Δ % of wage-workers in agriculture (1)	Δ % of wage-workers in manufacturing (2)	Δ of wage-worker in trade (3)	Δ % of wage-workers in services (4)
Panel A				
Δ output import tariff	-0.006 (0.006)	0.017 (0.011)	-0.006 (0.004)	-0.006 (0.005)
Δ input import tariff	-0.002 (0.005)	-0.025** (0.011)	-0.006 (0.004)	0.016*** (0.006)
F-test	302.3	302.3	302.3	302.3
Panel B				
Δ output import tariff	-0.003 (0.006)	0.007 (0.010)	-0.006 (0.004)	-0.002 (0.006)
Δ input import tariff	0.003 (0.006)	-0.047*** (0.013)	-0.007 (0.006)	0.025*** (0.008)
Δ output export Tariff	-0.004 (0.005)	0.017*** (0.006)	0.001 (0.003)	-0.007 (0.005)
F-test	7.533	7.533	7.533	7.533
Δ dep var	0.0155	0.00652	0.0153	0.100
Observations	224	224	224	224
Controls	×	×	×	×
Island dummies	×	×	×	×
IV	×	×	×	×

Note: Robust standard errors are reported in parentheses. ^{a, b, c} means, respectively, that the coefficient is significantly different from 0 at the level of 1%, 5% and 10%. All of the controls are measured in 2000. They include the district-level employment shares in agriculture, manufacturing and services, the composition of the population in terms of level of education (less than primary, primary, secondary and university education) and in terms of marital status (single, married, divorced, widowed), the share of men, the average age of the population, and the share of the population living in rural areas.

have been more exposed to the tariff variations imposed by the ACFTA have not experienced major changes neither in the size of their active population nor in the composition of their workforce, in particular in the proportion of workers with a regular contract. The robustness checks, discussed in section 7, demonstrate that the results remain consistent when considering longer time scales. Our findings depart from Kis-Katos & Sparrow (2015) who report evidence of a positive effect of tariff reduction on formal employment during the period 1993 to 1996. However, in their case, the tariff cuts were those related to the entry of Indonesia into WTO: hence, they were both multilateral and larger. It seems that in the case of a bilateral trade liberalization between two countries that already belong to WTO, the effects are much more modest or even statistically insignificant.

Table 7: Probability of being a wage-worker depending on workers' characteristics

	(1) Men	(2) Women	(3) Educated	(4) Non-educated
Panel A				
Δ output import tariff	0.001 (0.014)	-0.012 (0.009)	-0.014 (0.009)	-0.004 (0.012)
Δ input import tariff	0.001 (0.012)	-0.006 (0.011)	-0.006 (0.009)	-0.008 (0.015)
F-test	339.4	290.2	369.6	321.8
Panel B				
Δ output import tariff	0.007 (0.014)	-0.017* (0.009)	-0.002 (0.010)	-0.005 (0.013)
Δ input import tariff	0.014 (0.017)	-0.017 (0.014)	0.017* (0.010)	-0.011 (0.016)
Δ output export tariff	-0.010 (0.009)	0.008 (0.007)	-0.019** (0.008)	0.003 (0.008)
F-test	8.002	7.310	7.245	9.215
Δ var	0.0845	0.0392	0.0481	0.0363
Observations	224	224	224	224
Initial controls	×	×	×	×
Initial labor force and rural shares	×	×	×	×
Island dummies	×	×	×	×
Weighted IV	×	×	×	×

Sample: 2000 and 2010 IPUMS data. Note: Standard errors, clustered at the district level, are reported in parentheses. ***, **, * means, respectively, that the coefficient is significantly different from 0 at the level of 1%, 5% and 10%. Regressions are weighted by the district population size in 2000. The initial labor force shares includes the agricultural labor share, the manufacturing labor share, and the service labor share. We also control for initial controls such as the share of educated individuals, the share of men, the share of single, married, divorced and widowed individuals, the average family size, and the average age of the population.

Table 8: Other worker-level outcomes

	Δ % Unpaid workers	Δ % Employers	Δ Ln(active population)	Δ % Migrants
	(1)	(2)	(3)	(4)
Panel A				
Δ output import tariff	-0.021*	0.002	0.032	0.000
	(0.011)	(0.002)	(0.065)	(0.008)
Δ input import tariff	0.002	0.002	0.036	-0.024**
	(0.012)	(0.002)	(0.046)	(0.009)
F-test	302.3	302.3	302.3	302.3
Panel B				
Δ output import tariff	-0.022**	0.001	0.061	0.005
	(0.010)	(0.002)	(0.069)	(0.008)
Δ input import tariff	-0.001	0.002	0.096	-0.014
	(0.015)	(0.003)	(0.085)	(0.013)
Δ output export tariff	0.002	0.000	-0.048	-0.008
	(0.009)	(0.002)	(0.051)	(0.007)
F-test	7.533	7.533	7.533	7.533
Δ Dep. var	-0.0391	0.0143	0.176	-0.00853
Observations	224	224	224	224
Controls	×	×	×	×
Island dummies	×	×	×	×
IV	×	×	×	×

Note: Robust standard errors are reported in parentheses. ^{a, b, c} means, respectively, that the coefficient is significantly different from 0 at the level of 1%, 5% and 10%. All of the controls are measured in 2000. They include the district-level employment shares in agriculture, manufacturing and services, the composition of the population in terms of level of education (less than primary, primary, secondary and university education) and in terms of marital status (single, married, divorced, widowed), the share of men, the average age of the population, and the share of the population living in rural areas.

6 Firm-level analysis

We now try to understand the absence of impact of the ACFTA on the quality of available jobs for Indonesian workers by analyzing its impact on the performance of big and medium-sized manufacturing firms.

As described in Section 3, the SI data provides information on the universe of manufacturing firms with more than 20 employees in Indonesia. In 2000, these accounted for about 20% of all wage-workers in the census, and for 73% of wage-workers in manufacturing. These firms thus account for an important chunk of all salaried jobs in Indonesia, and we know from the literature on multiplier effects that high-paying manufacturing jobs have positive spillover effects on job creation in non-traded sectors. This is why we think studying how those firms have fared following the trade liberalization with China will help us shed some light on the reasons for our null result on the quality of available jobs at the district-level.

Table 9: Effect of ACFTA on the nb. of workers in 20+ manufacturing firms

	$\Delta \text{Ln}(\text{wage-workers})_{d,2000-2012}$			
	(1)	(2)	(3)	(4)
Δ Output Tariff 00-12	-0.004 (0.021)	-0.005 (0.021)	0.000 (0.022)	-0.000 (0.021)
Δ Input Tariff 00-12	-0.010 (0.030)	0.008 (0.033)	-0.011 (0.029)	0.015 (0.036)
Δ Export Tariff		-0.011 (0.008)		-0.016 (0.011)
$\Delta \text{Ln}(\text{wage-workers})_{d,2000-2012}$			0.0343	
R-squared	0.214	0.222	0.214	0.220
Observations	219	219	219	219
Controls	×	×	×	×
Island dummies	×	×	×	×
IV			×	×
F-test			685.9	46.09

Sample: 2000, and 2012 firms census (Survei Industry). *Note:* Robust standard errors are reported in parentheses. ***, **, * means, respectively, that the coefficient is significantly different from 0 at the level of 1%, 5% and 10%. All of the controls are measured in 2000. They include the district-level employment shares in agriculture, manufacturing and services, the composition of the population in terms of level of education (less than primary, primary, secondary and university education) and in terms of marital status (single, married, divorced, widowed), the share of men, the average age of the population, and the share of the population living in rural areas. Island dummies are also included, as well as the district-level average size of manufacturing firms and their total output in 2000.

We first aggregate the employment of firms in the SI data at the level of districts and compute the change in log employment per district between 2000 and 2012. To control for initial productive performance, on top of the controls we have used so far, we add to the regressors the district-level average size of manufacturing firms in terms of employees and total output in 2000. Table 9 replicates Table 5 when using the district-level log growth of employment from the SI data as our

dependent variable instead of the variation in the local share of wage-workers. Results on the effects of trade liberalization induced by the ACFTA on the employment in manufacturing firms align closely with our previous findings on the availability of wage work in Indonesia. OLS (columns (1) and (2)) and IV estimates (columns (3) and (4)) show that decreases in output and input tariffs do not significantly affect the variation in the number of workers employed in manufacturing firms with more than 20 employees. Controlling for export tariff cuts (columns (2) and (4)) does not change the results. Given that tariff cuts should firstly affect manufacturing firms, finding no effect on their employment level rationalize the results we find on salaried job in Indonesia.

However, those results may mask some interesting dynamics at the district-level given that there is significant churning of manufacturing firms (and thus employment) with many firms that are either present in 2000 or 2012 while a minority of them are observed in both periods. To have a better grasp of the manufacturing employment dynamics at the district-level, Table 10 provides a decomposition of district-level employment growth into: (i) a within effect, capturing the variation in employment at firms which are in the sample in both 2000 and 2012 (column (2)); and (ii) a net entry effect, measuring the change in employment coming from firms entering and exiting the sample (column (3)). The first column of Table 10 replicates the analysis on overall employment growth. There is no effect of output and input import tariff reductions through the net entry margin¹², and only a limited effect of output import tariff reductions through the within margin: for the firms that survive, the reduction in output tariffs increases their level of employment. Export tariff reductions seem to hurt incumbent firms and to favor net entry. In addition, the last column of Table 10 suggests a slight negative impact of output import tariff cuts on the overall number of firms. But again, all in all, the impact of the various types of tariff cuts on the growth rate of overall employment at firms bigger than 20 employees is precisely estimated and equal to zero.

In the Appendix, we complement our main findings with a firm-level analysis on incumbent manufacturing firms observed both in 2000 and 2012 (i.e. surviving firms). We estimate the effect of tariff changes using a slightly different strategy than the one used for the district-level estimates by exploiting only the sectorial dimension of tariff changes across firms and not the geographical dimension anymore. The main results presented in Table A.4 corroborate very much the findings that tariff changes did not affect significantly manufacturing firms when we look at most of their economic dimensions (their level of production, value added, number of workers etc.). We only find a small positive effect of import input tariff reductions on employment (column (3) of Table A.4).

¹²There is actually a small negative effect on exit that is fully compensated by entry. Note that exit and entry are defined for the sample of firms with more than 20 employees. An exit does not necessarily mean that the firm stops operating, but that it drops below the cutoff of 20 employees.

Table 10: Decomposition of the effect of import tariff cuts on the # workers in 20+ manufacturing firms

	Total	Within	Net entry	Nb. of firms
	(1)	(2)	(3)	(4)
Panel A				
Δ Output Tariff 00-12	0.000 (0.022)	-0.013** (0.006)	0.013 (0.021)	1.979* (1.118)
Δ Input Tariff 00-12	-0.011 (0.029)	0.004 (0.008)	-0.016 (0.028)	-0.707 (1.886)
F-test	685.9	685.9	685.9	685.9
Panel A				
Δ Output Tariff 00-12	-0.000 (0.021)	-0.012** (0.006)	0.012 (0.021)	1.984* (1.123)
Δ Input Tariff 00-12	0.015 (0.036)	-0.006 (0.010)	0.021 (0.035)	-1.435 (2.202)
Δ Export Tariff	-0.016 (0.011)	0.007** (0.003)	-0.023** (0.010)	0.443 (0.636)
F-test	46.09	46.09	46.09	46.09
Δ var	0.0343	0.00522	0.0290	5.027
Observations	219	219	219	219
Controls	×	×	×	×
Island dummies	×	×	×	×
IV	×	×	×	×

Sample: 2000, and 2012 firms census (Survei Industry). *Note:* Robust standard errors are reported in parentheses. ***, **, * means, respectively, that the coefficient is significantly different from 0 at the level of 1%, 5% and 10%. All of the controls are measured in 2000. They include the district-level employment shares in agriculture, manufacturing and services, the composition of the population in terms of level of education (less than primary, primary, secondary and university education) and in terms of marital status (single, married, divorced, widowed), the share of men, the average age of the population, and the share of the population living in rural areas. Island dummies are also included, as well as the district-level average size of manufacturing firms and their total output in 2000.

7 Robustness checks

We run three types of robustness checks.

All of our results rely on Bartik-type IV regressions. However, several recent contributions discuss the checks that should be done to assess the validity of Bartik instruments, Borusyak et al. (2022) being the most relevant one in our context.

Among the exercises they propose we perform balancing tests to ensure that our instrumental variables are not correlated with initial worker- and firm-level outcomes of interest at the district level. To do so, we run a series of regressions of the main outcomes measured in 2000 on the initial level of tariffs (our instruments) and controls similar to those in our main specification. Results displayed in Table A.5 show that the coefficients we obtain are small, and that almost all (20 out of 24) are insignificant. In addition to district-level characteristics, we also regress average firm-level outcomes in 2000 measured at the sectoral level (using the 97 sectors) on the instruments. Results in Table A.6 show again that coefficients are almost all insignificant (8 out of 9). Those results make us confident in the fact that our instruments are exogenous.

Second, since our empirical strategy is similar to a difference-in-differences design, we can test the associated common trend assumption - that districts facing different changes in tariff would have experienced similar evolutions in their main outcomes in the absence of the tariff cut. To do this, we use data from 2000 (IPUMS) and 2005 (SUPAS), considering that most import tariff reductions occurred after 2005 (note that this is not true for export tariffs, which saw substantive reductions between 2000 and 2005). We conduct a placebo test by regressing the variation of the main outcomes from the census between 2000 and 2005 on our treatment variable (tariff changes between 2000 and 2010) using the same empirical strategy as before, except that we do not include export tariffs (note that we do not have similar pre-tariff changes data for the firms).¹³ Results, presented in Table A.7 in Appendix, show that for our main outcome - the probability of being a wage-worker and most of the other outcomes used in the analysis, trends were similar in the districts facing different tariff cuts before they were actually implemented.

Third, as acknowledged in section 2, the growth of the share of China in Indonesian imports and exports seems to accelerate after 2010. To ensure that our results so far do not simply reflect the fact that the effects of the ACFTA take time to materialize, we replicate our main results using an alternative dataset, SUPAS, that provides information on labor market outcomes in 2005 and 2015 for the districts of Java. The results in Table A.8 in the Appendix first show that using IPUMS data between 2000 and 2010, the absence of effect of the ACFTA on the probability of being a wage-worker holds when we restrict the sample to the districts of Java. Table A.9 further shows that the result remains unchanged when we evaluate the impact of the ACFTA between 2005 and 2015. Finally, one can see from Table A.10 that no effect is detected between 2005 and

¹³The regressions for the placebo analysis are conducted on 188 districts (compared to 224 districts in the main analysis) due to some discrepancies between the district IDs of the SUPAS (2005) and IPUMS (2010) data

2015 on other dimensions of workers' employment status. Hence, the conclusion that the ACFTA has not improved the quality of the jobs available for Indonesian workers does not depend on the time-window we consider.

8 Conclusion

In this paper, we contribute to the literature on the impact of trade liberalization on the access of workers to salaried jobs, a measure of job quality in LMICs. Focusing on the effects of the ASEAN-China Free Trade Agreement (ACFTA) on Indonesia, we find no evidence that reductions in import or export tariffs increased the probability of being a wage-worker, except for the small group of more educated workers. This seems to be at least partially explainable by the fact that manufacturing firms, which are important providers of formal high-paying jobs and are the most directly exposed to the ACFTA, are not significantly impacted by the agreement. Our results are robust to a series of robustness checks.

While our results are context-specific, they underscore the need for cautious optimism regarding the potential gains in terms of job quality from further trade liberalization in LMICs, particularly in a global environment where tariffs are already low. These findings suggest that, in addition to trade liberalization agreements, policymakers should consider complementary policies to enhance labor market outcomes, especially for the least-educated, who account for the lion-share of the working-age population.

References

- Amiti, M. & Cameron, L. (2012), ‘Trade Liberalization and the Wage Skill Premium: Evidence from Indonesia’, *Journal of International Economics* **87**(2), 277–287.
- Amiti, M. & Konings, J. (2007), ‘Trade Liberalization, Intermediate Inputs, and Productivity: Evidence from Indonesia’, *American Economic Review* **97**(5), 1611–1638.
- Attanasio, O., Goldberg, P. K. & Pavcnik, N. (2004), ‘Trade reforms and wage inequality in Colombia’, *Journal of Development Economics* **74**(2), 331–366.
- 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.
- Banerjee, A. V. & Duflo, E. (2008), ‘What is middle class about the middle classes around the world?’, *Journal of Economic Perspectives* **22**(2), 3–28.
- Borusyak, K., Hull, P. & Jaravel, X. (2022), ‘Quasi-Experimental Shift-Share Research Designs’, *Review of Economic Studies* **89**(1), 181–213.
- Bown, C., Conconi, P., Erbahar, A. & Trimarchi, L. (2024), Politically Motivated Trade Protection, Technical report.
- Branstetter, L. G., Kovak, B. K., Mauro, J. & Venâncio, A. (2019), The China Shock and Employment in Portuguese Firms, GEE Papers 0133, Gabinete de Estratégia e Estudos, Ministério da Economia.
- Bustos, P. (2011), ‘Trade Liberalization, Exports, and Technology Upgrading: Evidence on the Impact of MERCOSUR on Argentinian Firms’, *American Economic Review* **101**(1), 304–340.
- Chandra, A. & Lontoh, L. (2011), ‘Indonesia – china trade relations: The deepening of economic integration amid uncertainty?’, *Trade Knowledge Network, International Institute for Sustainable Development* .
- Costa, F., Garred, J. & Pessoa, J. P. (2016), ‘Winners and losers from a commodities-for-manufactures trade boom’, *Journal of International Economics* **102**(C), 50–69.
- Dauth, W., Findeisen, S. & Suedekum, J. (2014), ‘The Rise Of The East And The Far East: German Labor Markets And Trade Integration’, *Journal of the European Economic Association* **12**(6), 1643–1675.
- Dix-Carneiro, R., Goldberg, P. K., Meghir, C. & Ulyssea, G. (2024), Trade and Domestic Distortions: The Case of Informality , Technical report.
- Dix-Carneiro, R. & Kovak, B. K. (2017), ‘Trade liberalization and regional dynamics’, *American Economic Review* **107**(10), 2908–46.

- Dix-Carneiro, R. & Kovak, B. K. (2019), ‘Margins of labor market adjustment to trade’, *Journal of International Economics* **117**(C), 125–142.
- Goldberg, P. K. & Pavcnik, N. (2007), ‘Distributional Effects of Globalization in Developing Countries’, *Journal of Economic Literature* **45**(1), 39–82.
- Hanson, G. H. & Harrison, A. (1999), ‘Trade Liberalization and Wage Inequality in Mexico’, *ILR Review* **52**(2), 271–288.
- Kis-Katos, K. & Sparrow, R. (2015), ‘Poverty, labor markets and trade liberalization in Indonesia’, *Journal of Development Economics* **117**(C), 94–106.
- Kis-Katos, K. & Sparrow, R. (2018), ‘Globalization and social change: gender-specific effects of trade liberalization in Indonesia’, *IMF Economic Review* **66**, 763–793.
- Lee, E. (2013), ‘World Bank: World Development Report 2013: Jobs’, *Population and Development Review* **39**(2), 353–355.
- McCaig, B. (2011), ‘Exporting out of poverty: Provincial poverty in Vietnam and U.S. market access’, *Journal of International Economics* **85**(1), 102–113.
- McCaig, B. & Pavcnik, N. (2018), ‘Export Markets and Labor Allocation in a Low-Income Country’, *American Economic Review* **108**(7), 1899–1941.
- McKenzie, D. (2017), ‘Identifying and Spurring High-Growth Entrepreneurship: Experimental Evidence from a Business Plan Competition’, *American Economic Review* **107**(8), 2278–2307.
- McMillan, M. S. & McCaig, B. (2020), ‘Trade Liberalization and Labor Market Adjustment in Botswana’, *Journal of African Economies* **29**(3), 236–270.
- Moretti, E. (2010), ‘Local Multipliers’, *American Economic Review* **100**(2), 373–377.
- Ooi, K. P. (2016), Examining The Impact of ASEAN-China Free Trade Agreement on Indonesian Manufacturing Employment, Technical report.
- Pavcnik, N. (2017), The Impact of Trade on Inequality in Developing Countries, Nber working papers, National Bureau of Economic Research, Inc.
- Revenge, A. (1997), ‘Employment and Wage Effects of Trade Liberalization: The Case of Mexican Manufacturing’, *Journal of Labor Economics* **15**(3), 20–43.
- Schoar, A. (2010), The Divide between Subsistence and Transformational Entrepreneurship, in ‘Innovation Policy and the Economy, Volume 10’, NBER Chapters, National Bureau of Economic Research, Inc, pp. 57–81.
- 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. (2018), ‘Workers beneath the Floodgates: Low-Wage Import Competition and Workers’ Adjustment’, *The Review of Economics and Statistics* **100**(4), 631–647.
- Utar, H. & 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**(C), 267–287.
- Verhoogen, E. A. (2008), ‘Trade, Quality Upgrading, and Wage Inequality in the Mexican Manufacturing Sector’, *The Quarterly Journal of Economics* **123**(2), 489–530.
- Wang, Z., Wei, S.-J., Yu, X. & Zhu, K. (2018), Re-examining the Effects of Trading with China on Local Labor Markets: A Supply Chain Perspective, NBER Working Papers 24886, National Bureau of Economic Research, Inc.

A Appendix

A.1 Descriptive statistics

Table A.1: Descriptive statistics of the main variables in the Population census

	2000		2010	
	Mean	S.D	Mean	S.D
Labor market outcomes				
Percentage of wage-workers	0.246	0.105	0.306	0.094
Percentage of unpaid workers	0.136	0.087	0.093	0.079
Percentage of employers	0.009	0.003	0.022	0.005
Share agriculture	0.435	0.249	0.369	0.230
Share manufacturing	0.090	0.079	0.117	0.093
Share services	0.198	0.113	0.165	0.064
Share trade	0.135	0.052	0.193	0.071
Share other activities	0.142	0.068	0.156	0.062
Education				
Less than primary completed	0.202	0.111	0.125	0.083
Primary completed	0.565	0.097	0.549	0.119
Secondary completed	0.211	0.119	0.282	0.122
University completed	0.021	0.020	0.045	0.030
Marital status				
Single/never married	0.250	0.051	0.220	0.052
Married or consensual union	0.681	0.055	0.722	0.049
Separated or divorced	0.031	0.017	0.021	0.007
Widowed	0.038	0.012	0.037	0.009
Miscellaneous				
Share of men	0.499	0.014	0.501	0.014
Average age	34.205	1.585	35.837	1.670
Percentage of migrants	0.062	0.049	0.052	0.040
Geography				
Share of rural population	0.557	0.298	0.486	0.295
Sumatra	0.186	0.390	0.198	0.400
Java	0.645	0.480	0.616	0.487
Tengarra	0.042	0.201	0.044	0.205
Kalimantan	0.052	0.223	0.057	0.231
Sulawesi	0.059	0.236	0.061	0.240
Maluku	0.008	0.088	0.009	0.095
Papua	0.009	0.092	0.016	0.124
Observations	224		224	

Sample: Active population (aged 16 to 65) from the 2000 and 2010 population census. Each district is weighted by the active population size of the district.

Table A.2: Descriptive statistics of the main variables in the firm survey

	2000		2012	
	Mean	S.D	Mean	S.D
Production				
ln(Total income)	14.29	2.17	15.97	2.14
ln(value added)	13.26	2.09	15.00	2.09
ln(value input)	13.60	2.38	15.29	2.30
% imported input	0.18	0.39	0.21	0.41
Workforce				
Number of workers	196.93	695.33	209.11	773.81
Number of unpaid workers	0.74	3.01	0.49	7.34
Use unpaid workers	0.38	0.49	0.21	0.41
ln (wage of blue-collar workers)	7.96	0.83	9.73	0.75
ln (wage of white-collar workers)	8.49	1.10	10.09	0.94
Miscellaneous				
Probability to export	0.17	0.37	0.16	0.36
% firms only observed in 2000	0.56	0.50	0.00	0.00
% firms only observed in 2012	0.00	0.00	0.58	0.49
Probability to survive between 2000 and 2012	0.00	0.00	0.42	0.49
Number of firms by district	409.57	389.07	438.17	387.19
Observations	22174		23420	

Sample: All firms with more than 20 employees, Manufacturing census of large and medium-sized firms (Sruvei Industry dataset).

A.2 Job quality analysis

Table A.3: Job Quality Indexes: Probability of looking for a new job, and self-reported employment status compared to the previous year

	(1) Looking for a job	(2) Better income	(3) Better overall situation
Wage-worker	-0.016*** (0.002)	-0.113* (0.069)	-0.080 (0.056)
Occasional worker in agriculture	0.032*** (0.004)	-0.251*** (0.092)	-0.192*** (0.055)
Occasional worker in non-agriculture	0.035*** (0.005)	-0.096 (0.142)	-0.109 (0.097)
Constant	0.046*** (0.001)	0.346*** (0.066)	0.192*** (0.055)
R-squared	0.0065	0.0090	0.0092
Observations	69,435	647	647

Note: The sample, in column (1) is composed of surveyed people that have a job in the 2003 Sakernas data. In columns (2) and (3), the sample includes all the employees in the 2003 Sakernas data who changed job within the past year. Robust standard errors are reported in parentheses. The reference category is the self-employed. The explanatory variables are measured at the time of the survey in column (1), and a year before in columns (2) and (3). ***, **, *, denote significance at, respectively, the 1%, 5% and 10% level.

A.3 Analysis on incumbent firms

Table A.4: Effect of sectoral tariffs on incumbent firms from 2000 to 2012

	$\Delta \log(\text{production})$	$\Delta \log(\text{value added})$	$\Delta \log(\text{nb. workers})$	$\Delta \log(\text{wage bill of productive workers})$	$\Delta \log(\text{wage bill of non productive workers})$
	(1)	(2)	(3)	(4)	(5)
Δ Output Tariff	-0.041 (0.090)	-0.065 (0.089)	0.021 (0.026)	0.051 (0.047)	-0.124 (0.088)
Δ Input Tariff	0.006 (0.051)	-0.002 (0.050)	-0.045** (0.020)	0.003 (0.046)	0.048 (0.077)
F-test	44.28	44.28	44.28	44.28	44.28
Δ Output Tariff	-0.003 (0.010)	-0.006 (0.010)	0.003 (0.004)	0.012 (0.008)	-0.014 (0.016)
Δ Input Tariff	0.000 (0.012)	-0.002 (0.012)	-0.011** (0.005)	-0.001 (0.011)	0.010 (0.021)
Δ Export Tariff	-0.009 (0.005)	-0.011** (0.006)	-0.001 (0.003)	-0.012 (0.010)	-0.013 (0.017)
F-test	3.527	3.527	3.527	3.527	3.527
Firms initial controls	×	×	×	×	×
IV	×	×	×	×	×
Observations	7,895	7,895	7,895	7,895	7,895

Note: Standard errors, clustered at the sector level, are reported in parentheses. ***, **, * means, respectively, that the coefficient is significantly different from 0 at the level of 1%, 5% and 10%.

A.4 Placebo analysis

Table A.5: Exogeneity test: regressions of outcomes in 2000 on initial tariffs

	Census data (2000)						Firms data (2000)	
	%						nb of workers (Ln)	nb of firms (Ln)
	wage workers (1)	wage workers manuf (2)	unpaid workers (3)	employers (4)	active pop. (Ln) (5)	% migrants (6)		
Output Tariff in 2000	-0.012 (0.014)	0.001 (0.004)	-0.010 (0.012)	0.002** (0.001)	-0.154 (0.185)	0.006 (0.013)		
Input Tariff in 2000	0.017 (0.017)	0.010* (0.006)	0.025 (0.016)	0.001 (0.001)	-0.020 (0.271)	-0.006 (0.016)		
Export Tariff in 2000	0.005 (0.004)	0.001 (0.002)	-0.008** (0.003)	0.000 (0.000)	-0.009 (0.039)	-0.004 (0.002)		
Output Tariff in 2000							0.071* (0.037)	0.035 (0.029)
Input Tariff in 2000							-0.079 (0.065)	-0.006 (0.045)
Export Tariff in 2000							0.016 (0.010)	-0.003 (0.006)
Dep. var	0.220	0.0341	0.150	0.00846	12.8582	0.0604	8.155	3.402
Observations	224	224	224	224	224	224	223	223
Controls	×	×	×	×	×	×	×	×
Island dummies	×	×	×	×	×	×	×	×

Sample: IPUMS 2000 and 2000 firms census (Survei Industry). *Note:* Robust standard errors are reported in parentheses. ***, **, * means, respectively, that the coefficient is significantly different from 0 at the level of 1%, 5% and 10%. All of the controls are measured in 2000. They include the district-level employment shares in agriculture, manufacturing and services, the composition of the population in terms of level of education (less than primary, primary, secondary and university education) and in terms of marital status (single, married, divorced, widowed), the share of men, the average age of the population, and the share of the population living in rural areas. Island dummies are also included

Table A.6: Exogeneity test: regressions of sectoral characteristics in 2000 on initial tariffs

	Nb. of firms	Mean(Value added)	Mean(nb. of workers)
Sectoral Output Tariff in 2000	21.281 (18.155)	-0.024 (0.170)	0.235 (0.227)
Sectoral Input Tariff in 2000	-6.928 (22.990)	-0.227 (0.197)	-0.013 (0.357)
Sectoral Export Tariff in 2000	40.219** (17.877)	0.115 (0.255)	0.328 (0.248)
Mean dep var	80.38	0.399	0.195
Observations	97	97	97

Sample: 2000 firms census (Survei Industry). *Note:* Robust standard errors are reported in parentheses. ***, **, * means, respectively, that the coefficient is significantly different from 0 at the level of 1%, 5% and 10%.

Table A.7: Placebo test: regressions of the variation of main outcomes between 2000 and 2005 on tariff changes between 2000 and 2010

	Δ % of wage workers	Δ % of wage workers in manuf	Δ % of unpaid workers	Δ % of employers	Δ Ln (active population)	Δ % migrants
	(1)	(2)	(3)	(4)	(5)	(6)
Δ output import tariff	-0.012 (0.020)	-0.009 (0.019)	0.006 (0.021)	0.001 (0.006)	-0.068 (0.053)	0.014** (0.006)
Δ input import tariff	0.031 (0.022)	-0.000 (0.022)	0.004 (0.023)	0.006 (0.007)	0.116* (0.062)	-0.000 (0.008)
F-test	291.8	291.8	291.8	291.8	291.8	291.8
Δ Dep. var	0.0507	-0.0408	0.0830	0.0471	0.0471	0.0471
Observations	188	188	188	188	188	188
Controls	×	×	×	×	×	×
Island dummies	×	×	×	×	×	×
IV	×	×	×	×	×	×

Sample: IPUMS 2000 and SUPAS 2005. *Note:* Robust standard errors are reported in parentheses. ***, **, * means, respectively, that the coefficient is significantly different from 0 at the level of 1%, 5% and 10%. All of the controls are measured in 2000. They include the district-level employment shares in agriculture, manufacturing and services, the composition of the population in terms of level of education (less than primary, primary, secondary and university education) and in terms of marital status (single, married, divorced, widowed), the share of men, the average age of the population, and the share of the population living in rural areas. Island dummies are also included

A.5 Robustness checks based on the SUPAS data, over the 2005-2015 period

Table A.8: Probability of being a wage-worker for Java Island 200-2010

	Δ % wage-workers $_{d,2000-2010}$			
	(1)	(2)	(3)	(4)
Δ output import tariff	-0.008 (0.010)	-0.011 (0.011)	-0.006 (0.009)	-0.001 (0.011)
Δ input import tariff	0.009 (0.011)	0.006 (0.011)	0.008 (0.010)	0.013 (0.012)
Δ output export tariff		0.004 (0.007)		-0.006 (0.009)
F-test			139.1	9.044
Δ % wage-workers $_{d,2000-2010}$			0.0622	
Observations	102	102	102	102
Controls	×	×	×	×
IV			×	×

Sample: 2000 and 2010 IPUMS data. *Note:* Robust standard errors are reported in parentheses. ^{a, b, c} means, respectively, that the coefficient is significantly different from 0 at the level of 1%, 5% and 10%. All of the controls are measured in 2000. They include the district-level employment shares in agriculture, manufacturing and services, the composition of the population in terms of level of education (less than primary, primary, secondary and university education) and in terms of marital status (single, married, divorced, widowed), the share of men, the average age of the population, and the share of the population living in rural areas.

Table A.9: Probability of being a wage-worker for Java island 2005-2015

	Δ % wage-workers _{d,2005-2015}			
	(1)	(2)	(3)	(4)
Δ output import tariff	0.018 (0.024)	0.015 (0.030)	0.023 (0.021)	0.026 (0.026)
Δ input import tariff	0.013 (0.026)	0.012 (0.026)	0.009 (0.024)	0.010 (0.023)
Δ output export tariff		0.003 (0.010)		-0.002 (0.012)
F-test			153.7	12.75
Δ % wage-workers _{d,2000-2010}	0.0207			
Observations	103	103	103	103
Controls	×	×	×	×
IV			×	×

Sample: SUPAS 2005 and 2015. *Note:* Robust standard errors are reported in parentheses. ^{a, b, c} means, respectively, that the coefficient is significantly different from 0 at the level of 1%, 5% and 10%. All of the controls are measured in 2000. They include the district-level employment shares in agriculture, manufacturing and services, the composition of the population in terms of level of education (less than primary, primary, secondary and university education) and in terms of marital status (single, married, divorced, widowed), the share of men, the average age of the population, and the share of the population living in rural areas.

Table A.10: Effect of tariffs on the employment status from 2005 to 2015

	Δ % has a job	Δ % self-employed	Δ % unpaid workers	Δ % employers
	(1)	(2)	(3)	(4)
Panel A				
Δ output import tariff	0.017 (0.013)	-0.010 (0.019)	-0.015 (0.027)	0.001 (0.010)
Δ input import tariff	0.028** (0.013)	-0.032 (0.022)	0.027 (0.030)	-0.003 (0.015)
F-test	153.7	153.7	153.7	153.7
Panel B				
Δ output import tariff	0.014 (0.013)	0.007 (0.019)	-0.038 (0.027)	0.006 (0.015)
Δ input import tariff	0.027* (0.014)	-0.023 (0.019)	0.013 (0.030)	-0.001 (0.014)
Δ output export tariff	0.002 (0.009)	-0.013 (0.014)	0.018 (0.015)	-0.004 (0.008)
-test	12.75	12.75	12.75	12.75
Δ var	0.0207	-0.100	-0.006	-0.010
Observations	103	103	103	103
Controls	×	×	×	×
IV	×	×	×	×

Note: Robust standard errors are reported in parentheses. ***, **, * means, respectively, that the coefficient is significantly different from 0 at the level of 1%, 5% and 10%. All of the controls are measured in 2000. They include the district-level employment shares in agriculture, manufacturing and services, the composition of the population in terms of level of education (less than primary, primary, secondary and university education) and in terms of marital status (single, married, divorced, widowed), the share of men, the average age of the population, and the share of the population living in rural areas.