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Labor market impact of export in a commodity-dependent nation: The case of Indonesia

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LABOR MARKET IMPACT OF EXPORT IN A COMMODITY-DEPENDENT NATION: THE CASE OF INDONESIA

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and Yessi Vadila

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Abstract

Does export lead to improvement in labor market outcomes? The answer to this is not always clear from the literature. Despite the rising role of export markets, informality is still high, and inequality is worsening in many developing economies. In addition, export expansion driven by commodities has also been linked with the Dutch disease phenomenon. Using the case of a major commodity-dependent nation, namely Indonesia, we assess the labor market effect of a broader export expansion, which includes manufacturing exports apart from commodities. We examine Indonesia's export expansion during the early 2000s, which was triggered by the import demand shock in the People's Republic of China (PRC) following its accession to the World Trade Organization (WTO). We find that more exposure to export expansion improved individuals' formal employment opportunities in cumulative terms by 2014. Export expansion, however, does not appear to improve individuals' earnings growth in general, but only in specific cases. We further find this export expansion episode to be relatively progressive as it raises more formal employment opportunities and earnings growth for individuals in the lower- and middle-income brackets. As we cover all tradable goods, we are able to produce distinct impacts of different export categories. We show that the improvement in labor market outcomes in our findings is mainly underpinned by manufacturing export expansion, rather than commodities.

Keywords: export, labor market, informal job, earnings, inequality, Indonesia, People's Republic of China (PRC)

JEL Classification: F14, F16, F63, F66, J31, J46

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1. INTRODUCTION

The participation of developing economies in global trade has increased considerably in the last two to three decades. The share of exports from developing Asian countries,¹ for example, jumped from around 11% in the early 1990s to more than 20% at the start of the 2010s, driven in particular by the rise of the PRC. However, the question remains as to whether this trade expansion has led to an improvement in labor market outcomes for workers.

In light of this, two main pieces of empirical evidence come to mind. First, a substantial share of workers in developing economies is still employed in informal activity. It accounts for around 30% of total employment in Latin American countries like Brazil and Colombia (Paz 2014) and more than 50% in the case of Indonesia (Pritadrajati, Kusuma, and Saxena 2021). These informal jobs typically are of lower quality than formal ones as they tend to be more precarious and underpaid due to being exempt from labor market regulation (Maloney 2004; Paz 2014; Ulyssea, 2020). Second, despite keeping trade open, inequality in a broader sense has trended upward in many parts of developing countries (Galiani and Sanguinetti 2003; Attanasio, Goldberg, and Pavcnik 2004; Ing 2009; Elsby, Hobijn, and Şahin 2013; Karabarbounis and Neiman 2014; Xu, Li and Zhao 2018; Dao, Das, and Koczan 2019).² Motivated by these facts, we revisit the issue of the labor market impact of trade using the case of the export expansion episode in Indonesia. Indonesia is a good fit for this study as it was exposed to an export boom mainly in the commodity sector driven by the rise of the PRC in the early 2000s. Despite that, it has been argued that the commodity export boom did not translate into improvement in labor market performance (Coxhead and Shrestha 2016; Shrestha and Coxhead 2020).

In this paper, we examine whether being exposed to greater export expansion leads to better labor market outcomes among individuals in cumulative terms. Unlike previous studies that focus on poverty and employment as labor market outcomes (Topalova 2010; McCaig 2011; Autor, Dorn, and Hanson 2013; Kis-Katos and Sparrow 2015), we look at whether export expansion in Indonesia contributes to providing more good jobs, especially in terms of formal employment opportunities for workers. More importantly, although export expansion in Indonesia is still mainly driven by commodity and natural resources exports, we evaluate the impact of exports across all sectors, including manufacturing. This approach differs from existing studies about Indonesia's export boom, which have typically focused more on the effect of commodities (Coxhead and Shrestha 2016; Edwards 2019).

We evaluate two main labor market outcomes. The first is cumulative formal employment, which is defined as the years spent in formal jobs between 2000 and 2014. The second is cumulative or total earnings growth from 2000 to 2014, obtained from taking the difference in log earnings between 2000 and 2014. The first indicator measures how often workers stay in formal employment or transition into formal jobs if they start or end up in informal work at some point in time. Meanwhile, the second one indicates the extent to which earnings have improved over the covered period. In addition, we also assess the equality dimension of export expansion by evaluating how it has impacted workers at different earnings levels. Although this strategy can only give indirect evidence of how exports affect the state of inequality, the more detailed

¹ Developing Asian countries include all ASEAN member states, the PRC, India, Pakistan, Bangladesh, and Sri Lanka. The share is computed based on UNCOMTRADE data downloaded from the WITS database.

² This includes the falling labor share of income, rising wage and income inequality, and skills premium.

distributional evidence could be more useful for government, especially when considering particular targets for the redistribution of the gain from trade. Outcomes of interest are constructed from the sample of all adult individuals (aged 25 to 55) that are consistently covered in the three waves of the Indonesia Family Life Survey (IFLS) 2000, 2007, and 2014 (balanced panel).

To establish a causal relation, we use the case of Indonesia's export expansion driven by the emergence of the PRC in the global economy. In particular, our treatment variable is defined as the change in Indonesia's export to the PRC from 2000 to 2007,³ which exposes districts differently due to their variation in sectoral employment.⁴ Accession to the World Trade Organization (WTO) in 2001 has brought the PRC not only a significant export supply shock but also a substantial import demand shock due to the positive income effect that followed. This means we can isolate the exogenous variation of Indonesia's exports to the PRC that emanates from the import demand shock in the PRC. This strategy will remove the labor market effect stemming from domestic economic development factors, which can also raise exporting capability across the board. In light of this, we use the exports of selected ASEAN countries to the PRC as an instrument.⁵ The intuition is that if the PRC's demand shock matters, it will stimulate increased exports from various countries, including Indonesia, and the increase in exports from other economies to the PRC will not directly relate to Indonesia's labor market performance. This provides the basis for our exclusion restriction assumption.

Comparing the evolution of labor market performance among individuals living in different exposure sites, we find a causal relationship between export expansion and good jobs. In particular, individuals living in those districts that were more exposed to export expansion to the PRC tended to have a greater likelihood of being employed in formal employment in cumulative terms from 2000 to 2014. We find this effect to be significant for employed individuals (workers) regardless of whether they started as formal or informal workers in the baseline year of 2000. This means that being exposed to greater export expansion increases the chance of workers staying in formal jobs and promotes more transition towards formal employment if they started as informal workers. Meanwhile, although workers in the more exposed districts have a larger earnings growth, the effect is not statistically significant. Taken together, these results suggest that while being exposed to greater export expansion to the PRC does not necessarily translate into a larger improvement in earnings, it does contribute to lowering the precarity of jobs among workers in relative terms via more prevalent formal employment.

We also find that the impact of export expansion has been relatively progressive. Exposure to export expansion raises more formal employment opportunities and earnings growth for individuals in the lower- to middle-income classes, especially those in the 3rd to the 7th decile of earnings in the year 2000 (pre-shock period). Meanwhile, there seems to be no effect for the lowest (1st decile) and highest (10th decile) income groups. This is consistent with transitional employment patterns among individuals covered in the IFLS, where movement from informal to formal jobs mainly occurs among lower- and middle-income workers (Oktiyanto 2024).

³ To improve accuracy, we use mirrored export data, meaning the PRC's imports from Indonesia and other partners.

⁴ We use Indonesia's Labor Force Survey (Sakernas) data to determine the sectoral employment variation for each district.

⁵ Later we show that our instrument, namely ASEAN export to the PRC, is highly relevant for predicting the structure of Indonesia's export evolution to the PRC.

Further heterogeneity analysis unveils interesting patterns. First, the cumulative impact of export on formal employment is more substantial for the group of workers that start with high informality in the pre-shock year of 2000. Understandably, as they initially have a larger share of informality, they have more opportunities to transition into formal employment in later periods as they are more exposed to export expansion. Second, unlike the impact on formality that tells the story of transition, we argue that the heterogeneous impact on earnings growth reflects the intuition of the Stolper-Samuelson effect, but at the local level: As Java island is exposed more to export expansion, the impact on return is greater for the factors that are relatively more abundant in that location.

We show that these effects do not simply reflect the selection bias across individuals and districts. The overall impact and progressivity story remains unchanged when comparing individuals with similar observable characteristics in the pre-shock period obtained through the matching technique. Even after controlling for initial district growth in tradable and formal employment from 1997 to 2000, the effect of export expansion still exists. This means the result does not necessarily reflect the continuation of districts' development trends that had occurred even before the PRC's shock.

These findings, however, do not indicate an aggregate impact of export expansion on inequality. Instead, they suggest the relative impact of export across individuals who live in districts with different exposure to export expansion. Consequently, they cannot be used to explain the high levels of informality and inequality in Indonesia during the commodity boom period in the early 2000s (Coxhead and Shrestha 2016; Shrestha and Coxhead 2018). One main caveat of this study is that we keep individuals' residences fixed in the pre-shock period, specifically the year 2000. This strategy is useful to avoid sorting into more favorable regions following export expansion, but it leaves us with one disadvantage: It assumes no significant role of internal migration. We further argue that the conclusion is still likely to hold as the role of internal migration is minimal in our data (Pardede, McCann, and Venhorst 2020).

This study relates to two strands of literature. Firstly, it relates to literature on the PRC's rise, but more from the demand side. Many studies have documented the adverse labor market impact of the PRC from a supply or export perspective, especially in developed countries (Autor, Dorn, and Hanson. 2013; Autor et al. 2014; Acemoglu et al. 2016). However, the PRC's demand shock in the world's economy might have produced different labor market consequences for its trading partners, yet it still receives much less attention (Feenstra, Ma, and Xu 2019). Unlike the effect of import from the PRC that tends to reduce good jobs, especially in the manufacturing sector, and earnings for workers, we find that exposure to export to the PRC improves formal job opportunities and earnings growth, and the effect is disproportionately larger for the lower- and middle-income classes.

Secondly, this paper enriches the literature on the export boom's impact in the context of a commodity-dependent nation. While manufacturing exports is found to promote more formality and reduce poverty (McCaig 2011; McCaig and Pavcnik 2018), the effect of export expansion that is mainly driven by commodities remains debatable. On the one hand, Costa, Garred, and Pessoa (2016), in the case of Brazil, observed larger wage growth in those regions more exposed to rising commodity demand from the PRC without worsening inequality. In contrast, Coxhead and Shrestha (2016) discovered a worsening informality and inequality during Indonesia's palm oil boom, which was also driven by the PRC's emergence. Our investigation of Indonesia's export to the PRC does not yield the same conclusion as the latter. Despite commodity exports still dominating Indonesia's export to the PRC, we find rising formal job opportunities and earnings growth for individuals living in the regions most exposed to

export to the PRC. One potential explanation for the contrasting result is that we pick up the overall export expansionary effect with the PRC rather than focusing only on the commodity side. Thus, we also include the effect of expansion in manufacturing export, which may have contributed differently to labor market performance compared to commodity export. We find support for this argument: The positive impact of export expansion on formal job opportunities and earnings growth is mostly concentrated in the districts with greater specialization in manufacturing activities. Meanwhile, the impact of export expansion in the districts that are more reliant on agriculture and commodity sectors is not statistically significant, even though it is larger in magnitude.⁶ This highlights the importance of manufacturing exports in improving labor market outcomes in a commodity-dependent country like Indonesia.

The rest of this paper is organized as follows. The following section reviews literature on this topic, while Section 3 discusses the relevance of the PRC's rise as the source of export expansion in Indonesia and other developing countries. Section 4 explains the methodology, while Section 5 outlines the data used in this analysis. We then present and discuss the empirical results in Section 6 and conclude the paper in Section 7, where we also draw some implications and describe possible extensions for future research.

2. LITERATURE REVIEW

The standard prediction from trade theory is that workers will benefit relatively more as labor-abundant developing countries engage in international trade (Krugman, Obstfeld, and Melitz 2018). This is because openness to trade in those countries will induce specialization in unskilled labor-intensive activities, thus raising the demand for unskilled labor relative to other factors, such as skilled labor and capital. Since unskilled labor constitutes the majority of the workforce in developing economies, improvements in employment and earnings for these workers contribute to reducing inequality. Factors will move away from import-competing sectors in search of better pay in the export sector, which has experienced a rise in relative prices due to global trade.

Although the theoretical prediction seems intuitive and straightforward, the latest empirical evidence shows that the effect is much more nuanced. Even among workers who are supposed to be on the winning side of globalization, winners and losers exist (Pavcnik 2017). The question of the labor market impact of trade will greatly depend on the types of shocks workers face and their initial characteristics.

In terms of trade shocks, workers experience different impacts depending on whether they are exposed to exports or imports. Studies show that people living in the region or working in industries exposed to greater import competition face adverse labor market outcomes (Topalova 2010; Dix-Carneiro and Kovak 2019), while those living in areas with more exposure to exports tend to fare better (McCaig 2011; McCaig and Pavcnik 2018; Erten and Leight 2021). As in the case of the disemployment impact of the PRC's import in the more advanced nations, especially the US (Autor, Dorn, and Hanson 2013; Acemoglu et al. 2016), studies in developing economies have also linked exposure to import competition with reduced earnings and employment in the local economy. However, one distinct feature prevails in the developing economy: The displaced workers often end up in informal jobs, which are more inferior to the formal

⁶ We later show that the large but insignificant coefficient for the commodity-reliant group is inflated by the weak instrument problem.

ones but are far better options than being unemployed (Dix-Carneiro and Kovak 2019). In this case, informal employment, which is the typical characteristic of a developing economy, can be a buffer amidst heightened trade competition.

Exposure to increased export, on the other hand, is associated with an improvement in earnings and employment, including in formal activities. As the expansion of exports will raise the demand for labor in the corresponding local economy and industry, this positive labor market effect is not surprising. However, there has been further debate on whether the impact of commodity exports would also produce positive labor market outcomes. Studies have found that export expansion fueled by the commodity boom exacerbates inequality as earnings may stagnate and formal employment could be negatively impacted (Coxhead and Shrestha 2016; Wihardja 2016; Shrestha and Coxhead 2018). This strand of literature argues that the boom in commodity export has made manufacturing exports less competitive, thus contributing to shrinking formal employment and the rise of nontradable informal sectors. Costa, Garred, and Pessoa (2016) did not share these bleak observations in the case of the commodity boom in Brazil. They discovered larger wage growth in regions that were more exposed to rising commodity demand from the PRC without a worsening inequality. This body of evidence suggests that the issue of labor market and distributional impact of trade in a developing economy remains an open empirical puzzle. This paper adds further empirical evidence of labor market outcomes of trade, as it focuses on a major developing economy that predominantly benefits from the boom in commodity export due to the rise of the PRC. However, we do not limit the evaluation only to commodities; instead, we cover all types of tradable sectors, including manufacturing.

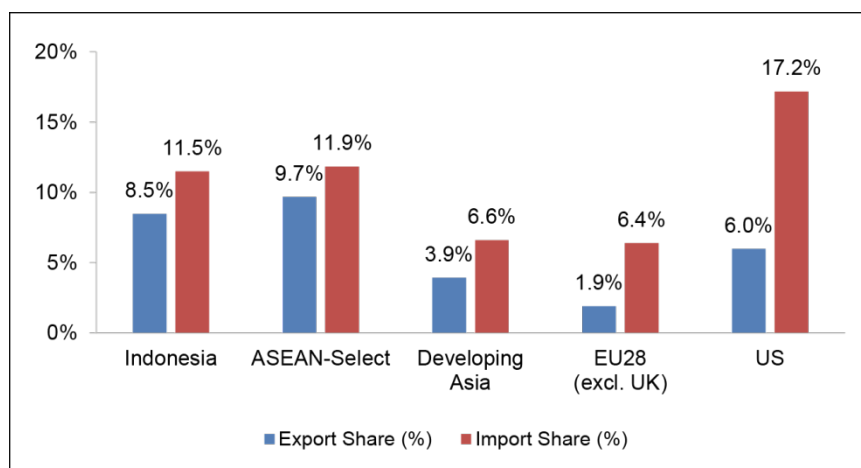
Although standard trade theory predicts that less skilled workers would benefit more as unskilled-labor-abundant countries engage in trade, this prediction is based on the assumption of fully mobile factors. When unskilled workers are able to shift flexibly from the comparatively disadvantaged (import) to the comparatively advantaged (export) sector, there is no doubt they will receive larger returns due to expansion in the export sector. However, in practice, the labor market is not frictionless. More educated and skilled workers might benefit more from export expansion than unskilled ones, as the former are more able to tap and shift into exporting opportunities. This may relate to the fact that an increase in exports often requires the adoption of new technology, which necessitates more skilled workers (Bustos 2011). In this scenario, the skill-biased export expansion would eventually contribute to exacerbating inequality. This paper contributes to the debate around the inequality implication of export by assessing whether or not export expansion is biased against workers on certain earnings and education levels as well as other demographic characteristics, such as gender and residence.

3. CONTEXT: HOW THE RISE OF THE PRC SHAPES THE EXPORT OF INDONESIA AND OTHER DEVELOPING COUNTRIES

The rise of the PRC has been central to understanding the impact of trade on the labor market. One of the main reasons is that the PRC's emergence on the global stage, especially following accession to the WTO in 2001, was so abrupt that it caused a major trade shock for its trading partners. This has allowed researchers to study the causal impact of trade as the rise of the PRC was unanticipated by the domestic market, thus providing them with an exogenous shock to work with (Autor, Dorn, and Hanson 2016; Autor 2018).

However, the impact of the PRC's rise has mostly been understood in the context of its imports into developed countries, especially the US. This is in part due to the fact that developed countries mostly engage with the PRC from the import side. Meanwhile, the PRC's relative importance in developing economies' trade baskets is much more balanced. For example, by 2007, a few years after the PRC's accession to the WTO, the degree of the PRC's importance in the US and EU import basket was about three times larger than in their export basket. Meanwhile, the gap between export and import share with the PRC is much smaller for Indonesia and several other ASEAN and developing Asian countries (see Figure 1).⁷ This means that studying the rise of the PRC as an export destination is much more suitable in the context of developing economies than in that of advanced countries – although this does not imply that there is no effect of exports to the PRC in the case of developed countries (see Feenstra, Ma, and Xu (2019), for example).

Figure 1: Trade Share with the PRC in 2007



Note: Selected ASEAN countries include Brunei Darussalam, Malaysia, Myanmar, the Philippines, Singapore, and Thailand, while developing Asian countries cover all ASEAN member countries plus India, Pakistan, Bangladesh, and Sri Lanka.

Source: Authors' calculation based on UNCOMTRADE data downloaded from WITS database.

The PRC emerged as a major global buyer following its accession to the WTO in 2001 (see Table 1). Table 1 illustrates the dramatic and sudden nature of the PRC's rise as a major global importer, especially during the early 2000s. Before accession to the WTO, the PRC only accounted for around 3% of the world's import demand. During this period, import growth normally hovered around 10%. After accession, imports increased by nearly 25% annually, which is many times faster than the standard rate during pre-accession times. This boosted the PRC's share in the world's imports to 6% by 2007.

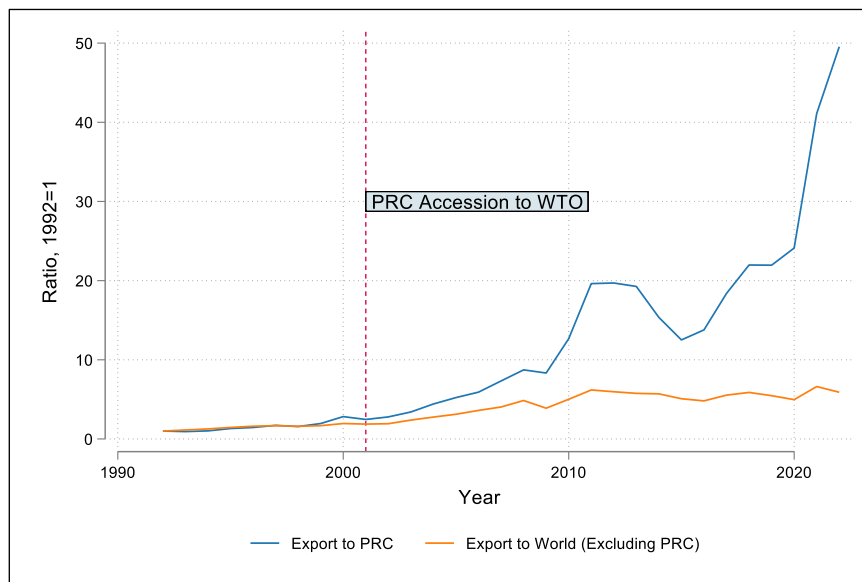
⁷ Developing Asian countries include all ASEAN member states, India, Pakistan, Bangladesh, and Sri Lanka. The share is computed based on UNCOMTRADE data downloaded from the WITS database.

Table 1: The Rise of the PRC: An Import Demand Perspective⁸

Year	PRC's Total Import (Billion USD)	World's Total Import (Billion USD)	PRC's Share to World Import	PRC's Import Growth (Annualized)	
1992	80.6	2,470.5	3.3%	Average 1992–1998:	10.1%
1998	140.2	5,345.1	2.6%		
2001	234.8	6,201.7	3.8%	Average 2001–2007:	24.7%
2007	870.3	13,944.0	6.2%		
2009	919.1	12,399.4	7.4%	Average 2009–2015:	10.4%
2015	1,536.2	16,070.2	9.6%		

Source: Authors' estimation based on UNCOMTRADE data, downloaded from WITS database.

The rise in the PRC's import demand consequently spurred export expansion among its trading partners, and Indonesia was one of the beneficiaries. Before accession, Indonesia's exports to the PRC and the rest of the world (ROW) moved somewhat similarly, resembling a parallel trend (see Figure 2). In particular, from 1992 to 1998, Indonesia's exports to the PRC grew by only 5% annually. However, post-accession, it grew dramatically by more than 28% on average annually between 2001 and 2007 (see Figure 3). As a result, exports to the PRC moved much farther away from the trend in exports to other countries (see Figure 2), breaking the parallel trend, and their share in Indonesia's export basket jumped from only 6% in 2001 to almost 12% in 2007. This growth, however, started to moderate after the global financial crisis in 2008/2009.

Figure 2: Indonesia's Export to the PRC and the Rest of the World

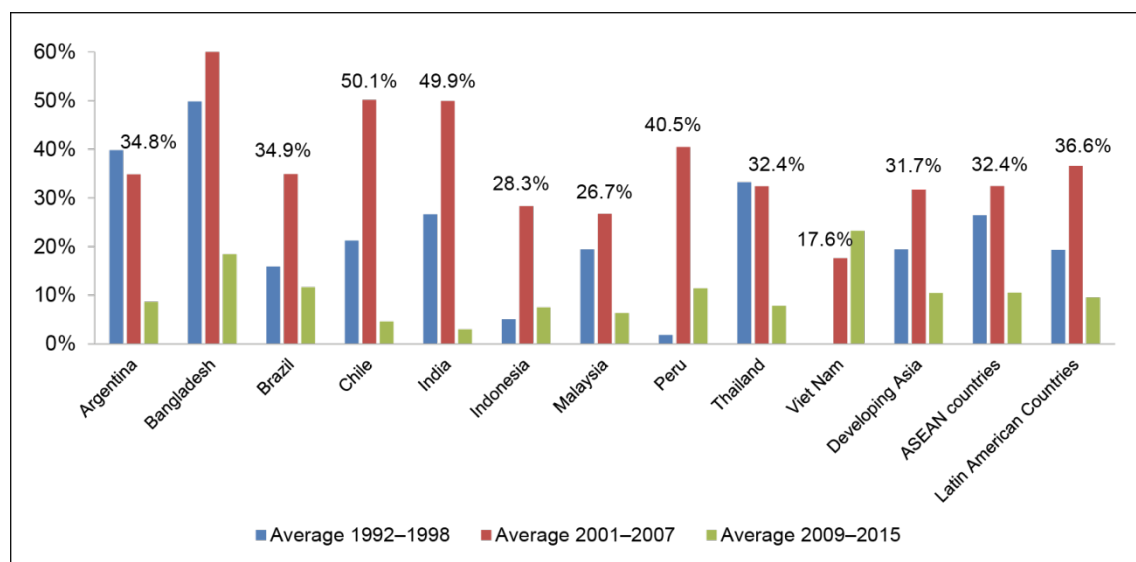
Source: Authors' estimation based on UNCOMTRADE data, downloaded from WITS database.

⁸ We compare the periods 1992–1998, 2001–2007, and 2009–2015 to avoid contamination from economic crisis. While looking at more recent data can be useful, the sole idea of this section is to highlight the transitory nature of the export boom with the PRC. Therefore, covering periods of the same length, before and after the PRC's accession to the WTO, is sufficient for this purpose. Furthermore, this paper is interested in the impact of export expansion to the PRC that happened in the past rather than in recent times.

The episode of export expansion was also shared by many other developing economies in Asian and Latin American regions (see Figure 3). The story is similar: Export to the PRC spiked shortly after the accession period, especially from 2001 to 2007, and moderated afterwards, except for Argentina and Viet Nam.⁹ This similar trend across developing economies indicates that the export expansion experienced by Indonesia was more likely to be driven by an import demand shock in the PRC rather than by a specific domestic factor. Should the domestic factor be more important, the increase in exports will not be similarly shared by other countries. This provides the basis for using other countries' export to the PRC as an instrument for our treatment variable.

Notably, the rapid export growth between 2001 and 2007 seems to have occurred only to the PRC. During that period, the rise in exports to the PRC in many developing Asian and Latin American countries far exceeded that to other major trading partners, such as Japan, the US, Canada, the EU, and the UK (see Figure 4). In some countries, the export growth rate to the PRC could even be twice as large as the export growth to other trading partners. For Indonesia, in particular, exports to Japan from 2001 to 2007 only grew by around 10%, while exports to the PRC grew almost three times faster. This further supports our argument that exports to the PRC from developing countries, including Indonesia, particularly in the 2000s, were mainly driven by the demand shock in the PRC.

Figure 3: Export Growth to the PRC: Asian and Latin American Countries

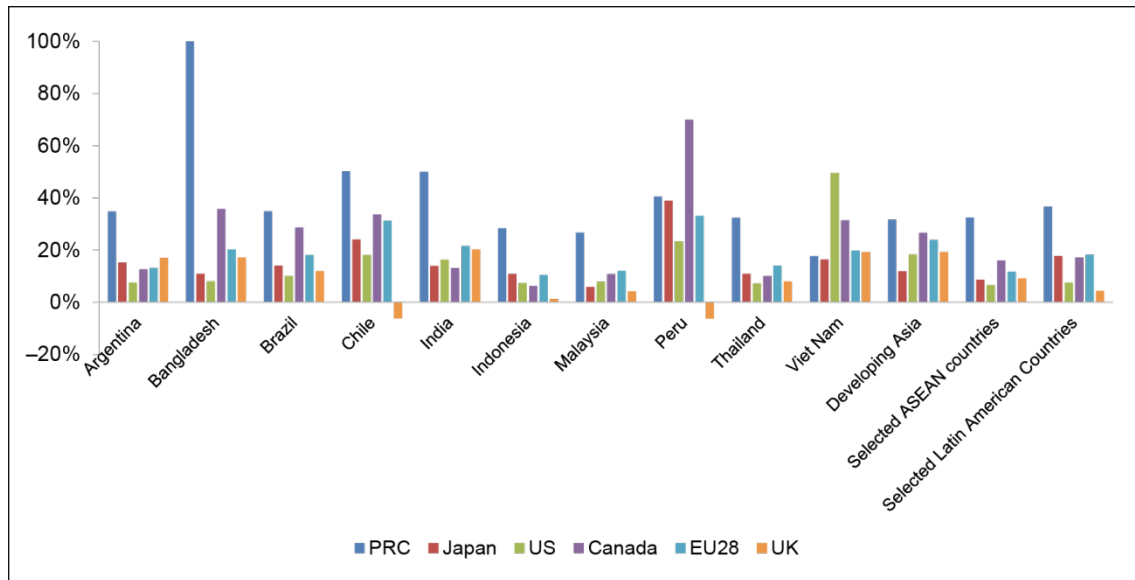


Note: Selected ASEAN countries include Brunei Darussalam, Malaysia, Myanmar, the Philippines, Singapore, and Thailand, while developing Asian countries cover all ASEAN member countries plus India, Pakistan, Bangladesh, and Sri Lanka. Selected Latin American countries consist of Argentina, Brazil, Chile, Mexico, Peru, Paraguay, Uruguay, and Venezuela.

Source: Authors' calculation based on UNCOMTRADE data downloaded from the WITS database.

⁹ For Argentina, the export growth to the PRC in the early 2000s was pretty much comparable to that of the 1990s, while for Viet Nam, exports to the PRC started to pick up only very recently. This is partly due to the rise of Viet Nam in the global economy that occurred rather late. The rise of Viet Nam's exports in the global market, however, is mainly driven by its exports to more advanced nations, such as the US, Canada, and European countries, rather than to the PRC (see Figure 4).

Figure 4: Export Growth to the PRC and Other Leading Trading Partners: 2001–2007

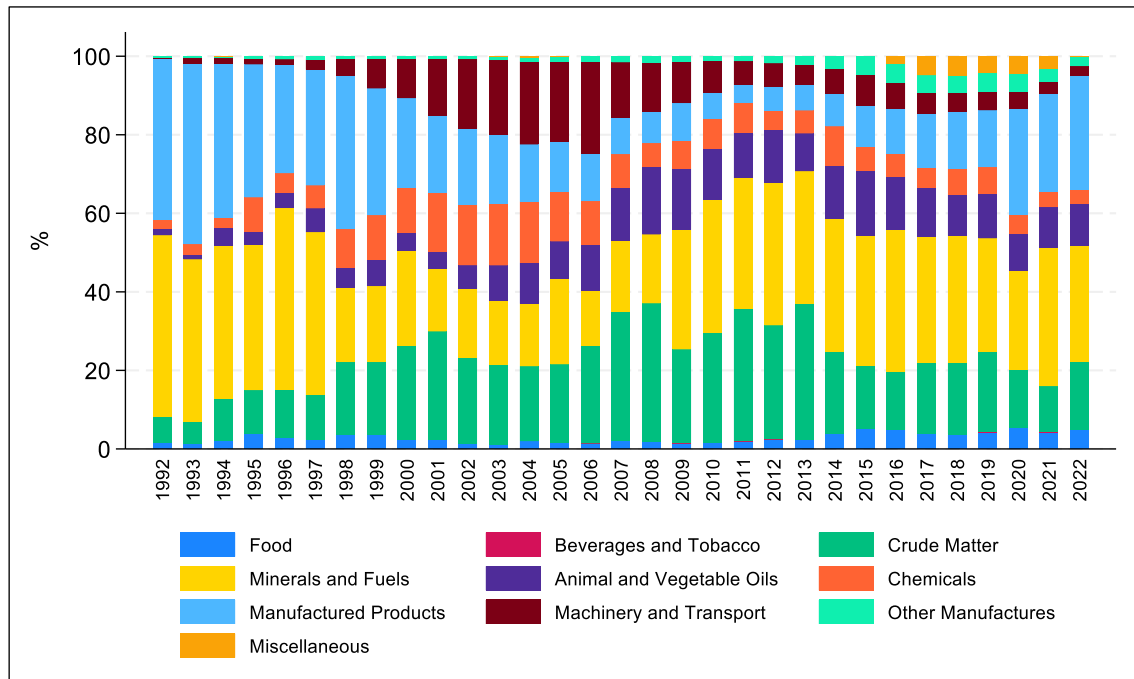


Note: Selected ASEAN countries include Brunei Darussalam, Malaysia, Myanmar, the Philippines, Singapore, and Thailand, while developing Asian countries cover all ASEAN member countries plus India, Pakistan, Bangladesh, and Sri Lanka. Selected Latin American countries consist of Argentina, Brazil, Chile, Mexico, Peru, Paraguay, Uruguay, and Venezuela.

Source: Authors' calculation based on UNCOMTRADE data downloaded from the WITS database.

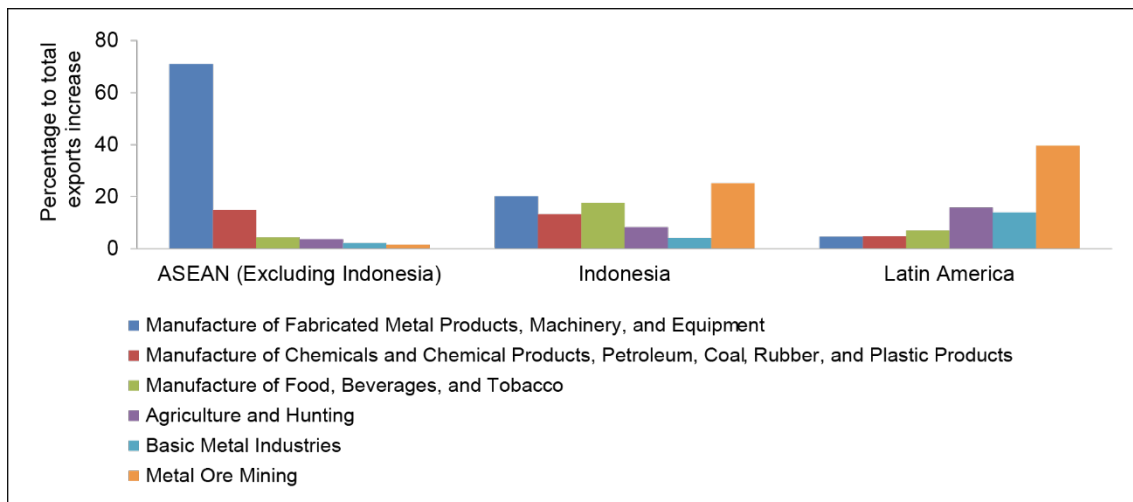
Although exports to the PRC were similarly growing at a rapid rate, the structure of export expansion varied across countries and regions, reflecting differences in their comparative advantage. Indonesia mainly exported raw materials, mining, and commodity products to the PRC (see Figure 5). Its export expansion to the PRC between 2001 and 2007 was also dominated by such products. Among the top three exports that were expanding heavily were nonferrous metal ore (ISIC 2302), palm oil (ISIC 3115), and coal (ISIC 2100). These products accounted for over half of Indonesia's export expansion to the PRC during that period. However, the increase in manufacturing exports was quite notable, even though they were still far less than resource-based exports. Around 20% of Indonesia's increased export to the PRC between 2001 and 2007 was driven by exports of machinery and equipment products (see the brown bar in Figure 5 and the blue bar in Figure 6). The exported machinery products ranged from communication equipment to general office and computing machines. Therefore, to fully understand the impact of trade on the labor market, it is essential to consider all tradable goods, not just commodities. This holds true even for a commodity-dependent nation like Indonesia, particularly given the nonnegligible expansion of manufacturing export to the PRC.

Unlike Indonesia, the export expansion to the PRC in other ASEAN countries was heavily concentrated on manufacturing products, especially machinery and equipment products, which contributed to more than 70% of the increased exports to the PRC. This mainly stems from the comparative advantage of Malaysia, Thailand, and the Philippines in the machinery and electronics industry. Meanwhile, the export expansion of Latin American countries to the PRC resembles more closely Indonesia's case, which is dominated by resource-based products. The noticeable difference is that the role of manufacturing export expansion in the case of Latin American countries is much smaller than that of Indonesia. This variation ensures that our instrument does not correlate perfectly with the treatment variable but is still a good predictor for the latter.

Figure 5: The Structure of Indonesia's Export to the PRC, by SITC Section

Note: Product classification is based on SITC revision 3 at the section level (1 digit).

Source: Authors' calculation based on UNCOMTRADE data downloaded from the WITS database.

Figure 6: The Pattern of Export Expansion to the PRC Between 2000 and 2007, by Region and ISIC Heading

Note: It includes only the top six exports and is sorted based on ASEAN's exports. Product classification is based on ISIC revision 2 at the heading level (2 digit). Selected ASEAN countries include Brunei Darussalam, Malaysia, Myanmar, the Philippines, Singapore, and Thailand, while the Latin American group consists of Argentina, Brazil, Chile, Mexico, Peru, Paraguay, Uruguay, and Venezuela.

Source: Authors' calculation based on UNCOMTRADE data downloaded from the WITS database.

4. METHODOLOGY

We compare the labor market outcomes of individuals living in districts more exposed to export expansion to the PRC to those of individuals living in less exposed ones. Our baseline model is specified as follows:

$$y_{irc} = \beta_0 + \beta_1 REE_r + X'_{i,0}\beta_2 + Z'_{r,0}\beta_3 + \alpha_p + \epsilon_i \quad (1).$$

Here, i denotes individual, while r and p indicate the district and province of residence of that individual, respectively, which we hold constant based on information in the pre-accession year of 2000.¹⁰ We keep individuals' residence constant for two main reasons. First, our goal is to evaluate whether living in districts facing more exposure to export expansion makes a difference in later labor market performance in cumulative terms. Individuals' choice of residence in the year 2000 would not have been made in anticipation of the PRC's shock driven by WTO accession in 2001. Due to the sudden shock of the PRC, jobseekers and workers simply would not have known which districts would benefit more. This allows us to cleanly isolate the labor market impact due to residing in more trade-exposed districts upon controlling for other preexisting individual and district characteristics. Second, although this forces us to assume no meaningful internal migration, this strategy is helpful for minimizing the self-selection problem as workers may move to a better-off region with more export exposure to the PRC (Autor et al. 2014). The selection problem will make inference more challenging as any improvement in labor market outcome could be interpreted as the effect of moving into the better-off region, rather than of the trade shock.

Subscript c indicates that our outcome variable (y) is constructed in cumulative terms covering the period from 2000 to 2014. Meanwhile, subscript 0 captures the year(s) preceding the PRC's shock period. $X_{i,0}$ is a vector of individual-level controls in the pre-accession year of 2000, which includes gender, age, and father's educational background, as well as sanitary conditions surrounding one's livelihood. $Z'_{r,0}$ is our district-level control in the baseline year of 2000, which includes tradable employment growth in the preceding period of 1997 to 2000. This district-level control is chosen to minimize the risk that variations in our individuals' earnings growth and formal employment originate from the trend in the regional labor market that was happening even before the PRC's accession to the WTO. Finally, α_p represents the time-invariant provincial fixed effects. Hence, this model essentially compares the labor market performance of individuals living in different exposure sites conditional upon individual- and district-level initial characteristics as well as province fixed effects.

Our cumulative labor market outcomes (y_{irc}) consist of two indicators. The first is the years spent in formal employment (L^f_{irc}). This is constructed by counting the number of years an individual held formal employment from 2000 to 2014, as expressed by the following formula: $L^f_{irc} = \sum_{t=2000}^{2014} L^f_{irt}$, where $L^f_{irt} = 1$ if a person held a formal job and $L^f_{irt} = 0$ when working in informal employment. The formality of employment is defined solely based on employment status, where formal workers are those who work as either government employees, private employees, or self-employed with permanent

¹⁰ It is important to note that our samples cover adults in their productive age of 25 to 55. This means our sample mostly consists of employed individuals (workers) as these are at their most productive age. Therefore, we often refer to them as "workers" rather than "individuals," especially when analyzing earnings growth.

workers.¹¹ The second outcome is cumulative earnings growth, calculated by taking the long difference in log earnings between 2014 and 2000. Specifically, it is computed as follows: $TEG_{irc} = \sum_w (\ln E_w - \ln E_{w-7})$, where $w \in \{2007, 2014\}$ corresponding to the IFLS survey waves. We define earnings as the total income of an individual derived from various sources. This means earnings include not only salary from working but also from other business ventures.

REE_r is our main treatment variable and measures regional exposure to export expansion at the district level. β_1 , therefore, quantifies the relative impact of living in the more exposed districts on labor market performance. The idea is that while export expansion to the PRC only varies across industries and time at the national level, districts experience different exposures due to varying industry specializations, as measured by the employment structure before the shock period. This makes it possible to establish a distinct exposure measure at the district level. Specifically, we define our treatment variable as the exposure of the change in exports to the PRC per worker in a particular district r :

$$REE_r = \sum_j \frac{L_{rj,0}}{L_{r,0}} \frac{\Delta EE_{jt}^{ID,C}}{L_{j,0}} \quad (2).$$

Our REE_r , hence, is essentially a “shift-share” variable, which takes a few steps to construct. We first normalize the “shift” component, i.e., the national-level change in Indonesia’s export to the PRC from 2000 to 2007 ($\Delta EE_{jt}^{ID,C}$), using the number of workers in that particular sector j . We limit our attention to the shock in the early 2000s, as these were the years when the PRC’s imports increased the most before the global financial crisis (GFC) hit in 2008–2009 (see Table 1).

Then, we link the normalized export expansion to the PRC ($\Delta EE_{jt}^{ID,C}/L_{j,0}$) to each district based on the sectoral employment “share” in the local economy. Both the national-level sectoral employment level ($L_{j,0}$) and the district’s sectoral employment share ($L_{rj,0}/L_{r,0}$) are constructed using pre-accession labor market survey (Sakernas) data from 2000. The detailed product-level trade data are collapsed to the most disaggregated sectoral classification allowed by the Sakernas dataset, which is at the two-digit ISIC based on revision 2. The use of pre-accession labor market data enables us to isolate the impact of trade shock ($\Delta EE_{jt}^{ID,C}$) and minimizes concern that the effect is driven by changing sectoral specialization at the district level stimulated by the rise of the PRC. We focus only on tradable employment when constructing the districts’ sectoral employment share as it is more closely related to the trade dataset and is more representative of the actual trade exposure felt by workers at the district level (see Table A1 for a list of all tradable sectors used in this paper).

However, the main identification challenge is that the growth of Indonesia’s export to the PRC likely coincides with Indonesia’s economic development progress, which raises production and exporting capability across the board. Without any modification,

¹¹ This definition is in line with the definition used by the Indonesia Statistics Agency (BPS), which refers to the International Conference of Labour Statisticians (ICLS-13) by the International Labour Organization (ILO). We use this definition for the entire survey period to maintain consistency. The latest definition for the formality of employment is based on ICLS-17, where, in addition to viewing employment status, it also looks at economic units, contributions to social security, entitlement to and benefits from paid annual leave, and entitlement to and benefits from paid sick leave. Some of that information is not available in the old survey period of the IFLS.

we cannot distinguish whether the impact on labor market outcome is due to export expansion or Indonesia's own developmental progress.

To address this, we take advantage of the fact that following accession to the WTO in 2001, not only did the PRC's export increase, but its domestic demand also rose following a positive income effect. The rise of the PRC as a major global importer was substantial and sudden as it occurred in such a short space of time (see Table 1). The PRC's share in the world's import demand has doubled in less than a decade. This means we can isolate the exogenous variation of Indonesia's exports to the PRC that emanates from the foreign demand shock component. This strategy allows us to remove the labor market effect stemming from domestic factors. In light of this, we use selected developing ASEAN countries' exports to the PRC as an instrument to circumvent the endogeneity problem in our treatment variable. The ASEAN countries include Brunei Darussalam, Malaysia, Myanmar, the Philippines, Singapore, and Thailand. The main reason behind this selection is that they were all part of the founding members of the WTO in 1995. By focusing on the founding members, we ensure that the change in exports among our IV countries is not driven by the export supply shock associated with late accession into the WTO in the 2000s. The rise in export of Viet Nam in the 2010s is a case in point (see Figures 3 and 4). Meanwhile, for the founding members, any export supply shock associated with membership of the WTO would have started in the second half of the '90s and likely dissipated in the period of our analysis, which covers the 2000s and early 2010s. Thus, by limiting the IV to include only the founding members of the WTO in the ASEAN region, we can focus on the impact of the import demand shock in the PRC that started in the early 2000s and minimize the contamination from other shocks.

Our instrumental variable is constructed by the following formula:

$$REE_r^{OTH} = \sum_j \frac{L_{rj,1997}}{L_{r,1997}} \frac{\Delta EE_{jt}^{OTH,C}}{L_{j,1997}} \quad (3).$$

Here, $\Delta EE_{jt}^{OTH,C}$ represents the export expansion of selected ASEAN countries to the PRC in the same period of 2000 to 2007. However, for the instrument, we use the employment structure from Sakernas 1997 rather than 2000. The three-year lag is employed to mitigate any simultaneity bias between the main treatment variable and the IV, as Autor et al. (2014) suggested. This approach also helps prevent our IV from directly influencing outcomes due to anticipatory effects of employment structure near the timing of the PRC's accession to the WTO.

The intuition is that the demand shock in the PRC will stimulate increased exports from various countries, including Indonesia. This is precisely the reverse of the PRC's export supply shock, as discussed in Autor, Dorn, and Hanson (2013), which simultaneously affected imports into the US and other high-income economies. In addition, the increase in exports from selected ASEAN countries to the PRC will not directly influence Indonesia's labor market performance, hence giving support for our exclusion restriction assumption.

The immediate threat to our IV design is that export expansion could be driven by the common export supply shock across developing economies. Perhaps a positive technological shock coincided with the PRC's rise and consequently helped countries expand their export to all trading partners. This correlated supply shock threatens the validity of our design as our instrument might not be exogenously determined. Based on the analysis in Section 3, we argue that the possibility of a correlated supply shock

does not pose a serious issue in our model. If these correlated shocks were important, we would have seen rapid export growth to other major trading partners rather than only to the PRC. Instead, we found a rapid export expansion, especially in the early 2000s, that was uniquely applied only to the PRC. The growth of exports to other major trading partners, such as Japan, the US, Canada, the EU, and the UK, simply fell short of that to the PRC (see Figure 4). Therefore, although it cannot be entirely ruled out, this minimizes concerns that the export expansion is driven by a correlated export shock among countries.

The other threat relates to the selection bias problem. The difference in labor market performance across individuals living in different exposure sites might be driven by initial individuals' characteristics and preexisting trends in the districts that had already varied even before the rise of the PRC. To minimize the concern of selection bias due to individual characteristics, as a robustness check, we will only compare similar individuals based on their observable characteristics obtained through matching techniques. We will sort individuals based on exposure to export expansion and put those living in districts with REE_t above the 75th percentile in a treated group, and the rest in a control group. The workers in the treated and the control group are then matched using one-to-one nearest neighbor propensity score matching (PSM) based on individual-level covariates ($X_{it,0}$) as well as formal job status, yearly earnings, and education level in the base year of 2000. We then run Equation (1) for the matched samples and compare it with the main results. To account for preexisting districts' trends, we already control for the districts' labor market evolution from 1997 to 2000, which mainly includes growth in tradable employment. For completeness, we also experiment with controlling for the growth in formal employment in our robustness analysis.

5. DATA

This paper combines three datasets. The first is the Indonesia Family Life Survey (IFLS) dataset, which is our primary data source for individual labor market outcomes and characteristics. The IFLS is a longitudinal household survey that contains key information on Indonesian individuals and households, including consumption, income, assets, education, migration, labor market outcomes, and other demographic variables. The first wave of the survey, IFLS1, was conducted in 1993–1994 and covered 13 out of 27 provinces in Indonesia, representing about 83% of the population at that time. The next wave then tracked the same sample roughly every seven years with average recontact rates of around 87.8% for all rounds of the survey period. The latest survey period in 2014 included over 70,000 individuals and around 16,000 households. Table 2 provides brief descriptive statistics of the full IFLS sample.

Table 2: Full IFLS Sample

Year	Full Sample				
	Observations	Mean Age (years)	Log (monthly real income)	Hours Worked (weekly)	Formal Shares (% of total workers)
1993	33,115	27.554	12.930	42.444	39.1%
1997	39,714	37.181	12.961	41.382	44.5%
2000	49,424	36.313	12.925	43.826	45.2%
2007	62,935	37.04	13.169	43.718	38.1%
2014	75,680	38.496	13.408	46.485	42.5%

Source: Authors' calculation based on IFLS datasets.

For this study, we utilize the last three surveys, namely 2000, 2007, and 2014, since the change in export trend is visible after 2000. In particular, we use balanced panel data of the IFLS, where the sample comprises individuals who were consistently present in the 2000, 2007, and 2014 survey waves. In addition, we further limit our sample to respondents at their productive age, between 25 and 55 years old, for the entire survey wave. In this way, we can study the dynamics of the labor market using the same individuals and avoid the possibility of different idiosyncratic characteristics affecting the dynamics of the labor market. We take advantage of the retrospective nature of employment-related questions in the IFLS, which allows us to construct cumulative formal employment (L_{irc}^f) based on annual data from 2000 to 2014, rather than by waves. The retrospective question is available only for limited questions, such as the status, type, and location of employment. This is why we are able to construct cumulative outcomes based on annual data for formality but not for earnings growth.

Table 3 outlines the characteristics of individuals who are the subjects of our analysis. As expected, as all of them are at their productive age, most individuals in our sample are in the labor force and employed. However, formal employment is rare in our dataset, where workers are typically either self-employed, self-employed with unpaid or temporary workers, unpaid family workers, or freelancers. The earnings split between formal and informal employment can be significant, where those with formal employment can earn up to 60% more than those holding informal jobs (see Table 4). This means the quality of jobs is still an issue for the majority of workers in Indonesia, at least for those represented in our datasets. This motivates us to look at the impact of export on formality instead of on employment. Intuitively, as the majority of individuals have been employed, any effect on export expansion will likely be detected through the formality margin rather than the employment one.

Table 3: Balanced Panel of IFLS

Balanced Panel							
Year	Obs	Mean Age (years)	Monthly Real Income (log)	Hours Worked (weekly)	Not in Labor Force (% of total observations)	Employed Shares (% of total labor force)	Formal Shares (% of total employed)
2000	7,017	32.66	13.03	44.15	0.6%	78.7%	47.3%
2007	7,017	39.90	13.28	43.43	1.5%	83.0%	34.6%
2014	7,017	46.75	13.49	46.66	3.8%	84.7%	35.8%

Source: Authors' calculation based on IFLS datasets.

Table 4: Differences in Workers' Earnings by Type of JOB

Year	Monthly Real Income (log)		Difference	t-stat	p-value (two-tailed)
	Formal	Informal			
2000	13.15	12.88	26.99%	9.08	0.000
2007	13.62	13.01	60.88%	21.33	0.000
2014	13.85	13.21	64.14%	20.61	0.000

Source: Authors' calculation based on IFLS datasets.

The second is a trade dataset obtained from the UNComtrade database, accessed through the World Integrated Trade Solution (WITS) platform. We use mirrored export data where the PRC's imports from Indonesia and other countries are used to observe exports into the PRC. The mirrored export data are understood to improve accuracy and be more representative of the actual export value, as reporting economies tend to

underreport their export value. The underreporting problem is much less of an issue in import statistics as countries are compelled to check trade value more thoroughly to enforce trade regulations on goods entering their border.

We then link these trade data to the district level using their labor market structure in the pre-accession year of 2000 based on Indonesian Labor Force Survey (Sakernas) data. Apart from Sakernas 2000, we also use Sakernas 1997 to construct our IV and district-level control variable. Sakernas, our third dataset in this study, is a cross-sectional household survey specifically designed to collect information on labor force statistics, allowing us to gather the sectoral employment variable. The Sakernas datasets offer detailed sectoral employment information for each district in Indonesia. While it is acknowledged that Sakernas may not be representative at a level lower than the province (as highlighted by Kis-Katos and Sparrow (2015)), this is unlikely to introduce bias into our econometric model (1), especially as we use districts' labor market structure in the year 2000, which preceded the demand shock in the PRC (Erten, Leight, and Tregenna 2019). Additionally, our focus is not on estimating total employment per district but rather on determining the relative importance of a particular sector j in a district's labor market. Alternatively, one could use a sampled version of the Indonesian Census to construct sectoral weights for each district, available through the Integrated Public Use Microdata Series (IPUMS) system. However, the main drawback is that the IPUMS dataset only contains a very small sample of Census data, resulting in a significant underestimation of national-level sectoral employment ($L_{j,0}$), which is central in normalizing exports into the PRC. Another limitation of IPUMS data is that they have much less sectoral variation than Sakernas, especially in the period of interest, where sectors only vary at the one-digit ISIC level. This will result in less data variation, or in other words, export expansion structures that are quite similar across districts.¹²

The Sakernas 2000 dataset encompasses 303 out of the total of 342 districts in Indonesia for the year 2000.¹³ Following the imposition of district-level weight based on Sakernas 2000, we find a considerable variation in district-level exposure to export expansion to the PRC. The highest exposure category comprises 59 districts, encompassing Sumatera (22.22%), Java (38.89%), Bali (5.56%), Kalimantan (25.93%), Sulawesi (5.56%), and Maluku (11.11%). Among the top ten districts with the highest exposures, Kalimantan island dominates with six districts. Given that Indonesia mainly exports resource-based products to the PRC, it's reasonable to anticipate that regions in Kalimantan island, which rely heavily on the resources sector, will have the highest level of exposure. The other districts in this highest category include districts from Java (2), then Sulawesi (1), and Maluku (1). On the other hand, districts with the smallest exposure to expansion are predominantly from Java and Sumatera, while some districts are exposed to export contraction. The latter include Sukabumi, Kotawaringin Barat, Kepulauan Sula, and Palu, ranked consecutively from the highest contraction.

The Sakernas-based export exposure variable (REE_{it}) is then matched to the IFLS dataset, which varies at the individual level, using residential information. However, as discussed in the previous section, we only match it with residential data as of 2000 and

¹² The difference in terms of periods across the three datasets (trade, Sakernas, and IFLS) is not an issue here as we aim to see whether individuals living in the more exposed districts in the year of 2000 experience better labor market outcomes later on. Cumulative outcomes from IFLS 2000–2014 are used to assess labor market performance following our trade shock. Meanwhile, the trade shock variable is derived from export expansion data between 2000 and 2007, which are mapped to the district level using Sakernas 2000 to identify sectoral specialization in each district based on employment structure.

¹³ Districts that are absent from Sakernas 2000 primarily cover Papua island and Kalimantan.

assume it to be fixed over time to avoid a sorting problem as individuals might move to more favorable districts due to opportunities presented by export expansion to the PRC. Since the IFLS dataset covers fewer districts than Sakernas, due to more limited sampling coverage of the former, some districts do not find their match. The number of districts reduces to 192, representing only 56.14% of all Indonesian districts in 2000. In this IFLS-matched dataset, the top ten districts with the highest exposures are now dominated by districts in Java island, followed by Kalimantan, then Sumatra, Bali, and Sulawesi. Kalimantan no longer dominates the districts with highest exposure because many of the districts in Kalimantan are not covered by the IFLS dataset.

This limitation is expected, as the IFLS dataset, while encompassing approximately 83% of the Indonesian population, only represents 13 of the 27 provinces¹⁴. The IFLS includes four provinces on Sumatra (North Sumatra, West Sumatra, South Sumatra, and Lampung), all five Javanese provinces (DKI Jakarta, West Java, Central Java, DI Yogyakarta, and East Java), and four provinces covering other major island groups (Bali, West Nusa Tenggara, South Kalimantan, and South Sulawesi). However, the IFLS lacks information for Papua and the Maluku Islands, as well as substantial parts of almost all islands except for Java. When analyzed by district, Java has the most significant proportion of the covered districts, comprising 90.91% of the total districts, while Sumatra and Bali-Nusa Tenggara have representation from only 50% of the total number of available districts. Meanwhile, Sulawesi and Kalimantan are the least represented, with 37.78% and 30.77% of the districts, respectively. Consequently, this study can only capture a limited part of the impact of exports on labor market dynamics for the eastern part of Indonesia.

Table 5: Summary Statistics

Variable	N	Mean	SD	Min	Max
Formal worker in 2000, 1 = yes, 0 = no	5,486	0.47	0.50	0.00	1.00
In labor force in 2000, 1 = yes, 0 = no	6,974	0.80	0.40	0.00	1.00
Employed in 2000, 1 = yes, 0 = no	6,974	0.79	0.41	0.00	1.00
Years of being employed, 2000–2014 (years)	7,017	11.59	4.75	0.00	15.00
Years in formal employment, 2000–2014 (years)	7,017	4.26	5.53	0.00	15.00
Total growth of income, nominal, 2000–2014	4,475	1.47	1.42	–6.26	13.59
Total growth of income, real, 2000–2014	4,475	0.57	1.39	–7.29	12.56
Indonesia's export expansion 2000–2007, 2000 district weight (Rp thousand per worker)	6,911	2,079.47	3,600.76	–200.43	23,983.23
ASEAN's export expansion 2000–2007, 1997 district weight (Rp thousand per worker)	6,911	21,563.16	21,488.39	630.91	234,000.00
Latin America's export expansion 2000–2007, 1997 district weight (Rp thousand per worker)	6,911	5,263.50	5,853.66	1,506.51	54,530.27
ASEAN and Latin America's export expansion 2000–2007, 1997 district weight (Rp thousand per worker)	6,911	26,827.32	24,684.66	2,137.42	255,000.00
Gender, 1 = male, 0 = female	7,017	0.45	0.50	0.00	1.00
Age in 2000 (years)	7,017	32.66	4.92	25.00	55.00
Father's years of education in 2000 (years)	7,007	0.95	2.80	0.00	17.00
Sufficient ventilation in 2000, 1 = yes, 0 = no	7,007	0.79	0.41	0.00	1.00
Piles of trash around the house in 2000, 1 = yes, 0 = no	7,007	0.12	0.33	0.00	1.00
District's tradable employment, compound annual growth rate 1997–2000 (%)	6,911	3.12	18.76	–52.88	148.50
District's formal employment, compound annual growth rate 1997–2000 (%)	6,743	–1.05	15.60	–48.38	100.40
Province location in 2000 (province code)	7,017	35.28	15.40	12.00	73.00

Source: Authors' calculation based on merged UNCOMTRADE, Sakernas, and IFLS datasets.

¹⁴ IFLS I (1994) and IFLS 2 (1997).

Another caveat is that, in some cases, districts that are present in the IFLS data are missing from the Sakernas dataset. In this case, we utilize the employment structure from the nearest available year in Sakernas. Although this cleaned dataset serves as the primary reference throughout the analysis, we demonstrate later that excluding the missing districts from our analysis does not alter the main conclusions, particularly regarding the impact of exports on formal employment and its progressive impact on Indonesia's labor market.

Table 5 summarizes the descriptive statistics of all variables used in this paper (see Table A2 of Appendix A for the summary statistics of standardized variables).

6. RESULTS AND DISCUSSION

6.1 Main Results

Following the empirical specification in Equation (1), we examine whether individuals living in districts more exposed to export expansion to the PRC have better labor market outcomes than those in less exposed ones. Table 6 summarizes the results and reports both the OLS and 2SLS estimates for formality and earnings growth analysis. Columns (1) and (4) estimate the impact through the OLS model without controlling for province fixed effects, while Columns (2) and (5) use the full set of control variables. Columns (3) and (6) present the results of the second-stage regression from our 2SLS model, where the predicted treatment variable (\widehat{REE}_r) is used in the regression instead of the actual one after instrumenting it with IV as specified in Equation (3). The result of the first-stage regression is provided in Table 7. All coefficients are measured in standardized value.

Table 6: The Impact of Export Expansion to the PRC on Formal Employment and Earnings Growth: OLS and 2SLS Comparison

	(1)	(2)	(3)	(4)	(5)	(6)
	Formal Employment			Earnings Growth		
	OLS	OLS	2SLS	OLS	OLS	2SLS
Indonesia's export expansion 2000–2007, 2000 district weight (standardized)	0.0571* [0.0268]	0.0519 [0.0320]	0.384** [0.148]	0.00924 [0.0232]	0.0142 [0.0268]	0.0746 [0.0513]
Observations	6,901	6,901	6,901	4,406	4,406	4,406
R^2	0.103	0.116	0.054	0.010	0.018	0.017
Province FE	No	Yes	Yes	No	Yes	Yes
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Kleibergen-Paap F-Stat			33.00			36.04

Note: Standard errors are provided in brackets and are clustered within district. The model uses export of the ASEAN region to the PRC as the instrument, which includes the following countries: Brunei Darussalam, Myanmar, Malaysia, the Philippines, Singapore, and Thailand. Individual-level data cover all adult individuals that exist across the three latest IFLS waves: 2000, 2007, 2014 (balanced panel). Continuous variables are transformed into standardized variables with mean = 0 and standard deviation = 1. Covariates are used across all estimations. The Stock-Yogo (2005) critical value with a 10% maximal bias is 16.38. Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Authors' calculation.

Based on the IV estimation in Columns (3) and (6), we find that, in general, individuals living in districts with greater exposure to export expansion to the PRC tend to have better labor market outcomes, in terms of both formal employment and earnings growth by 2014 in cumulative terms. In particular, individuals in districts with a 1 standard deviation larger exposure to export expansion can accumulate larger formal employment later on by almost 0.4 standard deviations. However, the magnitude of impact is much smaller on earnings growth, with a statistically insignificant impact (see Table A3 of Appendix A for the full results along with covariates). The first-stage regression results in Table 7 show that our instrument, namely selected ASEAN countries' exports to the PRC, strongly correlates with Indonesia's exports to the PRC. This supports our argument that Indonesia's export expansion to the PRC from 2000 to 2007 was driven by the PRC's demand shock. If the supply shock specific to Indonesia mattered more, we would not have observed this correlation across different exporters.

Another notable observation from Table 6 is that the impact of export expansion from the OLS model tends to be much smaller than the results from 2SLS. Since the F-statistics is quite large (larger than the critical value), the amplified coefficients from the 2SLS model are less likely to be caused by a weak instrument. Rather, the smaller coefficient in the OLS model is likely to be driven by endogeneity bias in our treatment variable associated with an unobserved domestic export supply shock. This attenuation bias has also been discovered in other studies with similar settings, such as by Autor Dorn, and Hanson (2013), in which endogeneity bias underestimated the impact of imports from the PRC on the US labor market. Therefore, the results from the 2SLS model are preferred.

Table 7: The Impact of Export Expansion to the PRC: First-Stage Regression

	(1)	(2)
Dependent: Indonesia's Export Expansion 2000–2007, 2000 District Weight (Standardized)	Formal Employment Analysis	Earnings Growth Analysis
ASEAN's export expansion 2000–2007, 1997 district weight (standardized)	0.285*** [0.0496]	0.283*** [0.0471]
Observations	6,901	4,406
Province FE	Yes	Yes
Covariates	Yes	Yes

Note: Standard errors are provided in brackets and are clustered within district. Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Authors' calculation.

Despite our F-statistics being greater than the traditional critical value provided by Stock and Yogo (2005) (see F-stat in Table 6), there has been recent debate in the IV literature about how strong an instrument should be to allow for a valid inference (Lee et al. 2022; Angrist and Kolesár 2024). This is important as the 2SLS estimator can be unreliable if it suffers from the weak-instrument problem (Andrews, Stock, and Sun 2019). Rather than solely depending on the screening test based on the strength of the F-statistics to make an inference, alternatively, one can construct confidence intervals for the treatment variable of interest in the second-stage regression under the assumption that the instrument may be weak (Keane and Neal 2023). Unlike the screening method, the latter approach acknowledges the uncertainty around the parameter estimates and, instead, develops confidence intervals that may contain true parameters independent of the instrument's strength in the first-stage regression (Andrews, Stock, and Sun 2019). Inference will be valid as long as the point of estimates lies within the constructed confidence sets. This means that the estimated

coefficients still fall within the range of plausibly true parameters that could occur even under weak instruments.

To implement confidence set-based inference, we follow Andrews (2018) in constructing confidence sets that are robust to heteroskedastic, clustered, and serially correlated data (often called “identification-robust confidence sets”). Table 8 presents robust confidence intervals for our treatment variable in the formality and earnings growth analysis. It shows that all of our coefficients of interest still lie within the confidence sets. Taken together, these results suggest that inference based on the main results in Table 6 remains valid even under the assumption of a weak instrument.

Table 8: The Impact of Export Expansion to the PRC: Robust Confidence Sets

Dependent	Effect of Export Expansion (point estimates)	Robust Confidence Sets	Nonrobust (Wald) Confidence Sets
Formal Employment	0.384**	[0.02, 0.646]	[0.093, 0.675]
Earnings Growth	0.075	[-0.025, 0.186]	[-0.026, 0.175]

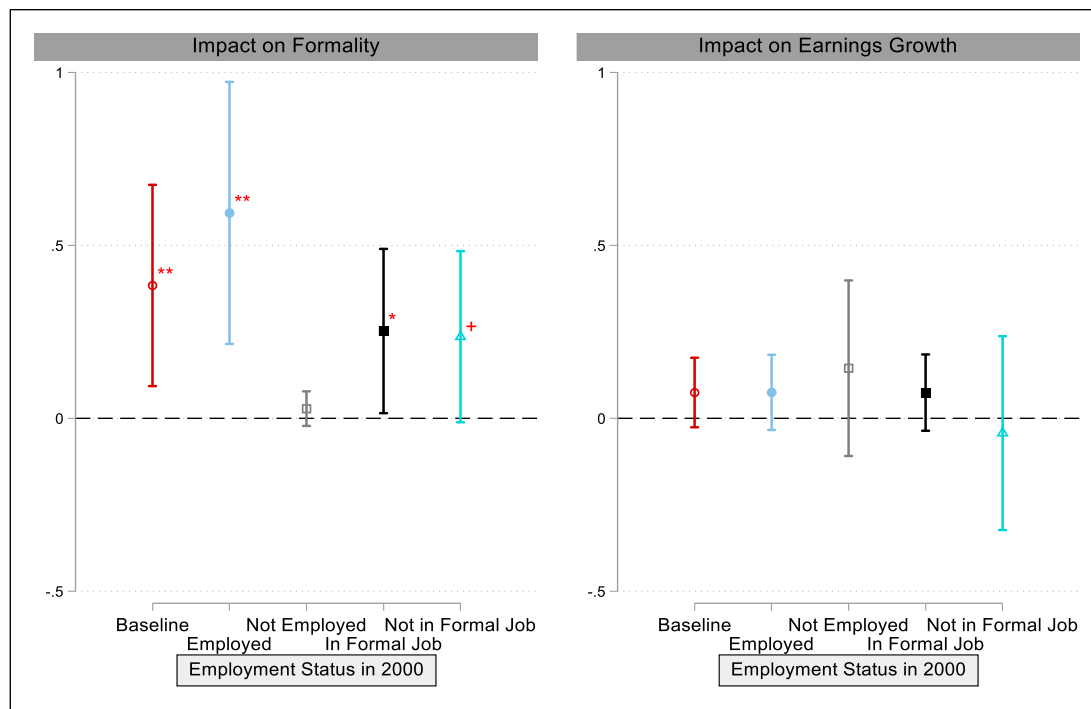
Note: Confidence sets are based on 1000 grid points in the interval of [-0.5, 2]. Robust confidence sets are based on the Anderson-Rubin (AR) test and robust to heteroskedasticity and clustering issues. Wald confidence sets are based on 2SLS estimates and are not robust to weak instruments. Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Authors' calculation.

We further find that the impact of export expansion on formal employment is significant only among employed individuals (workers) regardless of the employment type in the baseline year of 2000 (see Figure 7). The magnitude of impact is comparable between those who hold formal and informal jobs in 2000: A1 standard deviation larger exposure to export expansion to the PRC leads to a greater likelihood of holding formal employment in cumulative terms by around 0.2 standard deviations (see Table A4 in Appendix A for the full results). This means that being exposed to greater export expansion increases the chance of workers staying in formal jobs and promotes more transition towards formal employment if they started as informal workers. Meanwhile, we do not observe any discernible impact of export expansion on formal employment prospects by 2014 among individuals who were unemployed in 2000. This further indicates that export expansion improves the quality of jobs mainly through intensive margins, as it mostly affects those who were already working in the starting period. In terms of earnings growth, the impact of export expansion is not statistically significant regardless of individuals' employment status in 2000 (see Figure 7 and Table A5 in Appendix A for the full results).

From the equality dimension, we discover that the impact of export expansion to the PRC has been relatively progressive (see Figure 8). Exposure to export expansion raises more formal employment opportunities and earnings growth for individuals in the lower- to middle-income classes, especially those in the 3rd to 7th decile of earnings in the year 2000 (pre-shock period). Meanwhile, there seems to be no effect for the lowest (1st decile) and highest (10th decile) income groups (see Tables A6 and A7 in the Appendix A for the full results).

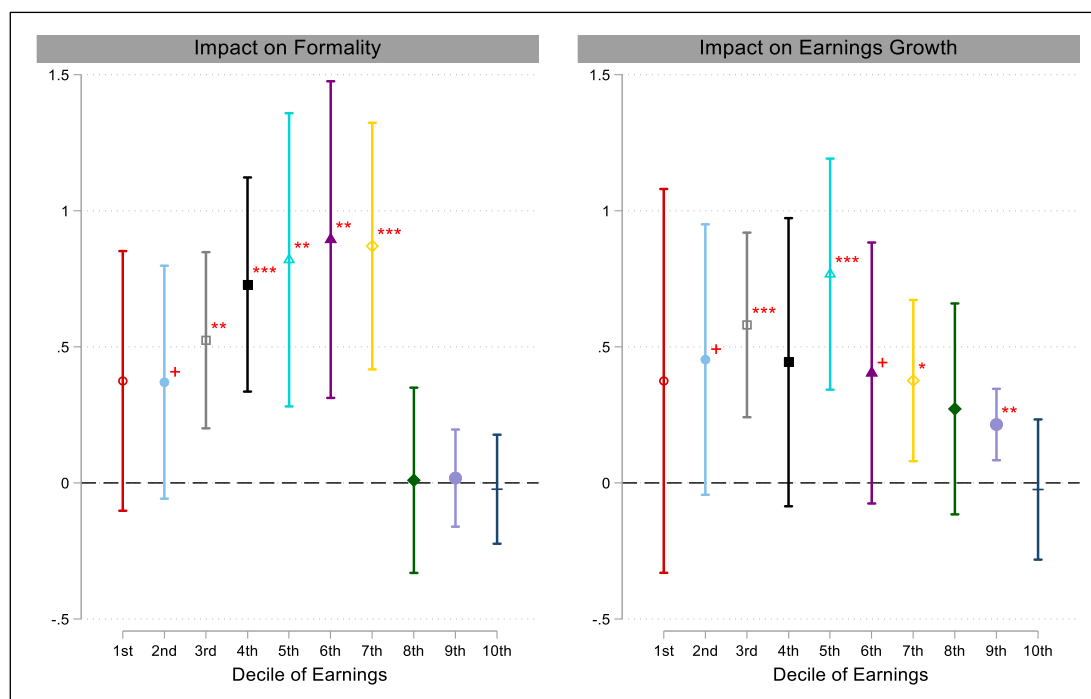
Figure 7: The Impact of Export Expansion to the PRC by Employment Status in the Year 2000



Note: Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Authors' calculation.

Figure 8: The Impact of Export Expansion to the PRC by Earnings Decile in the Year 2000

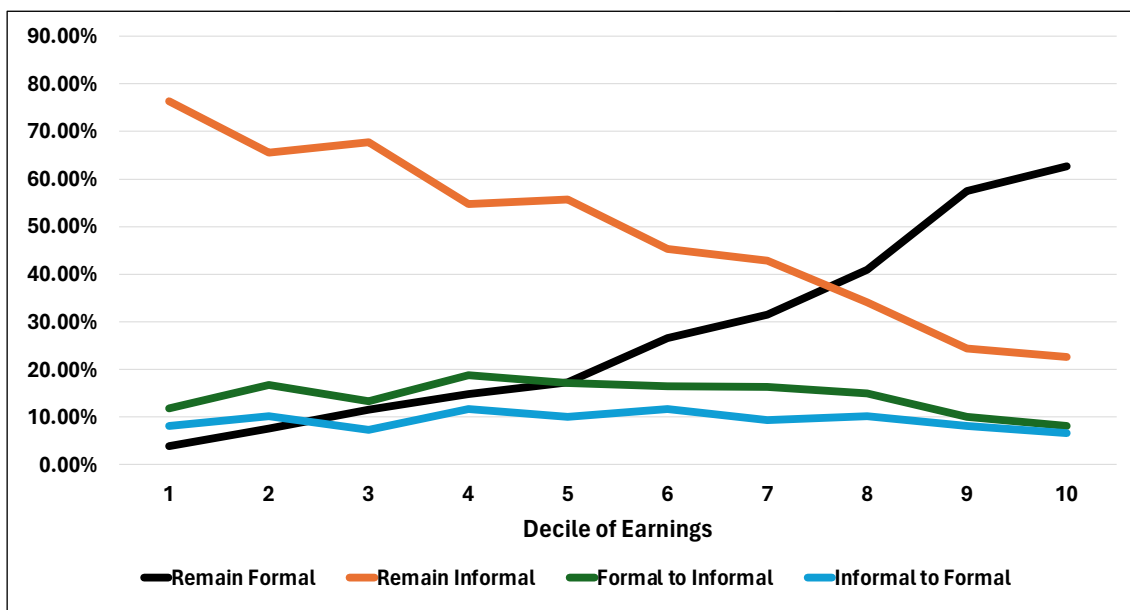


Note: Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Authors' calculation.

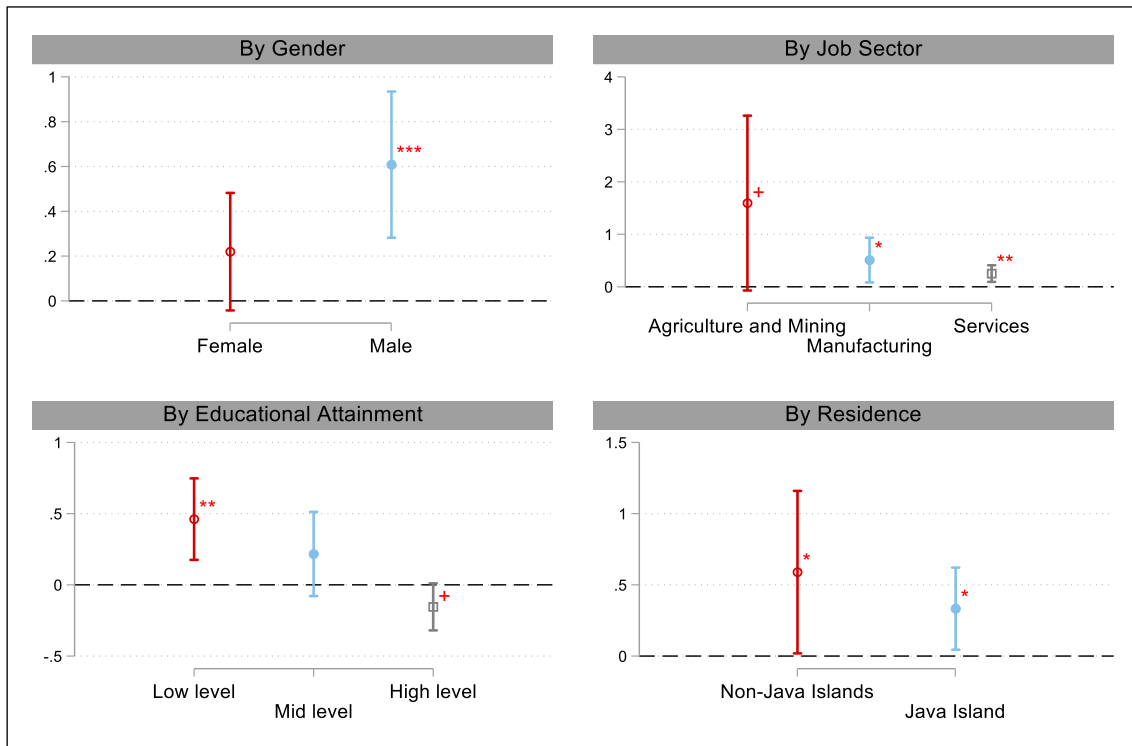
Our findings are consistent with Oktiyo (2024), who assesses employment dynamics in Indonesia based on IFLS data. He revealed that workers with high earnings tend to remain in the formal sector throughout their careers, especially those in the top 20% earnings bracket. On the other hand, workers in the lowest decile of earnings are primarily dominated by nontransitional informal workers. This means that those low-earning workers tend to be trapped in informal employment with limited prospects of transitioning into formal employment. As a result, these types of workers also experience the lowest increase in earnings compared to other workers. The impact of export expansion on formal employment that is concentrated among the lower- and middle-income classes is therefore consistent with these transitional patterns among workers in the IFLS dataset that tend to be more dynamic for lower- and middle-income groups (see Figure 9). As the expansionary effect in formal employment mostly occurs for those groups of workers, the improvement in earnings growth is also unsurprisingly concentrated among similar groups.

Figure 9: Transitional Patterns Among Workers with Different Earnings Levels



Source: Oktiyo (2024).

Our heterogeneity analysis unveils interesting patterns. First, the cumulative impact of export on formal employment is more substantial for the group of workers that start with high informality in the pre-shock year of 2000. Understandably, as they initially have a larger share of informality, they have more opportunities to transition into formal employment in later periods as they become more exposed to export expansion. This is particularly true for individuals who started as workers in the agriculture and mining sector, had low levels of education (primary school or below), and resided outside Java island in the year 2000. However, this pattern does not seem to apply to female workers. Despite female workers having more informal employment than their male counterparts in the year 2000, export expansion was not found to stimulate the transition to formality at a higher rate for the former (see Figure 10 and Table 9).

Figure 10: Heterogeneous Impact of Export Expansion on Formal Employment

Note: Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Authors' calculation.

Table 9: Formality Split by Individuals' Characteristics

Group	Number of Workers in 2000			Share to Total Workers in 2000	
	Informal	Formal	Total	Informal	Formal
By Gender					
Female	1,522	914	2,436	62.5%	37.5%
Male	1,367	1,683	3,050	44.8%	55.2%
By Initial Employment					
Agriculture and Mining	1,270	451	1,721	73.8%	26.2%
Manufacturing	292	563	855	34.2%	65.8%
Services	1,325	1,581	2,906	45.6%	54.4%
By Education					
Low level	1,523	886	2,409	63.2%	36.8%
Mid level	995	1,190	2,185	45.5%	54.5%
High level	126	411	537	23.5%	76.5%
By Residence					
Non-Java	1,414	880	2,294	61.6%	38.4%
Java	1,475	1,717	3,192	46.2%	53.8%
Total	2,889	2,597	5,486	52.7%	47.3%

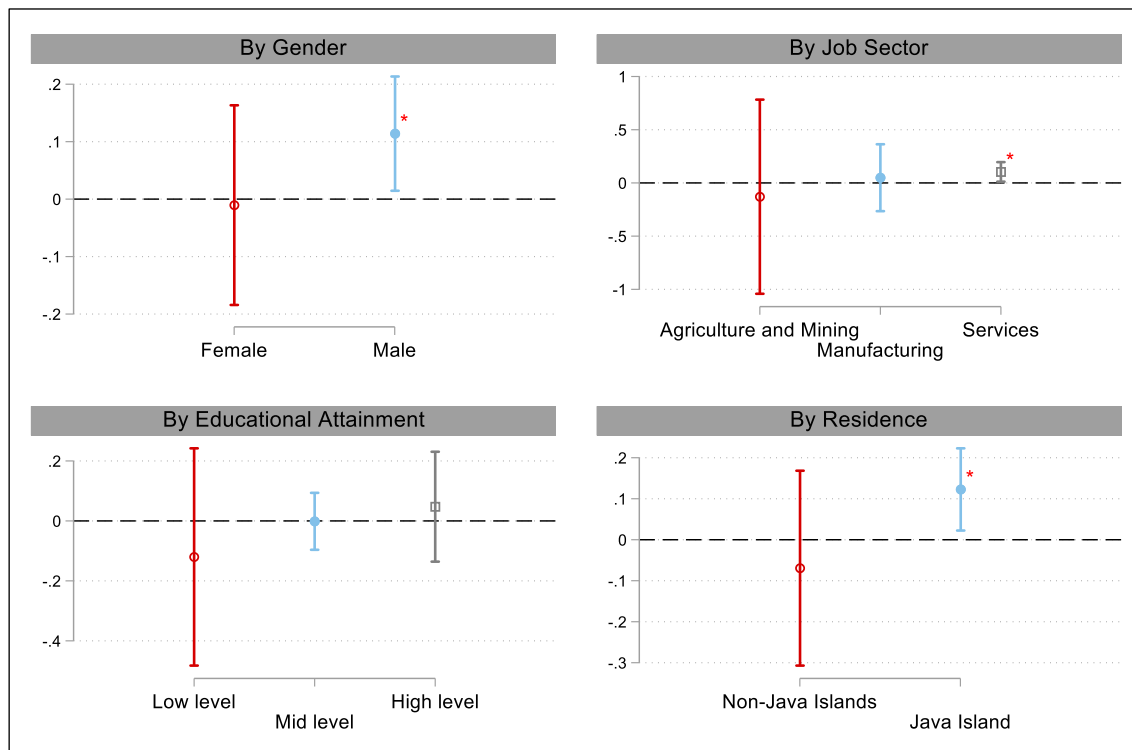
Source: Authors' calculation.

Second, we observe a heterogeneous impact on earnings growth that can be characterized as the Stolper-Samuelson effect but applied to the local level. In particular, as Java Island is exposed more to export expansion to the PRC (see previous discussion), the impact on earnings is greater for the factors that are relatively more abundant in that location, which are male workers and, interestingly, workers that start in the services sector (see Figure 11 and Table 10). Meanwhile, export expansion does not produce higher earnings growth for individuals at any education levels (see Tables A8 and A9 in Appendix A for the full results).

Table 10: Workers Split by Location

Group	Number of Workers in 2000			Share to Workers in Each Island 2000	
	Non-Java	Java	Total	Non-Java	Java
By Gender					
Female	1,042	1,394	2,436	45.4%	43.7%
Male	1,252	1,798	3,050	54.6%	56.3%
By Initial Employment					
Agriculture and Mining	942	779	1,721	41.1%	24.4%
Manufacturing	234	621	855	10.2%	19.5%
Services	1,117	1,789	2,906	48.7%	56.1%

Figure 11: Heterogeneous Impact of Export Expansion on Formal Employment



Note: Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Authors' calculation.

6.2 Discussion

The results above are broadly in line with other studies on this topic, such as the study by McCaig (2011) in Viet Nam, Paz (2014), and Costa, Garred, and Pessoa (2016) in Brazil, as well as Aragón and Rud (2013) in Peru, to name a few. These studies, like ours, generally found that exports improved labor market outcomes for affected regions and individuals, especially in terms of income and formal employment. McCaig and Pavcnik (2018) offered an explanation that links exports with changing business environments. They argue that export expansion stimulates the development of export-oriented businesses in the economy. As exporters tend to adhere to formal labor market standards, the expansion in exports will lead to more formal employment.

In our case, however, the improvement in labor market outcomes for workers has been mainly driven by expansion in manufacturing exports. As we include all tradable goods in our analysis, we are able to distinguish the varying impacts that different types of products can have on the labor market. Exploiting variation in districts' sectoral specialization, we compare the impact of export expansion in districts with larger initial endowments in agriculture and commodity sectors (commodity-reliant districts) with those that have more endowments in manufacturing sectors (noncommodity-reliant districts). To do this, we first construct the share of employment in agriculture and commodity sectors in each district, based on employment data in the initial year of 2000. This includes the share of employment in agriculture, hunting, forestry, mining, crude petroleum, and the manufacturing of food, beverages, and tobacco (covering ISIC numbers 11 to 31; see Table A1 of Appendix A). Districts that have an above-median employment share in agriculture and commodity sectors are considered "commodity-reliant districts," while the remaining districts are grouped as "noncommodity-reliant districts," meaning they have a larger employment share in manufacturing sectors.¹⁵ This strategy distinguishes districts that are more exposed to a commodity export boom from those that are more exposed to manufacturing export expansion.

Table 11 shows that the positive impact of export expansion on formal job opportunities and earnings growth is mostly concentrated in the districts with greater specialization in manufacturing activities (noncommodity-reliant districts). Although the coefficients are larger in the districts with greater endowment in agriculture and commodity sectors, the effects are all statistically insignificant, and their F-stat is very low, suggesting inflated estimates due to a weak-instrument problem. Meanwhile, the estimates for the groups of noncommodity-reliant districts have much stronger first-stage results and still lie between the identification-robust confidence intervals, meaning it allows us to make inferences even under weak-instrument assumptions. This indicates that the improvement in labor market outcome in our results is mainly driven by the effect of manufacturing export expansion.

¹⁵ We assign ISIC 31 along with agriculture and mining products as this sectoral category is dominated by palm oil-related activities.

Table 11: Heterogeneous Impact of Export Expansion to the PRC on Formality and Earnings Growth: 2SLS Estimation, by Districts' Endowment

	(1)	(2)	(3)	(4)
	Formality		Earnings Growth	
	Noncommodity-Reliant Districts	Commodity-Reliant Districts	Noncommodity-Reliant Districts	Commodity-Reliant Districts
Indonesia's export expansion 2000–2007, 2000 district weight (standardized)	0.322* [0.144]	2.255 [4.802]	0.110* [0.0501]	-5.115 [16.63]
Observations	4,402	2,499	2,876	1,530
R2	0.070	-1.276	0.019	-5.358
Province FE	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes
Kleibergen-Paap F-Stat	45.99	0.213	47.24	0.0973
Robust CS (lower bound)	-0.037	N.A.	0.016	N.A.
Robust CS (upper bound)	0.561	N.A.	0.218	N.A.
Nonrobust (Wald) CS (lower bound)	0.041	-7.157	0.012	-37.708
Nonrobust (Wald) CS (upper bound)	0.604	11.667	0.208	27.478

Note: Districts that have an above-median employment share in agriculture and commodity sectors are considered "commodity-reliant districts," while the remaining districts are grouped as "noncommodity-reliant districts." The IV regression is applied separately for these two groups. Standard errors are provided in brackets and are clustered within district. The model uses export from the ASEAN region to the PRC as the instrument, which includes the following countries: Brunei Darussalam, Singapore, Myanmar, Malaysia, the Philippines, and Thailand. Individual-level data cover all adult individuals that exist across the three latest IFLS waves: 2000, 2007, and 2014 (balanced panel). Continuous variables are transformed into standardized variables with mean = 0 and standard deviation = 1. Covariates are used across all estimations. The Stock-Yogo (2005) critical value with 10% maximal bias is 16.38. Robust confidence sets are based on the Anderson-Rubin (AR) test and robust to heteroskedasticity and clustering issues. Wald confidence sets are based on 2SLS estimates and are not robust to weak instruments. N.A. means that narrow confidence sets cannot be identified. Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Authors' calculation.

The impact of export expansion on the labor market is not always clear-cut in the literature, especially for resource-rich nations like Indonesia. In these economies, an export expansion driven by a foreign demand shock typically raises commodity exports more than others. This boom in commodity exports could shift productive factors into the commodity sectors and, consequently, nontradable services (Corden and Neary 1982). This is because the exchange rate tends to appreciate following a commodity boom episode, which weakens the competitiveness of manufacturing exports. As the manufacturing sector performs weakly, this translates to the contraction of its role in the economy and the declining ability to provide formal jobs, leading to adverse labor market outcomes for workers. This is popularly referred to as the "Dutch disease phenomenon."

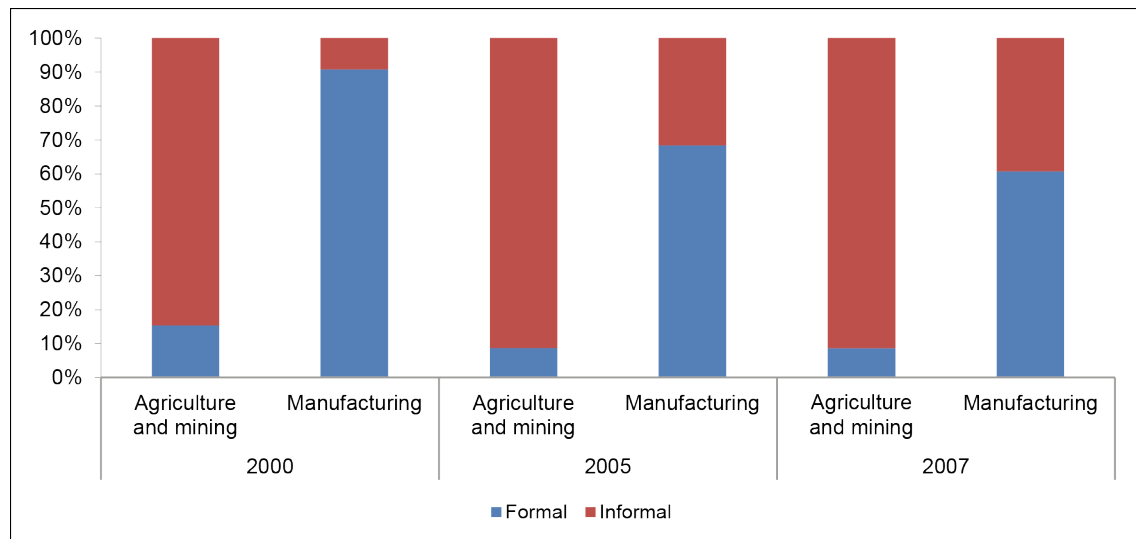
The prevailing view is that the export boom in Indonesia in the early 2000s, which was driven by the rise of the PRC's demand for commodities, produced labor market effects that resembled the Dutch disease phenomenon. This is characterized by poor manufacturing sector performance, worsening inequality, stubbornly high informality, and stagnated earnings for many workers (Wihardja 2016; Coxhead and Shrestha 2016; Shrestha and Coxhead 2018, 2020). Even though this is not the only view held by observers on Indonesia,¹⁶ it raises concerns about whether reliance on commodity exports can actually be detrimental to the Indonesian economy.

¹⁶ Edwards (2019) has painted a rather contrasting picture in which the palm oil boom helped lift people out of poverty and raise consumption growth.

Our study does not share this bleak view. Measuring export expansion in all tradable sectors, including commodities, we found that formality improves and earnings grow faster for those exposed more to export expansion to the PRC. In addition, we found export expansion to the PRC to be relatively progressive, as the effect is felt chiefly by individuals in lower- and middle-income groups. We argue that the differences in the results could be driven by the sectoral coverage in this paper, which focuses not only on commodities but also on broader manufacturing sectors (see a complete list in Table A1 of Appendix A). As shown in Figure 6, Indonesia experienced not only a substantial increase in the export of commodities, especially palm oil and mining products, but also a meaningful growth in the export of manufactured products, albeit to a much lesser extent. The findings in Table 11 suggest that the expansion in manufacturing export has impacted labor market performance differently than the commodity export. This means that to get a fuller picture of the impact of an export boom, it is essential to cover manufacturing exports apart from commodity ones.

The improvement in formal employment has a lot to do with the type of jobs created by the manufacturing sector. Figure 12 clearly shows that most jobs in the manufacturing sector are formal. Meanwhile, workers in agriculture, commodity, and resources sectors mainly hold informal employment. Formal jobs tend to have less volatile earnings dynamics and are better paid than informal ones (Paz, 2014, Ulyssea, 2020, Oktiyanto, 2024). Therefore, improvement in labor market outcomes is more likely to occur under expansion in manufacturing exports rather than commodity ones.

Figure 12: Formality Split by Sectors



Source: Authors' calculation from Sakernas datasets.

These results highlight the importance of maintaining the manufacturing sector's competitiveness. As a commodity-dependent nation, Indonesia is often exposed to commodity boom and bust cycles. The findings from our paper underline that a boom driven mainly by the rise in commodity demand does not necessarily have to lead to worsening labor market outcomes as predicted by the Dutch disease framework. The key here is to maintain manufacturing exports' competitiveness. This is not, by any means, a new finding in this literature. However, our paper is the first to show empirically, in the case of Indonesia, that individuals living in districts more exposed to manufacturing export expansion are better off than those living in districts that are heavily commodity driven.

However, this does not mean that we can totally rule out the role of a commodity export boom in keeping informality and inequality high during the boom period (Coxhead and Shrestha 2016). After all, the ability of Indonesia's manufacturing sector to provide formal employment showed a declining trend during the boom period of the 2000s (see Figure 13). Unfortunately, the main caveat of our empirical strategy is that it is not designed to interpret any aggregate trend at the national level. Our empirical specification, instead, can only capture the relative impact of export expansion across different individuals with varying exposure levels. As such, explaining the aggregate trend will require a more general equilibrium approach rather than a micro-econometric one.

6.3 Role of Internal Migration

Internal migration, which is the movement of people within a nation from one region to another, can impact income and job status in various ways. Workers who relocate to high-growth areas often find better job opportunities and frequently earn higher wages due to the increased demand for workers. In light of this, it is crucial to examine whether migration plays a role in our analysis.

Using data from five waves of the Indonesia Family Life Survey (IFLS) and a study by Pardede, McCann, and Venhorst (2020), we analyzed the number of internal migrants and found a slight change in the migration rate with a decreasing trend. On average, the rate of internal migration from 1993 to 1997 was 1.53%, which increased to 2.97% from 1997 to 2000, then decreased to 2.03% from 2000 to 2007, and further dropped to 1.83% from 2007 to 2014. Looking at the movement by subregional levels, the 1993–2014 data show that migration was dominated by inter-district movement, followed closely by inter-subdistrict (*kecamatan*) movement, while inter-provincial movement ranked the lowest (see Table 12). The pattern for 2000–2014 also shows a decreasing trend compared to 1993–2000, with inter-subdistrict migration decreasing from 0.86% to 0.71%, inter-district migration dropping from 0.84% to 0.74%, and inter-provincial migration declining from 0.51% to 0.49%. Further analysis (by income quantile in Table 12) indicates that the majority of migrants come from higher-income levels, with this trend becoming more pronounced in the 2000–2014 period than in 1993–2000, where most migrants were from the wealthiest 20% of the population.

These figures suggest that during the period analyzed, internal migration rates may not have significantly contributed to overall labor market changes. The findings from Pardede, McCann, and Venhorst support this view, showing a declining trend in inter-*kecamatan*, inter-*kabupaten*, and inter-provincial migration after the peak period of 1997–2000, indicating that internal migration has become less frequent over time. Moreover, they also point out that Indonesia's crude migration intensity (CMI) is relatively low compared to other countries, reinforcing the notion that internal migration might not have a significant impact on export-driven labor market outcomes. This declining trend suggests that even with significant export growth, migration rates may not necessarily increase proportionately, thereby reducing the likelihood that internal migration would significantly impact labor market outcomes.

Table 12: Annual Percentage of Migrants for Inter-Kecamatan Within a Kabupaten (Sub), Inter-Kabupaten Within a Province (Dist), and Inter-Province (Prov), by Survey Period

	Average 1993–2014			Average 1993–2000			Average 2000–2014		
	Sub	Dist	Prov	Sub	Dist	Prov	Sub	Dist	Prov
Total	0.78	0.79	0.50	0.86	0.84	0.51	0.71	0.74	0.49
Quintile									
Q1 (lowest 20% HH by income)	0.69	0.50	0.25	0.76	0.54	0.20	0.63	0.45	0.29
Q2	0.70	0.64	0.35	0.80	0.62	0.35	0.59	0.65	0.35
Q3	0.75	0.81	0.42	0.82	0.87	0.40	0.68	0.75	0.44
Q4	0.95	0.99	0.65	1.04	1.11	0.76	0.86	0.87	0.54
Q5	0.89	1.19	1.04	0.88	1.19	1.02	0.90	1.19	1.05
Origin (Pre-migration)									
Sumatera	1.01	0.96	0.53	1.06	1.02	0.54	0.97	0.90	0.52
Java	0.65	0.70	0.60	0.69	0.78	0.63	0.61	0.63	0.57
Others	0.89	0.83	0.19	1.08	0.80	0.16	0.70	0.85	0.22
Area (Pre-migration)									
Urban	0.85	0.99	0.66	0.92	1.08	0.72	0.78	0.91	0.61
Rural	0.72	0.59	0.35	0.80	0.62	0.33	0.63	0.57	0.37
N	128,577			57,180			71,397		

Note: (a) Calculation based on IFLS 1993, 1997, 2000, 2007, and 2014; (b) migration: the number of people who changed their residence between two waves of IFLS.

Source: Pardede, McCann, and Venhorst (2020), recalculated.

Furthermore, data from two major islands (Sumatera and Java) in Table 12 show a decrease in all types of migration, with only a slight increase in inter-district movements from other islands. However, the representation of other islands in the IFLS is minimal. The urban-to-urban migration trend is still dominant for all types of movements. This decreasing pattern suggests that the impact of the 2000–2014 export expansion did not significantly alter the migration patterns of Indonesian migrants. A study by Sugiyarto, Deshingkar, and McKay (2019) reveals that internal migration in Indonesia primarily occurs at the individual level, with the majority of movements happening within provinces. This suggests that most internal migration involves relocation within existing localities, primarily urban-to-urban or rural-to-rural, with limited cross-provincial migration. However, the analysis found that the number of rural migrants who moved across provinces increased in 2000–2014 compared to 1993–2000. Pardede, McCann, and Venhorst (2020) suggest that in Sumatra, rural residents are more likely to migrate inter-provincially than urban residents. They also conclude that migration originating from urban areas was more significant than migration from rural areas in most regions during the period 1993–2014. This does not align with our results, which highlight the importance of manufacturing during the export expansion era, suggesting that migration may play a secondary role in altering labor market outcomes due to export expansion.

Overall, these findings suggest that while internal migration can play a role in labor market outcomes, particularly in response to economic stability and export growth, its influence on specific labor market outcomes due to export expansion appears limited. The study by Autor et al. (2014) supports this idea, indicating that migration's role in shaping labor market changes due to export booms might be limited. Their research shows that high-wage workers are more likely to relocate in response to trade exposure, suggesting that migration driven by export expansion tends to involve individuals with more flexibility and resources. This pattern indicates that migration

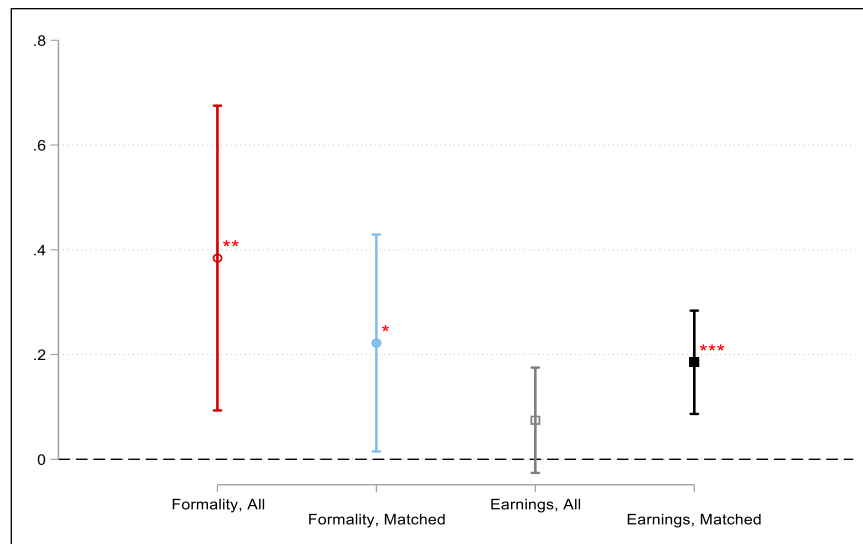
associated with export growth may not include the broader labor force, thereby suggesting a limited impact on the overall labor market outcomes.

However, our migration analysis is based only on simple descriptive statistics and does not involve causal and mechanism analysis. Further examination is needed to determine whether export expansion impacts migration and whether migration changes our results on formal employment opportunities and earnings growth.

6.4 Robustness and Sensitivity Test

The immediate concern about our empirical strategy is whether differences in labor market performance are driven by systematic differences in individuals' characteristics across different exposure sites. To assess this, we perform our IV regression within a more limited sample of individuals with comparable characteristics across exposure sites. So, firstly, individuals living in districts where exposure to export expansion is higher than the 75th percentile are assigned as the treatment group, while the rest are the control group. Then, we perform the propensity score matching technique using the one-to-one nearest neighbor matching method to match the treated observations to their corresponding observations in the control group. We select matched individuals based on their formality status, real yearly income level, education level, father's educational background, gender, age, and living conditions in the initial period of 2000. Figures A1 and A2 of Appendix A show that fairly balanced samples are achieved from our matching procedures.

Figure 13: The Impact of Export Expansion on Formality and Earnings Growth: 2SLS Estimation, Matched Datasets

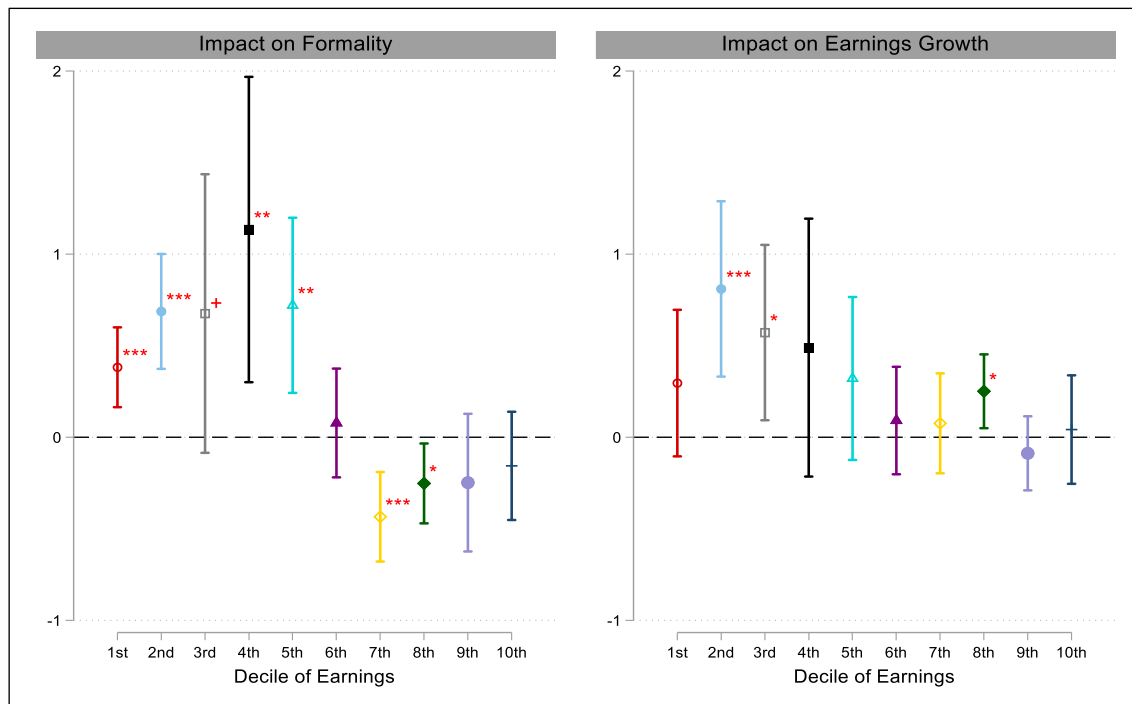


Source: Authors' calculation.

Figure 13 shows that using only matched observations, we still arrive at the same conclusion as the main model: Export expansion had boosted individuals' formal employment opportunities and earnings growth by the end of 2014 in cumulative terms. Notably, the impact on earnings growth became larger and statistically significant (see Table A10 in Appendix A for the full results). In addition, analysis using the matched observations also suggests a similar progressivity story to that in the main results, where the enhancement in formal job opportunities and earnings growth due to

export expansion is primarily directed towards people in the lower- to middle-income bracket (see Figure 14). However, the notable difference from the main results (in Figure 8) is that in the matched datasets, the impacts are more concentrated on the middle-lower earnings levels and less so on the middle-upper levels (see Tables A11 and A12 in Appendix A for the full results).

Figure 14: The Impact of Export Expansion to the PRC by Earnings Decile in the Year 2000: Matched Datasets



Source: Authors' calculation.

Another source of concern comes from the exclusion restriction assumption in our IV model. The standard Hansen J-statistics has been shown to be unable to provide a definitive answer to the fulfillment of the exclusion restriction assumption (Parente and Santos Silva 2012). Instead of proving that the assumption is met, alternatively, one can test whether the conclusion remains robust when the exclusion restriction assumption is altered.

In this regard, we follow Conley, Hansen, and Rossi (2012) in setting the instruments as plausibly rather than strictly exogenous. This means deliberately allowing our instrument to have a direct effect on the outcomes. The direct effect of IV is obtained from the subset of data in which the impact of the instrument does not differ from zero (insignificant) in the first-stage regression (Van Kippersluis and Rietveld 2018). This subset of data is often called the “zero-first-stage group.” In our case, the zero-first-stage group is obtained by focusing on the districts that have a low level of export expansion (below median) and specialize in agriculture and commodity sectors. In this subset of data, our treatment variable does not correlate statistically with the instrument. From this, we take the coefficient of IV in the reduced-form regression as the direct impact of IV on outcome. We then check whether results based on the more flexible assumption differ from the main model. The results in Table 13 suggest that making the IV assumption more flexible does not change the main conclusion: Export

expansion still leads to better formal employment opportunities and earnings growth in cumulative terms.

Table 13: The Impact of Export Expansion to the PRC on Formal Employment and Earnings Growth: 2SLS Vs. Plausibly Exogenous Model

	(1)	(2)	(3)	(4)	(5)	(6)
	Formality			Earnings Growth		
	2SLS	Plausibly Exogenous (Without Uncertainty)	Plausibly Exogenous (With Uncertainty)	2SLS	Plausibly Exogenous (Without Uncertainty)	Plausibly Exogenous (With Uncertainty)
Indonesia's export expansion 2000–2007, 2000 district weight (standardized)	0.384** [0.148]	0.527*** [0.0881]	0.527*** [0.0924]	0.0746 [0.0513]	0.0997** [0.0361]	0.0997* [0.0438]
Observations	6,901	6,911	6,911	4,406	4,412	4,412
R ²	0.054			0.017		
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Robust F-Stat	33.00			36.04		

Note: We test whether results change when violation of exclusion restriction assumption is allowed. Regions where export expansion is below the median (p50) and more commodity reliant are grouped as the zero-first-stage group. In these regions, Indonesia's export expansion to the PRC does not correlate statistically with that of ASEAN countries. Thus, a reduced-form coefficient can be taken as the direct impact of IV on outcome. The direct-effect coefficient serves as the level of exclusion restriction violation in our sensitivity test. The plausibly exogenous IV model corrects for a potential direct effect of IV on outcome. The model with uncertainty includes standard errors of the direct impact of IV on outcome from the reduced-form regressions, while the one without uncertainty assumes no deviation from the level of violation. Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

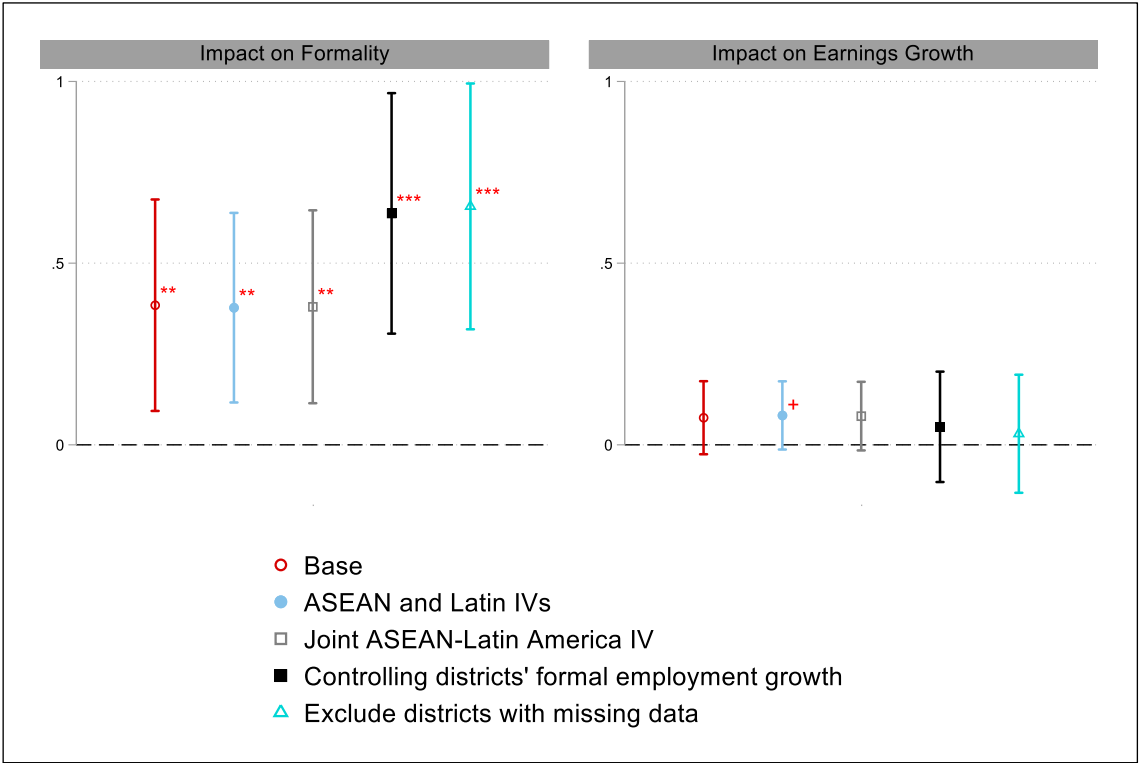
Source: Authors' calculation.

Next, we examine whether our main estimate is sensitive to alternative specifications and choice of data. In particular, we modify three aspects of our main model. First, as regards IV, we experiment with two alternatives: (i) we add a new instrument, which is the exports of selected Latin American countries to the PRC;¹⁷ and (ii) we combine both ASEAN and Latin America's export to the PRC as a joint instrument. The second modification is on the covariates. There is concern that our formal employment prospects might be driven by the initial trend that was underway before the PRC's shock. In this regard, we use formal employment growth from 1997 to 2000 as our district-level control variable instead of tradable employment growth. This will minimize the estimate in our formality analysis being contaminated by formal job growth trends at the district level. Lastly, we exclude districts with incomplete information from Sakernas in certain years, rather than imputing it with sectoral employment structure from the closest available year.

Figure 15 shows that the impact of export expansion remains consistent. Exposure to export expansion to the PRC improves formal employment outcomes and earnings growth among individuals living in the more exposed districts. However, the impact of export expansion on total earnings growth is only statistically significant when using two IVs (which are ASEAN and Latin American exports to the PRC). The progressivity story is also maintained when incomplete data are excluded from our analysis rather than imputed (see Figure 16). In general, these results suggest that our main findings are relatively robust as they survive various robustness and sensitivity checks.

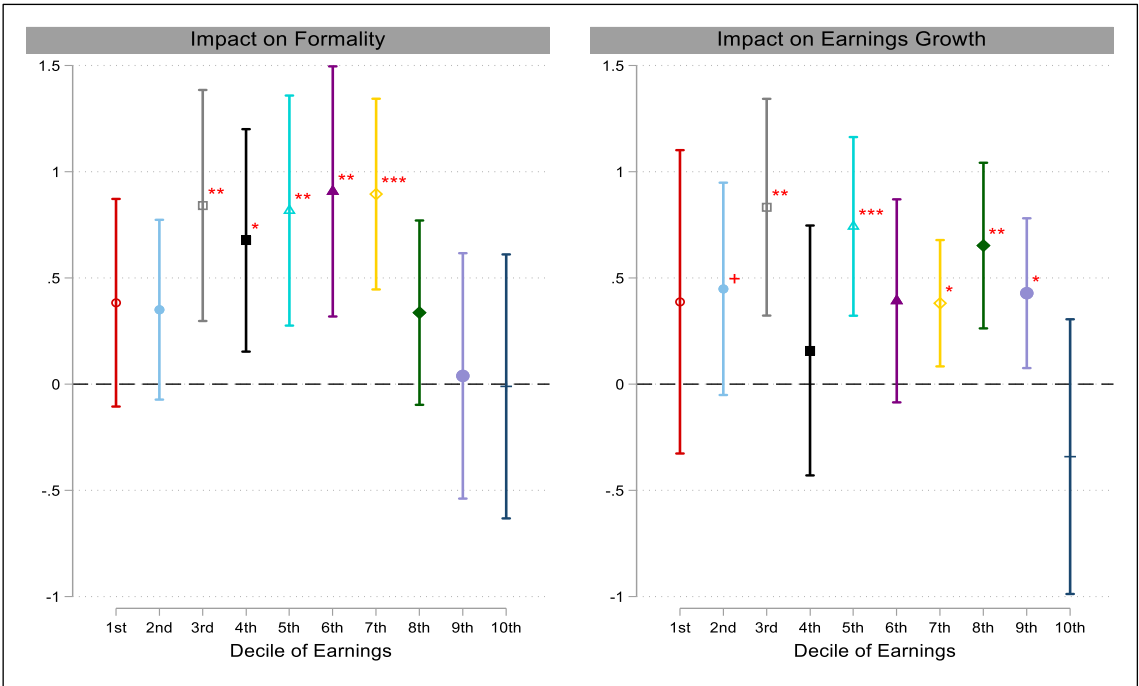
¹⁷ The Latin American countries include Argentina, Brazil, Chile, Mexico, Paraguay, Peru, Uruguay, and Venezuela. They were also the founding members of the WTO in 1995.

Figure 15: Sensitivity Analysis



Source: Authors' calculation.

Figure 16: Heterogeneity Analysis, Sample Excludes Missing Data



Source: Authors' calculation.

7. CONCLUSIONS AND IMPLICATIONS

Developing economies' participation in the export market has expanded considerably in the last two to three decades. However, there is no clear evidence that this has improved labor market outcomes. Informality is still persistently high, and inequality, in a broader sense, has risen in many parts of developing economies. In addition, some studies have linked commodity-driven export expansion with the Dutch disease effect, arguing that export expansion will not necessarily lead to improvement in labor market performance as it could simultaneously weaken the manufacturing sector, which is the main provider of formal jobs in the economy.

We revisit this issue by studying the export expansion episode of a major commodity-dependent nation, namely Indonesia. Rather than focusing only on commodity exports, we measure all export changes in tradable goods. To isolate exogenous variation in Indonesia's export, we focus on Indonesia's export expansion to the PRC between 2000 and 2007, as this period represents the time when the PRC dramatically rose as a major importer in the world's economy following its accession to the WTO. This exogenous import demand shock in the PRC has increased exports not only from Indonesia but also from other developing countries in Asian and Latin American regions. We then assess the impact of this export expansion to the PRC on individuals' labor market outcomes, which we obtained from the IFLS database. In particular, we compare the total number of years spent in formal employment and earnings growth from 2000 to 2014 of individuals who live in districts with larger exposure to export expansion to the PRC relative to those in less exposed ones. We further gauge how equal this export expansion has been by analyzing the heterogeneous impact of export expansion across individuals with different positions in terms of income distribution.

We discover that individuals living in districts with greater exposure to export expansion to the PRC between 2000 and 2007 tended to have larger formal employment prospects in cumulative terms. The overall impact on total earnings growth is also positive but not statistically significant. We also find that the impact of export expansion has been relatively progressive as improvements in formal job opportunities and earnings growth induced by exports are directed mostly towards individuals in the lower- and middle-income brackets. These results remain intact even when the instrument is assumed to be weak and violates the exclusion restriction assumption. Inference does not change either as we experiment with different specifications, data treatment techniques, and IV constructions.

These results are mainly underpinned by the effect of manufacturing export expansion. Due to the PRC's emergence in the global economy, Indonesia experienced not only a substantial increase in the export of commodities but also a meaningful growth in the export of manufactured products. We discover that the positive impact of export expansion on formal job opportunities and earnings growth is mostly concentrated in districts with greater specialization in manufacturing activities, whereas there appears to be no statistically significant effect for individuals in commodity-reliant districts. This arguably relates to the nature of the manufacturing sector, which tends to absorb more formal rather than informal employment. Formal jobs tend to be more secure and pay a better salary. Understandably, improvement in labor market outcomes is more likely to occur under expansion in manufacturing exports rather than commodity ones. These findings highlight the importance of maintaining the manufacturing sector's competitiveness in a commodity-dependent nation like Indonesia as a source to improve labor market performance.

However, the main caveat of our empirical strategy is that it is not designed to interpret any aggregate trend at the national level. The research design employed by this study can only answer the relative impact of export across individuals living in different exposure sites. This means we cannot link the rising role of commodity export during an export boom period with the PRC and the resulting high informality and inequality at that time. Explaining these aggregate trends, in our view, requires a more general equilibrium approach rather than a micro-econometric one. This could be a promising avenue for future research. Another limitation of this paper is that the empirical design holds individuals' residences fixed in the initial period before the PRC's accession to the WTO. Although this is needed to avoid sorting effects, it cannot explain the question of labor mobility as a result of a major export shock. We show that the role of internal migration in our data appears to be limited and less likely to alter the inference. This is due to its small magnitude and declining trend over time. However, this is based purely on descriptive works and does not answer the question as to whether or not export induces workers to move across regions and sectors – another topic that has been the core of trade theory yet remains an open empirical puzzle.

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APPENDIX A: SUPPLEMENTARY TABLES AND FIGURES

Table A1: Sectoral Classification of Tradable Employment (2-digit ISIC)

ISIC Rev 2	Description
11	Agriculture and Hunting
12	Forestry and Logging
13	Fishing
21	Coal Mining
22	Crude Petroleum and Natural Gas Production
23	Metal Ore Mining
29	Other Mining
31	Manufacture of Food, Beverages, and Tobacco
32	Textile, Wearing Apparel, and Leather Industries
33	Manufacture of Wood and Wood Products, Including Furniture
34	Manufacture of Paper and Paper Products, Printing, and Publishing
35	Manufacture of Chemicals and Chemical Products, Petroleum, Coal, Rubber, and Plastic Products
36	Manufacture of nonmetallic Mineral Products, Except Products of Petroleum and Coal
37	Basic Metal Industries
38	Manufacture of Fabricated Metal Products, Machinery, and Equipment
39	Other Manufacturing Industries

Table A2: Descriptive Statistics of Data Estimation (Standardized)

Variable	N	Mean	SD	Min	Max
Formal worker in 2000, 1 = yes, 0 = no	5486	0.47	0.5	0	1
In labor force in 2000, 1 = yes, 0 = no	6974	0.8	0.4	0	1
Employed in 2000, 1 = yes, 0 = no	6974	0.79	0.41	0	1
Years of being employed, 2000–2014 (standardized)	7017	0	1	–2.44	0.72
Years in formal employment, 2000–2014 (standardized)	7017	0	1	–0.77	1.94
Total growth of income, nominal, 2000–2014 (standardized)	4475	0	1	–5.43	8.52
Total growth of income, real, 2000–2014 (standardized)	4475	0	1	–5.68	8.66
Indonesia's export expansion 2000–2007, 2000 district weight (standardized)	6911	0	1	–0.63	6.08
ASEAN's export expansion 2000–2007, 1997 district weight (standardized)	6911	0	1	–0.97	9.86
Latin America's export expansion 2000–2007, 1997 district weight (standardized)	6911	0	1	–0.64	8.42
ASEAN-Latin America's export expansion 2000–2007, 1997 district weight (std)	6911	0	1	–1	9.25
Gender, 1 = male, 0 = female	7017	0.45	0.5	0	1
Age (years) in 2000 (standardized)	7017	0	1	–1.56	4.54
Father's years of education in 2000 (standardized)	7007	0	1	–0.34	5.74
Sufficient ventilation in 2000, 1 = yes, 0 = no	7007	0.79	0.41	0	1
Piles of trash around the house in 2000, 1 = yes, 0 = no	7007	0.12	0.33	0	1
District's tradable employment, compound annual growth rate 1997–2000 (standardized)	6911	0	1	–2.99	7.75
District's formal employment, compound annual growth rate 1997–2000 (standardized)	6743	0	1	–3.03	6.5
Province location in 2000	7017	35.28	15.4	12	73

Table A3: The Impact of Export Expansion to the PRC on Formal Employment and Earnings Growth: OLS and 2SLS Comparison, Full Results

	(1) Formal OLS	(2) Formal OLS	(3) Formal 2SLS	(4) Earnings OLS	(5) Earnings OLS	(6) Earnings 2SLS
Indonesia's export expansion 2000–2007, 2000 district weight (standardized)	0.0571* [0.0268]	0.0519 [0.0320]	0.384** [0.148]	0.00924 [0.0232]	0.0142 [0.0268]	0.0746 [0.0513]
Gender, 1 = male, 0 = female	0.560*** [0.0333]	0.557*** [0.0329]	0.560*** [0.0330]	0.000722 [0.0321]	–0.00201 [0.0317]	–0.00258 [0.0315]
Age (years) in 2000 (standardized)	–0.0429** [0.0138]	–0.0445** [0.0140]	–0.0450** [0.0140]	–0.0825*** [0.0160]	–0.0836*** [0.0160]	–0.0845*** [0.0160]
Father's years of education in 2000 (standardized)	0.0837*** [0.0125]	0.0801*** [0.0128]	0.0799*** [0.0129]	0.0137 [0.0139]	0.0132 [0.0136]	0.0123 [0.0136]
Sufficient ventilation in 2000, 1 = yes, 0 = no	0.0862** [0.0326]	0.101** [0.0326]	0.111** [0.0358]	0.0577 [0.0429]	0.0455 [0.0414]	0.0464 [0.0416]
Piles of trash around the house in 2000, 1 = yes, 0 = no	–0.252*** [0.0403]	–0.244*** [0.0375]	–0.241*** [0.0462]	–0.0904+ [0.0520]	–0.110* [0.0506]	–0.109* [0.0510]
District's tradable employment, cumulative annual growth 1997–2000 (standardized)	–0.0167 [0.0244]	–0.0254 [0.0253]	0.00141 [0.0418]	–0.0190 [0.0219]	–0.0201 [0.0212]	–0.0147 [0.0212]
Sumatera Barat		0.121 [0.101]	0.0910 [0.103]		0.101 [0.0979]	0.0942 [0.0912]
Riau		–0.0737 [0.206]	–0.314 [0.230]		–0.147 [0.226]	–0.182 [0.217]
Sumatera Selatan		–0.0454 [0.154]	–0.0455 [0.147]		0.307*** [0.0612]	0.306*** [0.0611]
Lampung		–0.280 [0.201]	–0.263+ [0.152]		0.0395 [0.0911]	0.0403 [0.0958]
DKI Jakarta		0.116 [0.125]	–0.749 [0.545]		0.0367 [0.0979]	–0.120 [0.185]
Jawa Barat		0.101 [0.0830]	0.0394 [0.0913]		0.0205 [0.0695]	0.00940 [0.0681]
Jawa Tengah		0.145 [0.100]	0.133 [0.100]		–0.0559 [0.0941]	–0.0594 [0.0912]
Yogyakarta		0.248** [0.0848]	0.258** [0.0862]		0.121* [0.0607]	0.122* [0.0596]
Jawa Timur		0.164+ [0.0878]	0.133 [0.0885]		0.0532 [0.0726]	0.0474 [0.0708]
Bali		0.0748 [0.144]	–0.0451 [0.129]		0.186 [0.136]	0.164 [0.135]
NTB		0.0385 [0.0977]	0.0566 [0.102]		0.193* [0.0767]	0.196** [0.0760]
Kalteng		0.540 [0.662]	–0.0467 [1.036]		0.0945 [0.316]	0.0600 [0.265]
Kalsel		–0.102 [0.129]	–0.238 [0.237]		0.000321 [0.104]	–0.0220 [0.104]
Sulsel		–0.103 [0.101]	–0.175 [0.124]		0.212* [0.0895]	0.196* [0.0848]
Constant	–0.291*** [0.0359]	–0.378*** [0.0703]	–0.293*** [0.0823]	–0.0359 [0.0458]	–0.0912 [0.0609]	–0.0737 [0.0605]
Observations	6,901	6,901	6,901	4,406	4,406	4,406
R2	0.103	0.116	0.054	0.010	0.018	0.017
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Kleibergen-Paap F-Stat			33.00			36.04

Note: Standard errors are provided in brackets and are clustered within district. The model uses export of ASEAN region to the PRC as the instrument, which includes the following countries: Brunei Darussalam, Singapore, Myanmar, Malaysia, the Philippines, and Thailand. Individual-level data cover all adult individuals that exist across the three latest IFLS waves: 2000, 2007, and 2014 (balanced panel). Continuous variables are transformed into standardized variables with mean = 0 and standard deviation = 1. Covariates are used across all estimations. The Stock-Yogo (2005) critical value with 10% maximal bias is 16.38, while the suggested minimum value for F-stat that is robust to heteroscedasticity, serial correlation, and clustering problems (effective F-stat) is 23.1. Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A4: The Impact of Export Expansion to the PRC on Formal Employment: 2SLS Estimation, Full Results

	(1) Baseline	(2) Employed in 2000	(3) Not Employed in 2000	(4) In Formal Job in 2000	(5) Not in Formal Job in 2000
Indonesia's export expansion 2000–2007, 2000 district weight (standardized)	0.384** [0.148]	0.594** [0.193]	0.0280 [0.0255]	0.252* [0.121]	0.236+ [0.126]
Gender, 1 = male, 0 = female	0.560*** [0.0330]	0.385*** [0.0342]	0.447*** [0.0924]	0.136* [0.0616]	0.239*** [0.0245]
Age (years) in 2000 (standardized)	–0.0450** [0.0140]	–0.0670*** [0.0175]	–0.0688*** [0.0126]	–0.000968 [0.0241]	–0.0706*** [0.0115]
Father's years of education in 2000 (standardized)	0.0799*** [0.0129]	0.0730*** [0.0165]	0.0666** [0.0219]	0.0348+ [0.0185]	0.0473* [0.0196]
Sufficient ventilation in 2000, 1 = yes, 0 = no	0.111** [0.0358]	0.151*** [0.0428]	–0.0115 [0.0340]	0.216*** [0.0577]	–0.00378 [0.0294]
Piles of trash around the house in 2000, 1 = yes, 0 = no	–0.241*** [0.0462]	–0.322*** [0.0677]	–0.0250 [0.0421]	–0.325*** [0.0798]	–0.100** [0.0339]
District's tradable employment, cumulative annual growth 1997–2000 (standardized)	0.00141 [0.0418]	–0.00643 [0.0506]	0.0144 [0.0182]	–0.0171 [0.0425]	0.00312 [0.0209]
Sumatera Barat	0.0910 [0.103]	0.0852 [0.134]	0.0806 [0.0664]	–0.0917 [0.193]	0.128 [0.0852]
Riau	–0.314 [0.230]	–0.499 [0.324]	–0.0554 [0.0362]	–0.785* [0.319]	0.0795 [0.299]
Sumatera Selatan	–0.0455 [0.147]	–0.0293 [0.199]	–0.0711+ [0.0413]	0.0400 [0.175]	0.0714 [0.0672]
Lampung	–0.263+ [0.152]	–0.335* [0.165]	–0.112** [0.0379]	–0.394 [0.335]	–0.0515 [0.0567]
DKI Jakarta	–0.749 [0.545]	–1.215 [0.802]	0.0328 [0.0878]	–0.666+ [0.402]	–0.470 [0.484]
Jawa Barat	0.0394 [0.0913]	0.0771 [0.124]	0.0228 [0.0437]	–0.168 [0.122]	0.107 [0.0847]
Jawa Tengah	0.133 [0.100]	0.0909 [0.130]	0.135* [0.0582]	–0.158 [0.140]	0.185** [0.0719]
Yogyakarta	0.258** [0.0862]	0.229+ [0.120]	0.160* [0.0634]	–0.0445 [0.141]	0.113 [0.0934]
Jawa Timur	0.133 [0.0885]	0.114 [0.119]	0.108* [0.0485]	–0.0447 [0.138]	0.0909 [0.0588]
Bali	–0.0451 [0.129]	–0.140 [0.167]	0.0700 [0.0457]	–0.00827 [0.229]	0.00931 [0.0988]
NTB	0.0566 [0.102]	0.0306 [0.133]	0.0692 [0.0699]	–0.134 [0.152]	0.0805 [0.0713]
Kalteng	–0.0467 [1.036]	0.149 [1.107]	–0.212* [0.0965]	–0.0849 [0.814]	
Kalsel	–0.238 [0.237]	–0.360 [0.324]	0.0172 [0.0593]	–0.0426 [0.180]	–0.0556 [0.145]
Sulsel	–0.175 [0.124]	–0.230 [0.194]	0.0308 [0.0577]	–0.257 [0.203]	0.0480 [0.0782]
Constant	–0.293*** [0.0823]	–0.0693 [0.116]	–0.590*** [0.0407]	0.708*** [0.131]	–0.573*** [0.0639]
Observations	6,901	5,396	1,463	2,560	2,836
R2	0.054	–0.038	0.096	0.009	0.010
Kleibergen-Paap F-Stat	33.00	35.88	27.76	45.86	21.57
Robust CS (lower bound)	0.021	0.146	–0.029	–0.037	–0.012
Robust CS (upper bound)	0.646	0.951	0.076	0.463	0.534
Nonrobust (Wald) CS (lower bound)	0.093	0.215	–0.022	0.015	–0.011
Nonrobust (Wald) CS (upper bound)	0.675	0.972	0.078	0.49	0.483

Note: Standard errors are provided in brackets and are clustered within district. The model uses export of ASEAN region to the PRC as the instrument, which includes the following countries: Brunei Darussalam, Singapore, Myanmar, Malaysia, the Philippines, and Thailand. Individual-level data cover all adult individuals that exist across the three latest IFLS waves: 2000, 2007, and 2014 (balanced panel). Continuous variables are transformed into standardized variables with mean = 0 and standard deviation = 1. Covariates are used across all estimations. The Stock-Yogo (2005) critical value with 10% maximal bias is 16.38, while the suggested minimum value for F-stat that is robust to heteroscedasticity, serial correlation, and clustering problems (effective F-stat) is 23.1. Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

**Table A5: The Impact of Export Expansion to the PRC on Earnings Growth:
2SLS Estimation, Full Results**

	(1) Baseline	(2) Employed in 2000	(3) Not Employed in 2000	(4) In Formal Job in 2000	(5) Not in Formal Job in 2000
Indonesia's export expansion 2000–2007, 2000 district weight (standardized)	0.0746 [0.0513]	0.0750 [0.0554]	0.145 [0.129]	0.0744 [0.0563]	–0.0427 [0.143]
Gender, 1 = male, 0 = female	–0.00258 [0.0315]	–0.0249 [0.0357]	–0.202 [0.141]	–0.0816* [0.0385]	0.0193 [0.0633]
Age (years) in 2000 (standardized)	–0.0845*** [0.0160]	–0.0871*** [0.0174]	–0.123* [0.0522]	–0.0676** [0.0221]	–0.103*** [0.0259]
Father's years of education in 2000 (standardized)	0.0123 [0.0136]	0.0222 [0.0143]	–0.0404 [0.0559]	0.00121 [0.0155]	0.0506+ [0.0282]
Sufficient ventilation in 2000, 1 = yes, 0 = no	0.0464 [0.0416]	0.0622 [0.0426]	–0.103 [0.152]	0.0580 [0.0500]	0.0605 [0.0676]
Piles of trash around the house in 2000, 1 = yes, 0 = no	–0.109* [0.0510]	–0.120* [0.0513]	0.0106 [0.176]	–0.122+ [0.0701]	–0.0906 [0.0673]
District's tradable employment, cumulative annual growth 1997–2000 (standardized)	–0.0147 [0.0212]	–0.0181 [0.0245]	0.0645 [0.0599]	–0.0206 [0.0211]	–0.0206 [0.0406]
Sumatera Barat	0.0942 [0.0912]	0.0692 [0.106]	0.125 [0.155]	0.0183 [0.0935]	0.0503 [0.168]
Riau	–0.182 [0.217]	–0.260 [0.250]	0.416** [0.156]	–0.607* [0.246]	0.272 [0.413]
Sumatera Selatan	0.306*** [0.0611]	0.244*** [0.0730]	0.656* [0.302]	0.218** [0.0837]	0.308* [0.141]
Lampung	0.0403 [0.0958]	–0.0278 [0.105]	0.317* [0.136]	–0.195+ [0.113]	0.152 [0.140]
DKI Jakarta	–0.120 [0.185]	–0.185 [0.203]	0.0612 [0.360]	–0.305 [0.188]	0.248 [0.437]
Jawa Barat	0.00940 [0.0681]	–0.0423 [0.0756]	0.303 [0.230]	–0.208** [0.0794]	0.117 [0.129]
Jawa Tengah	–0.0594 [0.0912]	–0.137 [0.0998]	0.471** [0.176]	–0.249* [0.111]	–0.0334 [0.134]
Yogyakarta	0.122* [0.0596]	0.0649 [0.0678]	0.349* [0.163]	–0.161+ [0.0892]	0.316** [0.118]
Jawa Timur	0.0474 [0.0708]	–0.0119 [0.0772]	0.340+ [0.182]	–0.164* [0.0832]	0.121 [0.123]
Bali	0.164 [0.135]	0.0832 [0.151]	0.679*** [0.179]	–0.0730 [0.146]	0.291 [0.203]
NTB	0.196** [0.0760]	0.148+ [0.0894]	0.360* [0.162]	–0.155+ [0.0931]	0.455*** [0.135]
Kalteng	0.0600 [0.265]	0.0118 [0.260]		–0.168 [0.258]	
Kalsel	–0.0220 [0.104]	–0.0597 [0.108]	–0.191 [0.388]	–0.118 [0.123]	0.0826 [0.151]
Sulsel	0.196* [0.0848]	0.160 [0.0976]	0.447 [0.286]	0.127 [0.0987]	0.247 [0.153]
Constant	–0.0737 [0.0605]	0.00102 [0.0704]	–0.384* [0.185]	0.236** [0.0835]	–0.253* [0.115]
Observations	4,406	4,054	337	2,181	1,873
R2	0.017	0.019	0.054	0.022	0.029
Kleibergen-Paap F-Stat	36.04	37.47	25.31	45.82	20.50
Robust CS (lower bound)	–0.024	–0.035	–0.117	–0.025	–0.407
Robust CS (upper bound)	0.186	0.193	0.428	0.203	0.218
Nonrobust (Wald) CS (lower bound)	–0.026	–0.034	–0.109	–0.036	–0.323
Nonrobust (Wald) CS (upper bound)	0.175	0.184	0.399	0.185	0.238

Note: Standard errors are provided in brackets and are clustered within district. The model uses export of ASEAN region to the PRC as the instrument, which includes the following countries: Brunei Darussalam, Singapore, Myanmar, Malaysia, the Philippines, and Thailand. Individual-level data cover all adult individuals that exist across the three latest IFLS waves: 2000, 2007, and 2014 (balanced panel). Continuous variables are transformed into standardized variables with mean = 0 and standard deviation = 1. Covariates are used across all estimations. The Stock-Yogo (2005) critical value with 10% maximal bias is 16.38, while the suggested minimum value for F-stat that is robust to heteroscedasticity, serial correlation, and clustering problems (effective F-stat) is 23.1. Confidence sets (CS) are based on 1,000 grid points in the interval of [–0.5, 2]. Robust confidence sets are based on the Anderson-Rubin (AR) test and robust to heteroscedasticity and clustering issues. Wald confidence sets are based on 2SLS estimates and are not robust to weak instruments. Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A6: The Impact of Export Expansion to the PRC on Formal Employment by Decile of Earnings: 2SLS Estimation, Full Results

	(1) 1st	(2) 2nd	(3) 3rd	(4) 4th	(5) 5th	(6) 6th	(7) 7th	(8) 8th	(9) 9th	(10) 10th
Indonesia' s export expansion 2000–2007, 2000 district weight (standardized)	0.375 [0.243]	0.370+ [0.218]	0.524** [0.165]	0.729*** [0.201]	0.820** [0.275]	0.894** [0.297]	0.870*** [0.231]	0.00964 [0.174]	0.0177 [0.0911]	–0.0232 [0.102]
Gender, 1 = male, 0 = female	0.299*** [0.0610]	0.149+ [0.0893]	0.351*** [0.0973]	–0.0350 [0.0724]	0.302** [0.0922]	0.165 [0.125]	0.122 [0.116]	0.133 [0.115]	0.0243 [0.100]	0.189+ [0.111]
Age (years) in 2000 (standardized)	–0.0648** [0.0224]	–0.111** [0.0404]	–0.104** [0.0345]	–0.115** [0.0350]	–0.129** [0.0482]	–0.157** [0.0504]	–0.129* [0.0599]	–0.138* [0.0548]	–0.109+ [0.0642]	0.128* [0.0575]
Father' s years of education in 2000 (standardized)	0.0355 [0.0340]	0.0566 [0.0583]	0.109+ [0.0601]	0.0979* [0.0405]	0.0602 [0.0589]	0.0888+ [0.0525]	0.104* [0.0420]	0.154*** [0.0456]	–0.0484 [0.0599]	0.0610* [0.0292]
Sufficient ventilation in 2000, 1 = yes, 0 = no	–0.0118 [0.0529]	–0.107 [0.0830]	0.239*** [0.0689]	–0.0587 [0.0816]	–0.0473 [0.114]	0.0768 [0.131]	0.0972 [0.119]	–0.205+ [0.124]	0.166 [0.136]	0.0716 [0.162]
Piles of trash around the house in 2000, 1 = yes, 0 = no	–0.0704 [0.0535]	–0.285** [0.107]	–0.246* [0.111]	–0.00149 [0.110]	–0.254+ [0.136]	–0.118 [0.157]	–0.492* [0.221]	–0.398** [0.128]	–0.425* [0.199]	–0.254 [0.250]
District' s tradable employment, cumulative annual growth 1997–2000 (standardized)	–0.00245 [0.0281]	–0.0894** [0.0340]	–0.0161 [0.0350]	–0.0199 [0.0394]	0.0881 [0.113]	0.0916 [0.0947]	0.121 [0.107]	–0.0701 [0.0516]	0.0267 [0.0542]	–0.108+ [0.0631]
Sumatera Barat	0.241* [0.119]	–0.190 [0.505]	–0.361 [0.249]	0.0392 [0.287]	0.326 [0.376]	–0.0580 [0.285]	–0.295 [0.282]	0.465+ [0.259]	0.131 [0.312]	0.397 [0.286]
Sumatera Selatan	0.0476 [0.0727]	–0.245 [0.477]	–0.104 [0.274]	0.0918 [0.280]	0.0217 [0.385]	–0.221 [0.221]	–0.267 [0.458]	0.249 [0.295]	–0.245 [0.402]	0.891** [0.290]
Lampung	0.0262 [0.0751]	–0.200 [0.495]	–0.390 [0.268]	–0.0156 [0.288]	0.0354 [0.295]	–0.326* [0.161]	–0.536+ [0.311]	–0.266 [0.362]	–0.667* [0.312]	0.377 [0.329]
DKI Jakarta	–0.353 [0.657]	–1.371 [1.011]	–1.182 [0.875]	–1.684* [0.834]	–2.299 [1.595]	–1.602* [0.817]	–2.569* [1.293]	0.262 [0.527]	0.0870 [0.427]	0.212 [0.315]
Jawa Barat	0.112 [0.0810]	0.0186 [0.486]	–0.134 [0.242]	0.270 [0.261]	0.388 [0.278]	–0.00166 [0.232]	–0.0179 [0.264]	0.371+ [0.222]	0.0929 [0.285]	0.280 [0.292]
Jawa Tengah	0.180** [0.0669]	–0.0186 [0.486]	–0.204 [0.230]	0.252 [0.248]	0.278 [0.282]	0.351 [0.240]	–0.00842 [0.301]	0.105 [0.246]	0.371 [0.369]	0.264 [0.299]
Yogyakarta	0.0800 [0.136]	0.0267 [0.502]	–0.000168 [0.250]	0.145 [0.271]	0.568* [0.271]	0.290+ [0.173]	0.181 [0.286]	0.609** [0.233]	0.557+ [0.305]	0.329 [0.274]

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Table A6 continued

	(1) 1st	(2) 2nd	(3) 3rd	(4) 4th	(5) 5th	(6) 6th	(7) 7th	(8) 8th	(9) 9th	(10) 10th
Jawa Timur	0.0609 [0.0751]	0.256 [0.498]	-0.136 [0.247]	0.0859 [0.245]	0.460+ [0.266]	0.265 [0.182]	0.116 [0.283]	0.241 [0.247]	0.326 [0.319]	0.307 [0.275]
Bali	0.279** [0.107]	0.102 [0.493]	-0.600* [0.263]	-0.0580 [0.327]	0.0412 [0.405]	0.105 [0.320]	-0.877** [0.281]	0.129 [0.370]	-0.166 [0.454]	0.516* [0.260]
NTB	0.0371 [0.0776]	-0.0517 [0.493]	-0.00943 [0.230]	-0.142 [0.245]	0.254 [0.260]	-0.0442 [0.353]	-0.0442 [0.300]	0.0346 [0.293]	0.553+ [0.330]	0.769** [0.293]
Kalsel	-0.197 [0.278]	0.673 [0.709]	-0.388 [0.403]	-0.422 [0.452]	-0.0726 [0.485]	-0.875 [0.608]	-0.482 [0.373]	-0.543* [0.270]	0.283 [0.394]	0.301 [0.335]
Sulsel	0.0128 [0.177]	-0.148 [0.502]	-0.162 [0.304]	-0.307 [0.362]	-0.362 [0.337]	0.117 [0.353]	-0.914* [0.396]	-0.500+ [0.274]	0.471 [0.416]	0.375 [0.301]
Riau			-1.272*** [0.307]	0.962*** [0.236]		-1.619* [0.654]		0.413+ [0.230]	-0.938** [0.316]	0.281 [0.283]
Kalteng							1.708*** [0.331]	-0.661 [0.655]		1.186*** [0.311]
Constant	-0.544*** [0.103]	-0.0617 [0.493]	-0.217 [0.223]	0.0722 [0.239]	-0.158 [0.280]	0.178 [0.198]	0.507* [0.258]	0.356 [0.290]	0.495+ [0.296]	0.312 [0.289]
Observations	777	301	539	636	474	533	645	487	473	533
R ²	-0.041	0.067	-0.024	-0.115	-0.137	-0.101	-0.202	0.133	0.066	0.071
Kleibergen-Paap F-Stat	8.828	8.199	52.09	17.48	22.52	18.88	21.70	33.93	73.68	112.8
Robust CS (lower bound)	0.041	-0.14	0.166	0.426	0.393	0.376	0.501	-0.432	-0.167	-0.227
Robust CS (upper bound)	1.544	1.004	0.836	1.372	1.63	1.7	1.539	0.300	0.198	0.178
Nonrobust (Wald) CS (lower bound)	-0.102	-0.058	0.201	0.336	0.281	0.312	0.417	-0.331	-0.161	-0.223
Nonrobust (Wald) CS (upper bound)	0.852	0.798	0.848	1.122	1.359	1.476	1.323	0.350	0.196	0.177

Note: Standard errors are provided in brackets and are clustered within district. The model uses export of ASEAN region to the PRC as the instrument, which includes the following countries: Brunei Darussalam, Singapore, Myanmar, Malaysia, the Philippines, and Thailand. Individual-level data cover all adult individuals that exist across the three latest IFLS waves: 2000, 2007, and 2014 (balanced panel). Continuous variables are transformed into standardized variables with mean = 0 and standard deviation = 1. Covariates are used across all estimations. The Stock-Yogo (2005) critical value with 10% maximal bias is 16.38, while the suggested minimum value for F-stat that is robust to heteroscedasticity, serial correlation, and clustering problems (effective F-stat) is 23.1. Confidence sets (CS) are based on 1,000 grid points in the interval of [-0.5, 2]. Robust confidence sets are based on the Anderson-Rubin (AR) test and robust to heteroskedasticity and clustering issues. Wald confidence sets are based on 2SLS estimates and are not robust to weak instruments. Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A7: The Impact of Export Expansion to the PRC on Earnings Growth by Decile of Earnings: 2SLS Estimation, Full Results

	(1) 1st	(2) 2nd	(3) 3rd	(4) 4th	(5) 5th	(6) 6th	(7) 7th	(8) 8th	(9) 9th	(10) 10th
Indonesia' s export expansion 2000–2007, 2000 district weight (standardized)	0.375 [0.360]	0.453+ [0.254]	0.581*** [0.173]	0.444 [0.270]	0.767*** [0.217]	0.404+ [0.245]	0.376* [0.151]	0.272 [0.198]	0.215** [0.0670]	–0.0243 [0.131]
Gender, 1 = male, 0 = female	–0.150 [0.123]	0.156 [0.125]	0.466*** [0.112]	0.314** [0.0986]	0.276** [0.0950]	0.0986 [0.112]	0.129 [0.0912]	0.139 [0.0957]	–0.196* [0.0782]	0.0532 [0.111]
Age (years) in 2000 (standardized)	–0.122 [0.0743]	–0.138* [0.0644]	–0.115** [0.0432]	–0.0706 [0.0493]	–0.112** [0.0414]	–0.116** [0.0447]	–0.0929* [0.0405]	–0.0259 [0.0353]	–0.0462 [0.0401]	0.154* [0.0647]
Father' s years of education in 2000 (standardized)	0.0229 [0.0425]	0.181+ [0.101]	0.0601 [0.0641]	0.116** [0.0442]	–0.00823 [0.0438]	0.0230 [0.0302]	0.0341 [0.0354]	0.0806* [0.0361]	–0.0440 [0.0509]	0.0586 [0.0387]
Sufficient ventilation in 2000, 1 = yes, 0 = no	–0.00233 [0.137]	0.238 [0.145]	0.384*** [0.0994]	–0.000223 [0.118]	0.231* [0.109]	0.125 [0.124]	0.206 [0.132]	0.194* [0.0965]	0.0941 [0.113]	0.121 [0.131]
Piles of trash around the house in 2000, 1 = yes, 0 = no	–0.265 [0.191]	–0.240 [0.215]	–0.0198 [0.101]	0.0971 [0.119]	–0.111 [0.138]	–0.359* [0.160]	–0.171 [0.124]	–0.450* [0.180]	–0.0517 [0.144]	–0.373 [0.280]
District' s tradable employment, cumulative annual growth 1997–2000 (standardized)	–0.0805+ [0.0460]	–0.0533 [0.0449]	–0.0822** [0.0270]	–0.00288 [0.0340]	0.0313 [0.0656]	–0.0413 [0.0377]	0.0337 [0.0532]	0.0635 [0.0582]	–0.0110 [0.0307]	–0.00799 [0.0674]
Sumatera Barat	–0.136 [0.250]	–1.026*** [0.254]	–0.167 [0.316]	–0.0721 [0.426]	–0.00646 [0.271]	0.130 [0.143]	–0.486*** [0.135]	–0.0558 [0.185]	0.245 [0.231]	0.129 [0.272]
Sumatera Selatan	0.103 [0.274]	–0.822*** [0.202]	0.0874 [0.300]	0.162 [0.136]	0.485** [0.174]	–0.0987 [0.153]	–0.373** [0.141]	–0.0225 [0.231]	–0.103 [0.313]	0.548* [0.238]
Lampung	–0.564 [0.474]	–1.028*** [0.271]	–0.889** [0.292]	0.0648 [0.172]	0.121 [0.274]	–0.104 [0.125]	–0.366* [0.163]	–0.100 [0.226]	–0.153 [0.220]	–0.0498 [0.225]
DKI Jakarta	–1.312 [0.950]	–1.154 [0.721]	–1.271 [0.786]	–0.441 [0.707]	–1.997 [1.359]	–1.185 [0.769]	–1.362+ [0.732]	–0.736 [0.658]	–0.202 [0.330]	0.211 [0.385]
Jawa Barat	0.201 [0.268]	–0.786*** [0.203]	–0.789** [0.302]	–0.200 [0.154]	0.0210 [0.177]	–0.166 [0.150]	–0.437*** [0.126]	–0.0628 [0.155]	0.0710 [0.179]	0.219 [0.241]
Jawa Tengah	–0.202 [0.255]	–0.988*** [0.163]	–0.910*** [0.274]	–0.293+ [0.164]	–0.142 [0.201]	–0.169 [0.152]	–0.466*** [0.119]	–0.370+ [0.191]	0.279 [0.247]	–0.229 [0.328]
Yogyakarta	0.132 [0.244]	–0.911*** [0.203]	–0.379 [0.287]	–0.161 [0.203]	0.162 [0.159]	–0.141 [0.137]	–0.244* [0.123]	0.224 [0.182]	0.251 [0.207]	0.169 [0.241]

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Table A7 continued

	(1) 1st	(2) 2nd	(3) 3rd	(4) 4th	(5) 5th	(6) 6th	(7) 7th	(8) 8th	(9) 9th	(10) 10th
Jawa Timur	0.289 [0.268]	-0.331 [0.289]	-0.437 [0.269]	-0.304+ [0.181]	0.0862 [0.146]	-0.206 [0.167]	-0.441*** [0.128]	-0.146 [0.168]	0.106 [0.192]	-0.0229 [0.274]
Bali	0.169 [0.355]	-0.669** [0.234]	-0.442 [0.303]	-0.150 [0.206]	-0.417* [0.176]	-0.174 [0.359]	-0.469* [0.190]	-0.433* [0.190]	0.110 [0.202]	0.472+ [0.264]
NTB	0.381 [0.248]	-0.390*** [0.117]	-0.385 [0.261]	-0.155 [0.277]	0.292+ [0.161]	-0.163 [0.140]	-0.653* [0.256]	-0.0421 [0.250]	0.253 [0.194]	0.338 [0.236]
Kalsel	-0.117 [0.384]	-0.662+ [0.355]	-0.900* [0.456]	-0.144 [0.280]	-0.273 [0.375]	-0.387 [0.430]	-0.341+ [0.187]	-0.304 [0.212]	0.210 [0.208]	0.222 [0.277]
Sulsel	0.297 [0.308]	-1.127*** [0.302]	-0.461+ [0.269]	-0.369 [0.267]	-0.298 [0.237]	-0.402 [0.348]	-0.000502 [0.269]	-0.158 [0.291]	0.507* [0.203]	-0.104 [0.305]
Riau			-0.672* [0.327]			-0.285 [0.234]		0.208 [0.164]	-0.175 [0.313]	-0.0288 [0.237]
Kalteng							-0.0732 [0.210]			1.119** [0.384]
Constant	-0.0120 [0.266]	2.165*** [0.233]	0.685** [0.263]	0.306+ [0.185]	-0.233 [0.161]	-0.000619 [0.199]	-0.0793 [0.163]	-0.315+ [0.169]	-0.266 [0.185]	-0.663** [0.250]
Observations	240	206	395	498	391	458	554	418	425	469
R ²	0.056	0.122	0.143	0.065	-0.140	-0.018	-0.045	0.070	0.047	0.089
Kleibergen-Paap F-Stat	5.612	14.95	30.71	23.26	27.07	19.74	22.93	32.56	83.52	79.50
Robust CS (lower bound)	-0.213	-0.067	0.208	-0.072	0.406	-0.03	0.106	-0.235	0.066	-0.277
Robust CS (upper bound)	2.618	1.067	0.929	1.084	1.342	1.052	0.759	0.604	0.333	0.248
Nonrobust (Wald) CS (lower bound)	-0.33	-0.044	0.241	-0.086	0.343	-0.076	0.08	-0.116	0.083	-0.282
Nonrobust (Wald) CS (upper bound)	1.08	0.95	0.92	0.973	1.192	0.884	0.672	0.659	0.346	0.233

Note: Standard errors are provided in brackets and are clustered within district. The model uses export of ASEAN region to the PRC as the instrument, which includes the following countries: Brunei Darussalam, Singapore, Myanmar, Malaysia, the Philippines, and Thailand. Individual-level data cover all adult individuals that exist across the three latest IFLS waves: 2000, 2007, and 2014 (balanced panel). Continuous variables are transformed into standardized variables with mean = 0 and standard deviation = 1. Covariates are used across all estimations. The Stock-Yogo (2005) critical value with 10% maximal bias is 16.38, while the suggested minimum value for F-stat that is robust to heteroskedasticity, serial correlation, and clustering problems (effective F-stat) is 23.1. Confidence sets (CS) are based on 1,000 grid points in the interval of [-0.5, 2]. Robust confidence sets are based on the Anderson-Rubin (AR) test and robust to heteroskedasticity and clustering issues. Wald confidence sets are based on 2SLS estimates and are not robust to weak instruments. Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A8: The Heterogeneous Impact of Export Expansion to the PRC on Formal Employment: 2SLS Estimation, Full Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Baseline	Female	Male	Agriculture and Mining	Manufacturing	Services	Low level	Mid level	High level	Non-Java Islands	Java Island
Indonesia's export expansion 2000–2007, 2000 district weight (standardized)	0.384** [0.148]	0.220 [0.134]	0.608*** [0.166]	1.595+ [0.850]	0.509* [0.218]	0.252** [0.0808]	0.461** [0.146]	0.217 [0.151]	-0.154+ [0.0842]	0.589* [0.291]	0.333* [0.147]
Gender, 1 = male, 0 = female	0.560*** [0.0330]			0.236*** [0.0552]	0.676*** [0.0871]	0.436*** [0.0448]	0.341*** [0.0385]	0.755*** [0.0503]	0.0700 [0.0962]	0.568*** [0.0511]	0.553*** [0.0438]
Age (years) in 2000 (standardized)	-0.0450** [0.0140]	-0.0316* [0.0159]	-0.0670** [0.0213]	-0.00209 [0.0315]	-0.114** [0.0348]	-0.0442* [0.0225]	-0.0442** [0.0158]	0.00254 [0.0234]	0.184*** [0.0477]	0.00504 [0.0242]	-0.0809*** [0.0156]
Father's years of education in 2000 (standardized)	0.0799*** [0.0129]	0.123*** [0.0169]	0.0277 [0.0220]	0.0690 [0.0452]	0.00437 [0.0296]	0.0672** [0.0211]	0.00327 [0.0256]	0.0615*** [0.0169]	0.00803 [0.0272]	0.120*** [0.0228]	0.0530*** [0.0157]
Sufficient ventilation in 2000, 1 = yes, 0 = no	0.111** [0.0358]	0.0446 [0.0361]	0.192*** [0.0485]	0.0886 [0.0618]	0.0470 [0.0893]	0.119* [0.0563]	-0.0339 [0.0386]	0.0494 [0.0497]	0.131 [0.170]	0.0861 [0.0524]	0.117* [0.0482]
Piles of trash around the house in 2000, 1 = yes, 0 = no	-0.241*** [0.0462]	-0.103* [0.0446]	-0.412*** [0.0747]	-0.161* [0.0664]	-0.0103 [0.155]	-0.428*** [0.0702]	-0.0996* [0.0498]	-0.264*** [0.0708]	0.234 [0.215]	-0.217*** [0.0588]	-0.230*** [0.0680]
District's tradable employment, cumulative annual growth 1997–2000 (standardized)	0.00141 [0.0418]	0.0142 [0.0441]	-0.0123 [0.0477]	-0.0396 [0.0713]	0.103 [0.0718]	-0.00788 [0.0296]	0.0787 [0.0518]	0.0260 [0.0326]	-0.0212 [0.0376]	0.0882* [0.0414]	-0.0320 [0.0419]
Sumatera Barat	0.0910 [0.103]	0.0532 [0.110]	0.128 [0.133]	0.0947 [0.315]	-0.331 [0.256]	0.0753 [0.187]	-0.0671 [0.154]	0.143 [0.100]	0.294 [0.303]	0.0550 [0.120]	
Riau	-0.314 [0.230]	-0.317 [0.270]	-0.327 [0.302]	0.674 [0.551]	-0.221 [0.213]	-1.002*** [0.196]	-0.496*** [0.150]	-0.00168 [0.313]	-1.231*** [0.270]	-0.484 [0.312]	
Sumatera Selatan	-0.0455 [0.147]	-0.154+ [0.0918]	0.0922 [0.269]	0.0940 [0.322]	-0.326 [0.252]	0.0634 [0.221]	-0.241 [0.180]	0.0774 [0.151]	0.0784 [0.342]	-0.0876 [0.151]	
Lampung	-0.263+ [0.152]	-0.145 [0.151]	-0.369* [0.172]	-0.163 [0.312]	-0.329 [0.268]	-0.281 [0.259]	-0.275 [0.172]	-0.109 [0.254]	0.319 [0.385]	-0.228+ [0.135]	
DKI Jakarta	-0.749 [0.545]	-0.488 [0.437]	-1.093 [0.697]	-8.435+ [4.816]	-1.062 [0.781]	-0.543 [0.350]	-1.352+ [0.702]	-0.110 [0.421]	0.159 [0.334]		
Jawa Barat	0.0394 [0.0913]	-0.0108 [0.0903]	0.104 [0.123]	-0.123 [0.285]	0.203 [0.208]	-0.0558 [0.165]	-0.141 [0.159]	0.273** [0.0849]	0.249 [0.255]		0.660 [0.500]
Jawa Tengah	0.133 [0.100]	0.159 [0.105]	0.103 [0.142]	0.00289 [0.301]	0.0603 [0.227]	-0.00662 [0.169]	0.0250 [0.172]	0.213* [0.0960]	0.405 [0.282]		0.754 [0.509]

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Table A8 continued

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Baseline	Female	Male	Agriculture and Mining	Manufacturing	Services	Low level	Mid level	High level	Non-Java Islands	Java Island
Yogyakarta	0.258** [0.0862]	0.225* [0.0880]	0.331* [0.134]	-0.127 [0.297]	-0.0356 [0.254]	0.192 [0.168]	-0.0710 [0.162]	0.272* [0.125]	0.345 [0.270]		0.881+ [0.515]
Jawa Timur	0.133 [0.0885]	0.181+ [0.103]	0.0857 [0.122]	0.0668 [0.291]	0.143 [0.226]	-0.0101 [0.165]	0.139 [0.162]	0.129 [0.0970]	0.312 [0.269]		0.765 [0.501]
Bali	-0.0451 [0.129]	-0.0185 [0.113]	-0.0591 [0.179]	-0.453 [0.434]	-0.357 [0.271]	-0.0304 [0.198]	-0.335* [0.167]	0.263 [0.208]	0.412 [0.301]	-0.112 [0.165]	
NTB	0.0566 [0.102]	-0.00302 [0.0890]	0.136 [0.152]	-0.225 [0.364]	-0.287 [0.233]	0.00317 [0.164]	-0.271 [0.165]	0.274* [0.117]	0.697* [0.278]	0.0965 [0.105]	
Kalteng	-0.0467 [1.036]	-1.213* [0.483]	0.223 [1.147]		0.482 [0.363]	-1.944*** [0.320]	-2.235*** [0.539]	1.218*** [0.186]		-0.440 [1.346]	
Kalsel	-0.238 [0.237]	-0.262 [0.181]	-0.171 [0.306]	-0.968 [0.976]	-0.250 [0.339]	0.0670 [0.237]	-0.559 [0.368]	0.0738 [0.162]	0.464 [0.311]	-0.321 [0.350]	
Sulsel	-0.175 [0.124]	-0.175 [0.112]	-0.235 [0.203]	-0.0646 [0.336]	-0.466+ [0.258]	-0.180 [0.198]	-0.309+ [0.186]	-0.00761 [0.115]	0.261 [0.371]	-0.221 [0.156]	
Constant	-0.293*** [0.0823]	-0.268** [0.0825]	0.236* [0.111]	0.121 [0.360]	0.150 [0.214]	0.0549 [0.160]	-0.159 [0.153]	-0.389*** [0.0838]	0.520* [0.228]	-0.214+ [0.129]	-0.927+ [0.484]
Observations	6,901	3,785	3,116	1,686	848	2,861	3,005	2,813	594,594	2,866	4,035
R ²	0.054	0.008	-0.052	-1.196	0.089	0.050	-0.053	0.139	0.094	0.021	0.041
Kleibergen-Paap F-Stat	33.00	37.18	29.73	3.806	46.54	35.93	19.22	37.50	101.3	5.176	81.61
Robust CS (lower bound)	0.0211	-0.105	0.213	0.631	0.016	0.076	0.213	-0.167	-0.317	0.258	0.001
Robust CS (upper bound)	0.646	0.453	0.914	...	0.906	0.408	0.871	0.469	0.018	...	0.594
Nonrobust (Wald) CS (lower bound)	0.093	-0.043	0.282	-0.071	0.083	0.094	0.175	-0.079	-0.32	0.019	0.045
Nonrobust (Wald) CS (upper bound)	0.675	0.482	0.934	3.261	0.936	0.411	0.748	0.512	0.011	1.16	0.621

Note: Standard errors are provided in brackets and are clustered within district. The model uses export of ASEAN region to the PRC as the instrument, which includes the following countries: Brunei Darussalam, Singapore, Myanmar, Malaysia, the Philippines, and Thailand. Individual-level data cover all adult individuals that exist across the three latest IFLS waves: 2000, 2007, and 2014 (balanced panel). Continuous variables are transformed into standardized variables with mean = 0 and standard deviation = 1. Covariates are used across all estimations. The Stock-Yogo (2005) critical value with 10% maximal bias is 16.38, while the suggested minimum value for F-stat that is robust to heteroscedasticity, serial correlation, and clustering problems (effective F-stat) is 23.1. Confidence sets (CS) are based on 1,000 grid points in the interval of [-0.5, 2]. Robust confidence sets are based on the Anderson-Rubin (AR) test and robust to heteroskedasticity and clustering issues. Wald confidence sets are based on 2SLS estimates and are not robust to weak instruments. Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A9: The Heterogeneous Impact of Export Expansion to the PRC on Earnings Growth: 2SLS Estimation, Full Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Baseline	Female	Male	Agriculture and Mining	Manufacturing	Services	Low level	Mid level	High level	Non-Java Islands	Java Island
Indonesia's export expansion 2000–2007, 2000 district weight (standardized)	0.0746 [0.0513]	–0.0105 [0.0886]	0.114* [0.0507]	–0.129 [0.465]	0.0493 [0.160]	0.104* [0.0468]	–0.120 [0.185]	–0.00138 [0.0485]	0.0474 [0.0935]	–0.0693 [0.121]	0.123* [0.0512]
Gender, 1 = male, 0 = female	–0.00258 [0.0315]			–0.0262 [0.0940]	0.0907 [0.0867]	–0.0612 [0.0400]	0.0304 [0.0538]	–0.0480 [0.0473]	0.00765 [0.0828]	–0.00756 [0.0506]	–0.00133 [0.0407]
Age (years) in 2000 (standardized)	–0.0845*** [0.0160]	–0.102*** [0.0269]	–0.0737*** [0.0192]	–0.0767* [0.0329]	–0.133** [0.0460]	–0.0953*** [0.0230]	–0.0971*** [0.0240]	–0.0524* [0.0244]	–0.0840+ [0.0431]	–0.0768** [0.0253]	–0.0932*** [0.0207]
Father's years of education in 2000 (standardized)	0.0123 [0.0136]	–0.00336 [0.0227]	0.0232 [0.0164]	0.0188 [0.0473]	–0.0179 [0.0377]	0.0338+ [0.0189]	–0.0650 [0.0513]	0.00869 [0.0185]	0.000848 [0.0291]	0.0241 [0.0217]	0.00174 [0.0178]
Sufficient ventilation in 2000, 1 = yes, 0 = no	0.0464 [0.0416]	0.0592 [0.0676]	0.0485 [0.0461]	0.0345 [0.0905]	0.172 [0.110]	0.0322 [0.0484]	0.0763 [0.0599]	–0.0180 [0.0610]	–0.0613 [0.227]	0.157* [0.0675]	–0.0151 [0.0503]
Piles of trash around the house in 2000, 1 = yes, 0 = no	–0.109* [0.0510]	0.0397 [0.0799]	–0.189** [0.0613]	–0.128+ [0.0746]	–0.361** [0.134]	–0.0711 [0.0751]	–0.0760 [0.0702]	–0.123 [0.0862]	–0.0596 [0.132]	–0.125+ [0.0678]	–0.110 [0.0767]
District's tradable employment, cumulative annual growth 1997–2000 (standardized)	–0.0147 [0.0212]	–0.0611+ [0.0349]	0.00722 [0.0268]	0.00220 [0.0375]	0.0799 [0.0536]	–0.0543+ [0.0280]	–0.0580 [0.0486]	–0.0276 [0.0230]	–0.0559 [0.0364]	–0.0425 [0.0268]	–0.00315 [0.0264]
Sumatera Barat	0.0942 [0.0912]	0.165 [0.156]	0.0464 [0.111]	–0.0477 [0.176]	–0.364+ [0.192]	0.214* [0.107]	–0.0799 [0.117]	0.174 [0.172]	0.504+ [0.302]	0.117 [0.108]	
Riau	–0.182 [0.217]	0.486 [0.365]	–0.413* [0.167]	–0.462 [0.392]	–0.809*** [0.148]	0.104 [0.240]	–0.563 [0.349]	0.0851 [0.272]		–0.100 [0.240]	
Sumatera Selatan	0.306*** [0.0611]	0.336+ [0.188]	0.288** [0.102]	0.0879 [0.138]	0.289 [0.192]	0.382** [0.121]	0.194 [0.131]	0.443** [0.166]	0.321 [0.399]	0.320*** [0.0677]	
Lampung	0.0403 [0.0958]	–0.184 [0.173]	0.118 [0.102]	0.0222 [0.154]	0.204 [0.400]	–0.128 [0.150]	–0.168 [0.121]	0.298* [0.138]	–0.0539 [0.377]	0.0307 [0.0893]	
DKI Jakarta	–0.120 [0.185]	0.0298 [0.246]	–0.191 [0.214]	0.712 [2.424]	–0.251 [0.433]	–0.212 [0.200]	0.282 [0.561]	0.167 [0.143]	–0.0837 [0.267]		
Jawa Barat	0.00940 [0.0681]	0.0670 [0.110]	–0.0223 [0.0844]	–0.145 [0.146]	–0.0463 [0.129]	0.0139 [0.0922]	–0.192 [0.141]	0.197* [0.0838]	0.152 [0.232]		0.249 [0.205]
Jawa Tengah	–0.0594 [0.0912]	–0.0546 [0.120]	–0.0608 [0.0958]	–0.0595 [0.142]	–0.270 [0.206]	–0.114 [0.0940]	–0.212 [0.134]	–0.0141 [0.116]	0.342 [0.236]		0.185 [0.237]

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Table A9 *continued*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Baseline	Female	Male	Agriculture and Mining	Manufacturing	Services	Low level	Mid level	High level	Non-Java Islands	Java Island
Yogyakarta	0.122* [0.0596]	0.0545 [0.106]	0.163* [0.0748]	0.234+ [0.139]	-0.132 [0.226]	0.0896 [0.0875]	0.0564 [0.120]	0.145+ [0.0831]	0.153 [0.235]		0.373+ [0.217]
Jawa Timur	0.0474 [0.0708]	0.139 [0.106]	-0.0142 [0.0805]	0.0211 [0.148]	-0.143 [0.153]	0.0240 [0.0753]	-0.0701 [0.132]	0.141 [0.0921]	0.144 [0.225]		0.294 [0.211]
Bali	0.164 [0.135]	0.314+ [0.179]	0.0619 [0.143]	0.148 [0.233]	-0.125 [0.259]	0.0983 [0.140]	-0.0616 [0.184]	0.413** [0.142]	0.318 [0.229]	0.208 [0.155]	
NTB	0.196** [0.0760]	0.252** [0.0798]	0.166+ [0.0982]	0.196 [0.192]	0.450+ [0.239]	0.0878 [0.0998]	0.112 [0.135]	0.391*** [0.0885]	-0.0678 [0.276]	0.186* [0.0801]	
Kalteng	0.0600 [0.265]		0.0747 [0.209]		0.168 [0.236]			0.184 [0.343]		0.208 [0.356]	
Kalsel	-0.0220 [0.104]	-0.0592 [0.188]	-0.0133 [0.109]	0.0134 [0.246]	-0.174 [0.255]	-0.0534 [0.141]	-0.171 [0.203]	0.202 [0.132]	0.123 [0.295]	0.0270 [0.131]	
Sulsel	0.196* [0.0848]	0.169 [0.107]	0.208* [0.103]	0.182 [0.173]	0.143 [0.356]	0.161+ [0.0881]	0.0724 [0.148]	0.351** [0.126]	0.270 [0.254]	0.226* [0.101]	
Constant	-0.0737 [0.0605]	-0.143 [0.0899]	-0.0421 [0.0791]	-0.0451 [0.205]	-0.150 [0.147]	0.0363 [0.0781]	-0.114 [0.122]	-0.0986 [0.0960]	0.177 [0.304]	-0.202* [0.0799]	-0.261 [0.209]
Observations	4,406	1,624	2,782	1,099	648	2,304	1,853	1,839	471	1,773	2,633
R ²	0.017	0.024	0.018	0.011	0.062	0.021	0.020	0.024	0.036	0.020	0.002
Kleibergen-Paap F-Stat	36.04	40.53	33.60	4.330	41.57	39.99	19.09	38.40	85.18	5.521	79.25
Robust CS (lower bound)	-0.024	-0.207	0.026	...	-252252	0.003	...	-0.105	-0.125	...	0.021
Robust CS (upper bound)	0.186	0.156	0.238	0.856	.405906	0.193	0.218	0.093	0.248	0.098	0.223
Nonrobust (Wald) CS (lower bound)	-0.026	-0.184	0.015	-1.042	-265144	0.012	-0.483	-0.096	-0.136	-0.307	0.022
Nonrobust (Wald) CS (upper bound)	0.175	0.163	0.213	0.783	.363683	0.196	0.242	0.094	0.231	0.168	0.223

Note: Standard errors are provided in brackets and are clustered within district. The model uses export of ASEAN region to the PRC as the instrument, which includes the following countries: Brunei Darussalam, Singapore, Myanmar, Malaysia, the Philippines, and Thailand. Individual-level data cover all adult individuals that exist across the three latest IFLS waves: 2000, 2007, and 2014 (balanced panel). Continuous variables are transformed into standardized variables with mean = 0 and standard deviation = 1. Covariates are used across all estimations. The Stock-Yogo (2005) critical value with 10% maximal bias is 16.38, while the suggested minimum value for F-stat that is robust to heteroscedasticity, serial correlation, and clustering problems (effective F-stat) is 23.1. Confidence sets (CS) are based on 1,000 grid points in the interval of [-0.5, 2]. Robust confidence sets are based on the Anderson-Rubin (AR) test and robust to heteroscedasticity and clustering issues. Wald confidence sets are based on 2SLS estimates and are not robust to weak instruments. Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A10: Impact of Export Expansion to the PRC on Formality and Earnings Growth: 2SLS Estimation, Matched Datasets, Full Results

	(1) Formality, All	(2) Formality, Matched	(3) Earnings, All	(4) Earnings, Matched
Indonesia's export expansion 2000–2007, 2000 district weight (standardized)	0.384** [0.148]	0.222* [0.106]	0.0746 [0.0513]	0.185*** [0.0503]
Gender, 1 = male, 0 = female	0.560*** [0.0330]	0.366*** [0.0586]	–0.00258 [0.0315]	–0.00186 [0.0462]
Age (years) in 2000 (standardized)	–0.0450** [0.0140]	–0.0544* [0.0264]	–0.0845*** [0.0160]	–0.0705** [0.0239]
Father's years of education in 2000 (standardized)	0.0799*** [0.0129]	0.0596** [0.0208]	0.0123 [0.0136]	0.0183 [0.0186]
Sufficient ventilation in 2000, 1 = yes, 0 = no	0.111** [0.0358]	0.178** [0.0587]	0.0464 [0.0416]	–0.00510 [0.0604]
Piles of trash around the house in 2000, 1 = yes, 0 = no	–0.241*** [0.0462]	–0.441*** [0.106]	–0.109* [0.0510]	–0.189 [0.117]
District's tradable employment, cumulative annual growth 1997–2000 (standardized)	0.00141 [0.0418]	–0.00410 [0.0431]	–0.0147 [0.0212]	–0.0570 [0.0460]
Sumatera Barat	0.0910 [0.103]	0.0740 [0.153]	0.0942 [0.0912]	0.267*** [0.0761]
Riau	–0.314 [0.230]	–0.819*** [0.217]	–0.182 [0.217]	–0.0196 [0.246]
Sumatera Selatan	–0.0455 [0.147]	0.0344 [0.207]	0.306*** [0.0611]	0.315** [0.119]
Lampung	–0.263+ [0.152]	–0.102 [0.262]	0.0403 [0.0958]	–0.0501 [0.101]
DKI Jakarta	–0.749 [0.545]	–0.456 [0.386]	–0.120 [0.185]	–0.349 [0.281]
Jawa Barat	0.0394 [0.0913]	0.198 [0.124]	0.00940 [0.0681]	–0.0204 [0.0925]
Jawa Tengah	0.133 [0.100]	0.0223 [0.146]	–0.0594 [0.0912]	–0.0850 [0.114]
Yogyakarta	0.258** [0.0862]	0.298* [0.148]	0.122* [0.0596]	0.111 [0.0821]
Jawa Timur	0.133 [0.0885]	0.207 [0.137]	0.0474 [0.0708]	–0.0246 [0.0889]
Bali	–0.0451 [0.129]	–0.0487 [0.220]	0.164 [0.135]	0.111 [0.148]
NTB	0.0566 [0.102]	0.539*** [0.154]	0.196** [0.0760]	0.184+ [0.0944]
Kalteng	–0.0467 [1.036]	0.466 [0.779]	0.0600 [0.265]	0.0559 [0.181]
Kalsel	–0.238 [0.237]	–0.262 [0.288]	–0.0220 [0.104]	–0.0475 [0.176]
Sulsel	–0.175 [0.124]	–0.109 [0.162]	0.196* [0.0848]	0.0150 [0.129]
Constant	–0.293*** [0.0823]	0.0509 [0.123]	–0.0737 [0.0605]	–0.0311 [0.0719]
Observations	6,901	2,192	4,406	1,813
R ²	0.054	0.023	0.017	–0.000
Kleibergen-Paap F-Stat	33.00	44.23	36.04	46.16
Robust CS (lower bound)	0.021	–0.02	–0.025	0.076
Robust CS (upper bound)	0.646	0.413	0.186	0.278
Nonrobust (Wald) CS (lower bound)	0.093	0.015	–0.026	0.087
Nonrobust (Wald) CS (upper bound)	0.675	0.429	0.175	0.284

Note: Columns (1) and (3) cover all samples, while Columns (2) and (4) only include matched individuals across control and treatment groups. Individuals living in a region where export expansion is larger than the 75th percentile are considered to be in the treated group. Standard errors are provided in brackets and are clustered within district. The model uses export of ASEAN region to the PRC as the instrument, which includes the following countries: Brunei Darussalam, Singapore, Myanmar, Malaysia, the Philippines, and Thailand. Individual-level data cover all adult individuals that exist across the three latest IFLS waves: 2000, 2007, and 2014 (balanced panel). Continuous variables are transformed into standardized variables with mean = 0 and standard deviation = 1. Covariates are used across all estimations. The Stock-Yogo (2005) critical value with 10% maximal bias is 16.38, while the suggested minimum value for F-stat that is robust to heteroscedasticity, serial correlation, and clustering problems (effective F-stat) is 23.1. Confidence sets (CS) are based on 1,000 grid points in the interval of [–0.5, 2]. Robust confidence sets are based on the Anderson-Rubin (AR) test and robust to heteroskedasticity and clustering issues. Wald confidence sets are based on 2SLS estimates and are not robust to weak instruments. Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A11: The Impact of Export Expansion to the PRC on Formal Employment by Decile of Earnings: 2SLS Estimation, Full Results, Matched Datasets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Indonesia' s export expansion 2000–2007, 2000 district weight (standardized)	0.382*** [0.111]	0.687*** [0.160]	0.676+ [0.388]	1.134** [0.425]	0.721** [0.244]	0.0780 [0.152]	-0.434*** [0.125]	-0.252* [0.111]	-0.248 [0.192]	-0.156 [0.151]
Gender, 1 = male, 0 = female	0.642*** [0.126]	0.0632 [0.130]	0.515** [0.163]	0.235 [0.180]	0.0899 [0.148]	0.392* [0.195]	0.0894 [0.130]	0.339 [0.216]	-0.121 [0.106]	0.390* [0.157]
Age (years) in 2000 (standardized)	-0.0925 [0.0628]	-0.0236 [0.0772]	-0.160* [0.0730]	-0.145 [0.0882]	-0.133+ [0.0769]	-0.201* [0.0860]	-0.184* [0.0858]	-0.0424 [0.117]	0.212** [0.0807]	0.162+ [0.0890]
Father' s years of education in 2000 (standardized)	0.134 [0.0827]	0.154** [0.0587]	0.107 [0.0752]	0.0742 [0.0788]	0.149** [0.0549]	0.207*** [0.0592]	-0.0324 [0.0597]	-0.148 [0.0970]	0.0242 [0.0472]	0.0824 [0.0692]
Sufficient ventilation in 2000, 1 = yes, 0 = no	0.0275 [0.103]	0.299+ [0.179]	-0.0732 [0.170]	0.0722 [0.185]	-0.0269 [0.147]	-0.469* [0.187]	-0.366* [0.163]	0.620* [0.294]	0.208 [0.279]	0.131 [0.195]
Piles of trash around the house in 2000, 1 = yes, 0 = no	-0.653*** [0.168]	0.190 [0.178]	-0.152 [0.301]	-0.0949 [0.448]	-0.834* [0.369]	-0.125 [0.391]	-0.0957 [0.257]	0.643 [0.426]	0.557+ [0.292]	-0.717+ [0.428]
District' s tradable employment, cumulative annual growth 1997–2000 (standardized)	-0.0308 [0.0461]	0.144 [0.0993]	0.130 [0.201]	0.116 [0.114]	0.301 [0.185]	-0.151 [0.0921]	-0.134* [0.0629]	-0.238* [0.0991]	-0.00821 [0.0612]	-0.100 [0.0937]
Sumatera Barat	-0.902 [0.558]	-0.997** [0.360]	0.605* [0.275]	-0.0902 [0.562]	0.294 [0.301]	-0.315 [0.398]	0.147 [0.303]	1.209** [0.447]	0.0290 [0.316]	0.689 [0.460]
Riau	-1.420* [0.578]			-1.993* [0.853]			-0.0218 [0.486]	-1.069** [0.362]		
Sumatera Selatan	-0.464 [0.543]	-0.447 [0.385]	0.191 [0.310]	-0.563 [0.375]	-0.296 [0.309]	-0.918* [0.395]	0.0747 [0.355]	0.191 [0.731]	0.491 [0.320]	0.980** [0.315]
Lampung	-0.507 [0.604]	-0.736* [0.363]	0.819+ [0.452]	-0.339 [0.243]	-0.180 [0.269]	-0.935+ [0.525]	0.366 [0.424]	-0.593 [0.566]	0.822* [0.327]	0.342 [0.382]
DKI Jakarta	-1.419+ [0.772]	-2.419** [0.836]	-1.323 [1.596]	-2.059* [0.991]	-1.827 [1.120]	-0.813* [0.408]	1.581** [0.601]	0.843* [0.414]	0.550 [0.575]	0.580 [0.425]
Jawa Barat	-0.525 [0.550]	-0.555 [0.384]	0.971** [0.347]	0.0995 [0.412]	0.377+ [0.218]	-0.784* [0.381]	0.397 [0.268]	0.616+ [0.344]	0.266 [0.333]	0.710* [0.306]
Jawa Tengah	-0.632 [0.570]	-0.729* [0.363]	0.743** [0.283]	0.0455 [0.311]	0.212 [0.232]	-0.600 [0.438]	0.438 [0.339]	0.867* [0.433]	-0.0197 [0.441]	0.369 [0.353]

continued on next page

Table A11 continued

	(1) 1st	(2) 2nd	(3) 3rd	(4) 4th	(5) 5th	(6) 6th	(7) 7th	(8) 8th	(9) 9th	(10) 10th
Yogyakarta	-0.367 [0.555]	-0.477 [0.414]	0.935** [0.344]	0.0874 [0.275]	0.558* [0.229]	-1.366** [0.485]	1.130*** [0.320]	0.465 [0.456]	-0.0227 [0.385]	0.441 [0.299]
Jawa Timur	-0.726 [0.565]	-1.075** [0.376]	0.645* [0.288]	0.0576 [0.257]	0.436+ [0.253]	-0.473 [0.410]	0.592* [0.290]	0.730+ [0.389]	0.205 [0.320]	0.680* [0.291]
Bali	-0.926 [0.576]	-1.447*** [0.430]	0.273 [0.421]	-0.646 [0.527]	-0.497+ [0.277]	-0.361 [0.487]	0.508 [0.468]	0.454 [0.537]	0.329 [0.337]	1.033** [0.398]
NTB	-0.334 [0.578]	-1.007** [0.369]	0.823* [0.325]	0.436 [0.428]	0.791*** [0.201]	0.663 [0.413]	0.518 [0.325]	0.229 [0.553]	0.586+ [0.306]	1.044** [0.400]
Kalsel	-1.100+ [0.620]	-2.228* [0.992]	0.108 [0.658]	-2.293 [1.412]	-0.160 [0.616]	-1.343** [0.451]	0.772+ [0.419]	0.523 [0.547]	0.455 [0.525]	0.419 [0.517]
Sulsel	-0.428 [0.655]	-1.482** [0.544]	-0.302 [0.579]	-0.585 [0.688]	-0.913* [0.450]	-1.507*** [0.426]	1.529** [0.551]	0.0230 [0.758]	0.522 [0.330]	0.311 [0.361]
Kalteng					2.207*** [0.486]		0.824 [0.546]		1.148* [0.539]	
Constant	0.265 [0.556]	0.545+ [0.318]	-0.626** [0.241]	0.270 [0.247]	0.340+ [0.204]	1.290** [0.398]	0.544* [0.274]	-0.318 [0.513]	0.909+ [0.469]	-0.262 [0.298]
Observations	232	219	201	232	322	113	324	135	207	207
R ²	0.114	-0.236	-0.168	-0.401	-0.238	0.347	-0.001	0.110	0.112	0.123
Kleibergen-Paap F-Stat	45.84	20.43	22.96	11.79	19.15	35.42	53.55	86.88	72.48	68.36
Robust CS (lower bound)	0.133	0.431	0.028	0.502	0.323	-0.29	-0.704	-0.465	-0.584	-0.462
Robust CS (upper bound)	0.586	1.147	1.722	2.688	1.427	0.338	-0.2	-0.022	0.189	0.143
Nonrobust (Wald) CS (lower bound)	0.164	0.374	-0.085	0.301	0.242	-0.219	-0.679	-0.470	-0.624	-0.452
Nonrobust (Wald) CS (upper bound)	0.6	1.	1.436	1.968	1.199	0.375	-0.19	-0.034	0.128	0.14

Note: Observation only includes matched individuals across control and treatment groups. Individuals living in a region where export expansion is larger than the 75th percentile are considered to be in the treated group. Standard errors are provided in brackets and are clustered within district. The model uses export of ASEAN region to the PRC as the instrument, which includes the following countries: Brunei Darussalam, Singapore, Malaysia, the Philippines, and Thailand. Individual-level data cover all adult individuals that exist across the three latest IFLS waves: 2000, 2007, and 2014 (balanced panel). Continuous variables are transformed into standardized variables with mean = 0 and standard deviation = 1. Covariates are used across all estimations. The Stock-Yogo (2005) critical value with 10% maximal bias is 16.38, while the suggested minimum value for F-stat that is robust to heteroskedasticity, serial correlation, and clustering problems (effective F-stat) is 23.1. Robust confidence sets are based on the Anderson-Rubin (AR) test and robust to heteroskedasticity and clustering issues. Wald confidence sets are based on 2SLS estimates and are not robust to weak instruments. Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A12: The Impact of Export Expansion to the PRC on Earnings Growth by Decile of Earnings: 2SLS Estimation, Full Results, Matched Datasets

	(1) 1st	(2) 2nd	(3) 3rd	(4) 4th	(5) 5th	(6) 6th	(7) 7th	(8) 8th	(9) 9th	(10) 10th
Indonesia' s export expansion 2000–2007, 2000 district weight (standardized)	0.296 [0.204]	0.810*** [0.244]	0.572* [0.244]	0.490 [0.359]	0.321 [0.227]	0.0913 [0.150]	0.0761 [0.139]	0.251* [0.103]	–0.0878 [0.103]	0.0419 [0.151]
Gender, 1 = male, 0 = female	0.203 [0.176]	0.294+ [0.159]	0.264 [0.178]	–0.0152 [0.155]	0.127 [0.133]	0.0997 [0.163]	–0.142 [0.0976]	–0.0832 [0.164]	–0.0727 [0.112]	0.148 [0.190]
Age (years) in 2000 (standardized)	–0.126 [0.0986]	–0.0671 [0.0809]	–0.179** [0.0656]	–0.0596 [0.0802]	–0.0613 [0.0596]	–0.0731 [0.0688]	–0.0789 [0.0541]	–0.0410 [0.0557]	0.165** [0.0524]	0.263* [0.122]
Father' s years of education in 2000 (standardized)	–0.00440 [0.0770]	0.132+ [0.0689]	0.0325 [0.0526]	0.00743 [0.0504]	0.0788* [0.0346]	0.0985+ [0.0573]	–0.0330 [0.0381]	–0.118* [0.0507]	0.0112 [0.0534]	0.0163 [0.0650]
Sufficient ventilation in 2000, 1 = yes, 0 = no	0.0462 [0.184]	–0.131 [0.197]	–0.00836 [0.139]	0.162 [0.152]	0.233+ [0.134]	0.143 [0.211]	0.167 [0.127]	–0.0492 [0.235]	0.211 [0.151]	0.214 [0.271]
Piles of trash around the house in 2000, 1 = yes, 0 = no	–0.295 [0.246]	–0.00937 [0.275]	0.312 [0.270]	–0.932* [0.457]	–0.269 [0.218]	–0.443 [0.424]	0.124 [0.277]	–0.325 [0.437]	–0.301 [0.427]	–1.047 [0.698]
District' s tradable employment, cumulative annual growth 1997–2000 (standardized)	–0.143* [0.0673]	–0.137 [0.105]	0.0336 [0.0924]	–0.0627 [0.0522]	0.0896 [0.119]	–0.0231 [0.0804]	0.0438 [0.0455]	–0.130 [0.0801]	0.0386 [0.0461]	–0.0200 [0.123]
Sumatera Barat	–1.365*** [0.387]	–0.506 [0.395]	0.347* [0.174]	0.538* [0.273]	–0.260 [0.241]	–0.124 [0.247]	–0.118 [0.206]	1.048* [0.477]	0.0398 [0.263]	0.596 [0.427]
Riau	–1.960*** [0.448]			0.194 [0.437]			–0.360 [0.399]	0.346 [0.463]		
Sumatera Selatan	–0.844* [0.394]	–0.339 [0.365]	0.524** [0.180]	–0.132 [0.321]	–0.128 [0.251]	–0.275 [0.287]	–0.199 [0.267]	–0.00366 [0.578]	0.695* [0.334]	0.586 [0.382]
Lampung	–2.323*** [0.393]	–0.660 [0.415]	0.493+ [0.281]	–0.111 [0.249]	–0.286 [0.181]	–1.100*** [0.330]	–0.0669 [0.287]	0.367 [0.511]	0.126 [0.192]	0.0257 [0.391]
DKI Jakarta	–1.680** [0.571]	–1.758+ [1.022]	–1.238 [1.113]	–1.161 [0.884]	–1.216 [0.880]	–0.698+ [0.387]	–0.0963 [0.484]	0.236 [0.458]	0.299 [0.317]	0.164 [0.540]
Jawa Barat	–1.477** [0.514]	–0.744** [0.262]	0.425* [0.202]	–0.0692 [0.252]	–0.215 [0.133]	–0.362 [0.261]	–0.0253 [0.201]	0.408 [0.452]	0.0244 [0.170]	0.582 [0.415]
Jawa Tengah	–2.158*** [0.391]	–0.709*** [0.194]	0.0853 [0.217]	–0.202 [0.239]	–0.566*** [0.125]	–0.343 [0.320]	–0.153 [0.265]	0.700 [0.526]	–0.282 [0.332]	0.246 [0.460]

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Table A12 continued

	(1) 1st	(2) 2nd	(3) 3rd	(4) 4th	(5) 5th	(6) 6th	(7) 7th	(8) 8th	(9) 9th	(10) 10th
Jawa Timur	-1.563*** [0.392]	-0.581+ [0.312]	0.205 [0.162]	-0.375 [0.320]	-0.457** [0.151]	0.114 [0.338]	-0.0738 [0.196]	0.0550 [0.548]	-0.164 [0.247]	0.338 [0.408]
Bali	-1.350** [0.416]	-0.503 [0.356]	-0.363+ [0.208]	0.429 [0.415]	-0.417 [0.375]	-0.315 [0.257]	-0.162 [0.196]	0.370 [0.453]	0.138 [0.218]	1.054* [0.464]
NTB	-1.637*** [0.372]	0.419 [0.451]	0.608** [0.199]	-0.229 [0.237]	-0.156 [0.173]	0.268 [0.349]	0.146 [0.197]	0.595 [0.490]	0.108 [0.142]	0.469 [0.425]
Kalsel	-1.977*** [0.551]	-1.339* [0.636]	-0.253 [0.428]	-0.937 [0.956]	-0.687+ [0.354]	-0.551+ [0.325]	0.110 [0.247]	0.498 [0.550]	0.0675 [0.195]	0.503 [0.698]
Sulsel	-2.023*** [0.504]	-1.512** [0.537]	0.655 [0.594]	-0.965 [0.747]	-0.336 [0.346]	-0.166 [0.398]	-0.00901 [0.483]	0.818 [0.501]	0.316+ [0.176]	-0.315 [0.456]
Yogyakarta		-0.389 [0.364]	0.343 [0.199]	0.114 [0.234]	-0.00361 [0.578]	-0.00109 [0.203]	-0.0539 [0.496]	0.810 [0.183]	-0.0668 [0.395]	0.424
Kalteng					0.0773 [0.327]				0.807** [0.272]	
Constant	2.470*** [0.437]	0.753** [0.243]	-0.326+ [0.183]	0.101 [0.228]	-0.120 [0.154]	-0.0316 [0.246]	-0.106 [0.181]	-0.557 [0.515]	-0.212 [0.215]	-1.324** [0.409]
Observations	156	166	167	187	277	93	279	120	193	175
R ²	0.218	-0.148	-0.114	-0.029	-0.081	0.192	0.053	0.151	0.145	0.171
Kleibergen-Paap F-Stat	23.29	24.61	28.26	10.66	17.29	56.21	58.18	88.47	77.78	48.90
Robust CS (lower bound)	-0.242	0.413	0.126	-0.115	-0.117	-0.26	-0.24	0.033	-0.285	-0.26
Robust CS (upper bound)	0.641	1.474	1.152	1.69	0.886	0.348	0.323	0.441	0.128	0.353
Nonrobust (Wald) CS (lower bound)	-0.104	0.331	0.093	-0.215	-0.124	-0.202	-0.197	0.05	-0.29	-0.254
Nonrobust (Wald) CS (upper bound)	0.696	1.289	1.05	1.194	0.766	0.385	0.348939	0.453	0.114	0.338

Note: Observation only includes matched individuals across control and treatment groups. Individuals living in a region where export expansion is larger than the 75th percentile are considered to be in the treated group. Standard errors are provided in brackets and are clustered within district. The model uses export of ASEAN region to the PRC as the instrument, which includes the following countries: Brunei Darussalam, Singapore, Malaysia, the Philippines, and Thailand. Individual-level data cover all adult individuals that exist across the three latest IFLS waves: 2000, 2007, and 2014 (balanced panel). Continuous variables are transformed into standardized variables with mean = 0 and standard deviation = 1. Covariates are used across all estimations. The Stock-Yogo (2005) critical value with 10% maximal bias is 16.38, while the suggested minimum value for F-stat that is robust to heteroskedasticity, serial correlation, and clustering problems (effective F-stat) is 23.1. Robust confidence sets are based on the Anderson-Rubin (AR) test and robust to heteroskedasticity and clustering issues. Wald confidence sets are based on 2SLS estimates and are not robust to weak instruments. Significance: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Figure A1: Covariates Balance, Overall

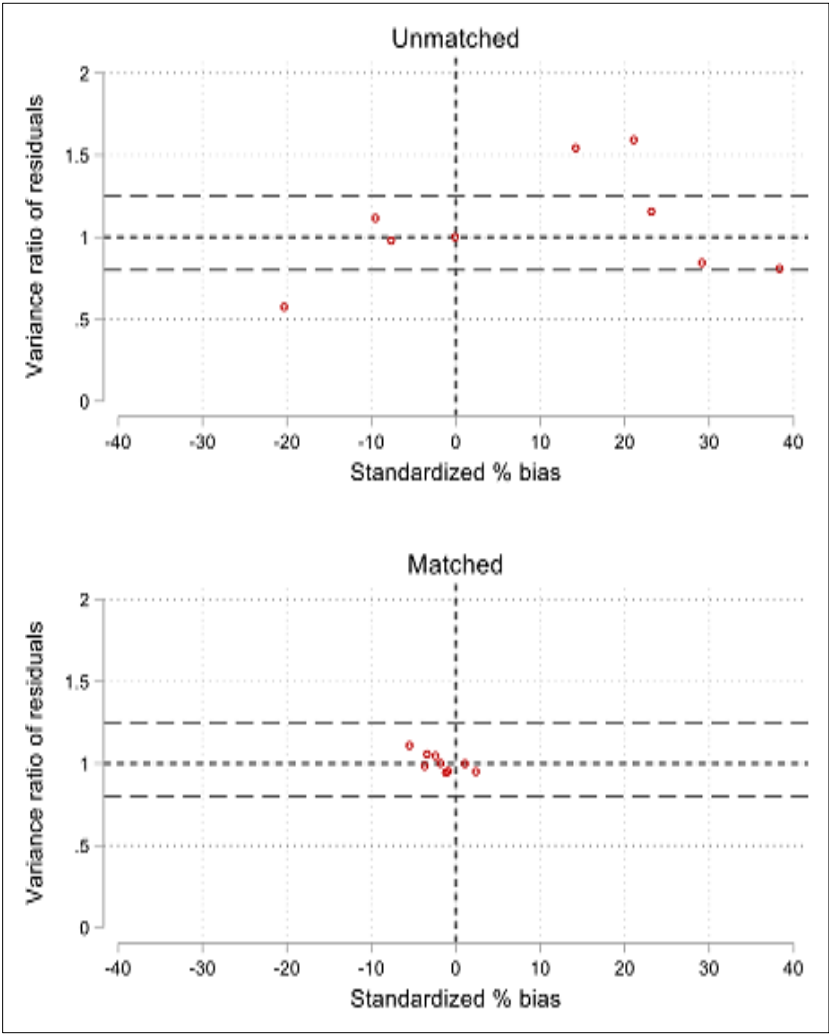


Figure A2: Covariates Balance, by Variables

