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Hani Mansour, Pamela Medina, Andrea Velásquez

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Import Competition and Gender Differences in Labor Reallocation

Abstract

We study gender differences in the labor market reallocation of Peruvian workers in response to trade liberalization. The empirical strategy relies on variation in import competition across local labor markets based on their industrial composition before China entered the global market in 2001. In contrast to much of the existing literature, we find that import competition did not have persistent negative employment effects on men or led them to sort into the non-tradable or informal sectors. The adverse effects on the employment of low-educated women in the tradable sector, however, persist over time leading them to sort into the non-tradable sector or out of the labor force. The results are consistent with a mechanism in which gender occupational and industrial segregation leads to a widening of the gender gap in employment.

JEL-Codes: E240, F140, J160, J710.

Keywords: import competition, female employment, gender discrimination.

Hani Mansour
Institute of Labor Economics
University of Colorado Denver / USA
hani.mansour@ucdenver.edu

Pamela Medina
University of Toronto / Canada
Pamela.MedinaQuispe@rotman.utoronto.ca

Andrea Velásquez
University of Colorado Denver / USA
andrea.velasquez@ucdenver.edu

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1 Introduction

A long-standing finding in the international economics literature is that trade increases welfare and productivity through the reallocation of resources across firms, industries, and countries. In theory, although workers are displaced from industries affected by import competition, the long-run impact of openness to trade on employment could be non-negative as workers relocate to expanding industries (Melitz, 2003). However, the process by which firms adjust to increased import competition and the type of labor market frictions that workers face are likely to impact the adjustment process of workers, and have a *priori* ambiguous distributional implications for workers who differ by gender and skill (Galor and Weil, 1996; Weinberg, 2000; Goldberg and Pavcnik, 2007; Autor et al., 2013; Sauré and Zoabi, 2014; Acemoglu et al., 2016; Autor et al., 2016; Do et al., 2016; Dix-Carneiro and Kovak, 2019).

While numerous empirical studies have found that exposure to import competition leads to a long-term decline in the employment rates of low-educated men (Ferreira et al., 2010; Autor et al., 2013; Dix-Carneiro and Kovak, 2017), there is no consensus on the impacts of openness to trade on the demand for female workers or the gender gap in the labor market (Juhn et al., 2014; Gaddis and Pieters, 2017; Autor et al., 2018; Erten and Keskin, 2020). Moreover, the evidence on the persistence of these effects over time is even more scarce (McCaig and Pavcnik, 2018; Erten et al., 2019; Dix-Carneiro and Kovak, 2019). In this paper, we add to this growing literature by providing novel evidence on the effects of import competition on the gender gap in employment and labor force participation in Peru and examine differences of the labor market adjustments between male and female workers in the long-term.

Our empirical strategy relies on China's accession to the World Trade Organization (WTO) in 2001. It uses variation in exposure to Chinese imports across Peruvian provinces according to their initial industrial composition before China entered the global market (Topalova, 2007; Autor et al., 2013; Dix-Carneiro and Kovak, 2017). The mapping of trade

shocks across local labor markets follows early studies by Bartik (1991), Blanchard and Katz (1992), and Borjas and Ramey (1995), as well as more recent work on the labor market effects of trade liberalization in developing countries (Topalova, 2007; Chiquiar, 2008; Topalova, 2010; Kovak, 2013; Gaddis and Pieters, 2017), and on the labor market effects of Chinese imports competition on U.S. workers by Autor et al. (2013).[1] Unlike trade liberalization policies in other Latin American countries (such as Brazil or Mexico) or the United States, both male- and female-intensive manufacturing industries in Peru were exposed to a large influx of Chinese imports after 2001.

While China's entry into the global market was arguably unrelated to increased Peruvian demand for Chinese goods and did not coincide with other technological or productivity shocks domestically, we address any remaining endogeneity concerns using an instrumental variable strategy. Specifically, we use changes in Chinese imports of Peru's neighboring countries or other upper-middle-income countries to instrument for changes in Peru's imports from China (Autor et al., 2013). Furthermore, in contrast to much of the prior literature, we identify the industries that contribute the most to the variation in import exposure following Goldsmith-Pinkham et al. (2020). In particular, we verify that the labor market shares of industries in trade-exposed markets are not correlated with other baseline local labor-market characteristics, such as the shares of female employment and college-educated people and the employment shares of the manufacturing and tradable sector.

Our main results show that the persistence of the trade-induced employment effects differs by gender. We find that both female and male low-educated workers in markets with greater exposure to Chinese imports experienced large short-term employment losses. However, while the negative employment effects for men dissipate over time, the adverse effects on women's employment and labor force participation are long-lasting. These results

[1] Chiquiar (2008) examines the impact of globalization on regional wages in Mexico. Topalova (2007) and Topalova (2010) examine the impact of trade liberalization on poverty and inequality in India. Kovak (2013) estimates the impact of reducing trade tariffs in Brazil on wages and migration, and Gaddis and Pieters (2017) estimate their effects on women relative to men in Brazil. Additional studies using cross-market variation to study the impact of trade on poverty, education, and employment include Edmonds et al. (2010), Kis-Katos and Sparrow (2011), McCaig (2011), and Hasan et al. (2012).

are robust to controlling for baseline demographic and labor market characteristics and, key to our identification strategy, to the inclusion of pre-trends in these demographic and labor market characteristics between 1998 and 2001.

The persistent impact of import competition on women's employment reflects gender differences in labor market adjustments. Specifically, we find that between 1998 and 2008, the employment share of low-educated women in the tradable sector fell by an average of 3.7 percent following an average increase of $170 in import competition per worker. We also find that women adjusted to the new labor market conditions by either moving to the non-tradable sector or by leaving the labor force, resulting in only a partial sectoral reallocation. In stark contrast, we find no evidence of reallocation between the tradable and non-tradable sectors for male workers. Although men's employment share in the tradable sector declines shortly after China's entry, the negative employment effects do not persist over time, there is no evidence of sorting into the non-tradable sector, or a decline in their participation rate. Thus, the results indicate that men adjusted to the new labor market conditions by reallocating to expanding industries within the tradable sector.

These reallocation results are robust to using an alternative set of instruments, controlling for a measure of export exposure, and excluding labor markets with a small number of observations or dropping Metropolitan Lima and the Constitutional Province of Callao. Furthermore, they are not explained by gender differences in workers' migration patterns searching for better employment opportunities.

Importantly, we also find that exposure to import competition shifts the composition of workers who continue to be employed. For instance, we provide evidence that the decline in the employment share of low-educated women is primarily driven by a decrease in informal employment without a corresponding increase in the formal sector.[2] In contrast, we find evidence that low-educated men reallocate from the informal to the formal sector in response

[2]We follow the methodology used by the Peruvian Ministry of Labor and define informal work to include dependent employees without health insurance provided by the employer and independent workers in firms with five or fewer employees.

to greater import competition, indicating improved labor market options.

These results differ from prior studies in developing countries which have found that men working in import-exposed labor markets move to the informal sector or the non-tradable sector (Menezes-Filho and Muendler, 2011; Ferreira et al., 2010; Dix-Carneiro and Kovak, 2017). The results are also different compared to prior studies which have found no change in the employment gender gap in import-exposed markets (Gaddis and Pieters, 2017; McCaig and Pavcnik, 2018; Erten et al., 2019; Dix-Carneiro and Kovak, 2019; Autor et al., 2018), and studies which found that import competition increases the demand for female labor (Juhn et al., 2014; Anukriti and Kumler, 2019; Erten and Keskin, 2020).

In addition to providing novel evidence on gender differences in labor market reallocation, the paper contributes to the existing literature by investigating the mechanisms through which the impact of trade liberalization differs by gender. For example, our results are not consistent with a pro-competitive channel that increases the demand for high-educated workers (Acemoglu, 2002; Thoenig and Verdier, 2003; Topalova and Khandelwal, 2011), lowers the demand for physically intensive skills (Galor and Weil, 1996; Weinberg, 2000; Juhn et al., 2014), or reduces the cost of labor market discrimination (Becker, 1957; Standings, 1989; Black and Brainerd, 2004; Ederington et al., 2009). Instead, the results are consistent with a mechanism in which expanding industries in the tradable sector do not increase their demand for female workers either because of occupational gender segregation or imperfect substitutability between male and female workers (Do et al., 2016; Gaddis and Pieters, 2017).

The paper proceeds as follows. Section 2 provides a conceptual framework and reviews the existing literature. Section 3 describes the data and defines local labor markets and the import competition shock. Section 4 discusses our empirical strategy. Section 5 reports the main results and Section 6 discusses potential mechanisms. We conclude in Section 7.

2 Conceptual Framework

The slow adjustment of displaced workers in response to import competition is consistent with the presence of frictions in the labor market (Goldberg and Pavcnik, 2007; Dix-Carneiro and Kovak, 2017; Acemoglu et al., 2016). Prior literature has particularly focused on the role of pro-competitive adjustments (Acemoglu, 2002; Thoenig and Verdier, 2003) and sectoral reallocation (Wacziarg and Wallack, 2004; Goldberg and Pavcnik, 2007; Autor et al., 2013). Both of which could have different implications by worker's gender and level of skill (Galor and Weil, 1996; Juhn et al., 2014; Do et al., 2016; Gaddis and Pieters, 2017; Autor et al., 2018).

The pro-competitive effects of trade liberalization can lead firms to adopt new technologies (Acemoglu, 2002; Thoenig and Verdier, 2003; Topalova and Khandelwal, 2011). Importantly, a skill-biased technical change is likely to reduce the demand for lower-skilled workers, and could thus also have gender-specific effects if educational attainment and types of skills differ by gender (Galor and Weil, 1996; Weinberg, 2000; Juhn et al., 2014). For instance, Juhn et al. (2014) shows that in Mexico exporting firms responded to tariff reductions by adopting new technologies that lowered the demand for physically intensive skills. This lead to a reduction in the wage and employment gender gaps of blue-collar workers. Increased competition due to trade could also improve the labor market outcomes of women by increasing the cost of discrimination (Becker, 1957; Black and Brainerd, 2004) and by increasing the demand for part-time and more flexible workers (Standings, 1989).[3]

The second channel is the sectoral reallocation of labor. Standard trade models predict that openness to trade will shift production factors away from sectors affected by import competition and reallocate them to exporting sectors in which the country has a comparative advantage (Melitz, 2003). With a few exceptions, however, existing empirical studies do not

[3]By increasing competition among firms, exposure to trade could push discriminating firms out of business or induce them to adopt non-discriminatory practices (Pieters, 2018). Black and Brainerd (2004) and Ederington et al. (2009) find support for this hypothesis in manufacturing industries in both the U.S. and Colombia.

indicate that trade reforms lead to a significant reallocation of labor from importing to comparative advantage sectors (Wacziarg and Wallack, 2004; Goldberg and Pavcnik, 2007; Autor et al., 2013). In developing countries, and contrary to the predictions of neoclassical trade theory, several papers show that displaced workers in import-competing industries moved into the informal sector, the non-tradable sector, or left the labor force (Menezes-Filho and Muendler, 2011; Ferreira et al., 2010; Dix-Carneiro and Kovak, 2017).[4]

Sectoral reallocation has ambiguous effects on women and men and for workers with different skills. For instance, the short-run labor market outcomes of women relative to men are expected to worsen if women are segregated in import-competing sectors or alternatively could improve if exporting sectors are more female-intensive (Do et al., 2016).[5] Even if there was little gender segregation in the labor market, it is possible that trade shocks will have differential effects by gender if men and women are not perfect substitutes (Galor and Weil, 1996; Sauré and Zoabi, 2014; Do et al., 2016). Imperfect substitution between men and women might make it harder for women to move into exporting sectors if they are traditionally more male-intensive. Similarly, the degree to which men and women can adjust by sorting into the traditionally female-intensive non-tradable sector will depend on how fast these sectors grow and on the type of skills they demand. In fact, Gaddis and Pieters (2017) show that although import-competing sectors in Brazil were male-intensive, trade liberalization in Brazil did not improve the relative labor market outcomes of women.

Finally, differences in the reservation wages of men and women could lead to gender differences in sectoral reallocation. Exposure to import competition has been linked to a decline in average local labor market wages (Autor et al., 2013). Thus, even if exposure to trade does not affect the gender wage gap, women may choose to leave the labor force entirely if the prevailing wage in their local labor market falls below their reservation wage.

[4]Ferreira et al. (2010) found that openness to trade in Brazil increased income inequality through employment shifts into the informal sector, and Dix-Carneiro and Kovak (2017) provide evidence that trade reforms led to a decade-long reduction in labor demand.

[5]Many studies have documented that women tend to cluster in particular sectors of the economy (Anker et al., 2003). Goldin (1995) argues that is partly due to stigmatization of women who work in heavy industries. It could also be due to social norms related to home production and childcare.

We add to this literature by studying how labor market adjustments to increased import competition in Peru differed by gender and by shedding light on the the relevance of these potential mechanisms.

3 Data and Background

3.1 Data

Our primary data source to measure labor market outcomes is the *Encuesta Nacional de Hogares* (ENAHO), between 1998-2008. To ease the presentation of results, we focus on the effects of Chinese imports between 1998 and 2004 and 1998 and 2008, although we also show effects for other alternative import exposure windows.[6] The ENAHO is a household survey assembled annually by the Peruvian Statistical Agency (INEI), and it is representative at the national and regional levels. Its purpose is to measure the living conditions of households and the impact of social programs. It surveys both urban and rural areas across the 24 Peruvian departments and the constitutional province, Callao. People over 14 years old have to fill out an employment module. This module includes questions on working status, occupation, and basic demographics characteristics. Importantly, the information on work status includes industrial and sectoral affiliation for both formal and informal workers. Throughout the paper, we limit our sample to include individuals ages 25-55 to focus on working-age people who would have completed their education and have not retired yet.

We use the United Nations Comtrade dataset for information on trade-flows at the product level between China and other countries. This information spans the period from 1998 to 2008 and is available at the annual level. We use the correspondences of the World Integrated Trade Solution (WITS) from the World Bank to convert six-digit Harmonized Tariff System (HTS) product level codes to CIIU Rev.3, the industry classification in Peruvian

[6]The main analysis ends in 2008 to avoid conflating the impact of Chinese imports with the effects of the global recession. In Section 5, we show and discuss the results for longer exposure windows up to 2016.

data.[7]

3.2 Chinese Import Competition

In December 2001, China gained accession to the WTO. This event resulted in a worldwide reduction in tariffs placed on Chinese products and an exponential growth of exports of Chinese goods.[8] China's exports of manufacturing products have grown by more than six times since then.

Initially, China's exports were labor-intensive manufactured goods (Chen, 2009). Textiles, wearing apparel, furniture, and toys were the Chinese most significant initial export sectors. Further along, China moved to export more technologically intensive goods such as intermediate inputs and capital goods. Accordingly, many countries experienced a sizable increase in Chinese import competition over this period. Peru, a country with a manufacturing sector focused on labor-intensive goods, was no exception.

The first column in Panel A of Table 1 shows the value of annual Peruvian imports from China for the years 1998, 2004, and 2008 (in millions of 1998 $US). In 2004, three years after China entered the WTO, imports from China increased threefold. China's imports continued to grow, and by 2008, their value increased by a factor of 15, representing an increase from 3 percent to 15 percent of total Peruvian imports. In contrast, imports to Peru from other countries (Column 2 of Table 1) did not change significantly between 1998 and 2004 and grew by a modest factor of 2.6 over the 1998-2008 period. China's accession to the WTO also affected other countries in the region and the world. Panel B of Table 1 presents the same statistics for Latin American countries who share a border with Peru.[9] While they also experienced a significant increase in Chinese imports, it was lower compared to the Peruvian experience.

[7] See https://wits.worldbank.org/product_concordance.html

[8] This also decreased tariffs on imports into China given the requirements placed upon China by WTO members.

[9] Countries bordering Peru include: Argentina, Bolivia, Brazil, Chile, Colombia, and Ecuador.

While significant, this shock affected Peruvian industries differently. Figure 1 shows the value of Chinese imports at the two-digit CIIU level. Industries such as agricultural products or food and beverages received a very low influx of Chinese imports. However, textiles, basic metals, machinery, and communication equipment faced massive import flows from China during this period. Our identification strategy exploits both the temporal variation in exposure to Chinese import competition and the differences in industry composition at the local labor market.

3.3 Local Labor Markets

We define local labor markets in Peru following the concept of commuting zones (Autor et al., 2013). To our knowledge, no study has categorized these zones for Peru. To make progress, we use the geopolitical unit of the province as our local labor market measure. A province is the administrative subdivision of a department, the primary geopolitical division in Peru. Provinces are further divided into districts.

Without considering the province that includes the capital city of Lima (Metropolitan Lima), the average province contains approximately 114,000 persons. Metropolitan Lima has a population of about 10 million and contains 51 districts. Using the Survey of Transport, Labor, and Technology Use, assembled by the Peruvian Studies Institute (IEP), Piselli (2013) describes five distinct zones in Metropolitan Lima in which people do most of their activities: Lima Center, Lima North, Lima South, Lima East, and Lima West. Each of these zones contain a subset of districts and we use them to define local labor markets within Lima. This classification results in 143 local labor markets across Peru for which we have data.

Table 2 presents local labor market statistics for men and women in 1998, 2004, and 2008. While most men participated in the labor force in both 1998 and 2008, women experienced a six percentage points increase in their labor force participation between 1998 and 2004. Although the speed of this increase stalled after 2004, 76.5 percent of women ages 25-55 participated in the labor force by 2008. The employment rate of women also increased

between 1998 and 2008, especially among the low-educated and was more pronounced in the non-tradable sector. The employment rates show clear evidence of sectoral segregation where female workers are more concentrated in the non-tradable sector, while male workers are more equally distributed between both sectors.

4 The Labor Market Effects of Import Competition

4.1 Local Exposure to Chinese Imports

To estimate the effect of Chinese import competition on labor outcomes at the labor market level we follow Autor et al. (2013) and Autor et al. (2018), and define local labor market exposure to Chinese import competition in Peru as the weighted average of industry changes in Chinese imports per worker, as in,

$$\Delta IPW_{it} = \sum_{j} \frac{L_{ij98}}{L_{i98}} \times \frac{\Delta M_{jt}}{L_{j98}}, \tag{1}$$

where $\frac{L_{ij98}}{L_{i98}}$ refers to the initial employment share of industry j in local labor market i at base period 1998, ΔM_{jt} is the change in Peru's imports originated in China in industry j between 1998 and year t, measured in 1998 thousand \$U.S., and L_{j98} is base period national employment in industry j.

Differences in ΔIPW_{it} depend on the variation of industry composition at the local labor market level in 1998, and our empirical model uses this variation in exposure to Chinese imports across local labor markets to identify its effects on labor market outcomes. Table 3 shows that the average Peruvian labor market experienced an increase of about \$20 in Chinese imports per worker between 1998-2004 (0.02*1000) and \$170 per worker between 1998 and 2008 (0.17*1000). However, there is significant variation in the extent to which different regions were affected by import competition. For example, by 2008, a labor market at the 75th percentile of exposure experienced a \$120 larger increase in Chinese imports

per worker compared to the change in imports per worker for a labor market at the 25th percentile of the exposure distribution.

These results are more striking when comparing the top and bottom ten local labor markets ranked by IPW shown in Panel B of Table 3. For instance, by 2008, local labor markets with the most substantial impact experienced an increase of $554-$2800 per worker in Chinese imports. These markets include provinces such as Callao, where economic activity is related to access to ports and airports. Likewise, other provinces high in manufacturing activity (Lima and the coast), and mining provinces (Ancash and Pasco) experienced a substantial increase in Chinese imports. On the contrary, poorer provinces, which rely mostly on non-tradables, are ranked at the bottom of exposure to Chinese imports. This geographical variation in exposure to Chinese imports across regions is depicted in Figure 2. Importantly, as shown in Figure 3, variation in ΔIPW_{it} is not systematically correlated with the share of female employment in 1998.

4.2 Empirical Model

Our primary empirical strategy to estimate the effect of import competition on labor market outcomes uses cross-local labor market variation in industry composition before China's accession to the WTO. This approach allows us to account for the direct impact of trade on the employment of men and women in trade-affected industries, as well as the indirect effect due to sorting across other sectors in the local labor market and leaving the labor force.

In our main specification, we aggregate all individual-level data at the labor market-level and estimate the following first-difference regression:

$$\Delta Y_{it} = \gamma_{it} + \beta_1 \Delta IPW_{it} + X'_{i98}\beta_2 + \Delta Z'_{i2001-98}\beta_3 + e_{it} \tag{2}$$

where ΔY_{it} denotes the gender-specific difference in employment or labor force participation shares, both calculated as a percentage of the overall working population ages 25-55 in local

labor market i, and t refers to the period between 1998 and year t (2004 or 2008 in the main analysis).[10] We also control for the vector X'_{i98}, which includes base period (1998) labor force and demographic composition measures such as the employment share in manufacturing, percentage of college-educated, the employment share in the tradable sector, and the female employment share. These controls further ensure that we are comparing local labor markets with similar economic features at baseline. To guarantee that local labor markets were not trending differently before China's entry into the global market, we control for the change in the variables included in X'_{i98} between 1998 and 2001 (vector $\Delta Z'_{i2001-98}$). Each observation is weighted by the start of the period region i population, and the sample size is equal to the number of local labor markets. Standard errors are clustered at the local labor market level.

One potential concern with this estimation strategy is that unobserved positive regional demand shocks drive Chinese imports. If such demand shocks are positively correlated with local labor market outcomes, the above specification will underestimate the real impact of import competition on employment (Autor et al., 2013). We expect this concern to have a limited effect in a small country like Peru. However, to address it, we instrument ΔIPW_{it} with a similar measure using Chinese imports to neighboring Latin American countries, such as Chile, Bolivia, Colombia, and Ecuador.

The intuition is the following. If Chinese exports to Peru are due to some favorable market conditions in the Peruvian economy, these conditions might also be influencing Peruvian local labor market outcomes. In this case, China's exports to Peru are an endogenous outcome of the Peruvian economic conditions rather than an exogenous import competition shock related to increased Chinese productivity. The exclusion restriction required by the instrument is that the growth in Chinese imports to neighboring countries impacts local labor market outcomes only through its correlation with the growth of Chinese imports to Peru. In this

[10] As we discuss in Section 5, the results are robust to using employment rates calculated as a percentage of the group-specific relevant working-age population. We choose to consistently use the overall working-age population as the denominator across all outcomes because, as shown by Atkin (2016), exposure to trade can impact human capital investments of exposed populations.

sense, this instrumental variable approach ensures that we are identifying the supply-related impacts of import competition.

Figure 4 shows the first-stage of our IV specification for changes between 1998 and 2004 and between 1998 and 2008. As shown, there is a strong positive and significant relationship between ΔIPW_{it} constructed with Peruvian and Latin-American data using the same control variables as in equation 2. In the first stage, the F-statistic ranges between 77 and 163, well above the traditional rule of thumb for relevance. Moreover, insofar Peru's labor demand conditions across labor regions are not systematically correlated with demand conditions in neighboring countries; the exclusion restriction is satisfied.[11]

4.3 Investigating the Validity of the Research Design

The allocation of national changes in Chinese imports to local labor markets amounts to what is typically referred to as the Bartik instrument following the work of Bartik (1991) and Blanchard and Katz (1992). In a recent paper, Goldsmith-Pinkham et al. (2020) show that in a Bartik design identification is based on the exogeneity of the industry shares and that the estimator is based on weights assigned to each industry.

We follow the methodology of Goldsmith-Pinkham et al. (2020) to estimate the weights of the Bartik estimator and to identify the industries whose variation contribute the most to the estimation. As shown in Panel B of Appendix Table A1, the sum of the weights of the top five industries receive over 87 percent of the absolute weight in the estimator ($0.913/1.048 = 0.87$). These industries are basic metals, rubber and plastics products, machinery and equipment n.e.c, other transport equipment, and electrical machinery n.e.c.

To test the plausibility of the identification strategy, we also estimate the relationship between the 1998 covariates we use in equation 2 and the shares of these top five industries. The results in Appendix Table A2 provide strong evidence that industry shares are not

[11] To alleviate the concern that South American countries share the same demand patterns, we check the robustness of the results using the same instrument for other upper-middle-income countries with similar GDP per capita to Peru. See Section 5.

correlated with the share of female employment, the share of college-educated people, the employment share in manufacturing, and the employment share in the tradable sector. This evidence provides further support that our import exposure measure is exogenous and not correlated with other local labor market unobserved characteristics.

5 Results

5.1 Effects of Import Competition on Employment

We begin our analysis by presenting the IV results of estimating equation 2 using different import exposure windows in Figure 5.[12] In the left panel of the Figure, we depict the coefficient estimates without baseline demographic controls; in the middle panel, we add controls for demographic and labor market characteristics in 1998; and, in the right panel, we add controls for the change in these characteristics between 1998 and 2001. The results are similar whether we use the reduced form or the IV model. For reference, the reduced form and IV estimates for the periods 1998-2004 and 1998-2008 are presented in Appendix Table A4.

The estimates in the right panel of Figure 5 (our preferred specification) indicate that by 2004 increased import competition had a sizable and statistically significant effect on Peruvian workers' employment share. Specifically, the coefficients from the Two-Stage Least Squares regression in Panel C of Appendix Table A4 indicate that an average increase of $20 per worker led to a 0.42 percentage point decline in the total employment-to-population share, significant at the 5 percent level (0.02*20.78). The difference in Chinese import exposure between the 75th and 25th percentiles during this period is 0.03. Thus, the share of employees in the working-age population of a local labor market at the 75th percentile of import exposure declined by 0.62 percentage point (0.03*20.78) more than in a local labor market at the 25th percentile.

[12] Appendix Table A3 presents the corresponding estimates for all workers and by gender.

It is also clear from Figure 5 and Appendix Table A4 that the adverse employment effects persisted through 2008 as imports from China continued to increase, showing only a partial adjustment to increased import competition.[13] The results indicate that an average increase of $170 per worker between 1998 and 2008 in imports from China is associated with a 0.61 percentage point (0.17*3.61) decline in the employment share, significant at the 5 percent level (Panel D, Appendix Table A4). Thus, we can calculate that the employment share in local labor markets at the 75th percentile of exposure to imports declined by 0.43 percentage point more than a labor market at the 25th percentile of exposure to Chinese imports (0.12*3.61).[14]

5.2 Effects by Gender and Education

In Figure 6 we report estimates of the employment effects for 2004 to 2008, separately by gender. Despite having lower baseline employment shares, the results suggest that the estimated effects of import competition were initially larger for women, with evidence of a slower adjustment over time. Between 1998 and 2008, an average increase of $170 per worker in Chinese imports reduced the employment share of women by 0.38 percentage points (0.17*2.245, Column 1 of Appendix Table A3), or about 1 percent relative to their baseline share of female employment in the working-age population. The corresponding estimate for men indicates that, by 2008, a similar increase in Chinese imports per worker is associated with a 0.5 percent decline in their employment share (0.17*1.369/43.83), but the coefficient is not significant at conventional levels.

Figure 7 further disaggregates the results by education.[15] The results in Panel B indi-

[13] In Appendix Table A5 we report the effects on employment for the 1998-2012 period and the 1998-2016 period. The results in Column 3 indicate that the negative effect of Chinese imports on total employment shares persisted through 2012, with some evidence that the effect becomes smaller and less precisely estimated by 2016.

[14] In comparison, Autor et al. (2013) found that manufacturing employment in a U.S. commuting zone at the 75th percentile of import exposure was reduced by 0.65 percentage point over a decade compared to a commuting zone at the 25th exposure percentile.

[15] Low-educated workers are defined as individuals who have a high school education or below, while high-educated workers are defined as those with above a high school degree.

cate that the employment effects of import competition were primarily concentrated among low-educated women, and despite some adjustment over time, are present through 2008. In contrast, the effects of import competition on the employment share of low-educated men (Panel A) shrink over time and, by 2006, are small in magnitude and not statistically significant. Panels C and D of Figure 7 show that import competition had little effect on the employment shares of high-educated Peruvian workers, regardless of gender.

To sum, the increase in Chinese imports to Peru are associated with a long-lasting decline in the employment share of low-educated women leading to a widening of the gender gap in employment.[16] In the following sections we focus on exploring the patterns of reallocation that explain the different labor market adjustments between low-educated men and women between 1998 and 2008.

5.3 Patterns of Labor Reallocation

The persistent decline in the employment share of low-educated women suggests that expanding industries in the tradable sector and movement into the non-tradable sector (e.g., non-tradable services) were not able to offset the employment effects of trade. To further examine the reallocation patterns of low-educated workers, we estimate equation 2 separately for the tradable and non-tradable sectors between 1998 and 2008 and report the results in Panel A of Table 4.

The results imply that sectoral reallocation between the tradable and non-tradable sectors played a key role in mitigating the employment effects of import competition for low-educated women but had little impact on the labor adjustments of male workers. While an average increase of $170 per worker in Chinese imports between 1998 and 2008 reduced the

[16] We also construct gender-specific import competition shocks, $\Delta IPWM$ and $\Delta IPWF$, following Autor et al. (2019). These measures use the male and female share of workers in each industry as alternative weights in equation 1. Appendix Table A6 shows summary statistics for these measures. While both men and women experience similar import competition shocks between 1998 and 2004, the increase in import competition between 1998 and 2008 is larger for male workers. Thus, gender differences in the growth of imports over time cannot explain the larger and more persistent employment effects on women.

employment share of women by about 3.7 percent (0.17*3.944/18.28) in the tradable sector, their share in the non-tradable sector increased by about 2.8 percent (0.17*2.224/13.52). The results for men suggest they did not reallocate to the non-tradable sector and instead were absorbed by expanding industries within the tradable sector.[17]

Another margin of adjustment considered by the literature in developing countries is the reallocation of workers to the informal sector (Menezes-Filho and Muendler, 2011; Ferreira et al., 2010; Dix-Carneiro and Kovak, 2019). We follow the methodology used by the Peruvian Ministry of Labor and define informal work to include dependent employees without health insurance provided by the employer and independent workers in firms with five or fewer employees. In Panel B of Table 4 we report estimates of equation 2 separately for the formal and informal sectors. Different from much of the existing evidence, the results indicate that low-educated men are more likely to move to the formal sector in markets with greater exposure to import competition. In contrast, we find that the share of low-educated women in the informal sector decreases but without a corresponding increase in their share in the formal sector. We investigate these effects further in Panel A of Appendix Table A8 where we estimate the effects on informality across the tradable and non-tradable sectors.[18] These results show that the decrease in the share of informal female workers is concentrated in the tradable sector. The results also show an increase in the share of informal workers in the non-tradable sector, indicating that the quality of jobs in the non-tradable sector did not improve in markets with greater exposure to import competition.

Gender differences in the reallocation patterns could reflect gender-differences in internal migration in search for better employment opportunities. For example, the effects of Chinese imports on the share of employed men in the working-age population would be biased

[17]Small labor markets might not contain enough observations once the sample is stratified by sector, gender, and education. Excluding labor markets with a sample size in the bottom 25th percentile leaves us with 111 local labor market but does not change results; see Panel A of Appendix Table A7. Moreover, excluding local labor markets in Metropolitan Lima and the constitutional province of Callao does not impact the results; see Panel B of Appendix Table A7.

[18]We split informal workers into two categories: independent workers (columns 2 and 5) or dependent workers without benefits (columns 3 and 6).

towards zero if it is easier for displaced men to migrate. Conversely, our estimates on the effects of Chinese imports on the share of employed women would be upwardly biased if the cost of migration was lower for high-productive female workers. Thus, the implications of internal migration for our estimates are empirically ambiguous and depends on the migration decisions of different workers as they adjust to new labor market conditions.

To examine the effects of Chinese imports on migration, we use information from the 2007 Peruvian Census on the district of residence in 2002 (i.e., five years before the Census date). Because districts are contained within a province, we are able to create migration rates consistent with our local labor market definition. We calculate migration rates between 2002 and 2007 as the share of people who changed their local labor market of residence divided by the local labor market's working-age population. The results in Table 5 show little evidence that the increase in Chinese import competition between 1998 and 2002 or between 1998 and 2008 is associated with an increase in overall migration rates. Importantly, the results by gender or education are not economically nor statistically significant. Thus, gender-selective migration is unlikely to explain differences in the reallocation patterns of male and female workers, and is consistent with previous literature which found that mobility responses to labor market shocks tend to be slow among lower-educated workers (Blanchard and Katz, 1992; Glaeser and Gyourko, 2005; Notowidigdo, 2011; Autor et al., 2013).

Finally, we examine whether low-educated women leave the labor force in response to greater import competition. The results in Table 6 indicate that between 1998 and 2008, an average increase of $170 per worker in Chinese imports decreased the participation of women in the labor force by 1 percent (0.17*2.314/38.08). Although not statistically significant at conventional levels, import competition seems to have reduced the participation rates of both low- and high-educated female workers. If only more productive low-educated women are able to adjust to the new labor market conditions, we should expect average wages to increase. In fact, the results in Appendix Table A9 indicate that, on average, the wages of low-educated female workers increased in markets with higher exposure to import competition.

5.4 Robustness Checks

We conduct several checks to assess the robustness of the results. First, although the ENAHO survey samples all provinces in Peru, it does not sample all districts within each province. This limitation could introduce measurement error in the employment weights we use to calculate the import competition measure in each local labor market. Sampling only a subset of districts within each province could also impact the population weights used in the estimation. To address these two concerns, we use the 1993 Peruvian Population Census to recalculate our import exposure measure using employment shares in 1993 as the baseline weights in equation 1. We also use the 1993 census to construct each province's population, which we use as alternative regression weights. Our main results are robust to this specification and are presented in Appendix Table A10. Importantly, the estimates in Appendix Table A10 are not statistically different from the main effects reported in Appendix Table A3.

The widening of the employment gender gap due to increased imports could simply reflect a decision to retire early by older female workers. In Appendix Table A11, we estimate the impact of the increase in Chinese imports by age groups where Panel A reports estimates for low-educated workers ages 25-40 and Panel B reports estimates for low-educated workers ages 41-55. The results provide little evidence that the long-term decline in employment shares of low-educated female workers is concentrated among older workers. In fact, the results indicate that the reallocation pattern between the tradable and non-tradable sectors is more prominent among younger female workers.[19]

Consistent with prior literature, we do not use employment rates (calculated as a percentage of the group-specific population) when measuring the impact of trade exposure (Autor et al., 2013; Gaddis and Pieters, 2017). This is because exposure to trade can impact the population's educational distribution, which would change the group-specific denominator

[19]The results are quantitatively similar if we expand the sample to include workers ages 25-65.

as shown by Atkin (2016).[20] Nonetheless, the results are robust to using employment rates as seen in Panel A of Appendix Table A13.

It is possible that our instrument does not satisfy the exclusion restriction because countries bordering Peru have similar demand patterns. To address this concern, we construct an alternative instrument using the information on Chinese imports to other upper-middle-income countries that are not in Latin America but that have similar GDP per capita as Peru.[21] The results in Panel B of Appendix Table A13 are robust to using this alternative instrument.

Finally, we check the robustness of the results when controlling for a measure of exposure to exports.[22] If changes in exports and imports at the local labor market are highly correlated, omitting changes in exports could bias our results. We calculate exposure to exports measure (from Peru to all other countries, including China) similarly to how we construct the import competition measure. Reassuringly, the correlation between the two measures at the local labor market is small. Thus, it is not surprising that controlling for exports in Panel C of Appendix Table A13 does not change the results.

6 Mechanisms

The effects of import competition on the employment and labor market adjustments of men and women in Peru differ from much of the existing evidence on the labor market impacts of trade in developing countries. In particular, the results are not consistent with a skill-biased technological change that reduces the demand for physically intensive skills or increases the demand for higher-educated workers (Weinberg, 2000; Juhn et al., 2014). The results are

[20] In Appendix Table A12, we estimate the impact of exposure to Chinese imports on the share of low- and high-educated people in the population. Although the results are not precisely estimated, there is some evidence that exposure to trade is associated with a decline in the share of low-educated women and an increase in the share of high-educated women.

[21] We use the information on Chinese imports to Malaysia and Turkey.

[22] Brummund and Connolly (2019) estimate the effect of the China trade shock on labor market adjustments in Brazil. In this case they find differential effects of increased imports from China and exports to China on internal migration.

also not consistent with a procompetitive mechanism through which import competition increases the cost of discrimination or the demand for more flexible workers (Becker, 1957; Black and Brainerd, 2004; Standings, 1989).

The lack of persistent adverse employment effects for men in the tradable sector, and the fact they do not reallocate to the non-tradable or informal sectors, indicate that the increase in the labor demand of expanding industries within the tradable sector was gender-specific. This could occur because of occupational gender segregation or because male and female workers are not perfect substitutes in production (Galor and Weil, 1996; Do et al., 2016; Sauré and Zoabi, 2014; Gaddis and Pieters, 2017).

We examine the importance of gender segregation by analyzing how the effects of import competition vary with initial labor market characteristics. To that end, we interact our measure of import competition, ΔIPW_{it}, with an indicator equal to 1 if the 1998 share of the non-tradable sector in market i is above the median share across all local labor markets and zero otherwise. The results in Column 1 of Table 7 suggest that the decline in the employment share of women between 1998 and 2008 is significantly smaller in markets with a baseline larger non-tradable sector. In contrast, a larger share of non-tradable sector does not seem to impact the employment share of men. This result is another indication that while men can mitigate trade-induced displacements by moving to expanding industries within the tradable sector, the lack of job-market opportunities in the non-tradable sector is an important mechanism that prevents women from adjusting to increased import competition.

Furthermore, in Column 2 of Table 7, we interact ΔIPW_{it} with an indicator equal to 1 if the 1998 share of the manufacturing sector in market i is above the median share across all local labor markets and zero otherwise. Interestingly, the results in Columns 2 and 5 suggest that working in a labor market with a baseline higher share of employment in the manufacturing sector is beneficial to both men and women. Thus, differences in manufacturing employment share across labor markets cannot explain men's and women's differential adjustments. The results do not significantly change if we include both interaction

terms in the regression (Columns 3 and 6). The interpretation is that even when we condition on having a labor market with a high share of manufacturing employment, an increase in the non-tradable sector's share allows women, but not men, to mitigate trade-induced displacements.

Low-educated women in the tradable sector in 1998 worked, on average, in lower-skilled occupations compared to men and are more likely to be informally employed.[23] To examine the role of occupational composition, we interact ΔIPW_{it} with an indicator equal to 1 if the 1998 share of employment in low-skilled occupations is above the median share across all local labor markets and zero otherwise. We report the results in Table 8. Although the estimate on the interaction term in Column 1 of Panel A is not significant, it is positive and suggests that a larger share of low-skilled occupations could help women mitigate the effects of trade. Similarly, the results indicate that women in markets with initially above median share of informal employment do not experience long-term declines in their employment. Interestingly, the share of informal employment in the market has the opposite effect on men. Overall, the results suggest that gender occupational and industrial segregation play an important role in female and male workers' labor market adjustments to import competition.

7 Conclusion

Previous studies on the labor market impacts of trade in developing countries have found that import competition leads to persisting declines in men's employment shares, with evidence of reallocation into the non-tradable and informal sectors (Ferreira et al., 2010; Dix-Carneiro and Kovak, 2017, 2019). There is, however, no consensus on how trade impacts the demand for female workers, with some studies finding no differential impact (Gaddis and Pieters,

[23] We define low-skilled occupations as elementary occupations (ISCO-08 classification code 9). While over 50 percent of low-educated women are employed in low-skilled occupations, only 21 percent of low-educated men work in these occupations. Similarly, while 69 percent of low-educated women in the tradable sector report to be informally employed, only 31 percent of low-educated men in the tradable sector are informally employed. On average, low-educated men and women in the tradable sector are of the same age and are equally likely to be married and have children.

2017; McCaig and Pavcnik, 2018; Erten et al., 2019; Dix-Carneiro and Kovak, 2019; Autor et al., 2018), while other studies document an increase in the demand for female workers (Juhn et al., 2014; Anukriti and Kumler, 2019; Erten and Keskin, 2020).

In this paper, we provide novel evidence on import competition's long-lasting effects on the employment of Peruvian men and women and examine how labor market adjustments to increased imports vary by gender. Following Autor et al. (2013), the identification strategy relies on China's entry into the WTO and uses variation in exposure to Chinese imports across Peruvian local labor markets based on their initial industrial composition before China entered the global market.

The results indicate that exposure to Chinese imports led to a widening of the gender gap in the labor market, driven by a decrease in the employment and participation of low-educated women. The labor market adjustments to new labor market conditions also differ by gender. The lack of adverse employment effects for men in the tradable sector combined with no evidence for sorting into the non-tradable or informal sectors indicates that men were able to sort into expanding industries within the tradable sector. In contrast, the share of female workers declines substantially in the tradable sector in more exposed markets with evidence of sorting into the non-tradable sector and out of the labor force.

We examine a number of potential mechanisms to explain gender differences in labor market adjustments. In particular, we analyze how trade effects vary with the baseline labor market characteristics, such as the share of employment in the non-tradable sector or low-skilled occupations. The results are consistent with a mechanism in which gender occupational and industrial segregation prevents women from benefiting from expanding employment opportunities within the tradable sector. The findings highlight the importance of considering how labor market frictions in developing countries vary by gender and have important implications on the type of policies that could mitigate he adverse effects of trade on the labor market.

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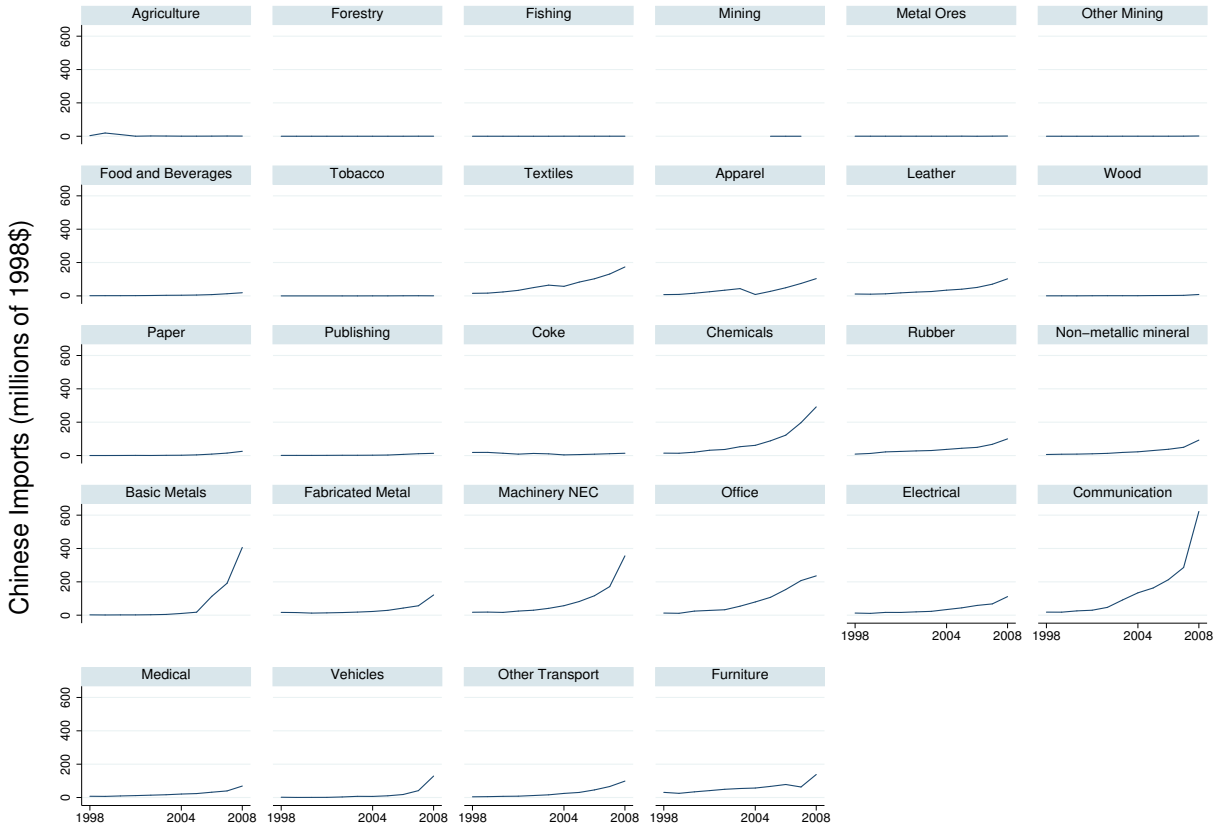
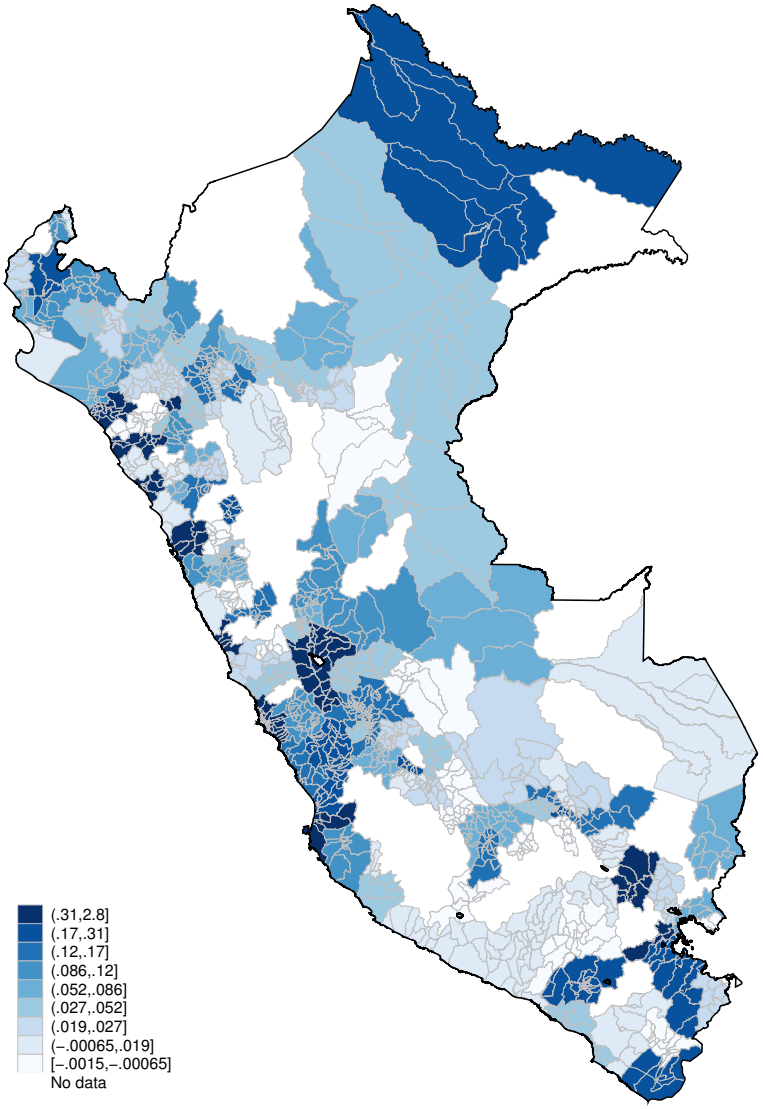
8 Figures

Figure 1: Chinese Imports by Industry



Source: UN Comtrade.
Notes: Industries are defined at the two-digit CIIU Rev 3.1. level

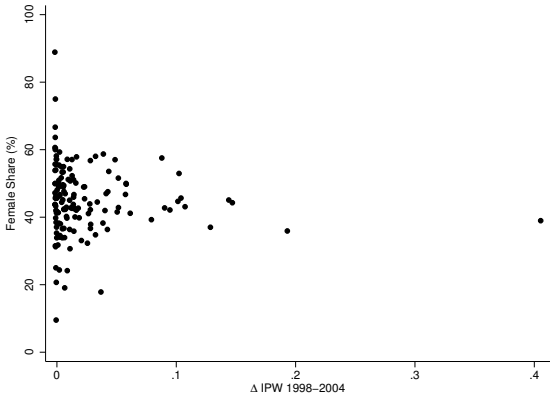
Figure 2: Change in Chinese Import Competition (ΔIPW) by Local Labor Market, 1998-2008



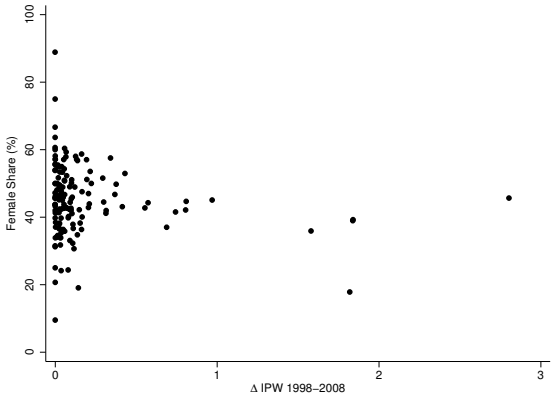
Source: ENAHO and UN Comtrade.
Notes: The map depicts the value of ΔIPW from 1998 to 2008 for all local labor markets considered in the analysis. Darker color means the local labor market was exposed to more import competition, while lighter ones reflect low exposure. Regions in white correspond to provinces for which ENAHO did not collect data in 1998 and 2008. Units of ΔIPW are in thousands of US dollars of 1998 per worker.

Figure 3: Female Share in 1998 and ΔIPW by Local Labor Market

(a) ΔIPW 98-04



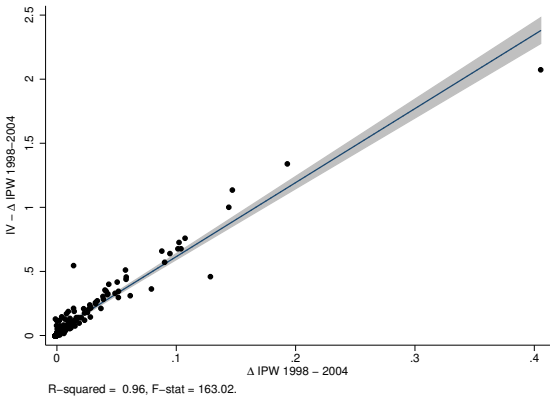
(b) ΔIPW 98-08



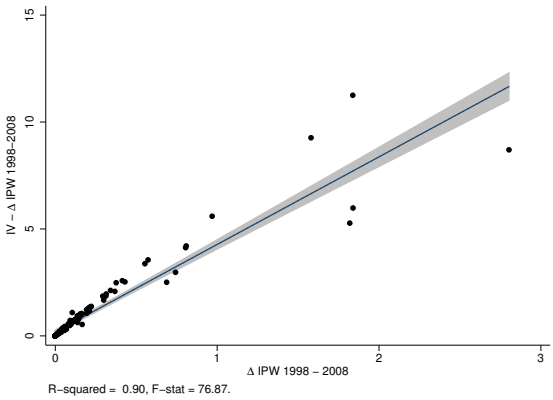
Source: ENAHO and UN Comtrade.
Notes: Panels (a) and (b) show the raw correlation between the share of female employment in 1998 and the import competition measure, ΔIPW. The unit of observation is the local labor market.

Figure 4: IV Strategy - First Stage

(a) $\Delta IPW98-04$

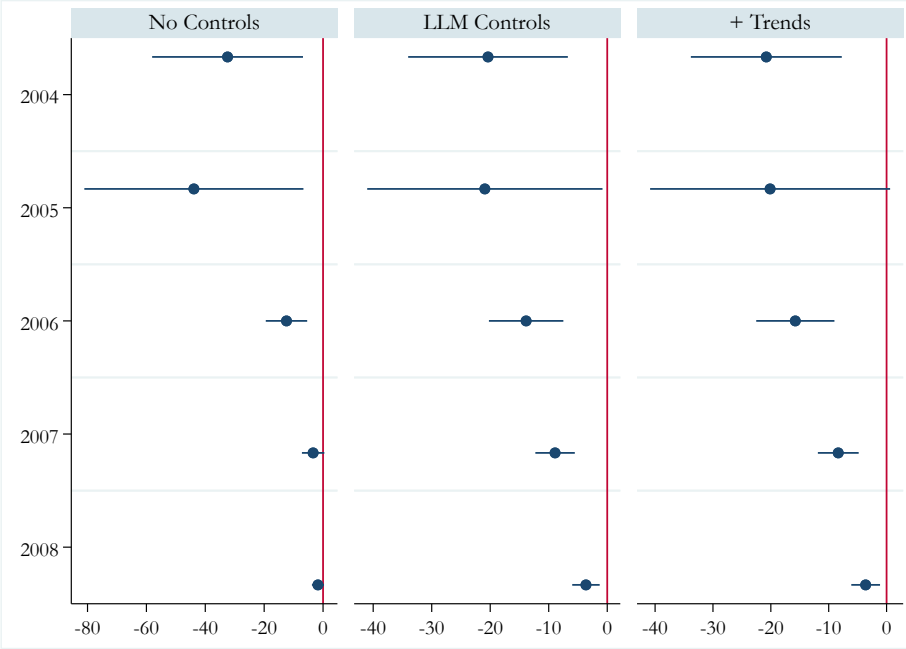


(b) $\Delta IPW98-08$



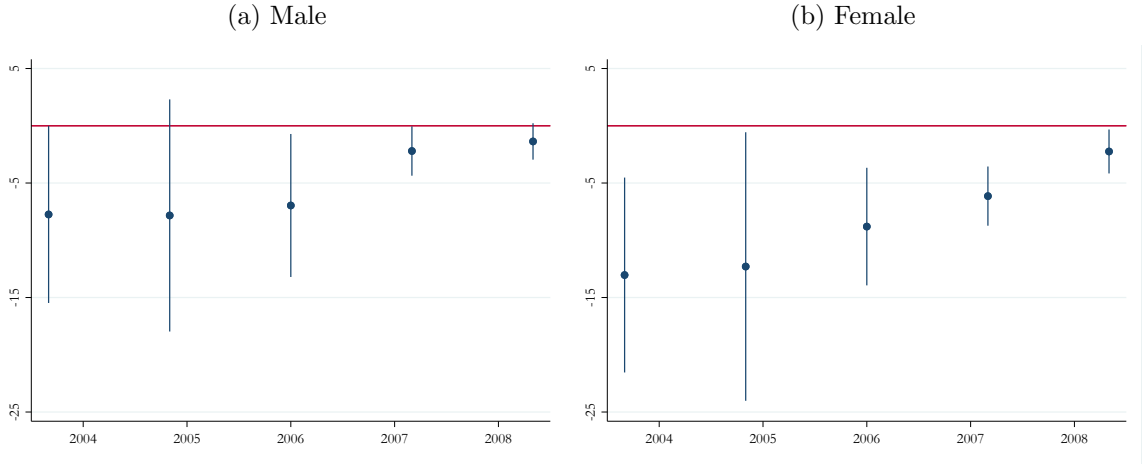
Notes: Panels (a) and (b) depict the raw correlation between the import competition measure, ΔIPW, and the import competition measure to other bordering Latin American countries, i.e., the first stage. The unit of observation is the local labor market. The lines depict the linear fit from the first stage regression which includes all the controls in Equation 2. The confidence intervals are shown in the shaded gray area. The R-squared and F-stat are shown below each panel.

Figure 5: Effect of China Trade Shock on Total Employment
Dependent Variable: Total Employment / Total LLM Pop * 100



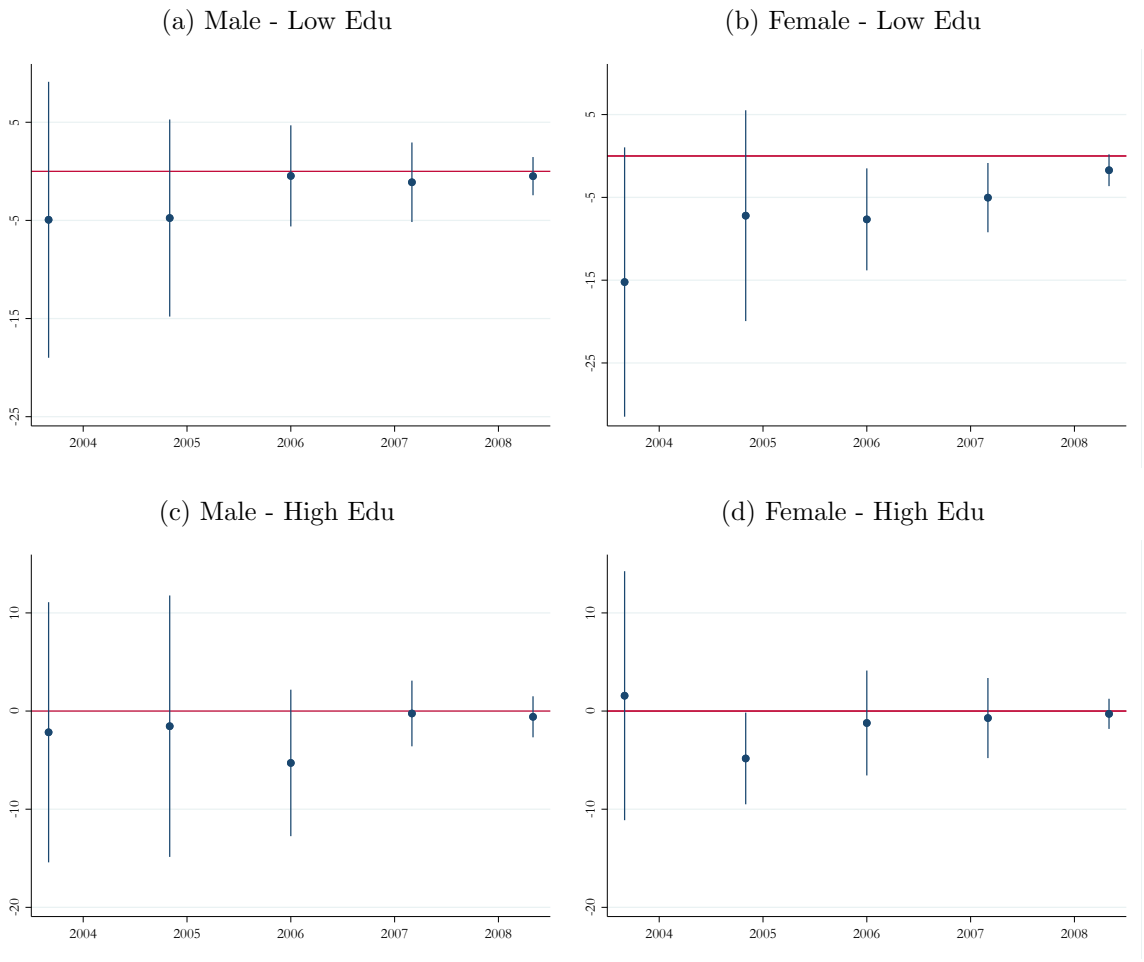
Notes: Data are from the 1998-2008 ENAHO. Figure shows the β coefficients of equation 2. Confidence intervals are also shown at the 90% confidence level. The dependent variable is the difference in the total employment share between 1998 and the year shown, where employment share is defined as the ratio between the number of working-age (25-55) individuals employed in a local labor market divided by the population in the given labor market, multiplied by 100. Baseline controls and pre-trends include: share of females, share of college graduates, share of workers in the tradable sector, and share of workers in the manufacture sector. In the regression, each observation is weighted by 1998 local labor market population. Standard errors are clustered at the local labor market level.

Figure 6: Effect of China Trade Shock on Total Employment by Gender
Dependent Variable: Total Group Employment / Total LLM Pop * 100



Notes: Data are from the 1998-2008 ENAHO. Figure shows the β coefficients of equation 2. Confidence intervals are also shown at the 90% confidence level. The dependent variable is the difference in the total employment share between 1998 and the year shown, where employment share is defined as the ratio between the number of working-age (25-55) individuals employed in a local labor market divided by the population in the given labor market, multiplied by 100. Baseline controls and pre-trends include: share of females, share of college graduates, share of workers in the tradable sector, and share of workers in the manufacture sector. In the regression, each observation is weighted by 1998 local labor market population. Standard errors are clustered at the local labor market level.

Figure 7: Effect of China Trade Shock on Employment by Gender and Education
Dependent Variable: Total Group Employment / Total LLM Pop * 100



Notes: Data are from the 1998-2008 ENAHO. Figure shows the β coefficients of equation 2. Confidence intervals are also shown at the 90% confidence level. The dependent variable is the difference in the total employment share between 1998 and the year shown, where employment share is defined as the ratio between the number of working-age (25-55) individuals employed in a local labor market divided by the population in the given labor market, multiplied by 100. Baseline controls and pre-trends include: share of females, share of college graduates, share of workers in the tradable sector, and share of workers in the manufacture sector. In the regression, each observation is weighted by 1998 local labor market population. Standard errors are clustered at the local labor market level.

9 Tables

Table 1: Chinese Import Competition

	Bilateral Trade (Millions of 1998 US$)	
	Imports China	Imports ROW
A: Peru		
1998	213.3	8,007.0
2004	679.7	8,258.3
2008	3,233.2	20,552.9
Growth 1998-2008	1,416%	156.7%
B: LATAM countries		
1998	3,355.8	127,337.5
2004	8,477.8	112,285.6
2008	33,237.6	249,712.0
Growth 1998-2008	890%	96.1%

Notes: Data source is UN Comtrade. Values are in Millions of 1998 US dollars. Panel A shows the values of annual Peruvian imports from China (Column 1) and from the Rest Of the World (Column 2). Panel B shows these values for Latin American countries sharing a border with Peru: Argentina, Bolivia, Brazil, Chile, Colombia and Ecuador.

Table 2: Descriptive Statistics on Labor Market Outcomes, By Gender

	Female			Male		
	1998	2004	2008	1998	2004	2008
Labor Force Participation	68.2	74.2	76.5	94.4	95.1	95.8
Total Employment Rate	65.7	71.3	73.9	91.9	92.4	93.8
Share in Tradables	25.9	27.9	27.8	46.6	48.0	45.9
Share in Non-tradables	39.7	43.4	46.0	45.3	44.4	47.9
Low-Educated Employment Rate	65.0	70.9	73.3	93.7	93.8	94.8
Share in Tradables	29.5	33.3	33.8	54.24	56.5	55.0
Share in Non-tradables	35.5	37.6	39.5	39.4	37.3	39.8
High-Educated Employment Rate	70.5	72.8	74.9	90.9	89.5	91.5
Share in Tradables	10.5	10.3	12.4	25.2	26.4	25.9
Share in Non-tradables	59.9	62.5	62.5	65.6	63.1	65.6

Notes: Data source is ENAHO. Employment rate is defined as the ratio between the number of working-age (25-55) individuals employed in a demographic group divided by the population in the given demographic group, multiplied by 100.

Table 3: Import Penetration per Worker (in thousands of US dollars)

Panel A: Δ IPW

	Mean	Median	S.Dev.	p75-p25	N
Δ IPW 98-04	0.02	0.01	0.05	0.03	146
Δ IPW 98-08	0.17	0.05	0.39	0.12	146

Panel B: Δ IPW 98-08 by Local Labor Market

Top 10		Bottom 10	
LLM	Δ IPW 98-08	LLM	Δ IPW 98-08
1. Pisco, Ica	2.803	1. Moho, Puno	-0.001
2. Santa, Ancash	1.839	2. Recuay, Ancash	-0.001
3. Callao, Callao	1.838	3. Candarave, Tacna	-0.001
4. Yauli, Junín	1.819	4. Asunción, Ancash	-0.001
5. Barranca, Lima	1.580	5. Grau, Apurímac	-0.001
6. Pasco, Pasco	0.969	6. Vilcas Huamán, Ayacucho	-0.001
7. Trujillo, La Libertad	0.805	7. Chincheros, Apurímac	-0.001
8. Pacasmayo, La Libertad	0.688	8. Chepén, La Libertad	-0.001
9. Contumaza, Cajamarca	0.573	9. Oyón, Lima	-0.001
10. Lambayeque, Chiclayo	0.554	10. Paruro, Cusco	-0.001

Notes: Data sources are COMTRADE and ENAHO. Where ΔIPW is defined following equation (1).

Table 4: Effect of Trade Shock on Employment of Low-Educated Workers by Sector
Dependent Variable: Total Group Employment / Total LLM Pop * 100

	Tradable		Non-Tradable	
	Female	Male	Female	Male
A: IV Regressions (1998-2008)				
Δ IPW	-3.944***	0.470	2.224*	-0.960
	(0.965)	(1.415)	(1.137)	(1.070)
Mean Y in 98	18.28	23.62	13.52	11.82
Baseline Controls	X	X	X	X
Δ(2001-1998) Controls	X	X	X	X
F-test	96.34	96.34	96.34	96.34
Sample Size	143	143	143	143
	Formal		Informal	
	Female	Male	Female	Male
B: IV Regressions (1998-2008)				
Δ IPW	0.525	1.835**	-2.631**	-2.153
	(0.352)	(0.725)	(1.278)	(1.567)
Mean Y in 98	0.29	1.43	34.92	34.30
Baseline Controls	X	X	X	X
Δ(2001-1998) Controls	X	X	X	X
F-test	96.34	96.34	96.34	96.34
Sample Size	143	143	143	143

Notes: Data are from the 1998-2008 ENAHO. The dependent variable is the difference in the total group employment share between 2008-1998 at the local labor market level, where employment share is defined as the ratio between the number of working-age (25-55) individuals employed in a local labor market divided by the population in the given labor market, multiplied by 100. A marginal increase Δ IPW should be interpreted as an increase in one thousand dollars per worker. The mean Δ IPW between 1998 and 2008 is 0.17, and the interquartile change form the 25th to the 75th percentile is 0.12. Baseline controls and pre-trends include: share of females, share of college graduates, share of workers in the tradable sector, and share of workers in the manufacture sector. Each observation is weighted by 1998 local labor market population. Standard errors clustered at the local labor market level in parentheses.* p<0.10, ** p<0.05, *** p<0.01

Table 5: Effect of Trade Shock on Migration Rates 02-07

	All	Female	Male	Low Educated Female	Low Educated Male
	(1)	(2)	(3)	(4)	(5)
A: IV Regressions (1998-2002)					
Δ IPW	-1.777	-0.743	-1.034	-0.344	-0.394
	(1.455)	(0.621)	(0.834)	(0.350)	(0.444)
B: IV Regressions (1998-2008)					
Δ IPW	0.099	0.043	0.056	0.024	0.032
	(0.232)	(0.099)	(0.133)	(0.052)	(0.064)
Baseline Controls	X	X	X	X	X
Δ(2001-1998) Controls	X	X	X	X	X
F-test	96.19	96.19	96.19	96.19	96.19
Sample Size	142	142	142	142	142

Notes: Migration rates between 2002 and 2007 are constructed using the 2007 Population Census and the question of place of residence in 2002. Each observation is weighted by 1998 local labor market population. Standard errors clustered at the local labor market level in parentheses.* p<0.10, ** p<0.05, *** p<0.01

Table 6: Effect of China Trade Shock on Labor Force by Gender and Education
Dependent Variable: Total Group in Labor Force / Total LLM Pop * 100

	Female			Male		
	(1) All	(2) Low-Edu	(3) High-Edu	(4) All	(5) Low-Edu	(6) High-Edu
A: IV Regressions (1998-2004)						
Δ IPW	-11.021*	-13.146	1.414	-5.766	-2.075	-3.005
	(5.742)	(10.620)	(7.585)	(4.459)	(9.458)	(8.955)
B: IV Regressions (1998-2008)						
Δ IPW	-2.314**	-1.352	-0.722	-0.725	0.171	-0.600
	(1.124)	(1.317)	(0.922)	(0.866)	(1.257)	(1.293)
Mean Y in 98	38.08	32.62	5.45	44.73	36.15	8.58
Baseline Controls	X	X	X	X	X	X
Δ(2001-1998) Controls	X	X	X	X	X	X
F-test	96.34	96.34	96.34	96.34	96.34	96.34
Sample Size	143	143	143	143	143	143

Notes: Data are from the 1998-2008 ENAHO. The dependent variable is the difference in the total group labor force share between 2004-1998, and 2008-1998 at the local labor market level, where labor force share is defined as the ratio between the number of working-age (25-55) individuals in the labor force in a local labor market divided by the population in the given labor market, multiplied by 100. A marginal increase Δ IPW should be interpreted as an increase in one thousand dollars per worker. The mean Δ IPW between 1998 and 2004 is 0.02, and the interquartile change form the 25th to the 75th percentile is 0.03. The mean Δ IPW between 1998 and 2008 is 0.17, and the interquartile change form the 25th to the 75th percentile is 0.12. Baseline controls and pre-trends include: share of females, share of college graduates, share of workers in the tradable sector, and share of workers in the manufacture sector. Each observation is weighted by 1998 local labor market population. Standard errors clustered at the local labor market level in parentheses.* p<0.10, ** p<0.05, *** p<0.01

Table 7: Persistence of Trade Shock for Low-Educated Workers by Local Labor Market Characteristics
Dependent Variable: Total Employment / Total LLM Pop * 100

	Low-Educated Women			Low-Educated Men		
	(1)	(2)	(3)	(4)	(5)	(6)
IV Regressions (1998-2008)						
Δ IPW	-17.909**	-7.170***	-22.110***	3.405	-7.578**	-0.976
	(8.658)	(2.052)	(8.564)	(9.785)	(3.099)	(10.029)
Δ IPW * $> p(50)$ Sh NoTrade	16.087*		15.419*	-3.624		-5.391
	(8.249)		(8.218)	(9.792)		(9.967)
Δ IPW * $> p(50)$ Sh Manuf		5.814***	5.137**		8.066***	7.050**
		(2.237)	(2.327)		(3.111)	(3.111)
Mean Y in 98	31.80	31.80	31.80	35.44	35.44	35.44
Baseline Controls	X	X	X	X	X	X
Δ(2001-1998) Controls	X	X	X	X	X	X
Sample Size	143	143	143	143	143	143

Notes: Data are from the 1998-2008 ENAHO. The dependent variable is the difference in the total group employment share between 2008-1998 at the local labor market level, where employment share is defined as the ratio between the number of working-age (25-55) individuals employed in a local labor market divided by the population in the given labor market, multiplied by 100. A marginal increase Δ IPW should be interpreted as an increase in one thousand dollars per worker. The mean Δ IPW between 1998 and 2008 is 0.17, and the interquartile change form the 25th to the 75th percentile is 0.12. Baseline controls and pre-trends include: share of females, share of college graduates, share of workers in the tradable sector, and share of workers in the manufacture sector. Each observation is weighted by 1998 local labor market population. Standard errors clustered at the local labor market level in parentheses.* p<0.10, ** p<0.05, *** p<0.01 * p<0.10, ** p<0.05, *** p<0.01

Table 8: Persistence of Trade Shock for Low-Educated Workers by Local Labor Market Characteristics
Dependent Variable: Total Employment / Total LLM Pop * 100

	(1)	(2)	(3)
A: IV Regressions for Low-Educated Women (1998-2008)			
Δ IPW	-2.270**	-3.497	-2.777
	(1.057)	(3.579)	(3.325)
Δ IPW * $> p(50)$ Sh LowSkill	2.145		2.336
	(1.924)		(1.908)
Δ IPW * $> p(50)$ Sh Informal		2.040	0.688
		(3.518)	(3.225)
Mean Y in 98	31.48	31.48	31.48
B: IV Regressions for Low-Educated Men (1998-2008)			
Δ IPW	0.069	7.462**	-9.886
	(1.297)	(3.602)	(17.380)
Δ IPW * $> p(50)$ Sh LowSkill	0.958		1.420
	(1.806)		(1.853)
Δ IPW * $> p(50)$ Sh Informal		-7.831**	-6.710*
		(3.498)	(3.488)
Mean Y in 98	35.44	35.44	35.44
Baseline Controls	X	X	X
Δ(2001-1998) Controls	X	X	X
Sample Size	143	143	141

Notes: Data are from the 1998-2008 ENAHO. The dependent variable is the difference in the total group employment share between 2008-1998 at the local labor market level, where employment share is defined as the ratio between the number of working-age (25-55) individuals employed in a local labor market divided by the population in the given labor market, multiplied by 100. A marginal increase Δ IPW should be interpreted as an increase in one thousand dollars per worker. The mean Δ IPW between 1998 and 2008 is 0.17, and the interquartile change form the 25th to the 75th percentile is 0.12. Baseline controls and pre-trends include: share of females, share of college graduates, share of workers in the tradable sector, and share of workers in the manufacture sector. Each observation is weighted by 1998 local labor market population. Standard errors clustered at the local labor market level in parentheses.* p<0.10, ** p<0.05, *** p<0.01