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The Impact of the China Shock on the Manufacturing Labor Market in Brazil

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Abstract

The vigorous growth of the Chinese economy together with its growing role in international trade has raised fears of deindustrialization among developing countries. This study draws on the large increase in the international trade exposure of the Brazilian economy from 2000 to 2012 to assess the impacts of trade on its manufacturing sector. In this period, import penetration increased by 25%, and at the same time, China's share of import penetration increased from 3% to 20%. Using household survey data that encompasses both formal and informal workers, this paper's estimates indicate that higher import penetration reduces the employment level, the share of employment in the population, the hourly wage, the interindustry wage premium, and the share of informal employment. The industry-level results indicate that a rise in import penetration from either China or the rest of the world (ROW) reduced the employment level, hourly wage, and share of informal employment while increasing the interindustry wage premium. The worker-level results suggest that industry-level import penetration from China and the ROW raised workers' wages and reduced the likelihood of their being informally employed. The state-level estimates imply that Chinese and ROW imports per worker initially reduced the employment level, the hourly wage, and share of informal employment, but these effects were reversed after 2008. Chinese imports per firm had a negative impact on the share of informal employment and a positive one on average years of schooling. Before 2008, Chinese imports per firm increased the share of workers with both high-school and college educations, and the net impact on both shares became negative after 2008. Estimates using actual imports per worker and per firm did not impact state-level labor-market outcomes. Finally, these effects were modulated by the labor intensity of the industry, the state-level initial share of manufacturing in the gross domestic product, the availability of a sea harbor in the state, and the implementation of the *Nova Matriz Econômica* policies in 2008.

Keywords: Brazil, China, employment, import penetration, informality, wages

JEL codes: F1, O1

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1. INTRODUCTION

Over the last three decades, China has experienced an impressive economic transformation involving rapid economic growth and increasing participation in international trade. In 2000, China accounted for 3.35% of world imports and 4% of world exports. By 2012, these figures stood at 9.77% of world imports and 11.42% of world exports. Given that world trade flows grew by 75% in this period, China achieved an unprecedented expansion in both its trade flows and participation in world trade, which has become known as the "China shock."

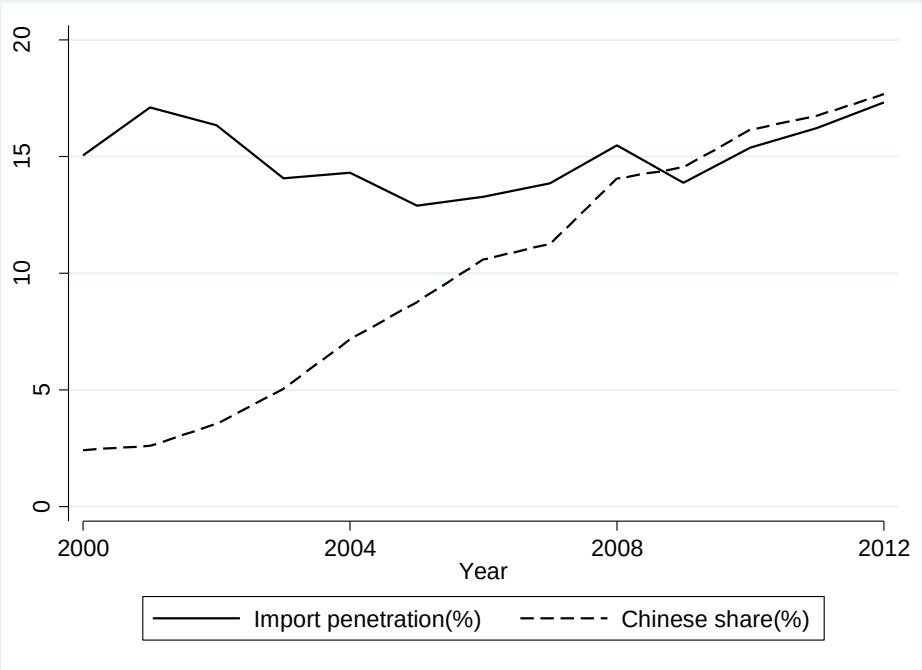
This rapid ascension of China as a major manufacturing powerhouse—about 90% of its exports are made up of manufactured goods—raised fears of deindustrialization in developing countries, especially those in Latin America. Such concerns are grounded in the fact that China is a populous country and that a substantial amount of its labor force is still employed in agriculture. This huge labor endowment makes China labor-abundant relative to other countries in the developing world. Moreover, the size of its economy leads to economies of scale that are important in several manufacturing industries. On top of this, Moreira (2006) points out that although in the early 2000s China presented lower productivity levels than some Latin American countries, its wages were more than proportionately lower than those in Latin American countries. All these features give China a strong competitive edge in world markets.

This naturally raises the question of whether Latin American economies and, more specifically, their manufacturing sectors have been impacted by the China shock. In this vein, the case of Brazil is emblematic. Besides being the most populous country in Latin America, it has the largest economy and a sizable manufacturing industry. In 2000–2012, as illustrated by figure 1, Brazil experienced a 25% increase in its manufacturing import penetration and, at the same time, a sixfold increase in China's share of such imports, which went from 3% to 20%. This made China the largest exporter to Brazil with a 20.4% share of the total Brazilian imports. Interestingly, Facchini et al. (2010) point out that Chinese manufacturing goods seem to be close substitutes for those produced in Brazil. Furthermore, China became the second-largest destination for Brazilian exports, with a share of 14.6%. These trade flows are uneven in terms of their contents, though. Manufactured goods constitute less than a third of Brazil's exports to China, but more than 90% of China's exports to Brazil. Additionally, China's trade expansion may also have affected Brazil on the export side of the economy. Figure 2 shows that China gained substantial market share in foreign markets already served by Brazilian exporters. In fact, Brazil's share in world trade increased by roughly 50%. This poor performance also extended to the manufacturing share in Brazil's GDP, which declined from 18% to 13%.

These observations suggest that the China shock is a good candidate for explaining the weak performance of the manufacturing sector, which suggests a deindustrialization of the Brazilian economy. This is an important question because many observers point out that the manufacturing sector is the driving force of economic growth and development and also typically pays higher wages than jobs in agriculture or services. Given the importance of manufacturing, there is a surprising dearth of research on the impacts of the China shock on developing countries, especially those in Latin America.

FIGURE 1. MANUFACTURING IMPORT PENETRATION IN BRAZIL AND CHINA'S SHARE IN IMPORT PENETRATION

PANEL A. MANUFACTURING IMPORT PENETRATION AND CHINA'S SHARE IN IMPORT PENETRATION



PANEL B. THE FOUR MEASURES OF IMPORT PENETRATION

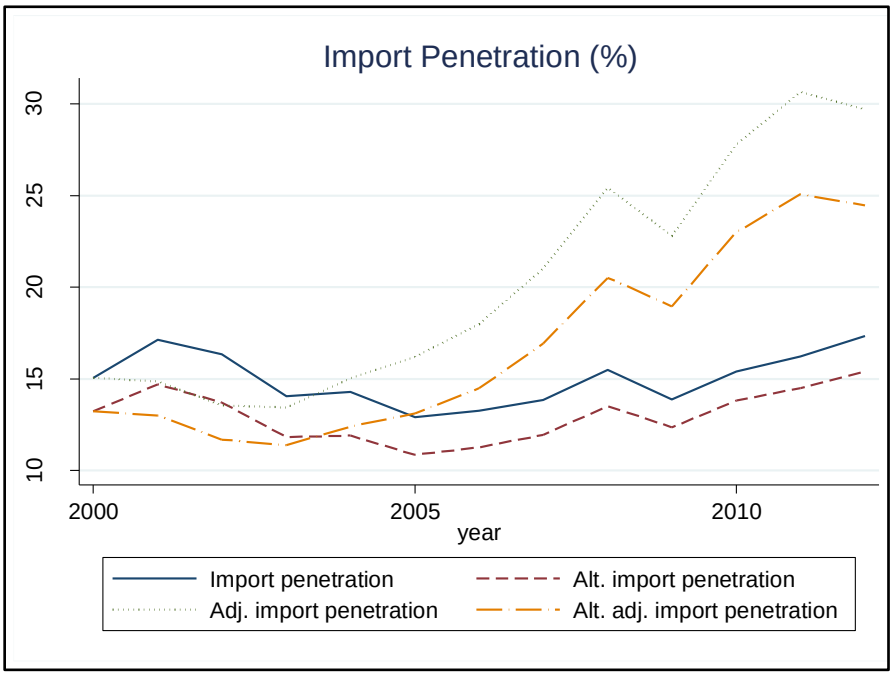
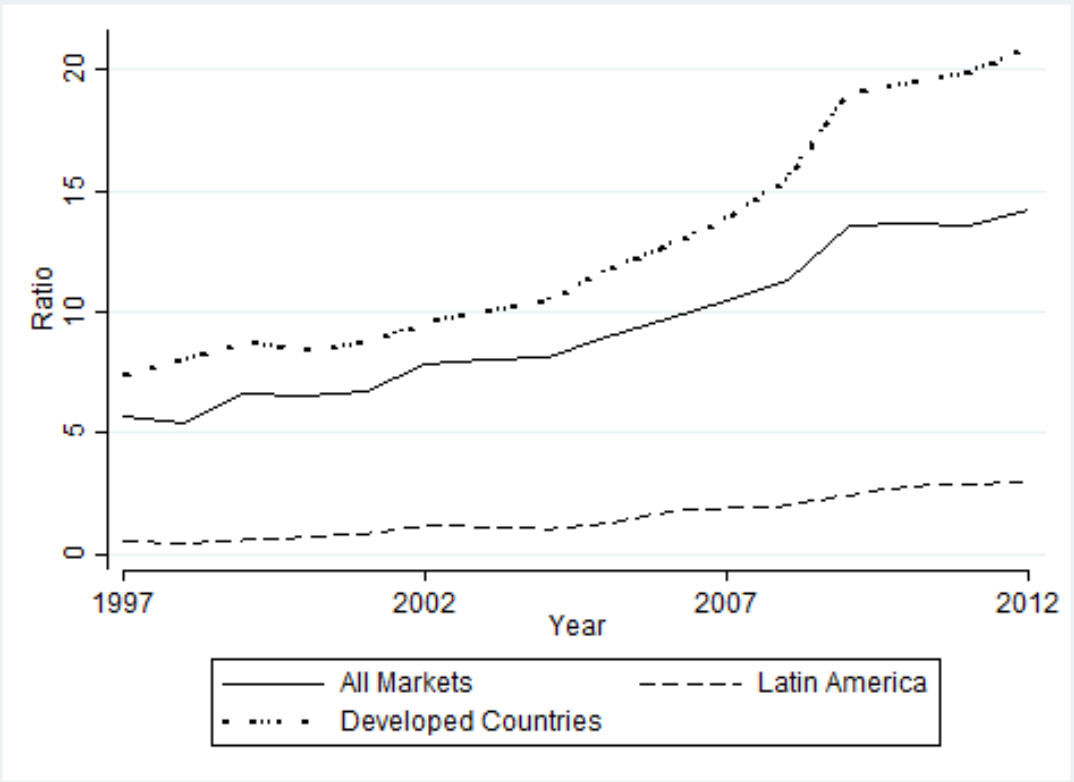


FIGURE 2. SIMPLE AVERAGE ACROSS INDUSTRIES OF THE RATIO BETWEEN CHINESE AND BRAZILIAN MARKET SHARE IN FOREIGN MARKETS



This study represents a step toward filling this gap by studying how the China shock affected Brazil's manufacturing labor market in 2000–2012. More precisely, a rigorous empirical analysis is conducted to examine how the level, skill, informality, sector, and regional composition of manufacturing employment in Brazil were affected by the changes in the industry-level import tariffs, import penetration, and the Chinese market share in foreign markets served by Brazilian firms. The empirical exercise utilizes data from the Brazilian Household Survey (Pesquisa Nacional por Amostra de Domicilios, PNAD) and from the Brazilian demographic census. This pooled cross-sectional household-level data contains detailed demographic and employment information. Most importantly, it encompasses both formal and informal workers. This is a major advantage of this data because the share of informal workers is larger than 20% in manufacturing as a whole, and approximately a third of workers are informal in industries like furniture and other products.

This paper's estimates at the industry level indicate that a rise in import penetration from either China or the ROW reduces the employment level. Chinese imports had a stronger effect on labor-intensive industries. Interestingly, Chinese imports in upstream industries increase the employment level in downstream industries. Import penetration from both the ROW and China reduced the industry-level hourly wage and share of informal employment, while they increased the interindustry wage premium. The implementation of the *Nova Matriz Econômica* (hereafter NME) policies in 2008 dampened these effects.

The worker-level results suggest that industry-level import penetration from both China and ROW raised workers' wages, with a greater effect for ROW import penetration in coastal states and a larger effect for Chinese import penetration on labor-intensive industries. The implementation of the NME magnified the effects of Chinese import penetration and dampened that of ROW import penetration. Industry-level Chinese and ROW import penetration reduced the likelihood of informal employment. These effects are smaller in states with a large manufacturing sector, and Chinese import penetration showed a larger effect on labor-intensive industries. However, the use of state-by-industry trade exposure measures led to some different results. In fact, the ROW import penetration effect switched

from being negative to positive after the implementation of the NME, and Chinese import penetration showed the exact opposite behavior. Analogously to the informal employment indicator, the sign for the measure for ROW import penetration also went from negative to positive in response to the implementation of the NME, while Chinese import penetration again showed the exact opposite pattern.

The last set of estimates were obtained using state-level identification following Autor et al.'s (2013) methodology. These results imply that before the NME was put into effect, both the Chinese and ROW imports per worker reduced the employment level but that these effects became positive after 2008. In the pre-NME period, the net effect of ROW and Chinese imports per worker decreased the log of the hourly wage and the share of informal employment, but both effects became positive after the NME. Moving to trade exposure measured as imports per firms, this study finds that Chinese imports per firm had a negative impact on the share of informal employment and a positive one on average years of schooling. Before the implementation of the NME, Chinese imports per firm increased the share of workers with both high-school and college educations, but the net impact on both shares became negative after the NME policies went into effect. The effects of ROW imports per firm on these two outcomes the exact opposite pattern. Finally, the estimates using actual imports per worker and per firm did not impact state-level labor-market outcomes.

At the end of the day, this paper provides new evidence that the China shock affected manufacturing in Brazil in a nontrivial way, making it difficult to assert that the shrinkage in the participation of manufacturing in Brazil's GDP is the result of the China shock. Most importantly, there is evidence suggesting that the effect of Chinese imports is different to those of imports from other countries. These impacts also differed depending on the characteristics of both the industry and the state. Finally, the new policies introduced by the implementation of the NME policies substantially altered the effects of the changes in trade exposure measures on labor-market outcomes, substantially, in some cases even reversing these. These findings are a significant contribution to policymakers facing the challenge of addressing these new, potentially harmful effects of the China shock.

The remainder of this paper is organized as follows. The next section provides an overview of trade-related policies in Brazil since the 1990s, introduces a theoretical framework to guide the empirical exercise, describes this project's dataset, and presents some raw data patterns to illustrate the effects of increased trade exposure on labor-market outcomes. The empirical methodology developed to assess causal effects of trade on manufacturing labor markets is laid out in section 3. Section 4 reports the estimates and discusses the results. Finally, conclusions are drawn in section 5.

2. POLICY BACKGROUND, THEORETICAL FRAMEWORK, AND RAW DATA DESCRIPTION AND PATTERNS

In this section, I provide a brief overview of the changes in trade-related policies that took place in Brazil from the 1990s onward. Next, I introduce a theoretical framework to facilitate the understanding of the possible labor market ramifications of the changes in Brazilian trade policies. This is followed by an explanation of the source of each component and the assembly procedure used to prepare the dataset employed in the empirical exercises of this project. Finally, I present descriptive statistics about the evolution of the trade exposure of the Brazilian economy and its labor-market outcomes during the 2000 to 2012 period.

A. Policy background

In the 1970s and 1980s, the Brazilian economy had a very small degree of openness that was a consequence of very high import tariffs coupled with several binding nontariff barriers (NTBs). At the end of the 1980s, this highly protective trade policy started to change. In 1988, the Brazilian government unilaterally decided to change its trade policy by cutting import tariffs to reduce the level of redundant protection. This means that tariffs were reduced to a level close to the domestic–international price differential. Despite these lowered tariffs, NTBs were not eliminated (cf. Kume et al., 2003), and this lowered protection level was still high enough to severely curb imports.

When the Collor de Mello administration took office in 1990, it implemented a series of economic reforms aiming to reintegrate Brazil into world markets. These reforms eliminated hurdles in the foreign currency market and implemented new rules facilitating flows of foreign direct investment (FDI) and capitals for portfolio investment purposes, as discussed in Baumann (2001). As a result, individuals and firms could obtain foreign currency more easily, which facilitated the importation of goods and services. Additionally, significant changes were made in the trade policy to reduce protection levels. In 1990, the new president also suddenly reduced NTBs drastically.[2] Moreover, nominal tariff reductions were scheduled to be implemented between 1990 and 1994. These tariff cuts were heterogeneous across industries. Interestingly, the original schedule was not followed, and tariffs were reduced even faster than originally planned. The protection of the manufacturing sector was dramatically reduced.[3] From an average tariff of almost 40% in 1989, the tariff cuts produced an average tariff of approximately 17% in 2000. The median tariffs tracked average tariffs very closely. The industries with the largest absolute decrease in import tariffs were apparel, textiles, pharmaceutical, rubber products, and automobiles. These tariff cuts had real effects on the economy: manufacturing imports grew by more than 200% between 1990 and 2000, and import penetration in manufacturing almost tripled, going from an initial level of 5.7% in 1990 to 14% in 2000.

Manufacturing industries were also impacted by the GATT/WTO's Uruguay Round of negotiations, which resulted in a multilateral reduction in the tariffs imposed on manufactured goods by developed countries, which dropped from an average of approximately 18% to just 8% by the end of the decade.[4] This led Brazilian manufacturing exports to increase by more than 70% between 1990 and 2000.

In the 2000s, additional changes were made to Brazilian trade policy by the da Silva and Roussef administrations. In 2004, the da Silva administration imposed a border tax—enacted by Law 10864—which consists of levying the PIS (1.65%) and the COFINS (7.65%) taxes on all imported goods.[5] These taxes were already being imposed on domestic producers since the 1970s. The Brazilian government gave market economy status to China in November 2004. This decision reduced the Brazilian government's ability to impose safeguards, countervailing duties, and antidumping measures on Chinese exporters. A noticeable change in the trade policy in this period was the shift from industry as the unit of protection to a (sensitive) product-level protection, especially by means of countervailing and antidumping duties. This is illustrated by the fact that the number of antidumping procedures in Brazil reached almost 100 in the 2000s, about 25% of which were against Chinese producers (cf. WTO Antidumping Gateway, 2016).

To alleviate the impacts of the 2007–2008 global financial crisis and to continue on the path of strong economic growth, the da Silva and later the Roussef administrations decided to change the course of their macroeconomic and trade policy starting in the second semester of 2008. This new policy became known as the *Nova Matriz Econômica* (NME). The NME had five pillars, namely (i) an expansionary fiscal policy, (ii) artificially low interest rates by means of subsidized loans to large firms provided by government-owned banks, (iii) higher import tariffs and adoption of NTBs for sensitive goods, (iv) central bank intervention in the exchange rate market to prevent a major appreciation of the currency, (v) increases in the minimum wage in excess of the inflation rate.[6] In the next subsection, I discuss a theoretical framework that can be used to better understand the implications of these policies, including the NME.

B. Theoretical framework

The analysis of the effects of the changes in the Brazilian trade environment on labor-market outcomes benefits from the use of a theoretical framework to motivate and guide the empirical exercise. In view of the multitude of outcomes examined in this paper, I will have to rely on two distinct types of theoretical model. The interindustry wage premium and the share of informal employment are mostly affected by intraindustry factors—according to Paz (2014a, 2014b)—and thus should be examined by means of a monopolistic competition model. The remaining outcomes are

[2] Except for the embargo on information technology products that ended in 1992.
[3] Kume et al. (2003, 2008), Abreu (1996), and Kovak (2013) provide a comprehensive description of Brazil's trade policy in the 1980s and 1990s.
[4] Although these were multilateral negotiations, the evidence amassed by Abreu (1996) strongly suggest that Brazil had very little influence in them.
[5] PIS is the Programa de Integração Social and COFINS is the Contribuição de Financiamento da Seguridade Social.
[6] For more details about the NME, the interested reader is referred to Alves (2015), for instance.

more likely to be impacted by interindustry factors and they can be studied via a Heckscher-Ohlin model like Leamer et al. (1999), as presented next.

As posited in Leamer et al. (1999), Brazil is natural-resource–abundant relative to most countries, including China. In terms of labor endowment, Brazil can only be considered labor-abundant relative to high-income countries. In contrast, the huge Chinese economy is labor-abundant relative to almost all other countries in the world, Brazil included. This implies that the Brazilian economy will experience different effects from increased trade exposure to China relative to increased trade exposure to high-income countries.

In light of these factor endowment differences for the Brazilian and Chinese economies relative to the ROW, a Heckscher-Ohlin (H-O) model with three factors—capital, labor, and natural resources—would be a suitable framework for investigating how China's increasing role in the world trading system affected the reallocation of employment among sectors and industries within Brazil's manufacturing sector. More precisely, China's accession to the WTO—which granted better access to foreign markets—exposed Brazil to a more labor-abundant competitor in its own market and in the destination markets for its exports, mainly developed countries. As a result, output and employment in labor-intensive Brazilian industries, such as apparel and footwear, are expected to decline. This leads to the first testable hypothesis.

Hypothesis 1: increased imports from China reduce absolute and relative employment in labor-intensive industries. Conversely, increased imports from the rest of the world (ROW) do not impact these labor-intensive industry outcomes.

These changes in employment may also affect other labor-market outcomes. One might expect the unskilled labor released from shrinking labor-intensive manufacturing industries to exert downward pressure on the wages for unskilled labor. It thus causes a skill downgrade and a negative effect on the average wage in manufacturing. This leads to the second testable hypothesis.

Hypothesis 2: increased imports from China cause a skill downgrade and a drop in the average wage in manufacturing industries. Conversely, increased imports from the ROW lead to a skill upgrade, and this potentially raises the average wage.

Moving to the outcomes analyzed via monopolistic competition-type models, the interindustry wage premium is usually thought to be a consequence of rent-sharing between firms and workers. The idea that higher profits induce higher wages has been empirically supported by several studies like Araújo and Paz (2015) for Brazil, and Blanchflower, Oswald, and Sanfey (1996) and Hildreth and Oswald (1997) for the USA. Thus, a reduction in trade protection could conceivably boost competitiveness in domestic markets. This increase in competitiveness may lead either to a price reduction or to a fall in the quantity demanded of the domestic output. Either effect results in a decrease in the industry rents that are shared with workers. Consequently, the wage premium declines.

In addition to impacting the demand side, trade can also affect rents indirectly via its effect on productivity. The literature has identified that trade affects labor productivity and total factor productivity (TFP), as found by Ferreira and Rossi (2003) for Brazil. Most importantly, this change in productivity occurred not only due to compositional changes at the industry-level (i.e., more productive firms expanding their market share while less productive firms contract theirs), but also due to productivity growth at the firm level, as found by Fernandes (2007) for Colombia. The idea here is that an increase in productivity expands the rents to be shared when all else is equal, as found by Bartel and Sicherman (1999) for the USA and Acosta and Gasparini (2007) for Argentina. Thus, labor productivity is expected to have a positive effect on the wage premium, and the effect of increased imports may not necessarily reduce the wage premium, as pointed out by Paz (2014b). As a consequence, a rise in import penetration has an ex-ante ambiguous effect on the wage premium.

Regarding the effect of import penetration on informality, the monopolistic competition model in Paz (2014a) indicates that increased imports make the smallest firms—who typically employ informal workers—exit the market. This leads to a reduction in the employment of informal workers. However, firms that were previously indifferent as to whether they hired formal or informal workers switch to informal employment in response to the increased

competitiveness induced by the growth of imports. This leads to import penetration having an ex-ante ambiguous effect on informality.

The NME policies outlined earlier can be studied using the theoretical framework introduced above. Pillars (i) and (iv) impact all manufacturing across the board. Pillar (ii) lowers the cost of capital, which disproportionately benefits more capital-intensive industries. Since the protection brought by pillar (iii) is at the product level and affected less than one hundred products, it is not likely that it will affect industry-level outcomes. Finally, pillar (v) would harm the profits of labor-intensive firms and of smaller firms in general, since these firms are more likely to face binding minimum wages due to their lower wages. Because each pillar of the NME affects the Brazilian economy in different ways, the direction of its effect on each outcome of interest is not clear, which becomes an empirical matter to be addressed in this study. In the next subsection, I present the details of the dataset used in the empirical exercise.

C. Data description

The dataset used in this study contains information on international trade flows, on Brazilian national accounts, and on household surveys. The international trade flow figures are available at the 1996 six-digit harmonized system (1996 HS-6) and they were extracted from the Comtrade database (United Nations, 2003) for the period between 1998 and 2012. The trade flows of interest are Brazilian imports from China and the remaining countries in the world (ROW), Brazilian and Chinese exports to the ROW, and the trade flows used to build some of the excluded instruments, as discussed below.[7] Additionally, I employ import data at the Brazilian state level from Aliceweb.[8] This data is available using the eight-digit *Nomenclatura Comum do Mercosul* (NCM) classification. I extracted the wholesale price index series for both Brazil and the United States from the World Development Indicators (World Bank, 2017).

The Brazilian national accounts data comes from the IBGE (2015). This dataset consists of the *Séries Retropoladas* 2000–2012, which encompass data on employment level, total output level, and imports and exports using an industry classification that resembles the IBGE's level 56 industry classification. For 1998, the national account data comes from the IBGE's *Tabelas de Usos e Recursos* at level 80 product classification. The number of firms and the employment level at the state level comes from the IBGE's CEMPRE-*Cadastro de Empresas*, using the CNAE 1.0 classification for 1996–2005 and the CNAE 2.0 classification for 2006–2012.

The raw Brazilian import-tariff data at the product level comes from the Secretariat of Foreign Trade at the Brazilian Ministry of Development. It was originally aggregated using the four-digit CNAE 2.0 classification. The tariff series used in this paper is a further aggregation by a simple average of the effective tariff applied that takes into account the effect of the PIS and COFINS taxes, which have been levied on imports since 2004.[9]

The labor-market data comes from the PNAD surveys and the Brazilian demographic censuses of 2000 and 2010, since the PNAD is not conducted in a census year. These surveys provide information on worker characteristics such as industry affiliation, earnings, hours worked in a week, job formality status, age, education, gender, marital status, race, and Brazilian state of residence. The PNAD surveys' questions about these characteristics do not change over time, and they are practically identical to those used in the censuses. Nevertheless, the industry classification used does change over time. The 2002–2012 PNADs employ the CNAE-Domiciliar classification.[10] The 2000 census also uses CNAE-Domiciliar, whereas the 2010 census uses CNAE-Domiciliar 2.0.

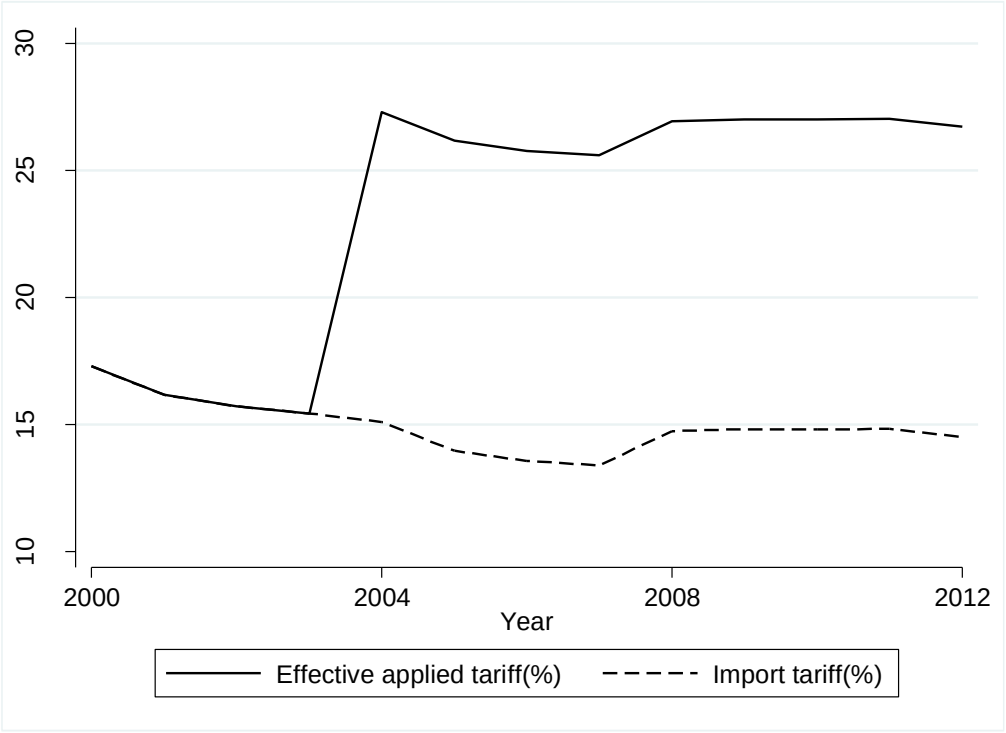
To put together the data set used in this study, I had to employ concordance tables for the different classifications mentioned above. These tables come from the CONCLA-IBGE website (https://concla.ibge.gov.br/). The classification used by the national accounts data is the most cursory and therefore dictates the final classification used in this project, which consists of a modified version of the level 56 classification with 26 manufacturing industries.

[7] This data will be used to compute ratios, hence there is no need to adjust for inflation.
[8] Re-imports and re-exports are not included in any of the trade data used in this project.
[9] This series was kindly provided by Mauricio Mesquita Moreira.
[10] The 2001 PNAD is not included in this sample since it employs the (very cursory) PNAD/CD91 classification, which would lead to a dataset with only 21 industries.

D. Raw data patterns

My examination of the manufacturing sector data begins with the measures of how far the Brazilian economy is exposed to international trade. Brazil's share of world trade grew much more modestly than China's: Brazil's exports increased from 0.88% in 2000 to 1.35% in 2012, while its import share went from 0.83% to 1.22% in 2012. Interestingly, the average effective import tariff in 2000 was 17.28% and declined to 14.51% in 2012; however, the average effective applied tariff—which accounts for the levying of the PIS and COFINS taxes from 2004 on—increased from 17.28% to 26.72%, as depicted in figure 3. This suggests an increase in trade protection enjoyed by Brazilian producers. However, tariffs are an imperfect measure of protection since the applied tariffs do not reflect the impact of NTBs such as antidumping duties. Another shortcoming of this trade protection measure is that the tariff series does not show much variability across industries and over time, which makes it less useful in the panel data analysis employed here.

FIGURE 3. SIMPLE AVERAGE OF IMPORT TARIFFS AND EFFECTIVE APPLIED IMPORT TARIFFS IN BRAZIL, 2000–2012

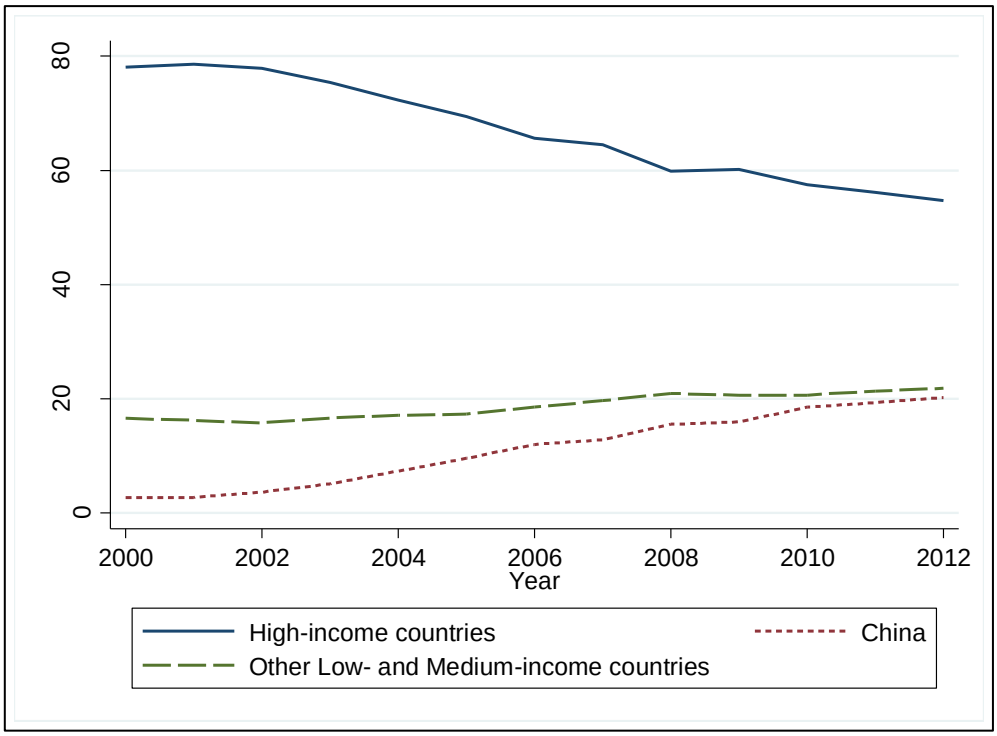


Another measure of the trade exposure of Brazilian firms is import penetration. This is the ratio between imports and apparent consumption (production plus imports minus exports). Overall import penetration in manufacturing increased from 14% in 2000 to 18% in 2012. Although figure 4 shows that China's share of Brazilian imports increased that of high-income countries fell, an important feature in the case of Brazil is that not only did the volume of imports from China grow, so did the volume of trade with the ROW, albeit at a different pace. Consequently, Brazil's experience in the 2000s cannot be summarized as merely being a case of supplier substitution.

China was the tenth-largest exporter to Brazil in 2000, accounting for 2.7% of Brazilian imports, and the ninth-largest importer of Brazilian goods, absorbing 2.2% of Brazilian exports. In 2012, these figures changed dramatically. China became the largest exporter to Brazil, accounting for 20.4% of total Brazilian imports and 14.6% of Brazilian exports, making it the second-largest importer of goods made in Brazil. Note that more than 90% of Chinese exports to Brazil consists of manufactured goods, while less than 30% of Chinese imports from Brazil are made up of

manufactured goods. In fact, in 2012, this share dropped further to 17%. This means that Brazilian exports to China consist mainly of primary commodities (minerals and agricultural products).

FIGURE 4. SHARE OF MANUFACTURING IMPORTS ACCORDING TO THE SOURCE COUNTRY



China's increasing market share in the ROW indicates that competing countries lost access to this market. Figure 2 shows the behavior of the simple average of the industry-level ratio between the Chinese and the Brazilian market share in the foreign markets served by Brazilian firms. This ratio displayed an upward trend throughout the period. More precisely, the trend differed depending on the destination market. It was steeper for developed nation markets and relatively flatter for Latin American markets. The significance of this is that Chinese export expansion may have constrained the expansion of Brazilian exports.

i. Industry-level data

Turning to the descriptive statistics at the industry-level, the data in table 1 shows that the upward trend in the effective tariffs, import penetration, and China's share of the import penetration shown in figures 1 and 2 is also present in most industries. In fact, the effective tariff increased in every industry. Part of this increase is due to the incidence of the PIS and COFINS taxes, which account for approximately 10%. Nevertheless, the tariffs for automobiles, buses, and trucks and footwear, apparel, and textiles also rose by much more than 10 percentage points; in other words, the increase in protection also came from pure import-tariff increases.

Import penetration increased by more than 20% in 16 industries out of 26. These industries account for more than 50% of employment in manufacturing. Seven industries exhibited a decline in import penetration, namely food and beverages, wood products, paper products, paint and varnishes, machinery, auto parts, and other transportation equipment. Interestingly, Chinese participation in import penetration increased markedly in 24 out of 26 industries.

Table 1 also shows that the market share of Brazilian exports in foreign markets increased in ten industries that are natural-resource intensive (such as paper products and biofuels) or capital intensive (such as steel, automobiles, and auto parts). The export share for industries that are typically labor-intensive declined considerably—examples of these are furniture, apparel, and, especially, footwear and leather products.

Chinese export expansion can be captured by Chinese market share in the foreign markets served by Brazilian exporters ($CEXP_{j,t}$), which is the cross-country weighted average of the Chinese market share in the destinations served by Brazilian exporters in 2000 weighted by the initial Brazilian market share (i.e., in year 2000), as shown below:

$$CEXP_{jt} = \sum_c \frac{IMP_{c,j,2000}^{Brazil}}{IMP_{c,j,2000}} \frac{IMP_{c,j,t}^{China}}{IMP_{c,j,t}},$$

where $IMP_{c,j,2000}^{Brazil}$ is industry *j*'s imports in year 2000 by country *c* that are from Brazil, and $IMP_{c,j,2000}$ is industry *j*'s total imports in year 2000 by country *c*. The idea here is to give more weight to increases in China's share of markets that are more important to Brazilian producers—that is, those with a higher share of Brazilian imports in 2000. The figures in table 1 show that the Chinese market share in the foreign markets served by Brazilian firms increased vigorously in every industry except biofuels and petroleum refining.

Despite the fact that the effects of both tariffs and nontariff barriers are reflected in the import penetration measure, their evolution may not clearly depict the changes in competitive pressure faced by Brazilian firms over time, since this may increase as a result of an expansion in domestic production coupled with an even larger increase in exports. I thus employ an alternative measure of import penetration that consists of the ratio between imports and the sum of imports and production. A third measure of import penetration used in this study is called the adjusted import penetration. The idea here is to adjust imports by differences in the RER (RER) of the Brazilian real to the US dollar relative to the RER of 2000.[11] Fluctuations in the nominal exchange rate may lead to swings in the value of imports which are not necessarily reflected in the quantity of imports. The adjusted import penetration is obtained by multiplying imports and exports by the factor (e_t^{adj}), which is described below:

$$e_t^{adj} = \frac{wpi_t^{Brazil}}{wpi_t^{USA}} \frac{wpi_{2000}^{USA}}{wpi_{2000}^{Brazil}} e_{2000},$$

where wpi_t^{Brazil} is the Brazilian wholesale price index in year *t*, wpi_t^{USA} is the US wholesale price index in year *t*, and e_{2000} is the implicit nominal exchange rate between the Brazilian real and the US dollar in 2000.[12] Panel B of figure 1 shows growth in all these import penetration measures. One notable feature is that the exchange-rate-adjusted import penetration series show a steeper slope.

The statistics for these three import penetration measures are reported in table 2. There, we can see that alternative import penetration is slightly lower than import penetration, except for tobacco and other transportation equipment, which are considerably smaller. The exchange-rate-adjusted import and alternative import penetrations are at least 50% larger, which suggests nontrivial RER changes in this period. In table 3, the correlations across these import penetrations are displayed. The correlations are above 0.87 among ROW import penetration measures and above 0.90 among Chinese import penetration measures.

Trade exposure may also have affected the Brazilian manufacturing sector through increased access to imported manufactured intermediate inputs, for instance. This upstream trade exposure can be measured as a weighted average of upstream industries' import penetrations. The weights are upstream industries' shares in the industry output value, as provided by the input-output matrix. This formulation is depicted below and has been used in the literature by Acemoglu et al. (2015), among others.

$$IP_{jt}^{Upstream} = \sum_r \frac{u_{rj}}{\sum_r u_{rj}} IP_{rt}$$

where $IP_{jt}^{Upstream}$ is the import penetration in year t of the industries that are upstream of industry *j*, IP_{rt} is the import penetration of industry *r* in year *t*, u_{rj} is the cost share of inputs from industry *r* in the output of industry *j.* Note that it is assumed for *r=j* that $u_{rj} \equiv 0$, since Acemoglu et al. (2015) define intermediate input to be goods manufactured by

[11] Brazilian imports and exports are expressed originally in US dollars.

[12] The implicit nominal exchange rate for 2000 was obtained by dividing the Aliceweb total for manufacturing imports, quoted in nominal US dollars, by the total imports from the *Contas Nacionais Retropoladas,* quoted in nominal Brazilian reals.

other industries.[13] By the same token, increased trade exposure on downstream industries may impact the demand faced by Brazilian manufacturers of intermediate inputs. This type of trade exposure can be calculated according to the equation below

$$IP_{jt}^{Downstream} = \sum_r \frac{v_{rj}}{\sum_r v_{rj}} IP_{rt}$$

where $IP_{jt}^{Downstream}$ is the import penetration in year *t* of the industries that are downstream of industry *j*, v_{rj} is the cost share of inputs from industry *j* in the output of industry *r.* Note that again for *r=j*, $v_{rj} \equiv 0$.

The descriptive statistics for the labor-market outcomes are reported in table 4. The manufacturing industry's share of employment only fell in the textiles and wood products industries.[14] This reduction is more than offset by the expansion of employment in the remaining industries, especially in food and beverages. Changes in the share of employment in total manufacturing employment indicate labor reallocation among manufacturing industries. Of the 26 industries, 13 natural-resource-intensive and capital-intensive industries—such as biofuels, food and beverages, appliances, automobiles, trucks, and buses—exhibited an increase in their employment share within manufacturing. The remaining industries, which are mostly labor-intensive, displayed a decline in the share in employment. This decline was considerable for apparel, textiles, wood products, footwear, and furniture.

The natural logarithm of the real hourly wage increased in seven industries only and diminished substantially in 13 industries.[15] The interindustry wage premium represents the premium attributed to the worker's industry affiliation as a percentage deviation from the average manufacturing wage.[16] We can see in table 4 that the wage premium variation is positively correlated to that of the average log of the hourly wage. The log wage variation thus cannot be entirely attributed to changes in workers' skill levels.

Table 5 displays the average worker's characteristics at the industry level for 2000 and 2012. In this study, an informal job is defined as an employment relationship in which the employer does not comply with social security contributions, as in Paz (2014a). This question is included in both the censuses and the PNAD surveys. The share of workers with informal jobs increased in nine industries, and this growth was robust in traditionally labor-intensive industries, such as apparel, wood products, and furniture. There was a sharp increase in the average years of schooling and the share of workers with a high-school diploma in all industries. The share of workers with a college degree experienced more modest growth. Part of this skill upgrade may be due to an expansion in the supply of workers with high-school and college educations in the 1990s and in the 2000s. Nonetheless, the growth in the shares of workers with both high-school and college educations was heterogeneous across industries, which indicate that this supply increase is not the sole driver of this observed skill upgrade. In fact, in some cases, the share of workers with college educations actually decreased in industries like auto parts, automobiles, trucks, and buses. In the next subsection, the analysis shifts to the regional level.

ii. State-level data

Brazil is a large country that has 26 states and a federal district, where its capital is located. Its manufacturing activity exhibits significant spatial heterogeneity. About 80% of the manufacturing output comes from just seven states, which are in the southeastern and southern regions of the country. Moreover, the state-level descriptive statistics reported in table 6 reveal that approximately 31% of the manufacturing firms are in São Paulo state, followed by Minas Gerais and Rio Grande do Sul with 13% each. At the other end of the spectrum, northern states like Acre and Roraima

[13] The cost share of inputs come from the IBGE's 2000 input-output matrix for Brazil, which provides data at the Level 56 classification level.
[14] A better measure would be the employment share of the economically active population. Unfortunately, no annual, nationwide data is available on Brazil's economically active or working-age population.
[15] The hourly wage consists of the monthly wage divided by 4.3 times the number of hours worked in a week, adjusted for inflation as in Corseuil and Foguel (2002).
[16] The wage premium is estimated as follows. For every year of the sample, hourly wages are regressed on educational and demographic controls, industry fixed effects, and state fixed effects. The state fixed effects are included to account for differences in labor regulation enforcement and to account for the state-specific minimum wages that were implemented in 2002. Once the Haisken-Denew transformation is applied to the estimated industry effects, they represent the wage premium as a percentage deviation from the wage of the base industry. This makes the estimated wage premia comparable over time. The sum of the wage premium is zero every year.

accounted for just 0.14% and 0.09% of firms, respectively. The manufacturing industry composition at the state level also varies considerably. Table 6 reports the Herfindahl index for the industry-level share of firms for each state. Manufacturing in states like Rio Grande do Sul and São Paulo is diversified, as is reflected by the low Herfindahl index of 0.09, whereas manufacturing in Pará and Alagoas is much less diversified, with Herfindahl indices of 0.17 and 0.22, respectively.

In terms of employment, the state-level share of employment in the manufacturing industry increased in almost every state. This increase was more prominent (in excess of 20%) in the southern and southeastern states. The last two columns of table 6 illustrate the evolution of the state employment share in overall manufacturing employment, where we can see that the relative share of states like São Paulo, Rio de Janeiro, Rio Grande do Sul, and Amazonas increased, while other states' shares declined. This means that manufacturing employment became spatially more concentrated.[17]

According to Autor, Dorn, and Hanson (2013)—hereafter, ADH—the trade exposure of local labor markets (Brazilian states) is measured by imports per worker, which can be calculated as the weighted average of imports experienced by the manufacturing industries in that state, using employment as weights, as shown below:

$$\Delta IPW_{st} = \sum_j \frac{L_{sjt}}{L_{jt}} \frac{\Delta M_{cjt}}{L_{st}}$$

where ΔIPW_{st} is the change in the imports per worker in state *s* between year *t* and *t*-1, L_{sjt} is the number of workers employed in industry *j* in state *s* in year *t*, and ΔM_{cjt} is the change in industry *j* imports from country *c* between year *t* and *t*-1.

A similar measure of trade exposure can be computed using the number of firms—that is, the local level of imports per firm.

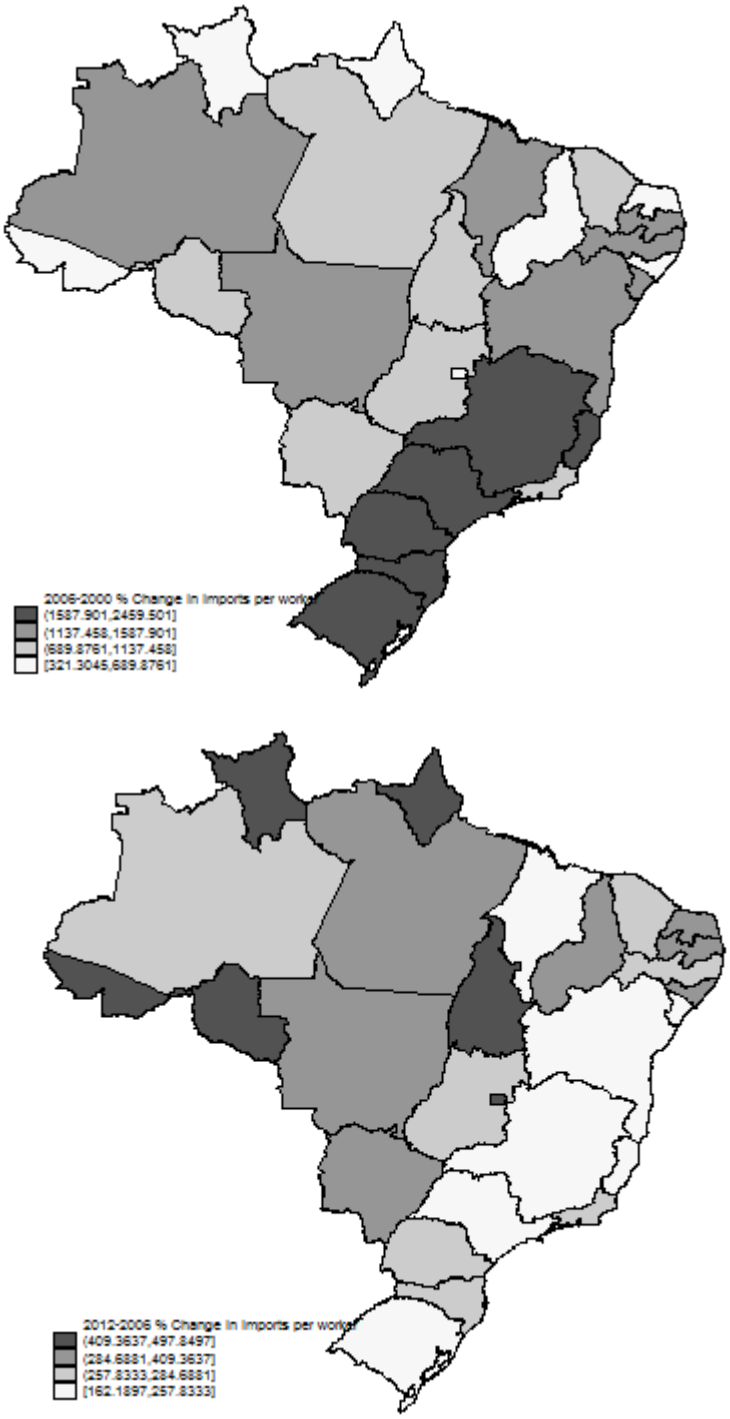
$$\Delta IPF_{st} = \sum_j \frac{F_{sjt}}{F_{jt}} \frac{\Delta M_{cjt}}{F_{st}}$$

where ΔIPF_{st} is the change in the imports per firm in state *s* between year *t* and *t*-1, and F_{sjt} is the number of firms employed in industry *j* in state *s* in year *t*.

Figure 5 and 6 show the changes in the Chinese and ROW imports per worker for the Brazilian states, respectively. The top map in both figures represents the changes between 2006 and 2000, whereas the bottom map illustrates the change between 2012 and 2006. We can see in both top maps that between 2006 and 2000 imports per worker grew considerably in almost all states. The largest increases took place in the southern or southeastern states, which account for most of Brazil's manufacturing. Surprisingly, these maps also show a very large increase in imports per worker in states with dismal levels of manufacturing, like Maranhão. An additional pattern that emerges from these two maps in the top is the similarity in the change in imports per worker from China and the ROW.

[17] An alternative driving force for the state-level share of employment are state-specific demographic trends, which changes the unobservable economically active population. Unfortunately, no data is available to evaluate this possible explanation.

FIGURE 5. STATE-LEVEL IMPORTS FROM CHINA PER WORKER



Turning to the imports-per-firm trade measures, figures 7 and 8 show the changes in imports per firm for China and for the ROW, respectively. In contrast to the imports-per-worker maps, we can see that the imports from China did not significantly impact firms located in the southeastern states. As before, both figures also show large changes in imports per firm in states with limited manufacturing activity, like Rondônia and Maranhão, for instance.

FIGURE 6. STATE-LEVEL IMPORTS FROM ROW PER WORKER

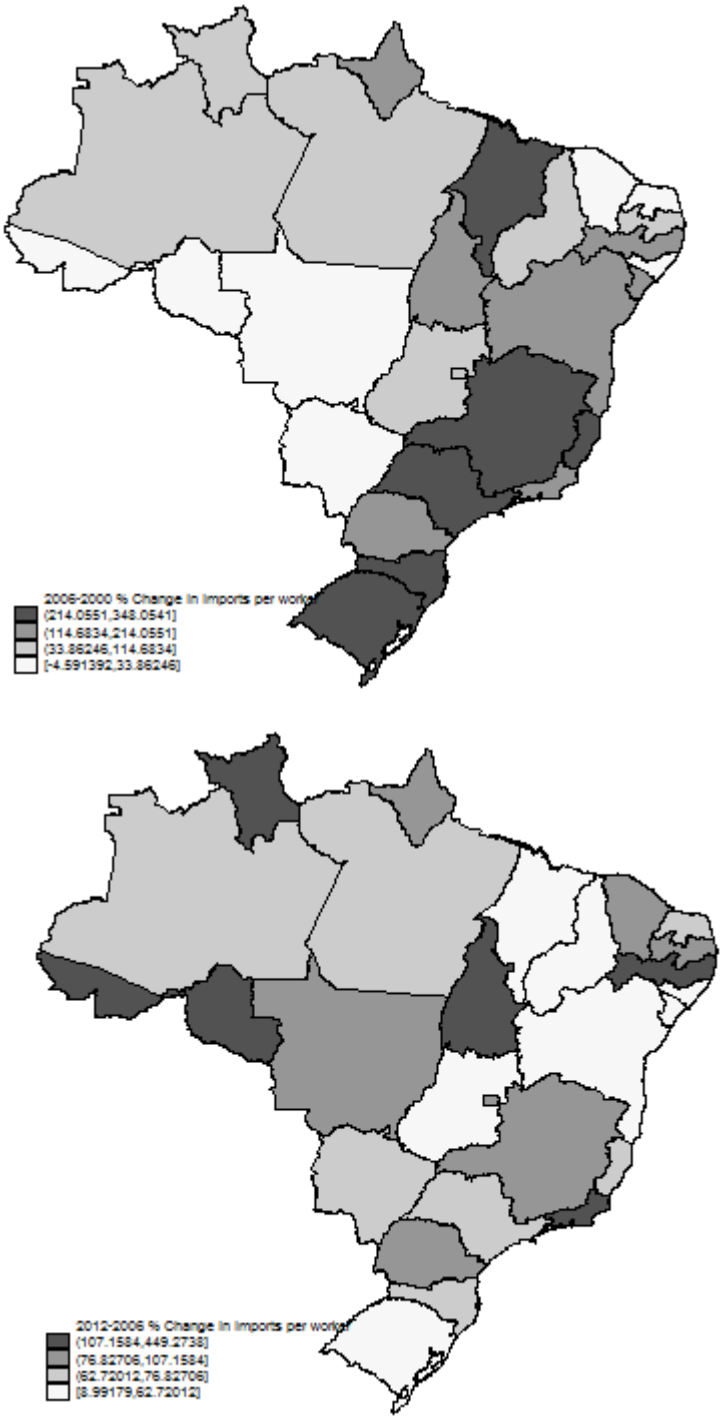


FIGURE 7. STATE-LEVEL IMPORTS FROM CHINA PER FIRM

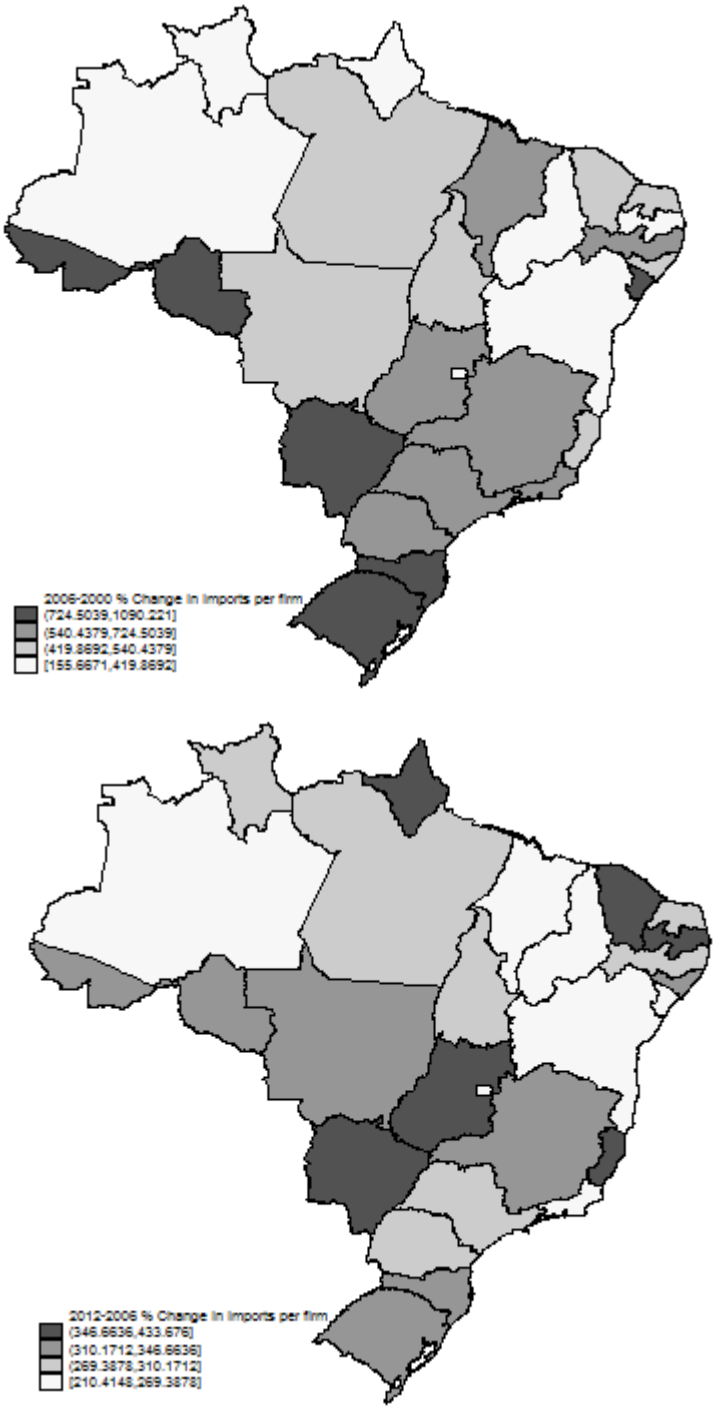
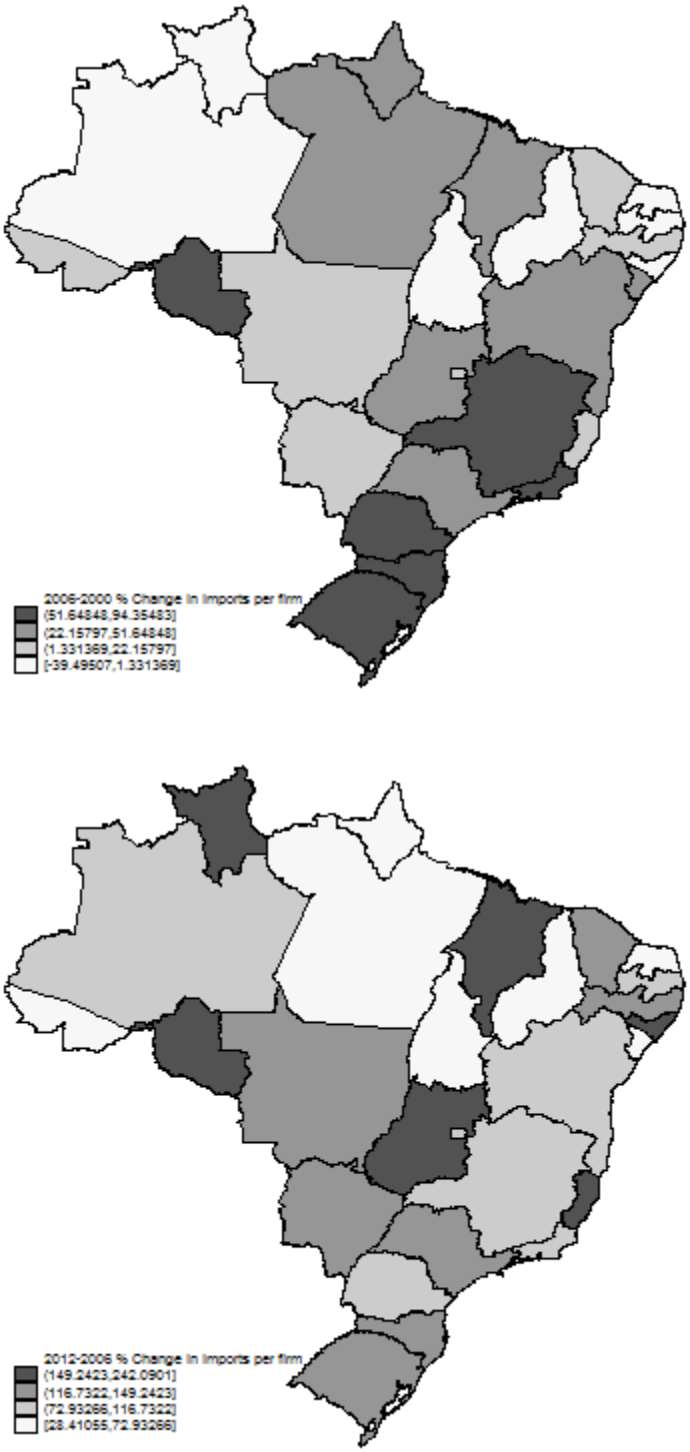


FIGURE 8. STATE-LEVEL IMPORTS FROM ROW PER FIRM



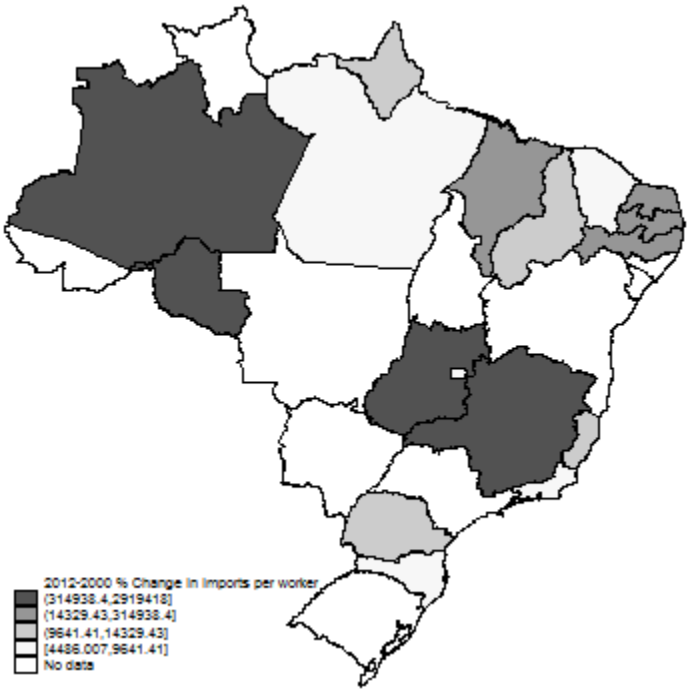
The international trade data extracted from the Aliceweb system contains import volumes according to the destination state of imports. I used this data to calculate imports per worker (hereafter, actual imports per worker) and imports per firm (hereafter, actual imports per firm) at the state level. Figures 9 and 10 show the changes in actual imports per worker and in actual imports per firm, respectively, between 2012 and 2000. The top map is for imports

from China while the bottom map for imports from the ROW. The pattern that emerges from the maps in both figures is that the states with little manufacturing activity are the ones exhibiting the largest increase in actual imports per worker and actual imports per firm. This unexpected result is in stark contrast with the maps depicting the ADH-style trade exposure measures. This casts some doubts on the representativeness of the ADH-type measures of trade exposure at the state level.

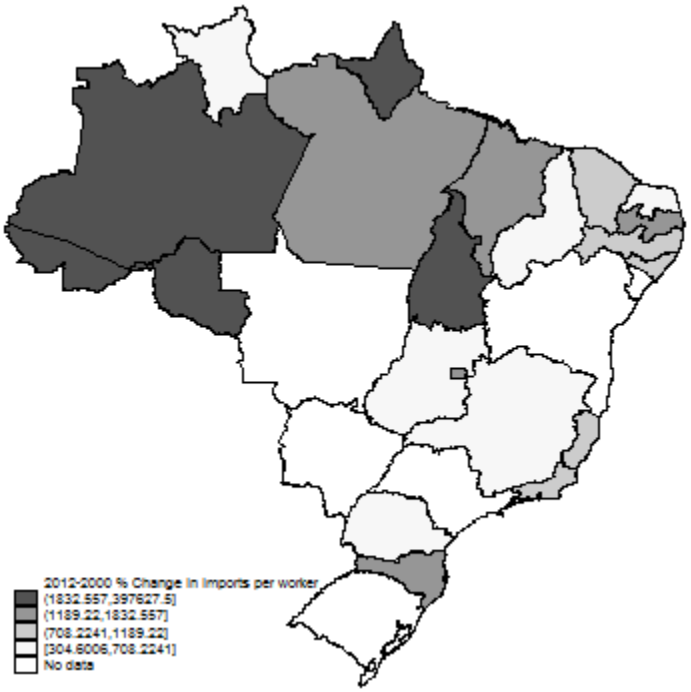
I now turn to describe the empirical methods used to evaluate the testable hypothesis outlined earlier and to distinguish the effects of each trade exposure measure on labor-market outcomes.

FIGURE 9. STATE-LEVEL ACTUAL IMPORTS PER WORKER

PANEL A. IMPORTS FROM CHINA



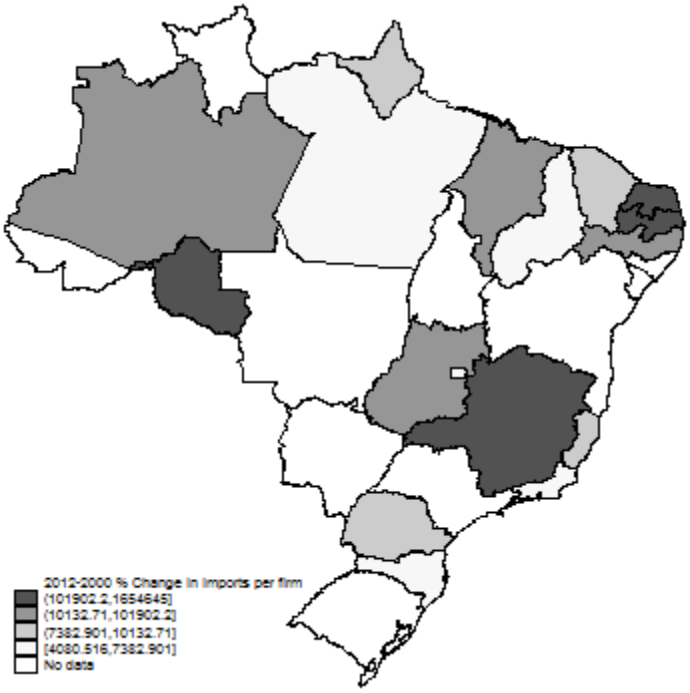
PANEL B. IMPORTS FROM ROW



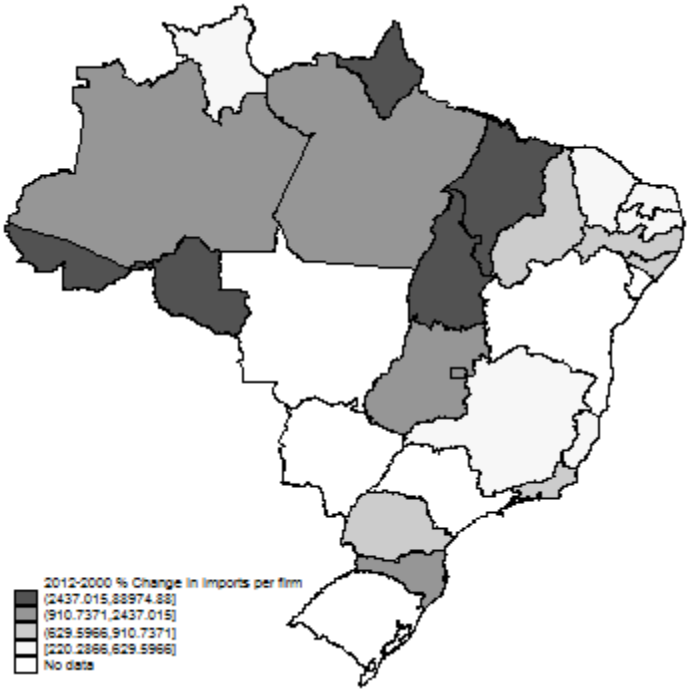
Note: No data means that the level of imports in 2000 is missing.

FIGURE 10. STATE-LEVEL ACTUAL IMPORTS PER FIRM

PANEL A. IMPORTS FROM CHINA



PANEL B. IMPORTS FROM ROW



Note: No data means that the initial level of imports per firm (year 2000) is missing

3. EMPIRICAL METHODOLOGY

The empirical methodology developed in this section exploits the industry-level, the state level, and the state-industry-level variation present in the data in order to estimate the impacts of the trade exposure measures on the

following industry-level outcomes (y_{jt}): the natural logarithm of the employment level, the share of the population in manufacturing industry employment, the share of manufacturing employment, the average log of the real hourly wage, the interindustry wage premium, the share of informal employment, workers' average years of schooling, the share of workers with a high-school diploma, and the share of workers with a college degree.

A. Industry- and worker-level specifications

Starting with the industry-level variation, the first econometric specification is used to investigate whether Chinese import penetration ($IP_{j,t-1}^{China}$) has an effect that differs from that of ROW import penetration ($IP_{j,t-1}^{ROW}$), as depicted by equation (2).

$$y_{jt} = \alpha + \beta_1 IP_{j,t-1}^{China} + \beta_2 IP_{j,t-1}^{ROW} + \gamma_j + \delta_t + u_{jt} \quad (2)$$

where γ_j and δ_t are industry and year effects respectively, and u_{jt} is the error term. Note that equation (2) can also incorporate additional control variables such as China's market share in the export destinations served by Brazilian firms, the effective applied import tariffs, and upstream Chinese and ROW import penetrations.[18]

Hypotheses 1 and 2 indicate that labor-intensive industries are more likely to be affected by imports from China, and to assess that I estimate equation (3), where LI_j is an indicator variable that is "1" for labor-intensive industries (food and beverages, textiles, apparel, footwear and leather products, wood products, nonmetallic minerals and products, and furniture and other products), and "0" otherwise.

$$y_{jt} = \alpha + \beta_1 IP_{j,t-1}^{China} + \beta_2 IP_{j,t-1}^{ROW} + \beta_3 IP_{j,t-1}^{China} \times LI_j + \beta_4 IP_{j,t-1}^{ROW} \times LI_j + \gamma_j + \delta_t + u_{jt} \quad (3)$$

Hypothesis 1 implies $\beta_3 < 0$ and $\beta_4 = 0$ whenever the dependent variables are the share of the population in manufacturing industry employment and the share of manufacturing employment. Hypothesis 2 implies $\beta_3 < 0$ and $\beta_4 = 0$ if the dependent variables are average log of the real hourly wage and the share of workers with a college degree.

The next step is to evaluate how the implementation of the NME policy altered the response of the labor-market outcomes to changes in trade environment variables. This assessment is implemented by augmenting equation (2) to incorporate interactions between the import penetration measures and the NME_t indicator variable, which is "1" when the NME is active in 2009 and onwards, and "0" otherwise, as depicted by equation (4).[19]

$$y_{jt} = \alpha + \beta_1 IP_{j,t-1}^{China} + \beta_2 IP_{j,t-1}^{ROW} + \beta_5 IP_{j,t-1}^{China} \times NME_t + \beta_6 IP_{j,t-1}^{ROW} \times NME_t + \gamma_j + \delta_t + u_{jt} \quad (4)$$

There are some aspects of the above econometric specifications that merit further discussion. The first issue is that it can take some time for Brazilian producers to react to changes in market conditions, hence I utilize lagged trade exposure variables to address this. The second issue is the simultaneity between the outcomes and the import penetration measures, since the value-added is part of the industry output that is used to calculate import penetration.[20] This is also alleviated by employing the first lag of the import penetration measures.

The third aspect is the omitted variable bias—more precisely, omitted factors that may affect both the outcome and the trade exposure measures. For instance, a government averse to unemployment may protect more labor-intensive industries. As a result, this industry characteristic affects import penetration and the industry employment share (outcome). This renders the estimates inconsistent. The industry-specific and time-invariant omitted variables are controlled for by industry effects. The year fixed effects account for time-varying factors that affect industries equally, such as business cycles. For example, if firms employing formal workers are more likely to reduce employment during

[18] Unfortunately, the downstream import penetration variables are highly correlated with the import penetration variables. This leads to a severe multicollinearity problem, and estimates could not be obtained for the downstream import penetrations.

[19] A shortcoming of the empirical specification used to assess the effects of the NME is that besides the response to the NME policies, the interaction coefficients may also capture the effects of the 2007–2008 world crisis.

[20] I consider the Chinese share in the markets served by Brazilian exporters ($CEXP_{j,t-1}$) to be exogenous because the Brazilian share is small relative to the market size and also much smaller than the Chinese market share in several industries. As a consequence, a supply shock in the Brazilian industry is highly unlikely to displace Chinese producers.

a recession, and, at the same time, the government raises tariffs in response to the recession, a spurious relationship will be found between tariffs and the share of informal workers unless year effects are used.

However, there may still be industry-specific and time-variant shocks that simultaneously affect outcomes and regressors, like Brazil-specific demand or supply shocks. An example of such shocks is larger-than-expected import penetration growth that is counteracted by import tariffs or by Brazilian-government-imposed safeguards or countervailing duties. As mentioned earlier, there were close to 100 antidumping procedures that were initiated in Brazil in this period. Since these nontariff trade protection measures at the product level cannot be accounted for at the industry level, the estimates will present an omitted variable bias. This issue is addressed by an instrumental variable strategy described next.

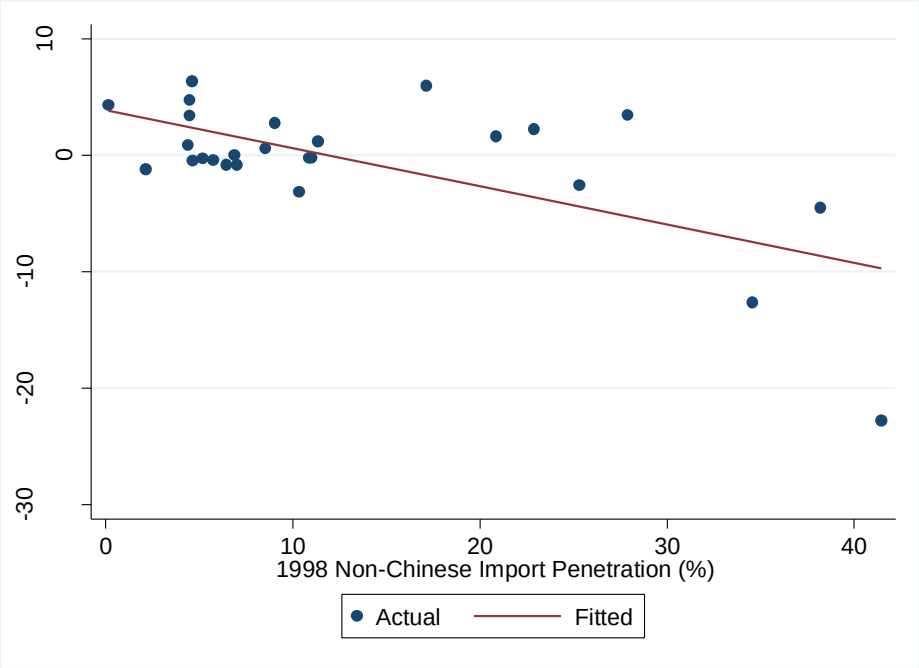
The first set of excluded instruments is based upon the idea of a supply-driven component of Brazilian imports from China and ROW. The idea follows Iacavone et al. (2013) and consists of using China's share of imports in third countries as an excluded instrument for Chinese import penetration. For Brazil, the third countries chosen are those in Latin America that have very limited trade ties with Brazil, namely Mexico, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Jamaica, Nicaragua, Panama, and Peru. By the same token, an additional excluded instrument is needed since the same endogeneity argument applies to ROW import penetration. This additional excluded instrument is the high-income countries' share in the imports of the above-mentioned third countries. The high-income countries chosen are Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, USA, and United Kingdom. We can see in table 7, panel A that these instruments are correlated with the endogenous regressors across all four different import penetration measures.[21]

There is another set of excluded instruments that can be used; however, they are for changes in import penetration measures. Figure 11, panel A shows that the change in ROW import penetration is negatively related to its initial level in 1998. Panel B displays that Chinese import penetration growth is positively related to its 1998 level. Thus, the 1998 level of these two import penetration measures can be used as instruments for their change. The rationale behind the use of these excluded instruments is that this correlation suggests that the 1998 levels of import penetration may indicate industry comparative (dis)advantage, in other words, industries with larger initial import penetration are the ones exhibiting greater change in import penetration. Consequently, the 1998 levels of import penetration are good predictors of the 2000–2012 change in import penetration.[22] Because the 1998 levels of import tariffs and import penetration are time-invariant, I interact them with Brazil's lagged RER and use these interactions as excluded instruments. The fluctuations in the RER do affect exposure measures to the extent that a depreciated RER curbs imports and reduces the need for protection via tariffs and NTBs.

[21] The excluded instruments for interaction terms are the excluded instruments mentioned above interacted with the respective indicator variable.
[22] The simple correlation between the 1998 levels of Chinese and ROW import penetration is 0.024.

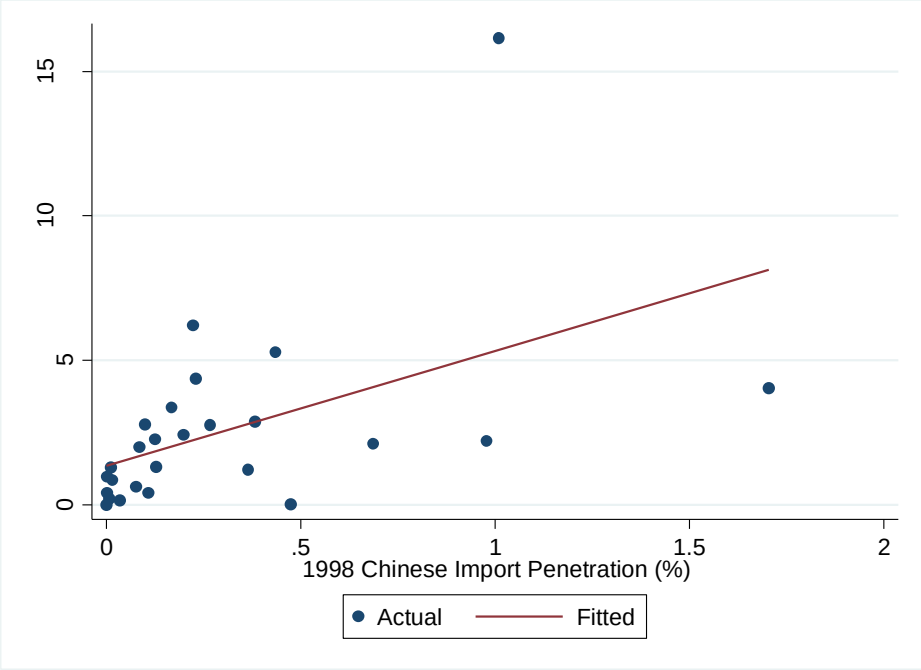
FIGURE 11. CORRELATION BETWEEN THE 1998 LEVEL OF IMPORT PENETRATION AND THE 2000–2012 CHANGE IN IMPORT PENETRATION AT THE INDUSTRY LEVEL

*PANEL A. ROW (*NON-CHINESE*) IMPORT PENETRATION*



Note: The fitted line slope is -0.328, its standard error is 0.079, and its *t*-statistic is -4.14.

PANEL B. CHINESE IMPORT PENETRATION



Note: The fitted line slope is 3.976, its standard error is 1.431, and its *t*-statistic is 2.78.

The RER is taken as given by all industries since Brazilian exports are relatively diversified and there is no dominant (manufacturing or nonmanufacturing) industry that is individually capable of setting the exchange rate. Furthermore,

throughout this period, the Brazilian economy underwent two major unexpected RER devaluations, first in January 1999 and later in the second semester of 2002. The exclusion restriction requires the RER to affect the outcomes solely through the trade exposure variable. I believe this restriction is not violated because the different sets of fixed effects used here will absorb the effects of variables that may affect outcomes and are also correlated with the exchange rate.

Table 7, panel B presents the correlations between the first difference of the endogenous regressors and the second set of excluded instruments at the industry level. These correlations indicate that the excluded instruments have predictive power on the endogenous regressors. In sum, to take advantage of this supplemental instrument set, I will estimate the industry-level specifications in their first difference.

A final concern here is that workers' observable characteristics are not controlled for in equations (2) through (4). This means that wages may be decreasing because firms decided to employ workers with a lower skill level, who earn lower wages. This effect would be mistakenly attributed to changes in trade exposure variables. This possibility can be addressed using a worker-level specification with controls for the workers' observable characteristics, as shown in equation (5).

$$y_{ijst} = \alpha + \beta_1 IP_{j,t-1}^{China} + \beta_2 IP_{j,t-1}^{ROW} + \Psi \text{Characteristics}_{ijst} + \gamma_j + \theta_s + \delta_t + u_{jt} \quad (5)$$

where y_{ijst} is the dependent variable (log of the hourly wage or an indicator variable of the informal employment status of the worker) of worker *i* in industry *j* in state *s* and year *t;* $\text{Characteristics}_{ijst}$ is a vector of observable characteristics for worker *i*, such as age, age squared, female indicator, married indicator, black indicator, Asian indicator, number of years of education, high-school diploma indicator, and college degree indicator; and θ_s are the state-of-residence fixed effects.[23] The state fixed effects capture state-specific and time-invariant characteristics—such as being landlocked—that affect both trade exposure and outcomes.

Another major advantage of worker-level data is the large number of observations it includes. This allows for richer variation in the specifications to be estimated.[24] As depicted in table 6, most of Brazil's manufacturing activity is concentrated in the southeastern and southern states. It is thus conceivable that such states may be more than proportionally impacted by changes in trade exposure. This can be investigated by adding interactions of the trade exposure measures with an indicator variable (*Manufacturing state*) that is "1" if the state is in the south or southeast of Brazil, and "0" otherwise. In this vein, states that have a sea harbor in their territory exhibit a lower transportation cost relative to a landlocked state, and this may affect the response to changes in trade exposure. This can be assessed by means of interactions between the trade exposure variables and the coastal state indicator, which is "1" if the state has a sea harbor in its territory, and "0" otherwise.

On top of the variations mentioned above, different types of fixed effects can be used to account for state-specific trends, for instance. Using state-by-year fixed effects in lieu of state and year effects can account for state-specific policies like changes in state-level educational systems, state-level minimum wages, and labor regulation enforcement. Moreover, since the production of commodities (iron ore or soybeans, for instance) in Brazil is geographically concentrated in a few states, these state-by-year effects can also pick up the effects of increased Chinese demand for these primary commodities.[25] The second combination of fixed effects consists of replacing industry and state fixed effects by state-industry effects. This would control for different state-level endowment of factors, which implies different factor prices at the state level.

A final variation in this specification consists of using state-industry alternative import penetration measures. The state-industry import penetration is calculated as the ratio between the state-level import data from Aliceweb and the

[23] The informality status indicator is "1" if the worker's employer does not comply with social security obligations, and "0" otherwise.
[24] Since the worker-level dataset is a pooled cross-section, it is not possible to estimate first difference specifications.
[25] There is a major drawback to the use of state-year effects. In the event that some industries are concentrated in very few states, state-year effects may absorb most of the industry-level variation and this results in a lack of identification of the trade exposure variables.

sum of the national output level with state-level imports.[26] The excluded instruments are built using ADH's methodology, as discussed below.

B. State-level specification

The next type of econometric model I use employs the variation at the state level, following the local labor market literature—see, for instance Autor, Dorn, and Hanson (2013). The original unit of analysis for this methodology is commuting zones in the USA. In other countries, municipalities are widely used—one example is the study by Costa et al. (2014) for Brazil using census data for 2000 and 2010. A major advantage of this approach resides in the large number of observations, moving from a few dozen industries to thousands of municipalities or commuting zones. Unfortunately, this is not the case here because data availability limits the unit of analysis to the state level. Trade exposure in this empirical methodology is measured in terms of state-level imports per worker, and estimates are calculated using equation (6):

$$\Delta y_{st} = \alpha + \phi_1 \Delta IPW_{s,t}^{China} + \phi_2 \Delta IPW_{s,t}^{ROW} + \delta_t + \varepsilon_{st} \quad (6)$$

In this specification, the omitted variable concerned is also addressed by means of an IV estimator. The excluded instruments are based upon the changes in China's share of imports in Latin American countries and the changes in the high-income countries' share of imports in the same Latin American countries. These shares are plugged in lieu of the imports into the IPW and IPF equations, and the resulting quantities are used as the excluded instruments for Chinese and ROW imports per worker. Table 7, panel C exhibits the simple correlations between the endogenous regressors and these excluded regressors, which are all above 0.7. I also employ the same type of empirical strategy and excluded instruments to assess the effects of imports per firm at the state level.

The use of this identification strategy raises a fundamental concern of the representativeness of the local trade exposure measures. This is a crucial aspect for Brazil because 80% of all manufacturing activity is situated in just seven states. Looking at the maps in figures 5 through 8, we see that states with almost no manufacturing exhibit large changes in their trade exposure—Maranhão, Roraima, and Amapá are all examples of this. When actual state-level trade is used as reported in the maps of figures 9 and 10, a different arrangement emerges. The highest impacts are now in states like Minas Gerais and Goiás for Chinese imports, and in Tocantins and Acre for ROW imports. Considering these remarks, one must be cautious when interpreting the results of state-level specifications. Since the variation identifying the coefficients come from states that are irrelevant in terms of manufacturing activity. In the next section, I present the estimates obtained using the empirical specifications presented above.

4. RESULTS

This section opens with the estimations using industry-level data and equations (2), (3), and (4). Next, the results from worker-level specifications based on equation (5) are reported. This is followed by estimates employing state-level data and equation (6). Finally, a discussion of these results is provided at the end of the section.

A. Industry-level variation

The first set of estimates are reported in table 8, and they are the OLS estimated coefficients for equation (2) for all four import penetration measures. Many of the estimated coefficients are not statistically significant even at the 10% level. The log of the employment level is negatively affected by both the Chinese and ROW import penetration in most cases, albeit only ROW import penetration is significant at the 10% level in the specifications with the alternative import penetration measures. The share of employment in the population is positively impacted by Chinese import penetration. The estimated coefficient for this is statistically significant at the 10% level in most panels. For the employment share of manufacturing, we can see a negative coefficient for the ROW alternative import penetration that is significant at the 10% level in the specifications using the alternative import penetrations.

[26] I assume that this Brazilian production is available in any state.

The log hourly wage is negatively impacted by Chinese import penetration, while ROW import penetration seems to have a substantially milder negative impact. The coefficients for panel D are interpreted as follows. A 1-percentage-point increase in Chinese import penetration reduces the hourly wage by 4%, while a 1-percentage-point increase in ROW import penetration decreases the hourly wage by 0.3%. The wage premium seemed to be positively affected by import penetration from both China and the ROW, though the former has a larger magnitude than the latter, and these coefficients are significant at the 5% level across all four different measures of import penetration. The share of informal employment decreases in the alternative import penetration for the ROW. Average years of schooling increase in all four ROW import penetration measures, whereas the share of workers with high-school diplomas does not seem to be affected by any import penetration measure. Finally, the share of college-educated workers seems to be decreasing in the adjusted and adjusted alternative import penetrations for China.[27]

The instrumental variable (IV) estimates for equation (2) are reported in table 9. There are no estimated coefficients that are statistically significant in this table. Most importantly, even though the first-stage F-statistics are above 20 in most cases, the estimated models exhibited a Kleibergen-Paap weak instrument test statistic (hereafter KP statistic) of below 3 in all cases. This strongly suggests that the weak instrument problem is affecting these estimates. The estimates using the first difference of equation (2) and the first difference of the instruments used before are reported in table 10. There are only two statistically significant coefficients in the entire table. They imply that the adjusted ROW import penetration have a negative effect on the average years of schooling and on the share of workers with high-school diplomas. As confirmed by the very low KP statistics, the weak instrument problem is present. The estimates with the second set of instruments (interactions of the 1998 level of import penetration with the RER) using the first difference of equation (2) are shown in table 11. The estimated coefficients for Chinese import penetration (across all four measures) were only statistically significant for the wage premium in column (5), at the 1% level. They imply that a rise in Chinese import penetration leads to a higher interindustry wage premium. At the 10% level of significance, the coefficients for Chinese import penetration positively affected the employment level and the share of employment in panel D, the share of employment in panel E, and the share of employment in manufacturing in panel A. The KP statistics for the estimated models in this table reached a maximum of 3.5. This is very low, hence these estimates are also plagued by the weak instruments problem.

The OLS and IV estimates based on equations (3) and (4) for each outcome of interest are reported in tables 12 through 20.[28] Practically all the IV estimated coefficients are not statistically significant at the 10% level. As before, the weak instrument problem also appeared in these estimated models. Accordingly, the discussion that follows will focus on the OLS results. The estimates for the log of the employment level indicate that both Chinese and ROW import penetrations had a negative effect, but only the former is significant at the 5% level, except in column (OLS-4), in which its interaction with the NME indicator has a significant negative coefficient. This indicates that the negative effect of ROW penetration became stronger after the NME was implemented. Table 13 contains the estimates for the share of employment in the population. The only result that was statistically significant at the 5% level indicates that an increase in upstream Chinese import penetration increases the share of employment. In the estimates using the employment share in manufacturing in table 14, ROW import penetration has a negative impact, which is significant in most OLS specifications. Chinese import penetration only affects the employment share negatively in column (OLS-3), which is also the only specification in which it is statistically significant. Again, upstream Chinese import penetration has a positive effect on the employment share. The coefficients for the interaction terms with the NME indicator are negative, albeit not significant. And the employment share is negatively affected by the interaction between Chinese import penetration and the labor-intensive industry indicator, as predicted by hypothesis 1.

Table 15 displays the estimates for the log of the hourly wage, in which the only statistically significant estimated coefficient is for upstream ROW import penetration, which is positive. The estimated coefficients for the regressions

[27] I also conducted OLS estimations based upon the first difference of equation (2), since the results were qualitatively similar to those in table 8, they were omitted in the report.

[28] Estimates using the other three import penetration measures led to similar results, and were omitted.

when the interindustry wage premium is the dependent variable are reported in table 16. In column (OLS-1), the coefficient for Chinese import penetration is negative and significant at the 10% level and the coefficient for Chinese market share abroad is positive and statistically significant at the 5% level. The coefficient for ROW import penetration is positive in all the columns, and it is significant solely in column (OLS-2). Only one more coefficient is significant in column (OLS-3) for upstream ROW import penetration.

The estimates obtained for the share of informal employment are displayed in table 17. They suggest a negative effect for both Chinese and ROW import penetrations, although only Chinese import penetration is significant at the 10% level in column (OLS-3). Interestingly, the estimated coefficient for the interaction between ROW import penetration and the NME indicator is negative and statistically significant at the 10% level. The coefficient for the interaction between Chinese import penetration and the labor-intensity indicator is negative and highly significant.

The effects of trade exposure on skill levels in manufacturing are first examined in table 18 for the average years of schooling. Three estimated coefficients are statistically significant in this table. The effective applied tariff coefficient is negative and significant at the 10% level. The coefficient for upstream ROW import penetration is positive and significant at the 5% level. The interaction between Chinese import penetration and the labor-intensity indicator is also positive and significant. The estimated effects of trade exposure on the share of workers with high-school diplomas are shown in table 19. China's market share abroad has a negative effect that is significant at the 10% level in column (OLS-1). Chinese import penetration shows a positive effect on high-school share, which is significant only in column (OLS-3). In this specification the upstream Chinese import penetration exhibits a negative effect significant at the 5% level. After the implementation of the NME, the impact of Chinese import penetration decreased while the effect of ROW import penetration increased. The positive effect of Chinese import penetration on the share of workers with a high-school diploma is stronger in labor-intensive industries. Finally, table 20 reports the estimates for the share of workers with college degrees. Only two columns exhibited statistically significant estimated coefficients. In column (OLS-3), Chinese import penetration has a positive effect on the share of workers with college degrees, and so does upstream ROW import penetration. The estimates in column (OLS-4) indicate that after the implementation of the NME, ROW import penetration displays a positive impact on the share of workers with college degrees. The analysis now turns to the specifications estimated using worker-level data.

B. Worker-level data

An important issue overlooked in the previous regressions is the variation in workers' observable characteristics. This issue is further investigated in the estimates using worker-level data, which have the additional advantage of allowing for different combinations of fixed effects. The three types of fixed effects used here are (i) industry, state, and year; (ii) industry and state-year; and (iii) state-industry and year. A drawback of the worker-level approach is that we can focus only on the log of the hourly wage and formality outcomes.

Table 21 shows the OLS estimates based on equation (5) using industry-level trade exposure measures and different types of fixed effects. The estimated coefficients for the workers' observable characteristics do not change much across the specifications, and they are in line with the estimates found elsewhere in the literature, such as Paz (2014a). For instance, the log of the hourly wage increases with worker age, but at a decreasing rate, since the estimated coefficient for age^2 is negative. Female and black workers earn a lower wage on average, while married and Asian individuals earn above-average hourly wages. Hourly wages also increase with the number of years of schooling, and workers with either a high-school diploma or a college degree earn a positive wage premium.

Focusing on the log of the hourly wage specifications, the effects of Chinese and ROW import penetration are positive. While the latter is always significant at the 5% level, the former is only significant in the specification with the state-industry and year fixed effects. Moving on to whether workers are informally employed, we can see that the estimated coefficients for both import penetration measures are negative and statistically significant. Interestingly, the

estimated coefficients in table 21 do not show much of a change for the different options of fixed effects, and only the statistical significance of Chinese import penetration seems to be affected.[29]

The next estimates are based upon augmented versions of equation (5) to control for industry-level effective applied tariffs, upstream import penetrations, and interactions between import penetrations and the labor-intensive industry indicator, the manufacturing state indicator, and the coastal state indicator. The OLS estimates for the log of the hourly wage using industry, state, and year effects are displayed in table 22. The coefficient for Chinese import penetration is positive and is only statistically significant in column (6). The estimated coefficients for ROW import penetration are positive and have a similar magnitude to the coefficients in table 21, which are statistically significant in most cases. Of the additional regressors, the only estimated coefficients that are statistically significant are the positive coefficient for the interaction between Chinese import penetration and the labor-intensity indicator, and the positive coefficient for the interaction between ROW import penetration and the coastal state indicator.

Table 23 reports similar estimates for informal employment status. In almost all cases, the import penetration coefficients are negative. The coefficients for Chinese import penetration are significant solely in columns (6) and (7), while the coefficients for ROW import penetration are significant in all specifications except for column (5). The effect of the Chinese market share abroad on informality is negative and significant, as can be seen in column (2), and so is the effect of the effective applied tariff. An increase in upstream ROW import penetration is found to reduce the likelihood of the worker having an informal job. The interaction between ROW import penetration and the NME indicator is positive and significant, even though the net effect of ROW import penetration after the implementation of the NME is still negative. The interaction between Chinese import penetration and the labor-intensity indicator has a negative coefficient, which indicates that workers that remain employed in a labor-intensive industry are less likely to be informal in the event of a rise in Chinese import penetration.

The IV estimates based on equation (5) with industry, state, and year effects are reported in table 24 for the log of the hourly wage, and in table 25 for the informal job indicator. In table 24, not a single coefficient is statistically significant even at the 10% level. Looking at the KP statistics for these estimated specifications, column (1) has a statistic of 27, column (3) of 12, and column (4) of 19. The remaining columns exhibited KP statistics of below 4 and thus are plagued by the weak instruments problem. The null hypothesis of exogeneity for the import penetration measures in columns (1), (3), and (4) could not be rejected. In fact, the coefficients for column (1) are very close to those obtained by means of OLS reported in table 22. The estimates in table 25 for the informal job indicator show a similar pattern; however, Chinese import penetration is negative and significant at the 10% level in column (1) and significant at the 5% level in column (7). Again, the null of exogeneity could not be rejected in columns (1), (3), and (4), which are the specifications with first-stage KP statistics above 12.

In view of the results of the statistically significant coefficients for Chinese import penetration in columns (3) and (6) of table 21, I decided to conduct further estimates using state-industry and year effects.[30] Table 26 shows the OLS estimates for the log of the hourly wage. These new estimates show more statistically significant coefficients and are comparable in magnitude to those in table 24, except for columns (6) and (7). Now, the Chinese import penetration coefficient is significant at the 5% level in columns (2) and (7). Chinese market share abroad, the effective applied tariffs, and the upstream ROW import penetration all have a positive statistically significant effect on the log of the hourly wage. The coefficients for the interactions of import penetration with the NME indicator show a positive effect for Chinese import penetration, and a small negative effect for ROW import penetration. In column (7), the interaction of Chinese import penetration with the coastal state indicator is negative and significant at the 10% level, while the interaction with ROW import penetration is negative and no longer statistically significant. This means that coastal states experienced a smaller net increase in wages due to an increase in Chinese import penetration. The OLS estimates for informal employment status are reported in table 27. In comparison to table 25, the only salient change

[29] Results obtained using the other import penetration measures were comparable, thus I omitted them from this report.
[30] Estimates using state-year and industry effects were similar to those using industry, state, and year effects.

is in the estimated coefficient for ROW import penetration interaction with the coastal indicator that is now positive and statistically significant at the 5% level of confidence.

Turning to the IV estimates for the log of the hourly wage with state-industry and year fixed effects (table 28), we can see that several estimated coefficients are statistically significant at the 5% level, such as ROW import penetration in columns (1), (3), and (4). In column (4), the upstream Chinese and ROW import penetrations had a negative effect on the log of the hourly wage. Note that this specification in column (4) is the only one in this table with a KP statistic of 17, while the other specifications have KP statistics that are below 6, which means that the weak instruments problem affects the latter estimated specifications. In column (7), the interaction between ROW import penetration and the manufacturing state indicator is positive and significant at the 5% level. The null of exogeneity of the regressors is only rejected in the specifications in columns (1), (2), and (5).

The IV estimates for informal employment status are reported in table 29, in which the coefficients for neither Chinese nor ROW import penetration are statistically significant. In fact, in the only specification that does not suffer from the weak instruments problem, column (4), none of the coefficients are statistically significant, although the null of exogeneity of the import penetrations could not be rejected. In column (5), we can see a negative effect of the interaction between ROW import penetration and the NME indicator. In column (7), it is the estimated coefficient of the interaction between ROW import penetration and the manufacturing indicator that is negative and statistically significant. Finally, in column (8), the interaction between Chinese import penetration and the coastal state indicator has a negative coefficient that is also statistically significant.

The final set of estimates employing the worker-level data uses state-by-industry trade exposure measures and industry, state, and year fixed effects. Table 30 reports the OLS estimates for the log of the hourly wage. In most specifications, the coefficients for ROW import penetration are positive and statistically significant. The effects of the upstream Chinese and ROW import penetration are negative and significant in column (4). Interestingly, the interaction between ROW import penetration and the NME indicator is positive and significant, while the coefficient for ROW import penetration is negative and not significant. This suggests that the positive effect of ROW import penetration on the regressions without controls for the NME comes from the period after the NME was implemented. Finally, in column (6), the coefficient for the interaction between ROW import penetration and the labor-intensive indicator is positive and statistically significant, while the interaction with Chinese import penetration is negative, as predicted by hypothesis 2. Table 31 shows the OLS estimates for informal employment status. Chinese import penetration shows a negative impact on informal employment, except in column (5), in which its interaction with the NME indicator is negative and significant. This implies that the total effect of Chinese import penetration was initially positive but became negative after the implementation of the NME. The coefficients for ROW import penetration show the exact opposite pattern.

The IV estimates for the worker-level specification employing state-industry import penetration are reported in table 32 for the log of the hourly wage and in table 33 for the informal employment status indicator. All the estimated specifications in both tables exhibit a KP statistic below 2.5, which is very low and implies that the estimates are plagued by the weak instrument problem. Table 32 exhibits only three statistically significant coefficients. In column (2), the coefficient of the Chinese market share abroad is negative and significant at the 5% level. In column (3), the coefficient for ROW import penetration is also negative and significant, whereas in column (6), its interaction with the NME indicator is positive and statistically significant at the 10% level. Finally, looking at the informal employment status indicator (table 33), there are only two statistically significant coefficients, namely the effective applied tariffs, which implies that larger tariffs reduce informality and the interaction between ROW import penetration and the manufacturing state indicator has a positive and significant coefficient. In the next subsection I move on to analyze the state-level specification.

C. State-level variation

Adjustments to changes in the trade environment might occur between different regions of the country within the same industry. This margin of adjustment may not be captured by the industry-level specifications used in this paper.

To fill this gap, I estimate state-level specifications based upon equation (6). The first set of OLS estimates using all four measures of state-level trade exposure are set out in table 34. All the dependent variables are expressed in their first difference in equation (6), and the trade exposure measures are calculated using the first difference of the import volumes. Panel A reports the estimates for the trade exposure measures constructed according to ADH's methodology. Chinese imports per worker showed a positive effect on the log of the employment level and on the log of the hourly wage and were statistically significant at the 10% level. These results can be interpreted as follows. A US$1,000 increase in Chinese imports per worker increases the employment level by 5.4%, whereas a similar increase in ROW imports per worker reduces employment by 0.1%.

In panel B, trade exposure is measured in terms of imports per firm. The estimates reveal that Chinese imports per firm have a statistically significant positive effect on employment and a positive effect on average years of schooling. ROW imports per firm exhibit a small positive effect on the log of the hourly wage and a negative effect on the share of informal employment, the average years of schooling, the share of workers with high-school diplomas, and the share of workers with college degrees. In panels C and D, the trade exposure measures are calculated using the actual imports obtained from the Aliceweb system. These estimates in panel C indicate a negative effect of Chinese imports per worker on the share of informal employment and the share of workers with high-school diplomas, whereas the estimated coefficients for ROW imports per worker suggest a positive statistically significant effect on the log of employment, the share of informal employment, and the share of workers with high-school diplomas. It shows a negative effect on the log of the hourly wage, which is significant at the 5% level. In panel D, the estimated coefficients for Chinese imports per firm reveal a negative effect on the share of informal employment and on the share of workers with high-school diplomas, and a positive effect on the average years of schooling.

The IV estimates for the state-level specification are reported in table 35. Before discussing the estimated coefficients, it is important to note that the KP test statistics for panels A and B are above 170, which means that under the assumption that the excluded instruments are valid, the weak instrument problem is not affecting the estimates of these panels. Nonetheless, the KP test statistics for panels C and D are below 2.5. This clearly indicates that the weak instrument problem is afflicting the estimates reported in these panels. Focusing the analysis on the estimates that are statistically significant at the 10% level at least, we can see in panel A that ROW imports per worker have a positive impact on the average years of schooling. In panel B, the coefficient for Chinese imports per firm is negative for the share of workers with high-school diplomas. ROW imports per firm show a positive effect on the log of the hourly wage and a negative effect on the share of workers with college degrees and on years of schooling. Note that the latter result is the opposite of that found in panel A for ROW imports per worker. panel C showed no statistically significant estimated coefficients. In panel D, Chinese imports per firm impacted positively the employment level, the employment share within manufacturing, and the log of the hourly wage, whereas it decreased the average years of schooling and the share of workers with college degrees. The ROW imports per firm had exactly the opposite effect, albeit with a smaller magnitude. The null hypothesis of exogeneity of the trade exposure measures was rejected only in some specifications of the share of employment in the population and of years of schooling.

The next collection of estimates employs an augmented version of equation (6) that includes interactions between the NME indicator and the trade exposure measures. Table 36 exhibits the OLS estimates of this specification. In panel A, the estimated effect of Chinese imports per worker on the log of the hourly wage is positive, although it turned negative after the implementation of the NME. The impact of ROW imports per worker follows the exact opposite pattern for both the log of the hourly wage and the share of informal employment, albeit with a smaller magnitude. In panel B, ROW imports per firm initially had a positive effect on the share of workers with college degrees. After the implementation of the NME, it had a negative effect on this and also started to negatively impact the share of workers with high-school diplomas. The results in panels C and D imply that after the implementation of the NME, Chinese imports per worker and per firm reduced both the share of informal employment and the share of workers with high-school diplomas, while ROW imports boosted the share of informal employment.

Table 37 reports the IV estimates of the augmented version of equation (6). The KP statistics of the estimates in panels A and B are greater than 6, which suggest that the weak instrument problem is not an issue here. Nevertheless, the same cannot be said about the specifications in panels C and D because their KP test statistics are below 0.5. The estimated coefficients in panel A indicate that Chinese imports per worker had a negative impact on the share of employment, which is statistically significant at the 10% level. It also had a negative estimated coefficient for the share of informal employment, which is statistically significant at the 5% level. The coefficients for ROW imports per worker were negative for the log of the hourly wage and positive for the share of informal employment. After the implementation of the NME, Chinese imports exhibited a positive impact on the share of informal employment, while ROW imports showed a negative impact. Moreover, the interaction between ROW imports per worker and the NME coefficient had positive and significant estimated coefficients for the share of employment in the population and for the log of the hourly wage.

The IV estimates for panel A did not differ much from the OLS estimates in table 36, panel A. In panel B, we can see that Chinese imports per firm had a negative effect on the hourly wage and on the share of informal employment, and a positive effect on years of schooling and the share of workers with college degrees. After the implementation of the NME, Chinese imports per firm had a positive effect on the hourly wage and a negative effect on the shares of workers with high-school diplomas and college degrees. Moving to panel C, Chinese imports per worker reduced the share of informal employment before the NME was implemented, but after this the effect became positive. In panel D there are no statistically significant estimated coefficients.

5. DISCUSSION OF THE RESULTS

The first round of estimates employed an industry-level identification strategy. Very few IV estimates, regardless of the excluded instruments used, did not suffer from the weak instrument problem, and the null of exogeneity of import penetration measures could not be rejected in these estimated specifications. Consequently, I will focus my analysis on the results of the OLS specification.

The industry-level results suggest that the employment level was negatively impacted by ROW import penetration and Chinese import penetration, albeit to a lesser extent. The implementation of the NME strengthened the negative effect of ROW import penetration. As predicted by hypothesis 1, labor-intensive industries were more negatively impacted by Chinese imports, even though the coefficient was not statistically significant. The share of employment in the population was not affected by changes in trade exposure. However, the employment share within manufacturing was negatively impacted by ROW import penetration. Interestingly, Chinese import penetration exhibits a negative impact once additional controls are present in the specification. More precisely, the implementation of the NME worsened this negative impact, though not statistically significant, and labor-intensive industries suffered a larger impact, as predicted by hypothesis 1. Upstream Chinese import penetration showed a positive effect.

The estimated effects on job characteristics indicate that both Chinese and ROW import penetrations have a negative effect on the hourly wage but that upstream ROW import penetration has a positive effect on this. The interaction of Chinese import penetration with the labor-intensive industry indicator is positive and not statistically significant, which does not support hypothesis 2. The interindustry wage premium was positively affected by both import penetration measures. Again, the sign of the effect of Chinese import penetration is sensitive to the additional controls included. The share of informal employment is negatively affected by the import penetration measures, more so for the labor-intensive industries. These negative impacts became stronger after the implementation of the NME.

The average years of schooling were only positively affected by Chinese import penetration in the labor-intensive industries, as was also the case with upstream ROW import penetration. The share of workers with high-school diplomas seems to be positively affected by Chinese import penetration, with a stronger impact on labor-intensive industries. And this effect declined after the implementation of the NME, but the net effect remained positive. Upstream Chinese import penetration had a negative effect on the share of workers with high-school diplomas. There is not much evidence that the share of workers with college degrees was impacted by trade exposure measures, except for

upstream ROW import penetration, which had a positive effect. At the end of the day, there seems to be almost no support for hypothesis 2.

The results discussed so far were obtained without controlling for the workers' observable characteristics. The use of worker-level data enabled the estimation of several additional econometric specifications, which resulted in several interesting new findings. Unlike the industry-level results, both ROW and Chinese import penetration led to an increase in wages, although the latter effect was small and only statistically significant in specifications with state-industry fixed effects. The effect of Chinese import penetration on wages is stronger for workers employed in labor-intensive industries. No evidence was found to suggest that the wages of workers residing in manufacturing states experienced the impact of import penetration differently. Workers living in coastal states were found to be more positively affected by ROW import penetration. When state-industry effects are used, the estimates reveal that the implementation of the NME magnified the positive effects of Chinese import penetration on wages and at the same time reduced the effect of ROW import penetration. Additionally, upstream ROW import penetration positively impacted wages. Chinese import penetration showed a larger positive effect on the workers of labor-intensive industries, and a smaller effect on the wages of workers living in coastal states.

Moving on to the impacts on the likelihood of having an informal job, both import penetration measures negatively impacted the likelihood of formal employment. The coefficient for ROW import penetration before the implementation of the NME was larger than its net effect after the NME was put into effect. Chinese market share abroad also exhibited a negative effect. The effect of Chinese import penetration on the log of the hourly wage was stronger for labor-intensive industries. When state-industry fixed effects are used, I also find that the effects of import penetration on the manufacturing states were considerably smaller. A rise in ROW import penetration reduced the likelihood of informal employment less in coastal states.

The estimates using state-industry-level trade exposure measures led to some results that differ from those using industry-level import penetration. In the log of the hourly wage estimates, the positive effect of ROW import penetration persists, although it is negative before the NME and its net effect becomes positive after the NME. The positive effect of Chinese import penetration found earlier becomes negative after the NME, although this is not statistically significant. Its effect on the wages of workers in labor-intensive industries is negative, as predicted by hypothesis 2. When the NME interactions are included in the econometric model, the before-NME effect of Chinese import penetration is positive but becomes negative after the NME. For the informal employment indicator, the use of the specification with the state-industry trade exposure measures leads to a sign reversal for the ROW import penetration measure, which becomes positive. The net effect of ROW import penetration is negative before the implementation of the NME and positive after this, while Chinese import penetration shows the exact opposite pattern.

The last set of estimates looks at the effects of the state-level variation in trade exposure measures on the state-level outcomes. These estimates exhibited few statistically significant coefficients and they varied considerably according to the trade exposure measure used. The effects of ADH's imports-per-worker trade exposure measure changed over time due to the implementation of the NME. Before the NME, both the Chinese and ROW imports per worker reduced employment, and their impact became positive after the NME, even though none of the coefficients were statistically significant. Chinese imports per worker reduced the share of employment in the population and the employment share in manufacturing, but solely the former is statistically significant. Both effects were also smaller after the implementation of the NME. The net effect of ROW imports per worker initially led to a reduction in the log of the hourly wage, but after the NME its net effect became positive. In the pre-NME period, the share of informal workers was negatively affected by Chinese imports per worker. After 2008, its net impact became positive. An exact opposite pattern was displayed by ROW imports from China. None of the three worker skill-level-related outcomes were affected by ADH's imports-per-worker measure.

New estimates employing trade exposure measures that replace the number of workers with the number of firms using ADH's methodology led to statistically significant results but only for the share of informal employment and for the skill-level-related outcomes. Chinese imports per firm had a negative impact on the share of informal employment

and a positive one on average years of schooling. Before the implementation of the NME, Chinese imports per firm increased the share of workers with high-school diplomas and of those with college degrees, but only the former was statistically significant, which contradicts hypothesis 2. The net impact on both these shares became negative and statistically significant after the NME policies came into effect. At first, ROW imports per firm had a negative effect on the share of workers with high-school diplomas and college degrees, but this became positive after the NME. Interestingly, the estimates using actual imports per worker and per firm did not have much of an impact on state-level outcomes.

Overall, the results revealed in this study provide support for hypothesis 1, in that they find trade exposure to have had a positive effect on the interindustry wage premium and, in most cases, a negative impact on the share of informal employment. The results on the skill level in manufacturing were mixed, which implies little support for hypothesis 2. The fact that trade exposure reduces the share of informal employment may seem counterintuitive since greater import competition might seem to push firms toward informal employment terms. Under the assumption that firms employing informal workers tend to be smaller and less productive, as discussed in Paz (2014a), it is conceivable that the strong competitive edge of Chinese producers—magnified by the similarity between their products and Brazilian-made ones—may have resulted in more firms leaving the market altogether (including ones that originally employed informal workers), rather than pushing firms toward higher levels of informal employment. These factors lead to a lower employment level (as found in my estimates) and a lower share of informal employment.

The effects of Chinese market share in destinations served by Brazilian exporters were usually not statistically significant. The small magnitude of these estimated coefficients may come from Brazil's limited participation in the world trade system and is perhaps due to the fact that Brazilian exports would not be much greater in the absence of Chinese competition in foreign markets. This conjecture is supported by several studies. Batista (2008) used a constant market approach methodology and found that for 1990–2004, Latin American countries lost approximately 1.7% of their total manufacturing exports to China. Using an industry-level gravity equation, Hanson and Robertson (2010) estimate that in the absence of the China shock, export demand would have been higher by between 1% and 2% for countries like Mexico. Using a methodology similar to that of Batista (2008), Moreira (2006) also found that Brazil lost only about 2.5% of its manufacturing exports to China in 1990–2004.

The myriad results revealed in this project are highly dependent on the type of data variation exploited and on the econometric specification used. This underscores the difficulty of identifying the effects of Chinese imports due to the following five issues. First, Brazil's experience is not one of a simple substitution of ROW imports by Chinese products. Second, the estimated effects differ according to the labor intensity of the industry in question. Third, states with a large share of manufacturing or with a sea harbor in their territory are impacted differently. Fourth, increased access to imported intermediate inputs has nonnegligible effects on labor market's outcomes, and these effects differ not only according to the origin of the inputs but also often have the opposite sign to that of import penetration of final goods. Last but not least, the implementation of the NME had a deep impact on how labor-market outcomes respond to changes in trade exposure. In sum, these issues are evidence that Chinese imports have a very nuanced impact on the Brazilian manufacturing industry, in which the effects of the China shock depend on the year, state, and industry in question.

6. CONCLUSIONS

China, one of the most populous countries in the world, entered the 21st century not only as one of the largest and fastest-growing economies but also as a major player in world trade. This quick ascent and its cost advantage in manufacturing production prompted several concerns in developing countries as to whether they would still be able to sustain a dynamic manufacturing sector in view of China's competitive edge. This concern is built on the fact that many observers perceive a strong manufacturing sector to be a key driver of economic growth and a provider of higher-wage jobs relative to those available in agriculture and services.

The changes undergone by the Brazilian economy in 2000–2012 provide a good case study through which to assess such concerns. Besides being the most populous country and largest economy in Latin America, Brazil also has a large, diversified manufacturing sector. In this period, import penetration in Brazil increased by more than 25% and China's share of such imports increased from 3% to 20%. Equally importantly, Chinese exporters' market share increased vigorously in markets that are also served by Brazilian exporters. In the same period, the share of manufacturing in the gross domestic product in Brazil declined by more than 20%.

This study employed Brazilian census and household survey data to examine the impacts of the increasing trade exposure experienced by the Brazilian economy on several labor-market outcomes of the manufacturing sector in 2000–2012. This data is notable for encompassing both formal and informal workers, which is significant given that the latter represent more than 20% of the workforce employed in the manufacturing sector. This study presents an empirical methodology that decomposes the effects of import penetration into that generated by Chinese and non-Chinese (or ROW) imports. This analysis is conducted at the industry, state, and worker levels.

The results at the industry level indicate that Chinese and ROW import penetration have a negative effect on the employment level, and that the impact of Chinese imports on labor-intensive industries was considerably stronger than on the other industries. Interestingly, upstream Chinese import penetration positively impacted the employment level. Both ROW and Chinese import penetration reduced the industry-level hourly wage and share of informal employment, while boosting the interindustry wage premium. The implementation of the NME policy in 2008 attenuated these effects.

The worker-level results suggest that after controlling for the worker's observable characteristics, Chinese and ROW import penetration at the industry level increased the workers' wages, with a larger effect for ROW import penetration in coastal states and a bigger effect for Chinese import penetration on labor-intensive industries. The implementation of the NME magnified the effects of Chinese import penetration and dampened that of ROW import penetration. Import penetration from both China and the ROW had a negative effect on the worker's likelihood of having an informal job. These effects are smaller in states with a large manufacturing sector, and Chinese import penetration had a larger impact on labor-intensive industries. However, the use of state-by-industry trade exposure measures led to some different results. In fact, the effect of ROW import penetration went from negative to positive after the implementation of the NME, while the exact opposite was true of Chinese import penetration. Analogously for the informal job indicator, the sign of the ROW import penetration measure also went from negative to positive in response to the implementation of the NME, while Chinese import penetration again showed the exact opposite pattern.

The last set of estimates were obtained using state-level identification using the methodology of Autor, Dorn, and Hanson (2013). These estimates showed that before the NME was put into effect, both Chinese and ROW imports per worker reduced employment levels and these effects became positive after 2008. In the pre-NME period, the net effect of ROW and Chinese imports per worker decreased the log of the hourly wage and the share of informal employment, respectively. After the NME went into effect, both effects became positive. Moving on to trade exposure measured as imports per firms, this study finds that Chinese imports per firm negatively impacted the share of informal employment and positively affected the average years of schooling. Before the NME was implemented, Chinese imports per firm increased the shares of workers with high-school diplomas and those with college degrees, but the net impact on both shares became negative after the NME policies came into effect. The effects of ROW imports per firm on these two outcomes behaved entirely to the contrary. Finally, the estimates using actual imports per worker and per firm did not impact the state-level labor-market outcomes.

At the end of the day, this paper provides evidence suggesting that the effects of Chinese imports are different than those of imports from other countries. These effects also differ according to the characteristics of both the industry and the state. Moreover, the new policies introduced by the implementation of the NME policies altered the effects of the changes in the trade exposure measures on labor-market outcomes, and in some cases, the NME even reversed them. Since the China shock affected manufacturing in Brazil in many ways, it is not possible to offer a conclusion that the shrinkage in the participation of manufacturing in Brazil's GDP is the result of the China shock. These heterogeneous

effects also suggest that a deeper investigation at the firm level may shed some light on the adjustment mechanisms used to cope with increased trade exposure and to the changes in policy caused by the implementation of the NME.

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TABLE 1. INTERNATIONAL TRADE EXPOSURE MEASURES AT THE INDUSTRY-LEVEL FOR BRAZIL

	Effective Applied Import Tariffs (%)		Import Penetration (%)		China's Share in Imports		Share of Brazilian Exports in Foreign Markets		Share of Chinese Exports in Foreign Markets	
Industry / year	2000	2012	2000	2012	2000	2012	2000	2012	2000	2012
Food and beverages	16.44	24.76	4.38	4.18	1.06	15.62	1.98	3.07	5.58	6.49
Tobacco	21.33	28.05	27.83	29.57	0.78	7.42	4.46	3.69	5.49	6.64
Textiles	19.69	34.98	9.68	15.64	2.40	41.17	1.86	2.53	10.35	23.67
Apparel	22.81	44.98	3.07	11.76	5.47	46.33	0.15	0.06	17.40	30.79
Footwear and leather products	22.43	37.18	6.24	8.33	9.05	31.94	2.57	1.31	27.75	36.51
Wood products	12.90	21.93	2.61	1.81	2.59	26.06	3.13	4.19	5.23	11.93
Paper products	15.32	24.86	10.60	8.30	0.09	10.28	2.71	3.97	0.98	4.54
Printing and publishing	18.22	21.62	0.63	1.65	0.57	9.04	0.96	0.93	2.62	5.39
Petroleum refining	1.94	12.88	8.99	13.76	1.22	0.86	0.63	0.61	0.98	0.25
Biofuel	25.00	31.62	0.00	4.33	0.00	0.00	5.99	33.51	5.20	0.19
Pharmaceutical products	9.02	18.44	21.07	28.28	2.06	5.84	0.28	0.40	1.40	1.95
Cleaning products	17.22	26.79	19.62	26.98	0.02	3.59	0.50	1.05	1.01	4.30
Paint and varnish	16.69	25.38	7.03	6.80	0.10	3.06	0.47	1.04	0.26	1.70
Rubber and plastic products	18.48	26.02	9.70	13.33	1.46	19.11	0.78	0.95	6.53	14.77
Steel	13.63	21.71	6.94	12.52	1.50	23.00	2.95	3.17	2.10	5.93
Nonferrous metals	10.64	19.66	22.81	26.38	1.17	5.98	1.84	1.43	1.36	2.29
Metal products	19.39	27.51	7.91	11.25	3.75	27.12	0.64	0.78	8.15	19.53
Machinery and equipment	17.42	24.93	26.38	26.27	1.00	17.63	0.81	1.24	2.28	10.87
Appliances	21.52	29.79	1.60	3.33	14.79	72.79	0.69	0.27	18.92	38.61
Auto parts	19.90	28.63	24.72	23.42	0.07	5.57	1.33	1.74	0.67	5.38
Other transportation equipment	17.97	25.27	55.89	36.47	0.46	9.89	1.91	0.92	2.50	6.02
Nonmetallic minerals and products	12.80	21.23	5.02	6.98	2.34	34.08	1.33	1.79	8.53	18.80
Office, electrical, electronic, optical, precision, and communication equipment	17.65	24.71	47.15	50.65	4.38	35.97	0.32	0.28	7.41	30.37
Automobiles, trucks, and buses	28.81	42.22	13.73	15.76	0.00	2.49	0.79	1.31	0.05	0.97
Other chemical products	11.70	20.12	27.27	33.61	2.15	10.27	0.98	1.39	1.92	6.20
Furniture and other products	20.46	29.38	6.11	9.34	20.84	56.88	0.48	0.37	23.44	35.54

Notes: Foreign markets consist of all countries served by Brazilian exports in 2000, except for China. Number of observations: 312.

TABLE 2. IMPORT PENETRATION MEASURES AT THE INDUSTRY-LEVEL FOR BRAZIL

	ROW import penetration (%)		Chinese import penetration (%)		ROW alternative import penetration (%)		Chinese alt. import penetration (%)		ROW adj. import penetration	Chinese adj. import penetration	ROW adj. alt. import penetration	Chinese adj. alt. import penetration
Industry / year	2000	2012	2000	2012	2000	2012	2000	2012	2012	2012	2012	2012
Food and beverages	4.33	3.53	0.05	0.65	3.78	2.92	0.04	0.54	7.20	1.33	5.06	0.94
Tobacco	27.61	27.38	0.22	2.19	20.30	17.68	0.16	1.42	60.61	4.86	27.37	2.19
Textiles	9.45	9.20	0.23	6.44	8.91	8.88	0.22	6.21	14.96	10.47	14.12	9.89
Apparel	2.90	6.31	0.17	5.45	2.69	6.18	0.16	5.34	10.43	9.00	10.09	8.71
Footwear and leather products	5.67	5.67	0.56	2.66	3.72	4.68	0.37	2.20	11.20	5.26	7.89	3.71
Wood products	2.54	1.34	0.07	0.47	1.76	1.14	0.05	0.40	2.71	0.96	2.01	0.71
Paper products	10.59	7.45	0.01	0.85	8.49	5.96	0.01	0.68	15.21	1.74	10.08	1.16
Printing and publishing	0.62	1.50	0.00	0.15	0.62	1.49	0.00	0.15	2.64	0.26	2.62	0.26
Petroleum refining	8.88	13.64	0.11	0.12	8.52	12.76	0.11	0.11	23.01	0.20	20.63	0.18
Biofuel	0.00	4.33	0.00	0.00	0.00	3.49	0.00	0.00	9.07	0.00	6.04	0.00
Pharmaceutical products	20.64	26.63	0.43	1.65	20.07	25.38	0.42	1.57	40.06	2.48	37.31	2.31
Cleaning products	19.62	26.01	0.00	0.97	18.84	24.15	0.00	0.90	40.22	1.50	35.93	1.34
Paint and varnish	7.02	6.60	0.01	0.21	6.85	6.38	0.01	0.20	11.42	0.36	10.79	0.34
Rubber and plastic products	9.56	10.79	0.14	2.55	8.96	10.12	0.13	2.39	18.22	4.30	16.40	3.88
Steel	6.83	9.64	0.10	2.88	5.01	7.50	0.08	2.24	19.57	5.85	12.40	3.70
Nonferrous metals	22.54	24.80	0.27	1.58	15.49	17.47	0.18	1.11	50.19	3.19	27.14	1.73
Metal products	7.61	8.20	0.30	3.05	7.20	7.74	0.28	2.88	13.99	5.21	12.72	4.73
Machinery and equipment	26.11	21.63	0.26	4.63	23.37	19.55	0.24	4.19	34.30	7.34	29.35	6.28
Appliances	1.36	0.91	0.24	2.43	1.32	0.90	0.23	2.40	1.58	4.23	1.56	4.17
Auto parts	24.71	22.11	0.02	1.30	19.41	19.01	0.01	1.12	37.27	2.20	29.22	1.72
Other transp. equipment	55.64	32.86	0.26	3.61	28.99	23.55	0.13	2.58	59.87	6.57	34.79	3.82
Nonmetallic min. and products	4.90	4.60	0.12	2.38	24.22	4.38	0.11	2.27	8.06	4.17	6.40	3.83
Office, electrical, electronic, optical, precision, and communication equipment	45.08	32.43	2.07	18.22	4.44	30.32	1.81	17.03	43.03	24.18	7.41	22.13
Automobiles, trucks, and buses	13.73	15.37	0.00	0.39	4.49	13.98	0.00	0.36	26.15	0.67	39.39	0.57
Other chemical products	26.69	30.16	0.59	3.45	39.51	27.50	0.53	3.15	45.21	5.17	22.36	4.52
Furniture and other products	4.84	4.03	1.27	5.31	11.61	3.85	1.17	5.08	6.90	9.11	39.48	8.44

Notes: Alternative import penetration is the ratio between the imports and the sum of imports and output value. Adjusted import penetration means that the import penetration is adjusted for RER fluctuations—see section 2 for more details. Number of observations: 312.

TABLE 3. CORRELATIONS BETWEEN IMPORT PENETRATION MEASURES

PANEL A. ROW IMPORT PENETRATION

	ROW import penetration (%)	ROW alternative import penetration (%)	ROW adj. import penetration
ROW alternative import penetration (%)	0.970	1.000	
ROW adj. import penetration	0.904	0.875	1.000
ROW adj. alt. import penetration	0.906	0.945	0.944

Number of observations: 312.

PANEL B. CHINESE IMPORT PENETRATION

	Chinese import penetration (%)	Chinese alternative import penetration (%)	Chinese adj. import penetration
Chinese alternative import penetration (%)	0.998	1.000	
Chinese adj. import penetration	0.983	0.981	1.000
Chinese adj. alt. import penetration	0.983	0.989	0.992

Number of observations: 312.

TABLE 4. LABOR-MARKET OUTCOMES AT THE INDUSTRY-LEVEL FOR BRAZIL

	Share of employment in the population (%)		Employment share of manufacturing (%)		Log (hourly wage)		Wage premium (%)	
Industry / year	2000	2012	2000	2012	2000	2012	2000	2012
Food and beverages	0.82	1.17	16.83	19.11	3.23	2.12	-0.07	-0.05
Tobacco	0.01	0.01	0.21	0.18	2.12	2.13	0.04	0.08
Textiles	0.32	0.31	6.49	5.08	3.03	2.10	-0.14	-0.20
Apparel	0.83	0.97	17.06	15.74	2.39	1.67	-0.11	-0.10
Footwear and leather products	0.27	0.29	5.61	4.76	1.98	1.94	-0.11	-0.06
Wood products	0.26	0.22	5.42	3.54	3.19	1.96	-0.06	-0.03
Paper products	0.09	0.11	1.85	1.74	2.83	2.11	0.07	-0.05
Printing and publishing	0.10	0.11	2.15	1.74	2.98	2.66	0.18	0.07
Petroleum refining	0.01	0.01	0.19	0.22	3.33	3.36	0.49	0.62
Biofuel	0.03	0.04	0.58	0.61	1.64	2.54	-0.12	0.09
Pharmaceutical products	0.05	0.05	0.92	0.85	2.88	3.23	0.32	0.37
Cleaning products	0.08	0.08	1.74	1.25	2.55	2.45	0.10	0.05
Paint, varnish, and liqueur	0.02	0.02	0.38	0.33	2.35	2.33	0.17	0.11
Rubber and plastic products	0.18	0.25	3.77	4.13	2.55	2.74	0.03	0.12
Steel	0.05	0.07	1.09	1.21	2.79	2.76	0.30	0.27
Nonferrous metals	0.05	0.06	1.01	0.95	2.26	2.97	0.17	0.15
Metal products	0.32	0.41	6.46	6.64	2.42	2.20	0.05	0.07
Machinery and equipment	0.25	0.52	5.20	8.51	2.69	2.43	0.15	0.15
Appliances	0.09	0.14	1.89	2.21	2.23	2.08	0.10	-0.01
Auto parts	0.11	0.18	2.24	2.95	2.39	2.65	0.13	0.20
Other transportation equipment	0.03	0.06	0.55	1.03	2.90	2.32	0.20	0.12
Nonmetallic minerals and products	0.27	0.35	5.56	5.70	2.84	1.90	-0.01	-0.03
Office, electrical, electronic, optical, precision, and communication equipment	0.10	0.13	1.96	2.12	2.57	2.50	0.15	0.14
Automobiles, trucks, and buses	0.08	0.10	1.58	1.69	2.79	2.72	0.47	0.19
Other chemical products	0.07	0.08	1.36	1.27	2.54	2.72	0.21	0.16
Furniture and other products	0.39	0.40	7.92	6.47	2.75	2.00	-0.05	-0.09

Notes: Hourly wage is in 2012 R$. Wage premium is the premium paid relative to the average manufacturing log hourly wage paid in a given year that is attributed to the worker's industry affiliation. Number of observations: 312.

TABLE 5. WORKERS' AVERAGE CHARACTERISTICS AT THE INDUSTRY LEVEL

	Informal share (%)		Years of schooling		High-school share (%)		College share (%)	
Industry / year	2000	2012	2000	2012	2000	2012	2000	2012
Food and beverages	20.40	21.05	6.44	8.62	21.28	45.82	3.09	6.21
Tobacco	6.96	11.51	7.55	8.89	33.02	54.40	6.54	10.80
Textiles	17.78	46.67	6.76	8.46	21.66	44.83	2.02	5.21
Apparel	22.28	53.31	6.61	8.26	18.74	39.66	1.14	2.95
Footwear and leather products	20.16	19.59	6.73	8.55	17.56	43.66	1.35	2.50
Wood products	25.00	51.95	5.07	6.63	9.79	25.28	0.96	2.19
Paper products	11.25	10.34	8.11	10.03	36.06	63.35	6.09	8.31
Printing and publishing	25.81	24.86	9.16	11.12	45.50	76.50	9.57	19.77
Petroleum refining	6.79	12.86	10.40	12.42	62.17	91.00	24.93	32.72
Biofuel	7.36	1.17	6.09	9.18	21.40	56.02	2.56	10.75
Pharmaceutical products	8.90	6.08	10.68	12.07	64.43	84.60	23.56	38.74
Cleaning products	15.63	8.63	8.77	9.97	44.24	62.27	7.61	10.60
Paint, varnish, and liqueur	9.13	5.83	8.86	10.56	44.41	69.74	10.25	14.39
Rubber and plastic products	11.52	12.75	7.86	9.61	31.45	61.82	4.62	7.25
Steel	6.18	5.47	8.79	10.54	43.53	69.48	9.54	13.07
Nonferrous metals	12.28	5.78	8.47	10.00	40.24	65.93	6.94	7.97
Metal products	17.42	31.57	7.34	8.69	26.20	45.29	3.20	3.57
Machinery and equipment	13.76	12.42	8.31	10.03	36.57	66.08	6.16	8.84
Appliances	6.57	5.06	9.24	10.59	48.32	74.92	8.11	8.46
Auto parts	11.01	6.53	8.45	9.56	38.32	61.59	5.73	4.61
Other transportation equipment	21.33	14.60	8.58	9.69	43.71	63.43	9.09	9.25
Nonmetallic minerals and products	30.31	24.00	5.75	7.62	16.46	33.17	2.41	3.85
Office, electrical, electronic, optical, precision, and communication equipment	13.97	13.89	9.30	10.86	50.08	75.02	8.49	15.28
Automobiles, trucks, and buses	5.20	3.60	9.76	10.78	53.15	78.72	14.15	12.23
Other chemical products	13.44	11.02	8.59	10.50	43.14	70.31	12.22	19.99
Furniture and other products	28.04	44.86	6.84	8.67	20.30	45.66	2.22	5.48

Notes: Number of observations: 434,796 for 2000 and 18,583 for 2012. Household survey weights are used.

TABLE 6. SPATIAL HETEROGENEITY OF MANUFACTURING ACTIVITY IN BRAZIL AT THE STATE LEVEL

State \ Year	Share in number of firms 1998	Industry Herfindahl index 1998	Share of employment in the population (%) 2000	2012	Employment share of manufacturing (%) 2000	2012
Rondônia	0.72	0.16	0.033	0.038	0.676	0.612
Acre	0.14	0.15	0.007	0.008	0.134	0.126
Amazonas	0.49	0.10	0.024	0.032	0.489	0.522
Roraima	0.09	0.14	0.003	0.003	0.062	0.054
Pará	0.96	0.17	0.048	0.057	0.977	0.923
Amapá	0.07	0.15	0.003	0.004	0.063	0.059
Tocantins	0.36	0.11	0.018	0.022	0.375	0.366
Maranhão	0.71	0.12	0.033	0.039	0.684	0.640
Piauí	0.56	0.12	0.028	0.034	0.570	0.561
Ceará	2.86	0.15	0.138	0.166	2.822	2.704
Rio Grande do Norte	0.72	0.15	0.030	0.036	0.618	0.587
Paraíba	0.82	0.14	0.035	0.042	0.721	0.686
Pernambuco	2.13	0.15	0.084	0.103	1.730	1.676
Alagoas	0.44	0.22	0.016	0.020	0.329	0.324
Sergipe	0.40	0.16	0.017	0.021	0.342	0.334
Bahia	2.82	0.12	0.136	0.168	2.781	2.732
Minas Gerais	12.78	0.11	0.601	0.738	12.313	12.013
Espírito Santo	1.84	0.13	0.084	0.106	1.731	1.721
Rio de Janeiro	5.83	0.12	0.281	0.362	5.756	5.891
São Paulo	30.71	0.09	1.479	1.913	30.303	31.140
Paraná	8.09	0.10	0.404	0.503	8.280	8.186
Santa Catarina	7.54	0.11	0.400	0.497	8.190	8.084
Rio Grande do Sul	12.97	0.09	0.681	0.866	13.945	14.101
Mato Grosso do Sul	0.87	0.11	0.051	0.066	1.054	1.075
Mato Grosso	1.59	0.18	0.081	0.094	1.660	1.526
Goiás	2.81	0.15	0.140	0.174	2.862	2.833
Distrito Federal	0.68	0.16	0.026	0.032	0.536	0.525

Notes: Number of observations: 27 for each year.

TABLE 7. SIMPLE CORRELATIONS BETWEEN ENDOGENOUS REGRESSORS AND EXCLUDED INSTRUMENTS

PANEL A. IMPORT PENETRATION AT THE INDUSTRY LEVEL.

Endogenous regressor\Excluded instrument	China's share of imports in Latin American countriest-1	high-income countries' share of imports in Latin American countries t-1
ROW imp. penetrationt-1	-0.129	0.299
Chinese imp. penetrationt-1	0.574	0.316
ROW alt. imp. penetrationt-1	-0.120	0.297
Chinese alt. imp. penetrationt-1	0.580	0.320
ROW adj. imp. penetrationt-1	-0.051	0.184
Chinese adj. imp. penetrationt-1	0.616	0.352
ROW adj. alt. imp. penetrationt-1	-0.056	0.220
Chinese adj. alt. imp. penetrationt-1	0.625	0.356

Number of observations: 286.

PANEL B. ALTERNATIVE INDUSTRY-LEVEL EXCLUDED INSTRUMENTS

Endogenous regressor\Excluded instrument	Chinese imp. penet.1998 × Real exch. ratet-1	ROW imp. penet.1998 × Real exch. ratet-1
ΔChinese imp. penetrationt	0.550	0.458
ΔROW imp. penetrationt	-0.011	0.748
ΔChinese alt. imp. penetrationt-1	0.557	0.441
ΔROW alt. imp. penetrationt-1	0.031	0.741
ΔChinese adj. imp. penetrationt-1	0.561	0.451
ΔROW adj. imp. penetrationt-1	-0.029	0.775
ΔChinese adj. alt. imp. penetrationt-1	0.576	0.422
ΔROW adj. alt. imp. penetrationt-1	0.034	0.788

Number of observations: 286.

PANEL C. IMPORT PENETRATION AT THE STATE-BY-INDUSTRY LEVEL.

Endogenous regressor\Excluded instrument	ΔLatin American countries' Chinese share	ΔLatin American countries' high-income countries share
ΔChinese imports per worker	0.881	0.702
ΔROW imports per worker	0.629	0.888
ΔChinese imports per firm	0.760	0.845
ΔROW imports per firm	0.880	0.683

Number of observations: 6,057.

TABLE 8. INDUSTRY-LEVEL OLS REGRESSION OF TRADE EXPOSURE MEASURES ON LABOR-MARKET OUTCOMES USING EQUATION (2)

Outcome	(1) Log (employment level)	(2) Share of employment in the population (%)	(3) Emp. share of manuf.	(4) Log (hourly wage)	(5) Wage premium	(6) Informal share	(7) Years of schooling	(8) High-school share	(9) College share
A.									
Chinese import penetrationt-1	-0.002	0.002**	0.013	-0.055*	0.070***	-2.890	-0.001	-2.317	-2.026
	(0.011)	(0.001)	(0.012)	(0.030)	(0.024)	(2.033)	(0.103)	(1.672)	(1.366)
B.									
Chinese import penetrationt-1	0.001	0.002*	0.017	-0.048*	0.070***	-2.590	-0.059	-2.161	-1.869
	(0.014)	(0.001)	(0.014)	(0.028)	(0.022)	(1.869)	(0.099)	(1.585)	(1.158)
ROW import penetrationt-1	-0.002	-0.000	-0.002	-0.003	0.010**	-0.152	0.030***	-0.079	-0.080
	(0.002)	(0.000)	(0.002)	(0.004)	(0.004)	(0.124)	(0.004)	(0.146)	(0.140)
C. Alternative import penetration									
Chinese alt. import penetrationt-1	-0.005	0.003*	0.015	-0.036	0.072***	-2.919	-0.045	-1.913	-1.922
	(0.013)	(0.001)	(0.015)	(0.031)	(0.026)	(1.881)	(0.125)	(1.883)	(1.166)
ROW alt. import penetrationt-1	-0.004*	-0.000	-0.004*	-0.005	0.013**	-0.546**	0.067***	0.056	-0.228
	(0.002)	(0.000)	(0.002)	(0.005)	(0.005)	(0.234)	(0.018)	(0.170)	(0.154)
D. Adjusted import penetration									
Chinese adj. import penetrationt-1	-0.004	0.001	0.009	-0.040*	0.043***	-1.742	-0.009	-0.917	-1.006**
	(0.011)	(0.001)	(0.008)	(0.019)	(0.011)	(1.323)	(0.042)	(0.776)	(0.484)
ROW adj. import penetrationt-1	-0.000	-0.000	-0.000	-0.003**	0.006***	0.002	0.012***	-0.097	-0.031
	(0.001)	(0.000)	(0.001)	(0.001)	(0.002)	(0.069)	(0.004)	(0.078)	(0.059)
E. Adjusted alternative imp. penet.									
Chinese adj. alt. import penetrationt-1	-0.004	0.002*	0.011	-0.024	0.044***	-1.909	-0.001	-0.848	-1.051**
	(0.010)	(0.001)	(0.011)	(0.024)	(0.013)	(1.345)	(0.059)	(1.038)	(0.497)
ROW adj. alt. import penetrationt-1	-0.003**	-0.000	-0.003*	-0.006	0.007**	-0.420**	0.053***	0.061	-0.207
	(0.001)	(0.000)	(0.002)	(0.005)	(0.003)	(0.161)	(0.016)	(0.160)	(0.135)

Notes: Number of observations: 286. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Year and industry fixed effects included in the specification. Standard errors clustered at the industry level. Regressions for wage premium uses the inverse of the estimated wage premium variance as weights, and for the remaining outcomes, the weights are the inverse of the number of observations used to compute the industry-level variable.

TABLE 9. INDUSTRY-LEVEL IV REGRESSION OF TRADE EXPOSURE MEASURES ON LABOR-MARKET OUTCOMES USING EQUATION (2)

Outcome	(1) Log (employment level)	(2) Share of employment in the population (%)	(3) Emp. share of manuf.	(4) Log (hourly wage)	(5) Wage premium	(6) Informal share	(7) Years of schooling	(8) High-school share	(9) College share
A.									
Chinese import penetrationt-1	0.047	0.014	0.074	-0.041	0.013	-0.089	0.076	0.842	-0.498
	(0.058)	(0.009)	(0.088)	(0.075)	(0.015)	(0.717)	(0.082)	(1.145)	(1.322)
B.									
Chinese import penetrationt-1	0.037	0.018	-0.020	0.168	0.011	0.765	1.359	7.722	3.112
	(0.403)	(0.023)	(0.876)	(1.901)	(0.020)	(8.394)	(9.221)	(46.893)	(33.944)
ROW import penetrationt-1	-0.014	0.006	-0.138	0.306	-0.019	1.254	1.883	10.101	5.299
	(0.586)	(0.035)	(1.279)	(2.715)	(0.025)	(13.092)	(13.315)	(68.214)	(47.672)
C. Alternative import penetration									
Chinese alt. import penetrationt-1	0.053	0.013	0.113	-0.122	0.011	-0.421	-0.412	-1.761	-1.904
	(0.145)	(0.014)	(0.140)	(0.191)	(0.019)	(1.929)	(1.835)	(10.562)	(4.097)
ROW alt. import penetrationt-1	0.009	-0.003	0.075	-0.165	-0.023	-0.675	-1.008	-5.399	-2.852
	(0.254)	(0.020)	(0.187)	(0.321)	(0.027)	(3.698)	(3.476)	(20.515)	(5.694)
D. Adjusted import penetration									
Chinese adj. import penetrationt-1	0.034	0.002	0.137	-0.244	-0.037	-0.966	-1.347	-7.013	-4.139
	(0.418)	(0.025)	(0.810)	(1.470)	(0.131)	(6.858)	(8.052)	(45.458)	(27.126)
ROW adj. import penetrationt-1	0.002	-0.003	0.039	-0.094	-0.083	-0.389	-0.595	-3.215	-1.637
	(0.175)	(0.010)	(0.314)	(0.585)	(0.252)	(2.721)	(3.087)	(17.183)	(10.912)
E. Adjusted alternative imp. penet.									
Chinese adj. alt. import penetrationt-1	0.032	0.007	0.075	-0.093	-0.011	-0.337	-0.380	-1.776	-1.496
	(0.123)	(0.006)	(0.139)	(0.146)	(0.048)	(1.779)	(0.647)	(5.067)	(2.851)
ROW adj. alt. import penetrationt-1	0.001	-0.001	0.020	-0.048	-0.072	-0.200	-0.307	-1.663	-0.842
	(0.082)	(0.003)	(0.066)	(0.078)	(0.170)	(1.112)	(0.286)	(2.549)	(1.709)

Notes: Number of observations: 286. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Year and industry fixed effects included in the specification. Standard errors clustered at the industry level. Regressions for wage premium uses the inverse of the estimated wage premium variance as weights, and for the remaining outcomes, the weights are the inverse of the number of observations used to compute the industry-level variable. The excluded instruments used are China's share of imports in Latin American countries and the high-income countries' share of imports in Latin American countries.

TABLE 10. INDUSTRY-LEVEL FIRST DIFFERENCE IV REGRESSION OF TRADE EXPOSURE MEASURES ON LABOR-MARKET OUTCOMES USING EQUATION (2)

Outcome	(1) Log (employment level)	(2) Share of employment in the population (%)	(3) Emp. share of manuf.	(4) Log (hourly wage)	(5) Wage premium	(6) Informal share	(7) Years of schooling	(8) High-school share	(9) College share
A.									
Chinese import penetrationt-1	0.003	0.010	-0.023	-0.472	0.305	-13.415	-2.242	-47.147	4.096
	(0.134)	(0.009)	(0.119)	(0.462)	(0.290)	(15.834)	(2.902)	(45.152)	(4.156)
B.									
Chinese import penetrationt-1	-0.037	0.010	-0.034	-0.153	0.266	-10.639	-1.191	-36.017	2.700
	(0.126)	(0.008)	(0.106)	(0.606)	(0.310)	(9.785)	(1.755)	(28.428)	(5.789)
ROW import penetrationt-1	0.032	0.000	0.008	-0.255	-0.258	-2.222	-0.841	-8.911	1.117
	(0.039)	(0.002)	(0.020)	(0.228)	(0.560)	(2.425)	(0.593)	(6.092)	(1.329)
C. Alternative import penetration									
Chinese alt. import penetrationt-1	-0.150	0.009	-0.064	0.722	0.312	-3.438	1.659	-6.847	-1.037
	(0.307)	(0.010)	(0.118)	(2.256)	(0.522)	(20.343)	(6.894)	(81.090)	(15.603)
ROW alt. import penetrationt-1	-0.126	-0.002	-0.029	1.059	-0.517	10.495	3.584	41.174	-4.914
	(0.254)	(0.010)	(0.078)	(2.264)	(1.431)	(30.191)	(8.433)	(105.145)	(14.693)
D. Adjusted import penetration									
Chinese adj. import penetrationt-1	-0.019	0.005	-0.017	-0.077	0.223	-5.455	-0.608	-18.461	1.382
	(0.076)	(0.004)	(0.057)	(0.287)	(0.385)	(5.663)	(1.212)	(17.746)	(2.702)
ROW adj. import penetrationt-1	0.011	0.000	0.003	-0.089	-0.095	-0.724	-0.288***	-2.938**	0.377
	(0.009)	(0.000)	(0.006)	(0.055)	(0.208)	(0.695)	(0.108)	(1.236)	(0.501)
E. Adjusted alternative imp. penet.									
Chinese adj. alt. import penetrationt-1	-0.100	0.005	-0.040	0.535	0.375	-0.624	1.372	1.269	-1.189
	(0.079)	(0.004)	(0.043)	(0.870)	(0.917)	(11.186)	(2.777)	(39.655)	(7.214)
ROW adj. alt. import penetrationt-1	-0.040	-0.001	-0.009	0.339	-0.268	3.428	1.151	13.403	-1.587
	(0.043)	(0.002)	(0.026)	(0.254)	(0.782)	(5.150)	(1.060)	(14.828)	(2.719)

Notes: Number of observations: 286. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Year fixed effects included in the specification. Standard errors clustered at the industry level. Regressions for wage premium uses the inverse of the estimated wage premium variance as weights, and for the remaining outcomes, the weights are the inverse of the number of observations used to compute the industry-level variable. The excluded instruments used in IV estimates are the first difference of China's share of imports in Latin American countries and of the high-income countries' share of imports in Latin American countries.

TABLE 11. INDUSTRY-LEVEL FIRST DIFFERENCE IV REGRESSION OF TRADE EXPOSURE MEASURES ON LABOR-MARKET OUTCOMES USING EQUATION (2) AND SECOND SET OF INSTRUMENTS

Outcome	(1) Log (employment level)	(2) Share of employment in the population (%)	(3) Emp. share of manuf.	(4) Log (hourly wage)	(5) Wage premium	(6) Informal share	(7) Years of schooling	(8) High-school share	(9) College share
A.									
Chinese import penetrationt-1	0.088	0.011	0.167*	-0.023	0.053	0.261	-0.049	0.392	0.189
	(0.064)	(0.007)	(0.099)	(0.086)	(0.042)	(1.122)	(0.174)	(1.755)	(1.274)
B.									
Chinese import penetrationt-1	0.080	0.009	0.113	-0.076	0.135***	1.877	0.028	-5.465	-0.614
	(0.096)	(0.009)	(0.117)	(0.119)	(0.036)	(3.525)	(0.432)	(6.108)	(1.825)
ROW import penetrationt-1	-0.007	-0.001	-0.013	-0.028	0.053*	0.352	0.009	-2.224	-0.291
	(0.031)	(0.003)	(0.039)	(0.063)	(0.027)	(1.527)	(0.205)	(2.850)	(0.838)
C. Alternative import penetration									
Chinese alt. import penetrationt-1	0.096	0.011	0.114	0.048	0.119***	1.321	0.287	-0.284	-1.273
	(0.074)	(0.007)	(0.093)	(0.081)	(0.045)	(1.976)	(0.213)	(3.139)	(2.420)
ROW alt. import penetrationt-1	-0.010	-0.001	-0.034	0.069	0.063	-0.108	0.316	0.336	-1.582
	(0.031)	(0.004)	(0.062)	(0.081)	(0.041)	(1.929)	(0.202)	(3.418)	(1.474)
D. Adjusted import penetration									
Chinese adj. import penetrationt-1	0.061*	0.007*	0.084	0.001	0.064***	0.764	0.035	-0.161	-0.076
	(0.036)	(0.004)	(0.054)	(0.053)	(0.017)	(0.995)	(0.116)	(0.868)	(0.610)
ROW adj. import penetrationt-1	-0.006	-0.000	0.005	-0.006	-0.027	-0.291	-0.013	0.008	-0.029
	(0.006)	(0.001)	(0.013)	(0.007)	(0.042)	(0.202)	(0.027)	(0.528)	(0.129)
E. Adjusted alternative imp. penet.									
Chinese adj. alt. import penetrationt-1	0.068	0.008*	0.088	0.000	0.068***	0.981	0.043	-0.384	-0.089
	(0.044)	(0.004)	(0.065)	(0.050)	(0.019)	(1.093)	(0.106)	(0.906)	(0.696)
ROW adj. alt. import penetrationt-1	-0.003	0.000	0.024	-0.002	-0.024	-0.624	0.010	0.364	-0.223
	(0.018)	(0.001)	(0.031)	(0.024)	(0.035)	(0.617)	(0.066)	(1.111)	(0.415)

Notes: Number of observations: 286. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Year fixed effects included in the specification. Standard errors clustered at the industry level. Regressions for wage premium uses the inverse of the estimated wage premium variance as weights, and for the remaining outcomes, the weights are the inverse of the number of observations used to compute the industry-level variable. The excluded instruments used in all IV estimates are Chinese import penet.$_{1998}$×Real exch. rate$_{t-1}$ and ROW import penet.$_{1998}$×Real exch. rate$_{t-1}$.

TABLE 12. INDUSTRY-LEVEL REGRESSION OF IMPORT PENETRATION MEASURES ON THE LOG (EMPLOYMENT) USING EQUATION (3)

Regressors	OLS-1	OLS-2	OLS-3	OLS-4	OLS-5	IV-1	IV-2	IV-3	IV-4	IV-5
Chinese import penetrationt-1	-0.031	-0.026	-0.065*	-0.032	-0.025	0.056	0.076	0.225	0.083	0.216
	(0.033)	(0.023)	(0.032)	(0.027)	(0.024)	(0.189)	(0.332)	(2.054)	(0.199)	(3.781)
ROW import penetrationt-1	-0.010**	-0.010**	-0.008**	-0.007	-0.010**	0.070*	0.037	0.056	-0.056	0.184
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.040)	(0.371)	(0.342)	(0.076)	(4.570)
Chinese market share abroadt-1	0.004					0.009				
	(0.018)					(0.048)				
Effective applied tarifft-1		-0.005					0.005			
		(0.008)					(0.081)			
Upstream Chinese imp. penet.t-1			0.109					-0.145		
			(0.068)					(2.072)		
Upstream ROW imp. penet.t-1			0.005					0.023		
			(0.008)					(0.094)		
Chinese imp. penet.t-1 × NMEt				0.021					-0.056	
				(0.013)					(0.156)	
ROW imp. penet.t-1 × NMEt				-0.007**					0.005	
				(0.003)					(0.058)	
Chinese imp. penet.t-1 × L. intensivetj					-0.028					-0.446
					(0.040)					(7.502)
ROW imp. penet.t-1 × L. intensivetj					0.031					-0.775
					(0.037)					(14.028)

Notes: Number of observations: 286. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Year and industry fixed effects included in the specification. Standard errors clustered at the industry level. Regressions weights are the inverse of the number of observations used to compute the industry-level variable. The excluded instruments used in all IV estimates are China's share of imports in Latin American countries and the high-income countries' share of imports in Latin American countries.

TABLE 13. INDUSTRY-LEVEL REGRESSION OF IMPORT PENETRATION MEASURES ON THE SHARE OF EMPLOYMENT IN THE POPULATION USING EQUATION (3)

Regressors	OLS-1	OLS-2	OLS-3	OLS-4	OLS-5	IV-1	IV-2	IV-3	IV-4	IV-5
Chinese import penetrationt-1	-0.001	0.003	-0.004	0.004	0.003	0.017	0.006	0.017	0.023	0.031
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.011)	(0.071)	(0.136)	(0.024)	(0.450)
ROW import penetrationt-1	-0.000	-0.000*	-0.000	-0.000	-0.000	0.004	-0.009	0.006	-0.006	0.021
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.084)	(0.022)	(0.008)	(0.541)
Chinese market share abroadt-1	0.003*					-0.000				
	(0.002)					(0.003)				
Effective applied tarifft-1		0.000					-0.002			
		(0.001)					(0.017)			
Upstream Chinese imp. penet.t-1			0.017***					0.004		
			(0.004)					(0.142)		
Upstream ROW imp. penet.t-1			0.000					0.002		
			(0.001)					(0.006)		
Chinese imp. penet.t-1 × NMEt				-0.001					-0.010	
				(0.001)					(0.014)	
ROW imp. penet.t-1 × NMEt				-0.000					0.001	
				(0.000)					(0.005)	
Chinese imp. penet.t-1 × L. intensivetj					0.002					-0.032
					(0.006)					(0.882)
ROW imp. penet.t-1 × L. intensivetj					-0.012					-0.057
					(0.010)					(1.645)

Notes: Number of observations: 286. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Year and industry fixed effects included in the specification. Standard errors clustered at the industry level. Regressions weights are the inverse of the number of observations used to compute the industry-level variable. The excluded instruments used in all IV estimates are China's share of imports in Latin American countries and the high-income countries' share of imports in Latin American countries.

TABLE 14. INDUSTRY-LEVEL REGRESSION OF IMPORT PENETRATION MEASURES ON THE MANUFACTURING SHARE OF EMPLOYMENT USING EQUATION (3)

Regressors	OLS-1	OLS-2	OLS-3	OLS-4	OLS-5	IV-1	IV-2	IV-3	IV-4	IV-5
Chinese import penetrationt-1	-0.006	0.008	-0.065**	0.019	0.027	0.015	0.293	0.544	0.160	0.535
	(0.023)	(0.023)	(0.029)	(0.032)	(0.027)	(0.137)	(1.462)	(3.505)	(0.230)	(10.629)
ROW import penetrationt-1	-0.008**	-0.010**	-0.005	-0.009*	-0.008**	0.024	0.276	0.061	-0.056	0.463
	(0.004)	(0.004)	(0.003)	(0.005)	(0.003)	(0.060)	(1.782)	(0.624)	(0.069)	(12.760)
Chinese market share abroadt-1	0.012					0.017				
	(0.020)					(0.035)				
Effective applied tarifft-1		-0.016					0.042			
		(0.012)					(0.353)			
Upstream Chinese imp. penet.t-1			0.201***					-0.498		
			(0.071)					(3.403)		
Upstream ROW imp. penet.t-1			0.005					0.028		
			(0.017)					(0.179)		
Chinese imp. penet.t-1 × NMEt				-0.008					-0.108	
				(0.015)					(0.143)	
ROW imp. penet.t-1 × NMEt				-0.000					-0.001	
				(0.004)					(0.051)	
Chinese imp. penet.t-1 × L. intensivetj					-0.330***					-1.409
					(0.076)					(20.874)
ROW imp. penet.t-1 × L. intensivetj					0.047					-2.177
					(0.158)					(39.107)

Notes: Number of observations: 286. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Year and industry fixed effects included in the specification. Standard errors clustered at the industry level. Regressions weights are the inverse of the number of observations used to compute the industry-level variable. The excluded instruments used in all IV estimates are China's share of imports in Latin American countries and the high-income countries' share of imports in Latin American countries.

TABLE 15. INDUSTRY-LEVEL REGRESSION OF IMPORT PENETRATION MEASURES ON THE LOG (HOURLY WAGE) USING EQUATION (3)

Regressors	OLS-1	OLS-2	OLS-3	OLS-4	OLS-5	IV-1	IV-2	IV-3	IV-4	IV-5
Chinese import penetrationt-1	0.009	-0.004	0.027	0.016	-0.005	0.101	-0.187	-1.345	-0.132	0.824
	(0.027)	(0.023)	(0.030)	(0.051)	(0.024)	(0.221)	(0.633)	(8.091)	(0.142)	(26.806)
ROW import penetrationt-1	0.000	0.000	0.000	-0.000	0.001	-0.006	-0.163	-0.205	-0.035	1.049
	(0.005)	(0.005)	(0.004)	(0.004)	(0.005)	(0.040)	(0.750)	(1.391)	(0.069)	(32.138)
Chinese market share abroadt-1	-0.010					-0.034				
	(0.010)					(0.045)				
Effective applied tarifft-1		-0.014					-0.048			
		(0.013)					(0.136)			
Upstream Chinese imp. penet.t-1			0.008					1.447		
			(0.091)					(8.030)		
Upstream ROW imp. penet.t-1			0.064***					0.002		
			(0.023)					(0.405)		
Chinese imp. penet.t-1 × NMEt				-0.021					0.086	
				(0.036)					(0.129)	
ROW imp. penet.t-1 × NMEt				0.002					0.019	
				(0.003)					(0.030)	
Chinese imp. penet.t-1 × L. intensivetj					0.032					-1.620
					(0.025)					(52.221)
ROW imp. penet.t-1 × L. intensivetj					0.018					-3.037
					(0.031)					(97.509)

Notes: Number of observations: 286. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Year and industry fixed effects included in the specification. Standard errors clustered at the industry level. Regressions weights are the inverse of the number of observations used to compute the industry-level variable. The excluded instruments used in all IV estimates are China's share of imports in Latin American countries and the high-income countries' share of imports in Latin American countries.

TABLE 16. INDUSTRY-LEVEL REGRESSION OF IMPORT PENETRATION MEASURES ON THE INTERINDUSTRY WAGE PREMIUM USING EQUATION (3)

Regressors	OLS-1	OLS-2	OLS-3	OLS-4	OLS-5	IV-1	IV-2	IV-3	IV-4	IV-5
Chinese import penetrationt-1	-0.011*	0.004	0.014	-0.002	-0.000	-0.005	0.005	0.036	-0.033	-0.010
	(0.006)	(0.007)	(0.014)	(0.007)	(0.004)	(0.130)	(0.029)	(0.029)	(0.067)	(0.026)
ROW import penetrationt-1	0.002	0.004*	0.001	0.004	0.002	-0.017	-0.028	-0.030	0.008	-0.017
	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.042)	(0.039)	(0.029)	(0.065)	(0.028)
Chinese market share abroadt-1	0.010***					0.006				
	(0.003)					(0.045)				
Effective applied tarifft-1		-0.001					0.003			
		(0.002)					(0.007)			
Upstream Chinese imp. penet.t-1			-0.026					-0.091**		
			(0.027)					(0.046)		
Upstream ROW imp. penet.t-1			0.012**					0.044		
			(0.005)					(0.031)		
Chinese imp. penet.t-1 × NMEt				0.003					0.030	
				(0.007)					(0.048)	
ROW imp. penet.t-1 × NMEt				0.000					0.010	
				(0.002)					(0.020)	
Chinese imp. penet.t-1 × L. intensivetj					0.016					0.032
					(0.013)					(0.035)
ROW imp. penet.t-1 × L. intensivetj					-0.011					-0.024
					(0.010)					(0.049)

Notes: Number of observations: 286. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Year and industry fixed effects included in the specification. Standard errors clustered at the industry level. Regressions weights are the inverse of the estimated wage premium variance. The excluded instruments used in all IV estimates are China's share of imports in Latin American countries and the high-income countries' share of imports in Latin American countries.

TABLE 17. INDUSTRY-LEVEL REGRESSION OF IMPORT PENETRATION MEASURES ON THE SHARE OF INFORMAL EMPLOYMENT USING EQUATION (3)

Regressors	OLS-1	OLS-2	OLS-3	OLS-4	OLS-5	IV-1	IV-2	IV-3	IV-4	IV-5
Chinese import penetrationt-1	-1.312	-1.205	-1.824*	-0.403	-1.031	0.703	1.163	-2.177	3.136	14.401
	(0.936)	(0.748)	(1.016)	(0.693)	(0.732)	(4.760)	(13.894)	(32.667)	(3.459)	(415.633)
ROW import penetrationt-1	-0.123	-0.144	-0.097	-0.075	-0.117	0.965	1.780	0.173	-0.975	16.877
	(0.097)	(0.095)	(0.095)	(0.085)	(0.095)	(0.610)	(15.894)	(5.271)	(1.542)	(499.577)
Chinese market share abroadt-1	0.102					-0.031				
	(0.268)					(1.261)				
Effective applied tarifft-1		-0.340					0.053			
		(0.285)					(3.244)			
Upstream Chinese imp. penet.t-1			1.237					2.381		
			(1.390)					(33.320)		
Upstream ROW imp. penet.t-1			-0.338					-0.290		
			(0.236)					(1.470)		
Chinese imp. penet.t-1 × NMEt				-0.414					-2.929	
				(0.703)					(2.613)	
ROW imp. penet.t-1 × NMEt				-0.102*					0.248	
				(0.053)					(0.790)	
Chinese imp. penet.t-1 × L. intensivetj					-2.529***					-33.400
					(0.728)					(812.971)
ROW imp. penet.t-1 × L. intensivetj					-0.486					-65.717
					(0.806)					(1,519.345)

Notes: Number of observations: 286. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Year and industry fixed effects included in the specification. Standard errors clustered at the industry level. Regressions weights are the inverse of the number of observations used to compute the industry-level variable. The excluded instruments used in all IV estimates are China's share of imports in Latin American countries and the high-income countries' share of imports in Latin American countries.

TABLE 18. INDUSTRY-LEVEL REGRESSION OF IMPORT PENETRATION MEASURES ON THE AVERAGE YEARS OF SCHOOLING USING EQUATION (3)

Regressors	OLS-1	OLS-2	OLS-3	OLS-4	OLS-5	IV-1	IV-2	IV-3	IV-4	IV-5
Chinese import penetrationt-1	0.090	0.056	0.151	0.090	0.051	0.989*	-1.170	-6.604	-0.072	5.592
	(0.086)	(0.077)	(0.093)	(0.087)	(0.072)	(0.591)	(8.590)	(43.414)	(0.855)	(159.842)
ROW import penetrationt-1	-0.006	-0.007	-0.009	-0.009	-0.005	0.163	-1.456	-0.867	-0.158	6.677
	(0.013)	(0.013)	(0.013)	(0.015)	(0.012)	(0.166)	(10.266)	(7.245)	(0.348)	(191.766)
Chinese market share abroadt-1	-0.025					-0.186				
	(0.020)					(0.140)				
Effective applied tarifft-1		-0.047*					-0.339			
		(0.027)					(2.068)			
Upstream Chinese imp. penet.t-1			-0.144					7.304		
			(0.134)					(43.730)		
Upstream ROW imp. penet.t-1			0.075**					-0.203		
			(0.032)					(2.183)		
Chinese imp. penet.t-1 × NMEt				-0.049					0.221	
				(0.039)					(0.804)	
ROW imp. penet.t-1 × NMEt				0.010					0.124	
				(0.007)					(0.192)	
Chinese imp. penet.t-1 × L. intensivetj					0.163**					-10.447
					(0.063)					(311.943)
ROW imp. penet.t-1 × L. intensivetj					-0.095					-19.611
					(0.095)					(582.679)

Notes: Number of observations: 286. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Year and industry fixed effects included in the specification. Standard errors clustered at the industry level. Regressions weights are the inverse of the number of observations used to compute the industry-level variable. The excluded instruments used in all IV estimates are China's share of imports in Latin American countries and the high-income countries' share of imports in Latin American countries.

TABLE 19. INDUSTRY-LEVEL REGRESSION OF IMPORT PENETRATION MEASURES ON THE SHARE OF WORKERS WITH HIGH-SCHOOL DIPLOMAS USING EQUATION (3)

Regressors	OLS-1	OLS-2	OLS-3	OLS-4	OLS-5	IV-1	IV-2	IV-3	IV-4	IV-5
Chinese import penetrationt-1	1.286	0.797	2.022**	1.408	0.745	6.071	-6.210	-29.131	5.598	23.700
	(0.955)	(0.830)	(0.891)	(0.998)	(0.816)	(6.752)	(50.872)	(198.685)	(5.822)	(653.648)
ROW import penetrationt-1	0.247	0.262	0.197	0.179	0.263	2.422	-8.294	-2.758	-0.230	27.973
	(0.161)	(0.160)	(0.162)	(0.122)	(0.167)	(1.834)	(61.287)	(33.810)	(2.008)	(784.638)
Chinese market share abroadt-1	-0.383*					-0.830				
	(0.188)					(1.537)				
Effective applied tarifft-1		-0.149					-1.870			
		(0.325)					(12.579)			
Upstream Chinese imp. penet.t-1			-3.589***					33.161		
			(1.208)					(197.412)		
Upstream ROW imp. penet.t-1			-0.292					-1.375		
			(0.464)					(10.243)		
Chinese imp. penet.t-1 × NMEt				-0.980*					-3.006	
				(0.563)					(4.557)	
ROW imp. penet.t-1 × NMEt				0.214**					0.775	
				(0.087)					(1.172)	
Chinese imp. penet.t-1 × L. intensivetj					1.486*					-39.725
					(0.784)					(1,275.183)
ROW imp. penet.t-1 × L. intensivetj					-1.395					-70.917
					(1.163)					(2,380.292)

Notes: Number of observations: 286. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Year and industry fixed effects included in the specification. Standard errors clustered at the industry level. Regressions weights are the inverse of the number of observations used to compute the industry-level variable. The excluded instruments used in all IV estimates are China's share of imports in Latin American countries and the high-income countries' share of imports in Latin American countries.

TABLE 20. INDUSTRY-LEVEL REGRESSION OF IMPORT PENETRATION MEASURES ON OUTCOMES FOR THE SHARE OF WORKERS WITH COLLEGE DEGREES USING EQUATION (3)

Regressors	OLS-1	OLS-2	OLS-3	OLS-4	OLS-5	IV-1	IV-2	IV-3	IV-4	IV-5
Chinese import penetrationt-1	1.249	0.787	1.761*	1.098	0.832	1.925	-3.882	-24.036	-3.914	12.364
	(0.875)	(0.767)	(0.997)	(1.198)	(0.827)	(4.260)	(18.001)	(151.669)	(4.984)	(403.669)
ROW import penetrationt-1	0.006	0.020	-0.017	-0.041	0.029	-0.219	-3.935	-3.965	0.986	15.605
	(0.087)	(0.091)	(0.095)	(0.067)	(0.092)	(0.561)	(20.649)	(25.867)	(1.935)	(483.231)
Chinese market share abroadt-1	-0.362					-0.596				
	(0.214)					(0.795)				
Effective applied tarifft-1		-0.131					-0.939			
		(0.238)					(3.918)			
Upstream Chinese imp. penet.t-1			-1.391					25.446		
			(2.046)					(151.142)		
Upstream ROW imp. penet.t-1			0.871**					-0.324		
			(0.350)					(7.457)		
Chinese imp. penet.t-1 × NMEt				-0.604					3.692	
				(0.569)					(3.552)	
ROW imp. penet.t-1 × NMEt				0.157**					0.147	
				(0.065)					(1.261)	
Chinese imp. penet.t-1 × L. intensivetj					-0.336					-23.064
					(0.913)					(784.563)
ROW imp. penet.t-1 × L. intensivetj					-1.001					-40.454
					(0.616)					(1,464.847)

Notes: Number of observations: 286. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Year and industry fixed effects included in the specification. Standard errors clustered at the industry level. Regressions weights are the inverse of the number of observations used to compute the industry-level variable. The excluded instruments used in all IV estimates are China's share of imports in Latin American countries and the high-income countries' share of imports in Latin American countries.

TABLE 21. WORKER-LEVEL OLS ESTIMATES OF THE EFFECTS OF INDUSTRY-LEVEL IMPORT PENETRATION USING EQUATION (5)

Regressors	Log (hourly wage)			Informal employment status		
	(1)	(2)	(3)	(4)	(5)	(6)
Chinese imp. penetration$_{t-1}$	0.014	0.014	0.013**	-0.032*	-0.036**	-0.038**
	(0.010)	(0.009)	(0.006)	(0.017)	(0.016)	(0.017)
ROW imp. penetration$_{t-1}$	0.011**	0.010**	0.009***	-0.026***	-0.026***	-0.027***
	(0.005)	(0.005)	(0.003)	(0.008)	(0.009)	(0.009)
Age	0.045***	0.045***	0.044***	-0.024***	-0.024***	-0.024***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
Age^2	-0.000***	-0.000***	-0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	-0.319***	-0.319***	-0.310***	0.019*	0.018*	0.018*
	(0.021)	(0.021)	(0.021)	(0.010)	(0.010)	(0.009)
Married	0.107***	0.107***	0.107***	-0.017***	-0.016***	-0.017***
	(0.012)	(0.012)	(0.012)	(0.004)	(0.004)	(0.004)
Black	-0.044***	-0.044***	-0.043***	-0.004	-0.004	-0.003
	(0.008)	(0.008)	(0.008)	(0.002)	(0.002)	(0.002)
Asian	0.032***	0.032***	0.032***	0.006	0.006	0.006
	(0.010)	(0.010)	(0.010)	(0.006)	(0.006)	(0.005)
Years of schooling	0.041***	0.041***	0.041***	-0.011***	-0.011***	-0.010***
	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)
High-school diploma	0.303***	0.303***	0.302***	0.007	0.008*	0.004
	(0.019)	(0.019)	(0.019)	(0.004)	(0.004)	(0.004)
College degree	0.339***	0.339***	0.340***	0.034***	0.034***	0.030***
	(0.020)	(0.020)	(0.019)	(0.006)	(0.006)	(0.006)
Year, industry, and state fixed effects	Yes	No	No	Yes	No	No
Industry and year-state fixed effects	No	Yes	No	No	Yes	No
Year and state-industry effects	No	No	Yes	No	No	Yes

Notes: Number of observations: 669,9664. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the industry level. Sample weights from PNAD/Census used.

TABLE 22. WORKER-LEVEL OLS ESTIMATES OF THE EFFECTS OF INDUSTRY-LEVEL IMPORT PENETRATION ON THE LOG (HOURLY WAGE) USING EQUATION (5)

Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Chinese import penetrationt-1	0.003	0.013	0.034	0.008	0.001	0.009**	0.009
	(0.008)	(0.009)	(0.025)	(0.010)	(0.005)	(0.004)	(0.011)
ROW import penetrationt-1	0.010*	0.011**	0.008*	0.010*	0.003	0.011**	0.009
	(0.005)	(0.005)	(0.005)	(0.005)	(0.003)	(0.005)	(0.005)
Chinese market share abroadt-1	0.008						
	(0.005)						
Effective applied tarifft-1		0.001					
		(0.002)					
Upstream Chinese imp. penet.t-1			-0.047				
			(0.045)				
Upstream ROW imp. penet.t-1			0.011				
			(0.010)				
Chinese imp. penet.t-1 × NMEt				0.006			
				(0.006)			
ROW imp. penet.t-1 × NMEt				-0.002			
				(0.002)			
Chinese imp. penet.t-1 × L. int.j					0.037**		
					(0.017)		
ROW imp. penet.t-1 × L. int.j					0.006		
					(0.013)		
Chinese imp. penet.t-1 × Manuf.s						0.005	
						(0.010)	
ROW imp. penet.t-1 × Manuf.s						0.000	
						(0.002)	
Chinese imp. penet.t-1 × Coastals							0.003
							(0.008)
ROW imp. penet.t-1 × Coastals							0.004***
							(0.001)

Notes: Number of observations: 669,9664. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the industry level. Sample weights from PNAD/Census used. Workers' observable characteristics; and industry, state, and year fixed effects included in the estimated model.

TABLE 23. WORKER-LEVEL OLS ESTIMATES OF THE EFFECTS OF INDUSTRY-LEVEL IMPORT PENETRATION ON THE INFORMAL EMPLOYMENT STATUS INDICATOR USING EQUATION (5)

Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Chinese import penetrationt-1	0.010	-0.013	-0.046	-0.026	-0.002	-0.040**	-0.031*
	(0.016)	(0.011)	(0.036)	(0.022)	(0.007)	(0.016)	(0.015)
ROW import penetrationt-1	-0.020***	-0.013**	-0.015**	-0.016**	-0.007	-0.026***	-0.026***
	(0.006)	(0.005)	(0.007)	(0.007)	(0.005)	(0.008)	(0.009)
Chinese market share abroadt-1	-0.029**						
	(0.013)						
Effective applied tarifft-1		-0.014***					
		(0.004)					
Upstream Chinese imp. penet.t-1			0.024				
			(0.070)				
Upstream ROW imp. penet.t-1			-0.046**				
			(0.021)				
Chinese imp. penet.t-1 × NMEt				-0.019			
				(0.017)			
ROW imp. penet.t-1 × NMEt				0.012***			
				(0.003)			
Chinese imp. penet.t-1 × L. int.j					-0.095***		
					(0.029)		
ROW imp. penet.t-1 × L. int.j					0.006		
					(0.034)		
Chinese imp. penet.t-1 × Manuf.s						0.007	
						(0.004)	
ROW imp. penet.t-1 × Manuf.s						0.001	
						(0.001)	
Chinese imp. penet.t-1 × Coastals							-0.001
							(0.003)
ROW imp. penet.t-1 × Coastals							0.000
							(0.001)

Notes: Number of observations: 669,9664. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the industry level. Sample weights from PNAD/Census used. Workers' observable characteristics; and industry, state, and year fixed effects included in the estimated model.

TABLE 24. WORKER-LEVEL IV ESTIMATES OF THE EFFECTS OF INDUSTRY-LEVEL IMPORT PENETRATION ON THE LOG (HOURLY WAGE) USING EQUATION (5)

Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chinese import penetrationt-1	0.016	-0.038	0.007	0.029	-0.312	-0.015	0.010	0.008
	(0.015)	(0.085)	(0.024)	(0.033)	(0.816)	(0.029)	(0.015)	(0.020)
ROW import penetrationt-1	0.006	0.010	-0.006	0.004	0.230	-0.015	0.012	0.005
	(0.023)	(0.029)	(0.049)	(0.034)	(0.558)	(0.041)	(0.023)	(0.023)
Chinese market share abroadt-1		0.021						
		(0.033)						
Effective applied tarifft-1			0.004					
			(0.009)					
Upstream Chinese imp. penet.t-1				-0.043				
				(0.058)				
Upstream ROW imp. penet.t-1				0.014				
				(0.039)				
Chinese imp. penet.t-1 × NMEt					0.228			
					(0.581)			
ROW imp. penet.t-1 × NMEt					0.066			
					(0.159)			
Chinese imp. penet.t-1 × L. int.j						0.046		
						(0.055)		
ROW imp. penet.t-1 × L. int.j						0.013		
						(0.052)		
Chinese imp. penet.t-1 × Manuf.s							0.008	
							(0.025)	
ROW imp. penet.t-1 × Manuf.s							0.021	
							(0.018)	
Chinese imp. penet.t-1 × Coastals								0.008
								(0.009)
ROW imp. penet.t-1 × Coastals								0.001
								(0.008)
Endogeneity test	0.0707	0.541	0.149	0.0668	4.611	3.775	8.578*	1.970
	[0.790]	[0.763]	[0.928]	[0.967]	[0.330]	[0.437]	[0.072]	[0.741]

Notes: Number of observations: 669,9664. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the industry level. Sample weights from PNAD/Census used. Workers' observable characteristics; and industry, state, and year fixed effects included in the estimated model. The excluded instruments used in all IV estimates are China's share of imports in Latin American countries and the high-income countries' share of imports in Latin American countries.

TABLE 25. WORKER-LEVEL IV ESTIMATES OF THE EFFECTS OF INDUSTRY-LEVEL IMPORT PENETRATION ON THE INFORMAL EMPLOYMENT STATUS INDICATOR USING EQUATION (5)

Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chinese import penetrationt-1	-0.062*	0.066	-0.022	-0.080	0.292	0.013	-0.068**	-0.055
	(0.037)	(0.130)	(0.052)	(0.098)	(0.688)	(0.056)	(0.030)	(0.038)
ROW import penetrationt-1	-0.034	-0.044	0.021	-0.023	-0.205	0.016	-0.035	-0.034
	(0.060)	(0.041)	(0.121)	(0.067)	(0.445)	(0.078)	(0.060)	(0.058)
Chinese market share abroadt-1		-0.050						
		(0.044)						
Effective applied tarifft-1			-0.019					
			(0.020)					
Upstream Chinese imp. penet.t-1				0.073				
				(0.206)				
Upstream ROW imp. penet.t-1				-0.045				
				(0.078)				
Chinese imp. penet.t-1 × NMEt					-0.236			
					(0.490)			
ROW imp. penet.t-1 × NMEt					-0.041			
					(0.127)			
Chinese imp. penet.t-1 × L. int.j						-0.111		
						(0.117)		
ROW imp. penet.t-1 × L. int.j						-0.030		
						(0.100)		
Chinese imp. penet.t-1 × Manuf.s							0.006	
							(0.012)	
ROW imp. penet.t-1 × Manuf.s							-0.007	
							(0.010)	
Chinese imp. penet.t-1 × Coastals								-0.007
								(0.006)
ROW imp. penet.t-1 × Coastals								-0.001
								(0.004)
Endogeneity test	0.151	0.243	0.312	0.478	6.517	1.685	6.297	7.083
	[0.698]	[0.886]	[0.856]	[0.787]	[0.164]	[0.793]	[0.178]	[0.132]

Notes: Number of observations: 669,9664. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the industry level. Sample weights from PNAD/Census used. Workers' observable characteristics; and industry, state, and year fixed effects included in the estimated model. The excluded instruments used in all IV estimates are China's share of imports in Latin American countries and the high-income countries' share of imports in Latin American countries.

TABLE 26. WORKER-LEVEL OLS ESTIMATES OF THE EFFECTS OF INDUSTRY-LEVEL IMPORT PENETRATION ON THE LOG (HOURLY WAGE) USING EQUATION (5) AND STATE-INDUSTRY AND YEAR FIXED EFFECTS

Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Chinese import penetrationt-1	0.001	0.010*	0.019	0.006	0.002	0.020***	0.025**
	(0.005)	(0.005)	(0.016)	(0.006)	(0.003)	(0.005)	(0.010)
ROW import penetrationt-1	0.008**	0.007**	0.005*	0.007**	0.003	0.009***	0.011**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.005)
Chinese market share abroadt-1	0.008**						
	(0.004)						
Effective applied tarifft-1		0.002*					
		(0.001)					
Upstream Chinese imp. penet.t-1			-0.012				
			(0.029)				
Upstream ROW imp. penet.t-1			0.017**				
			(0.006)				
Chinese imp. penet.t-1 × NMEt				0.008*			
				(0.004)			
ROW imp. penet.t-1 × NMEt				-0.003**			
				(0.001)			
Chinese imp. penet.t-1 × L. int.j					0.029**		
					(0.010)		
ROW imp. penet.t-1 × L. int.j					0.004		
					(0.009)		
Chinese imp. penet.t-1 × Manuf.s						-0.014	
						(0.009)	
ROW imp. penet.t-1 × Manuf.s						-0.000	
						(0.005)	
Chinese imp. penet.t-1 × Coastals							-0.018*
							(0.011)
ROW imp. penet.t-1 × Coastals							-0.002
							(0.006)

Notes: Number of observations: 669,9664. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the industry level. Sample weights from PNAD/Census used. Workers' observable characteristics; and state-industry, and year fixed effects included in the estimated model.

TABLE 27. WORKER-LEVEL OLS ESTIMATES OF THE EFFECTS OF INDUSTRY-LEVEL IMPORT PENETRATION ON THE INFORMAL EMPLOYMENT STATUS INDICATOR USING EQUATION (5) AND STATE-INDUSTRY AND YEAR FIXED EFFECTS

Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Chinese import penetrationt-1	0.003	-0.018	-0.051	-0.029	-0.007	-0.053***	-0.045**
	(0.017)	(0.011)	(0.034)	(0.022)	(0.006)	(0.018)	(0.020)
ROW import penetrationt-1	-0.021***	-0.013**	-0.015**	-0.017**	-0.006	-0.032***	-0.032***
	(0.006)	(0.005)	(0.007)	(0.007)	(0.005)	(0.009)	(0.009)
Chinese market share abroadt-1	-0.029**						
	(0.012)						
Effective applied tarifft-1		-0.015***					
		(0.004)					
Upstream Chinese imp. penet.t-1			0.019				
			(0.065)				
Upstream ROW imp. penet.t-1			-0.049**				
			(0.020)				
Chinese imp. penet.t-1 × NMEt				-0.022			
				(0.017)			
ROW imp. penet.t-1 × NMEt				0.012***			
				(0.003)			
Chinese imp. penet.t-1 × L. int.j					-0.095***		
					(0.028)		
ROW imp. penet.t-1 × L. int.j					0.001		
					(0.034)		
Chinese imp. penet.t-1 × Manuf.s						0.028***	
						(0.007)	
ROW imp. penet.t-1 × Manuf.s						0.010**	
						(0.005)	
Chinese imp. penet.t-1 × Coastals							0.009
							(0.007)
ROW imp. penet.t-1 × Coastals							0.007**
							(0.003)

Notes: Number of observations: 669,9664. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the industry level. Sample weights from PNAD/Census used. Workers' observable characteristics; and state-industry, and year fixed effects included in the estimated model.

TABLE 28. WORKER-LEVEL IV ESTIMATES OF THE EFFECTS OF INDUSTRY-LEVEL IMPORT PENETRATION ON THE LOG (HOURLY WAGE) USING EQUATION (5) AND STATE-INDUSTRY AND YEAR FIXED EFFECTS

Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chinese import penetrationt-1	0.010	0.217	0.010	0.005	-0.026	-0.059	-0.027	0.000
	(0.031)	(0.454)	(0.030)	(0.009)	(0.033)	(0.209)	(0.019)	(0.031)
ROW import penetrationt-1	0.036*	0.022	0.036*	0.031***	-0.000	0.086	-0.004	0.033
	(0.021)	(0.035)	(0.019)	(0.010)	(0.017)	(0.324)	(0.021)	(0.022)
Chinese market share abroadt-1		-0.024						
		(0.048)						
Effective applied tarifft-1			-0.000					
			(0.004)					
Upstream Chinese imp. penet.t-1				-0.081***				
				(0.031)				
Upstream ROW imp. penet.t-1				-0.020*				
				(0.010)				
Chinese imp. penet.t-1 × NMEt					0.036			
					(0.043)			
ROW imp. penet.t-1 × NMEt					0.038***			
					(0.012)			
Chinese imp. penet.t-1 × L. int.j						0.091		
						(0.338)		
ROW imp. penet.t-1 × L. int.j						0.084		
						(0.549)		
Chinese imp. penet.t-1 × Manuf.s							0.043	
							(0.031)	
ROW imp. penet.t-1 × Manuf.s							0.043***	
							(0.016)	
Chinese imp. penet.t-1 × Coastals								0.012
								(0.008)
ROW imp. penet.t-1 × Coastals								0.004
								(0.005)
Endogeneity test	2.945	4.790	3.493	3.722	11.09	6.845	6.894	5.606
	[0.086]	[0.091]	[0.174]	[0.156]	[0.026]	[0.144]	[0.142]	[0.231]

Notes: Number of observations: 669,9664. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the industry level. Sample weights from PNAD/Census used. Workers' observable characteristics; and state-industry, and year fixed effects included in the estimated model. The excluded instruments used in all IV estimates are China's share of imports in Latin American countries and the high-income countries' share of imports in Latin American countries.

TABLE 29. WORKER-LEVEL IV ESTIMATES OF THE EFFECTS OF INDUSTRY-LEVEL IMPORT PENETRATION ON THE INFORMAL EMPLOYMENT STATUS INDICATOR AND STATE-INDUSTRY AND YEAR FIXED EFFECTS

Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chinese import penetrationt-1	-0.000	-0.073	-0.000	0.001	0.089	0.044	0.011	0.010
	(0.019)	(0.195)	(0.022)	(0.009)	(0.058)	(0.175)	(0.013)	(0.020)
ROW import penetrationt-1	-0.015	-0.010	-0.017	-0.010	0.008	-0.062	0.004	-0.013
	(0.012)	(0.013)	(0.011)	(0.006)	(0.012)	(0.279)	(0.012)	(0.012)
Chinese market share abroadt-1		0.008						
		(0.021)						
Effective applied tarifft-1			-0.001					
			(0.003)					
Upstream Chinese imp. penet.t-1				0.030				
				(0.021)				
Upstream ROW imp. penet.t-1				0.003				
				(0.005)				
Chinese imp. penet.t-1 × NMEt					-0.088			
					(0.070)			
ROW imp. penet.t-1 × NMEt					-0.023**			
					(0.012)			
Chinese imp. penet.t-1 × L. int.j						-0.059		
						(0.290)		
ROW imp. penet.t-1 × L. int.j						-0.093		
						(0.476)		
Chinese imp. penet.t-1 × Manuf.s							-0.012	
							(0.016)	
ROW imp. penet.t-1 × Manuf.s							-0.020***	
							(0.008)	
Chinese imp. penet.t-1 × Coastals								-0.012**
								(0.005)
ROW imp. penet.t-1 × Coastals								-0.001
								(0.001)
Endogeneity test	0.806	1.856	2.996	2.637	6.499	5.127	5.302	6.086
	[0.369]	[0.395]	[0.224]	[0.267]	[0.165]	[0.274]	[0.258]	[0.193]

Notes: Number of observations: 669,9664. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the industry level. Sample weights from PNAD/Census used. Workers' observable characteristics; and state-industry, and year fixed effects included in the estimated model. The excluded instruments used in all IV estimates are China's share of imports in Latin American countries and the high-income countries' share of imports in Latin American countries.

TABLE 30. WORKER-LEVEL OLS ESTIMATES OF THE EFFECTS OF STATE-INDUSTRY IMPORT PENETRATION ON THE LOG (HOURLY WAGE) USING EQUATION (5)

Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chinese import penetrationt-1	-0.006	0.000	-0.011	-0.013	0.015	0.004	-0.010	-0.037
	(0.017)	(0.021)	(0.024)	(0.017)	(0.028)	(0.042)	(0.018)	(0.066)
ROW import penetrationt-1	0.742***	0.748***	0.139	0.769***	-0.089	0.091	0.686***	0.861***
	(0.102)	(0.101)	(0.249)	(0.109)	(0.186)	(0.222)	(0.186)	(0.226)
Chinese market share abroadt-1		-0.001						
		(0.002)						
Effective applied tarifft-1			0.004					
			(0.003)					
Upstream Chinese imp. penet.t-1				-0.015**				
				(0.006)				
Upstream ROW imp. penet.t-1				-0.004**				
				(0.002)				
Chinese imp. penet.t-1 × NMEt					-0.023			
					(0.304)			
ROW imp. penet.t-1 × NMEt					0.844***			
					(0.240)			
Chinese imp. penet.t-1 × L. int.j						-0.050		
						(0.481)		
ROW imp. penet.t-1 × L. int.j						0.932***		
						(0.198)		
Chinese imp. penet.t-1 × Manuf.s							0.062	
							(0.119)	
ROW imp. penet.t-1 × Manuf.s							0.057	
							(0.184)	
Chinese imp. penet.t-1 × Coastals								0.004
								(0.074)
ROW imp. penet.t-1 × Coastals								-0.159
								(0.289)

Notes: Number of observations: 669,9664. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the industry level. Sample weights from PNAD/Census used. Workers' observable characteristics; and state, industry, and year fixed effects included in the estimated model.

TABLE 31. WORKER-LEVEL OLS ESTIMATES OF THE EFFECTS OF STATE-INDUSTRY-LEVEL IMPORT PENETRATION ON THE INFORMAL EMPLOYMENT STATUS INDICATOR USING EQUATION (5)

Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chinese import penetrationt-1	-0.028	-0.033**	-0.028	-0.030	0.188**	0.013	-0.036*	-0.029
	(0.204)	(0.014)	(0.036)	(0.019)	(0.081)	(0.050)	(0.019)	(0.038)
ROW import penetrationt-1	0.167**	0.163**	0.278	0.164**	-0.137	0.141	0.459*	0.252**
	(0.074)	(0.072)	(0.188)	(0.077)	(0.184)	(0.091)	(0.229)	(0.107)
Chinese market share abroadt-1		0.001						
		(0.002)						
Effective applied tarifft-1			-0.017***					
			(0.004)					
Upstream Chinese imp. penet.t-1				0.010				
				(0.008)				
Upstream ROW imp. penet.t-1				-0.000				
				(0.002)				
Chinese imp. penet.t-1 × NMEt					-0.224**			
					(0.091)			
ROW imp. penet.t-1 × NMEt					0.314			
					(0.184)			
Chinese imp. penet.t-1 × L. int.j						-0.046		
						(0.052)		
ROW imp. penet.t-1 × L. int.j						0.037		
						(0.103)		
Chinese imp. penet.t-1 × Manuf.s							-0.062	
							(0.062)	
ROW imp. penet.t-1 × Manuf.s							-0.380	
							(0.241)	
Chinese imp. penet.t-1 × Coastals								0.002
								(0.031)
ROW imp. penet.t-1 × Coastals								-0.113
								(0.145)

Notes: Number of observations: 669,9664. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the industry level. Sample weights from PNAD/Census used. Workers' observable characteristics; and state, industry, and year fixed effects included in the estimated model.

TABLE 32. WORKER-LEVEL IV ESTIMATES OF THE EFFECTS OF STATE-INDUSTRY-LEVEL IMPORT PENETRATION ON THE LOG (HOURLY WAGE) USING EQUATION (5)

Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chinese import penetrationt-1	2.430	2.043	0.731	2.402	1.462	0.173	0.896	5.281
	(2.008)	(1.597)	(0.582)	(1.780)	(2.836)	(0.121)	(1.049)	(4.216)
ROW import penetrationt-1	-0.021	-1.512	-3.619*	-1.229	-2.341	-1.102	1.962	-1.272
	(2.657)	(2.793)	(2.112)	(1.856)	(4.113)	(3.418)	(1.698)	(2.432)
Chinese market share abroadt-1		-0.009**						
		(0.005)						
Effective applied tarifft-1			0.004					
			(0.004)					
Upstream Chinese imp. penet.t-1				-0.025				
				(0.016)				
Upstream ROW imp. penet.t-1				0.005				
				(0.006)				
Chinese imp. penet.t-1 × NMEt					-1.475			
					(2.898)			
ROW imp. penet.t-1 × NMEt					2.387			
					(4.175)			
Chinese imp. penet.t-1 × L. int.j						-0.184		
						(0.120)		
ROW imp. penet.t-1 × L. int.j						0.052*		
						(0.027)		
Chinese imp. penet.t-1 × Manuf.s							3.360	
							(3.487)	
ROW imp. penet.t-1 × Manuf.s							-1.807	
							(2.986)	
Chinese imp. penet.t-1 × Coastals								-3.864
								(4.013)
ROW imp. penet.t-1 × Coastals								2.022
								(3.414)
Endogeneity test	3.671*	6.680**	5.026*	5.920*	10.08**	7.926*	6.859	7.511
	[0.0554]	[0.035]	[0.081]	[0.052]	[0.039]	[0.094]	[0.144]	[0.111]

Notes: Number of observations: 669,9664. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the industry level. Sample weights from PNAD/Census used. Workers' observable characteristics; and state, industry, and year fixed effects included in the estimated model. The excluded instruments used in all IV estimates are the state-industry level Chinese share of imports in Latin American countries and the state-industry level high-income countries' share of imports in Latin American countries.

TABLE 33. WORKER-LEVEL IV ESTIMATES OF THE EFFECTS OF STATE-INDUSTRY-LEVEL IMPORT PENETRATION ON THE INFORMAL EMPLOYMENT STATUS INDICATOR USING EQUATION (5)

Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chinese import penetrationt-1	-0.622	-0.524	-0.299	-0.579	-0.444	-7.386	-0.301	-0.759
	(0.854)	(0.731)	(0.246)	(0.695)	(1.258)	(7.727)	(0.633)	(1.205)
ROW import penetrationt-1	1.040	1.419	-0.740	1.452	0.703	1.899	-0.605	0.039
	(1.373)	(1.674)	(1.359)	(0.962)	(1.948)	(1.822)	(1.028)	(0.872)
Chinese market share abroadt-1		0.002						
		(0.003)						
Effective applied tarifft-1			-0.019***					
			(0.004)					
Upstream Chinese imp. penet.t-1				0.011				
				(0.007)				
Upstream ROW imp. penet.t-1				-0.003				
				(0.004)				
Chinese imp. penet.t-1 × NMEt					0.449			
					(1.286)			
ROW imp. penet.t-1 × NMEt					-0.706			
					(1.977)			
Chinese imp. penet.t-1 × L. int.j						7.599		
						(7.278)		
ROW imp. penet.t-1 × L. int.j						-1.588		
						(1.259)		
Chinese imp. penet.t-1 × Manuf.s							-1.411	
							(1.777)	
ROW imp. penet.t-1 × Manuf.s							2.832**	
							(1.360)	
Chinese imp. penet.t-1 × Coastals								0.119
								(1.109)
ROW imp. penet.t-1 × Coastals								1.309
								(1.168)
Endogeneity test	0.669	0.610	1.350	1.980	1.941	5.015	3.801	5.885
	[0.414]	[0.737]	[0.509]	[0.372]	[0.747]	[0.286]	[0.434]	[0.208]

Notes: Number of observations: 669,9664. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the industry level. Sample weights from PNAD/Census used. Workers' observable characteristics; and state, industry, and year fixed effects included in the estimated model. The excluded instruments used in all IV estimates are the state-industry level Chinese share of imports in Latin American countries and the state-industry level high-income countries' share of imports in Latin American countries.

TABLE 34. STATE-LEVEL OLS ESTIMATES OF THE EFFECTS OF IMPORTS ON LABOR-MARKET OUTCOMES USING EQUATION (6)

Regressors	(1) Log (employment level)	(2) Share of emp. in the population (%)	(3) Emp. share of manuf.	(4) Log (hourly wage)	(5) Informal share	(6) Years of schooling	(7) High-school share	(8) College share
Panel A. Calculated imports								
Chinese imports per worker	0.054*	-0.001	0.012	0.158*	0.923	0.091	3.975	-0.912
	(0.027)	(0.002)	(0.028)	(0.087)	(4.967)	(0.169)	(4.836)	(0.986)
ROW imports per worker	-0.001	0.000	0.008	-0.052	-0.785	0.019	-0.961	0.174
	(0.004)	(0.001)	(0.009)	(0.039)	(1.499)	(0.041)	(1.054)	(0.221)
Panel B.								
Chinese imports per firm	0.004**	-0.000	0.002	0.004	-0.264	0.017***	0.047	-0.077
	(0.002)	(0.000)	(0.001)	(0.004)	(0.379)	(0.005)	(0.131)	(0.062)
ROW imports per firm	0.000***	0.000	-0.000	0.001**	-0.044***	-0.003***	-0.038***	-0.005**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.015)	(0.000)	(0.007)	(0.002)
Panel C Actual								
Chinese imports per worker	-0.006	-0.000	-0.000	0.001	-3.885**	0.027	-1.975**	-0.227
	(0.005)	(0.000)	(0.002)	(0.011)	(1.444)	(0.022)	(0.831)	(0.159)
ROW imports per worker	0.001*	-0.000	0.000	-0.005*	0.419**	-0.003	0.107**	0.007
	(0.000)	(0.000)	(0.000)	(0.003)	(0.171)	(0.003)	(0.045)	(0.045)
Panel D.								
Chinese imports per firm	-0.000	0.000	0.000	0.001	-0.087*	0.001*	-0.037**	-0.002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.044)	(0.001)	(0.017)	(0.006)
ROW imports per firm	0.000*	0.000	0.000	-0.000	0.031**	-0.000	0.012**	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.015)	(0.000)	(0.005)	(0.003)

Notes: imports in US$1,000 per worker. Number of observations: 351. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. All variables are in their first difference. Year fixed effects included in the specification. Standard errors clustered at the state level. Regressions are weighted by the inverse of the number of observations used to compute the state-level variable.

TABLE 35. STATE-LEVEL IV ESTIMATES OF THE EFFECTS OF IMPORTS ON LABOR-MARKET OUTCOMES USING EQUATION (6)

Regressors	(1) Log (employment level)	(2) Share of emp. in the population (%)	(3) Emp. share of manuf.	(4) Log (hourly wage)	(5) Informal share	(6) Years of schooling	(7) High-school share	(8) College share
Panel A. Calculated imports								
Chinese imports per worker	0.011	-0.004	-0.041	0.114	-1.742	-0.337	-3.656	-1.446
	(0.029)	(0.003)	(0.041)	(0.079)	(2.876)	(0.220)	(2.232)	(1.018)
ROW imports per worker	0.007	0.000	0.016	-0.031	-1.015	0.103**	0.350	0.155
	(0.006)	(0.001)	(0.013)	(0.036)	(1.349)	(0.045)	(0.905)	(0.198)
Panel B.								
Chinese imports per firm	0.006	-0.000	0.002	0.002	-1.164	0.011	-0.485*	-0.090
	(0.004)	(0.000)	(0.002)	(0.004)	(0.817)	(0.010)	(0.282)	(0.084)
ROW imports per firm	0.000*	0.000	-0.000	0.001**	0.037	-0.003**	0.005	-0.005**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.040)	(0.001)	(0.021)	(0.003)
Panel C Actual								
Chinese imports per worker	-0.004	-0.002	-0.036	0.085	0.506	-0.266	-1.958	-0.794
	(0.021)	(0.002)	(0.046)	(0.073)	(2.839)	(0.185)	(1.927)	(0.602)
ROW imports per worker	0.005	0.000	0.010	-0.019	-0.699	0.064	0.186	0.084
	(0.005)	(0.000)	(0.011)	(0.029)	(0.802)	(0.047)	(0.704)	(0.152)
Panel D.								
Chinese imports per firm	0.009***	0.000	0.001**	0.022*	-0.196	-0.043***	-0.278	-0.178***
	(0.002)	(0.000)	(0.001)	(0.011)	(0.520)	(0.012)	(0.293)	(0.061)
ROW imports per firm	-0.004***	-0.000	-0.000*	-0.010*	0.024	0.020***	0.097	0.074***
	(0.001)	(0.000)	(0.000)	(0.005)	(0.216)	(0.005)	(0.118)	(0.022)

Notes: imports in US$1,000 per worker. Number of observations: 351. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. All variables are in their first difference. Year fixed effects included in the specification. Standard errors clustered at the state level. Regressions are weighted by the inverse of the number of observations used to compute the state-level variable. The excluded instruments used in all IV estimates are the first difference of the state-level Chinese share of imports in Latin American countries and of the state-level high-income countries' share of imports in Latin American countries.

TABLE 36. STATE-LEVEL OLS ESTIMATES OF THE EFFECTS OF IMPORTS ON LABOR-MARKET OUTCOMES USING EQUATION (6)

Regressors	Log (employment level)	Share of emp. in the population (%)	Emp. share of manuf.	Log (hourly wage)	Informal share	Years of schooling	High-school share	College share
Panel A. Calculated imports	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chinese imports per worker	0.034	-0.003	0.029	0.330*	-6.514***	-0.052	-0.176	-0.706
	(0.038)	(0.003)	(0.029)	(0.182)	(0.913)	(0.162)	(2.578)	(0.925)
Chinese imports per worker × NMEt	0.030	0.002	-0.042	-0.453	18.849**	0.349	10.409	-0.137
	(0.111)	(0.003)	(0.025)	(0.318)	(9.033)	(0.391)	(10.895)	(0.911)
ROW imports per worker	-0.004	-0.000	0.004	-0.110*	1.391***	0.055	0.201	0.293
	(0.006)	(0.000)	(0.008)	(0.056)	(0.478)	(0.041)	(0.512)	(0.273)
ROW imports per worker × NMEt	0.011	0.002***	0.011	0.163**	-5.972**	-0.097	-3.181	-0.355
	(0.016)	(0.000)	(0.008)	(0.078)	(2.735)	(0.071)	(1.936)	(0.273)
Panel B.								
Chinese imports per firm	0.002	-0.001	0.003	0.015	-0.157	0.017	-0.108	-0.061
	(0.005)	(0.001)	(0.004)	(0.027)	(0.154)	(0.014)	(0.188)	(0.052)
Chinese imports per firm × NMEt	0.002	0.001	-0.001	-0.013	-0.162	-0.001	0.145	-0.053
	(0.006)	(0.001)	(0.003)	(0.027)	(0.425)	(0.017)	(0.213)	(0.049)
ROW imports per firm	0.001	0.000	0.000	-0.003	-0.028	-0.001	0.029	0.026*
	(0.001)	(0.000)	(0.001)	(0.007)	(0.073)	(0.003)	(0.025)	(0.015)
ROW imports per firm × NMEt	-0.001	-0.000	-0.000	0.004	-0.015	-0.002	-0.070***	-0.031**
	(0.001)	(0.000)	(0.001)	(0.007)	(0.073)	(0.003)	(0.024)	(0.014)
Panel C Actual								
Chinese imports per worker	-0.023	-0.001	-0.005	-0.032	-0.456	0.040	0.147	-0.117
	(0.022)	(0.001)	(0.006)	(0.022)	(0.417)	(0.039)	(0.500)	(0.192)
Chinese imports per worker × NMEt	0.022	0.001	0.006	0.042	-4.324**	-0.016	-2.668***	-0.137
	(0.020)	(0.001)	(0.006)	(0.025)	(2.017)	(0.039)	(0.791)	(0.145)
ROW imports per worker	0.002	-0.000	-0.000	-0.001	-0.045	-0.005	-0.049	0.016
	(0.002)	(0.000)	(0.001)	(0.005)	(0.069)	(0.006)	(0.122)	(0.055)
ROW imports per worker × NMEt	-0.002	0.000	0.000	-0.006	0.667**	0.002	0.220	-0.014
	(0.003)	(0.000)	(0.001)	(0.005)	(0.300)	(0.010)	(0.163)	(0.020)
Panel D.								
Chinese imports per firm	-0.000	-0.000	0.000	0.000	-0.005	0.001	0.011	-0.002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.009)	(0.001)	(0.014)	(0.007)
Chinese imports per firm × NMEt	0.000	0.000	-0.000	0.001	-0.116*	-0.000	-0.070***	-0.001
	(0.000)	(0.000)	(0.000)	(0.001)	(0.063)	(0.001)	(0.024)	(0.003)
ROW imports per firm	0.000	-0.000	0.000	-0.000	-0.005	-0.000	-0.002	0.002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)	(0.000)	(0.008)	(0.004)
ROW imports per firm × NMEt	-0.000	0.000	-0.000	-0.000	0.054**	-0.000	0.020*	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.025)	(0.001)	(0.010)	(0.001)

Notes: imports in US$1,000 per worker. Number of observations:351. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Year, fixed effects included in the specification. Standard errors clustered at the state level.

TABLE 37. STATE-LEVEL OLS ESTIMATES OF THE EFFECTS OF IMPORTS ON LABOR-MARKET OUTCOMES USING EQUATION (6)

Regressors	Log (employment level)	Share of emp. in the population (%)	Emp. share of manuf.	Log (hourly wage)	Informal share	Years of schooling	High-school share	College share
Panel A. Calculated imports	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chinese imports per worker	-0.005	-0.012*	-0.069	0.220	-6.580***	-0.253	0.422	-0.732
	(0.065)	(0.006)	(0.062)	(0.145)	(1.709)	(0.348)	(2.605)	(0.828)
Chinese imports per worker × NMEt	0.009	0.011	0.041	-0.239	10.761*	-0.165	-7.071	-1.099
	(0.115)	(0.007)	(0.057)	(0.173)	(5.755)	(0.331)	(5.287)	(1.102)
ROW imports per worker	-0.008	-0.001	0.012	-0.083*	1.287***	0.080	0.048	0.216
	(0.010)	(0.001)	(0.016)	(0.049)	(0.372)	(0.061)	(0.547)	(0.221)
ROW imports per worker × NMEt	0.035	0.002**	0.010	0.121**	-5.343**	0.051	0.680	-0.146
	(0.022)	(0.001)	(0.017)	(0.057)	(2.460)	(0.110)	(2.037)	(0.274)
Panel B.								
Chinese imports per firm	0.004	-0.001	0.004	-0.028*	-0.792***	0.042***	0.234	0.243***
	(0.005)	(0.001)	(0.005)	(0.017)	(0.247)	(0.016)	(0.321)	(0.084)
Chinese imports per firm × NMEt	0.003	0.001	-0.003	0.033*	-0.613	-0.039	-0.958***	-0.457**
	(0.006)	(0.001)	(0.004)	(0.018)	(0.981)	(0.025)	(0.331)	(0.196)
ROW imports per firm	0.001	0.000	-0.000	0.020	0.104	-0.015	-0.207	-0.086**
	(0.002)	(0.000)	(0.001)	(0.013)	(0.073)	(0.011)	(0.130)	(0.044)
ROW imports per firm × NMEt	-0.000	-0.000	0.000	-0.020	-0.062	0.013	0.228*	0.087*
	(0.002)	(0.000)	(0.001)	(0.013)	(0.090)	(0.010)	(0.124)	(0.045)
Panel C Actual								
Chinese imports per worker	0.021	-0.003	-0.069	0.362	-7.144**	-0.370	0.054	-1.019
	(0.055)	(0.004)	(0.081)	(0.276)	(3.155)	(0.380)	(2.739)	(1.168)
Chinese imports per worker × NMEt	-0.033	0.002	0.047	-0.388	10.770**	0.144	-2.966	0.282
	(0.066)	(0.004)	(0.058)	(0.282)	(4.658)	(0.313)	(3.540)	(1.034)
ROW imports per worker	-0.011	-0.001	0.014	-0.108	1.585	0.104	0.081	0.277
	(0.015)	(0.001)	(0.018)	(0.107)	(1.706)	(0.097)	(0.715)	(0.350)
ROW imports per worker × NMEt	0.021	0.002	-0.006	0.123	-3.155	-0.055	0.160	-0.263
	(0.020)	(0.002)	(0.012)	(0.107)	(2.184)	(0.090)	(0.976)	(0.299)
Panel D.								
Chinese imports per firm	0.006	0.000	0.002	0.112	0.273	-0.073	-1.197	-0.424
	(0.010)	(0.000)	(0.004)	(0.163)	(0.706)	(0.122)	(1.839)	(0.606)
Chinese imports per firm × NMEt	0.003	-0.000	-0.001	-0.103	-0.566	0.035	1.035	0.277
	(0.010)	(0.000)	(0.004)	(0.163)	(0.402)	(0.139)	(1.959)	(0.631)
ROW imports per firm	-0.002	-0.000	-0.001	-0.046	-0.141	0.031	0.489	0.180
	(0.004)	(0.000)	(0.002)	(0.066)	(0.295)	(0.049)	(0.745)	(0.251)
ROW imports per firm × NMEt	-0.001	0.000	0.000	0.042	0.190	-0.013	-0.459	-0.124
	(0.004)	(0.000)	(0.002)	(0.066)	(0.214)	(0.055)	(0.820)	(0.264)

Notes: imports in US$1,000 per worker. Number of observations: 351. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. All variables are in their first difference. Year fixed effects included in the specification. Standard errors clustered at the state level. Regressions are weighted by the inverse of the number of observations used to compute the state-level variable. The excluded instruments used in all IV estimates are the first difference of the state-level Chinese share of imports in Latin American countries and of the state-level high-income countries' share of imports in Latin American countries.