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Reference: Paz, Lourenço Senne (2022). Does age modulate the impact of import competition on job type?. In: Economics and Business Letters 11 (4), S. 161 - 171.
<https://reunido.uniovi.es/index.php/EBL/article/download/17717/15448/54675>.
doi:10.17811/ebl.11.4.2022.161-171.

This Version is available at:

<http://hdl.handle.net/11159/12755>

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Does age modulate the impact of import competition on job type?

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Received: 5 February 2022

Revised: 3 September 2022

Accepted: 6 September 2022

Abstract

This study investigates the effects of the 2000–2012 increase in import competition in the Brazilian economy on the type of manufacturing jobs available to different age groups. These effects are assessed using a multinomial logit model and household survey data that cover formal, informal, and self-employed workers. The empirical estimates indicate that an increase in the Chinese or in the rest of the world import penetrations expand self-employment only among young workers. Larger Chinese imports reduce self-employment for middle-aged workers. In contrast, greater imports from elsewhere increase informality across all age groups, though the magnitude is decreasing in age. These estimates are robust to endogeneity concerns through the use of a control function approach.

Keywords: Brazil; China; Globalization; Informal employment; Self-employment

JEL Classification Codes: F14, F16

1. Introduction

The reduction in job-related benefits and compliance with labor regulations concurrently with increased import competition has attracted the attention of scholars and policymakers. This job precarization typically means the replacement of formal jobs—those covered by labor regulations—by either self-employment or informal jobs. While the latter does not comply with labor regulations, the former albeit legal does not shield workers from income volatility (Fields, 2020). According to Sehnbruch et al. (2020), precarization is commonplace in Latin America. For example, the minority of Mexican workers are formal (Conover et al., 2021), while approximately half of the workers are formal in Brazil (Paz, 2018). Additionally, population ageing in these countries may also aggravate precarization because age is an important determinant of workers' job type (Simoes et al., 2016).

The case of Brazil is emblematic because of its large share of workers with precarious jobs. The share of formal jobs in manufacturing grew from 52 to 67 percent between 2000 and 2012, while the share of informal jobs declined from 19 to 12 percent and the share of self-employment fell from 29 to 21 percent. Interestingly, the share of informality decreased by 40 percent among younger workers, whereas it fell by just 30 percent for elder workers. While the

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Citation: Paz, L. (2022) Does age modulate the impact of import competition on job type?, *Economics and Business Letters*, 11(4), 161-171.

DOI: 10.17811/eb1.11.4.2022.161-171

share of self-employment declined by 30 percent for young workers, it grew by five percent for elder workers. Simultaneously, Brazilian manufacturing experienced greater import competition in this period. Its import penetration increased by 25 percent and the share of Chinese imports went from three to twenty percent (Kapri and Paz, 2019). In light of the ubiquitous job precarization, increased economic openness in developing countries and the mixed evidence in the extant literature (Dávalos, 2019), it is important to examine if the greater import competition experience in Brazil resulted in this considerable age-heterogeneous formalization of its labor force.

This study uses 2000–2012 Brazilian household survey data and a discrete-choice econometric specification to estimate the effects of import competition on the worker-level likelihood of holding different job types, and how these effects are modulated by the worker's age and by the source of the imports. It is related to the literature on the empirical effects of trade on job informality in Brazil—like Paz (2014), Costa et al. (2016), and Dix-Carneiro et al. (2021)—and to recent studies that uncovered that informality and self-employment are related phenomena and are differentially affected by trade (Paz, 2021, and Almeida et al., 2022). It is also linked to studies on the unequal impact of import competition according to the source of imports (Facchini et al., 2010 and Kapri and Paz, 2019) and to studies on ageism and job type (Simoes et al. 2016).

The empirical estimates indicate that the relationship between import competition and job type are indeed moderated by the source of the imports and is heterogeneous across age groups. An increase in the Chinese or in the rest of the world import penetrations expand self-employment among young workers. Larger Chinese imports reduce self-employment for middle-aged workers and is not related to the likelihood of holding an informal job in any age group. In contrast, imports from the rest of the world increase informality across all age groups, though its magnitude is decreasing in age.

2. Methods

The effect of import competition on the types of jobs available is ambiguous in the theoretical literature. In Paz's (2014) model, tougher competition makes the smallest firms—which typically employ informal workers—unprofitable and leads them to exit the market. There are also some firms that were previously indifferent between hiring either formal or informal workers. These firms switch to informal employment due to the increased import competition. This means that the overall effect of import competition on informality is ambiguous. This mechanism and its implications should also apply to self-employment, since it is an additional margin of adjustment for import competition (Almeida et al., 2022).

The literature regarding the relationship between age and job type has examined self-employment and informal employment separately. From a theoretical perspective, Lévesque and Minniti (2006) suggested that elder workers are more likely to be self-employed because (i) they would possess more social, financial, and human capital that would increase their earnings of transitioning to self-employment; (ii) proclivity towards flexible employment arrangements due to family or health limitations (Cahill et al, 2013) or to postpone their exit of the labor force (Van Solinge, 2014). Nevertheless, Dunn and Holtz-Eakin (2000) and Blanchflower (2004) show some evidence that self-employment becomes less interesting for elderly workers because of higher risk aversion (Moulton and Scott, 2016) and declining mental and physical ability (Coduras et al., 2018, Mulders, 2020). The empirical literature on informal employment indicates it is more prevalent among young workers (Paz, 2014) and is considered by many observers as an entry door to labor markets (Maurizio, 2015). That is, after accumulating some experience, these young workers would then transition to a formal job.

In light of these remarks, the effects of import competition on the type of jobs available are an important empirical matter, especially because it may differ according to the worker's age group. The methodology developed here to assess these effects utilizes an unordered multinomial logit of the worker's type of job that is estimated using data for three age groups, namely 15–29, 30–50, and 50–65 years of age as commonly defined in the literature. Let Y_{ijst} represent the type of job held by worker i in industry j in state s and year t . The job types are formal ($o=0$, base outcome), informal ($o=1$), or self-employment ($o=2$). Import competition is measured by the industry-level import penetration. According to Paz (2019), imports from China should be treated separately from those of the ROW for two reasons. First, Facchini et al. (2010) find that Chinese goods are more immediate substitutes of Brazilian goods than those imported from ROW. Second, while Brazil can be considered labor-abundant relative to the ROW, it is labor-scarce relative to China. This suggests that the effects of imports vary according to the source country. Hence, the industry-level import penetration is decomposed into Chinese ($IMP_{j,t}^{China}$) and ROW ($IMP_{j,t}^{ROW}$) import penetrations. The empirical specification is depicted by Eq. 1:

$$P(Y_{ijst} = 0) = \frac{1}{1+e^{y_{ijst,1}^*}+e^{y_{ijst,2}^*}} \text{ and } P(Y_{ijst} = o) = \frac{e^{y_{ijst,o}^*}}{1+e^{y_{ijst,1}^*}+e^{y_{ijst,2}^*}}, o = 1, 2 \quad (1)$$

where $y_{ijst,o}^* = \alpha_o + \beta_{1,o}IMP_{jt}^{China} + \beta_{2,o}IMP_{jt}^{ROW} + \Psi_o Charact_{ijst} + \mu_{j,o} + \sigma_{s,o} + \tau_{t,o}$; $Charact_{ijst}$ is a vector of worker's characteristics: age and age²/100; indicators for female, married, black; years of education; high school degree; and college degree; μ_j , σ_s , and τ_t are industry, state-of-residence, and year effects, respectively.

A common concern in empirical studies is the existence of omitted factors affecting both the outcome and the import penetrations, which would lead to biased estimates. For example, an unanticipated surge in imports that is offset by Brazilian government-imposed safeguards, like anti-dumping duties. According to the WTO Antidumping Gateway, of the approximately 100 antidumping procedures initiated in this period in Brazil, about a quarter of them were against Chinese firms. This econometric issue in the multinomial logit model is tackled with the control function approach from Liu et al. (2010), in which identification hinges on the excluded instruments being correlated with the endogenous regressors and not correlated with the error of the multinomial logit specification. The first step of this approach is the estimation of the residuals of ordinary least squares (OLS) regressions of the endogenous regressors on the excluded instruments and on the other control variables from equation (1). In the second step, these estimated residuals are included into equation (1) as additional control variables. These new regressors will control for the previously ignored correlation between the error term and the endogenous regressors.

The choice of the excluded instruments follows Iacovone et al.'s (2013) reasoning that there are supply-driven components of source countries that are uncorrelated with the Brazilian demand for imports. And this supply-driven components also impacts imports of countries similar to Brazil. In this vein, an excluded instrument for the Chinese import penetration in Brazil is the Chinese share of imports of Latin American countries with small trade ties with Brazil, as shown in Table 1. The simple correlation between the Chinese import penetration and this excluded instrument is 0.574. Comparably, an excluded instrument for the ROW import penetration is the share of the imports of those Latin American countries sourced in rich countries, as listed in Table 1. The simple correlation between the ROW import penetration and this excluded instrument is 0.299.

Table 1. Industry-level international trade descriptive statistics.

| Variable/Period | Mean | Std. Dev. | Minimum | Maximum |
|--|--------|-----------|---------|---------|
| <i>2000</i> | | | | |
| Chinese import penetration | .288 | .453 | 0 | 2.066 |
| ROW import penetration | 14.211 | 13.846 | 0 | 55.636 |
| LA share of imports from China | .021 | .027 | 0 | .123 |
| LA share of imports from high income countries | .761 | .118 | .547 | .973 |
| <i>2012</i> | | | | |
| Chinese import penetration | 2.83 | 3.613 | 0 | 18.219 |
| ROW import penetration | 13.735 | 10.717 | .907 | 32.863 |
| LA share of imports from China | .124 | .118 | 0 | .438 |
| LA share of imports from high income countries | .572 | .161 | .282 | .859 |
| <i>Change 2000-2012</i> | | | | |
| Chinese import penetration | 2.542 | 3.229 | 0 | 16.152 |
| ROW import penetration | -.476 | 5.909 | -22.773 | 6.391 |
| LA share of imports from China | .104 | .098 | -.018 | .361 |
| LA share of imports from high income countries | -.189 | .131 | -.447 | .116 |

Source: Author's calculations from United Nations (2003) and IBGE (2015). Notes: Number of observations in 2000 is 26 and in 2012 is 26. ROW means the countries in the rest of the world, that is, except for China. LA means Latin American countries, namely Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Jamaica, Mexico, Nicaragua, Panama, and Peru. The high-income countries 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.

3. Data

The data used in this study comprise international trade flows, Brazilian national accounts and household surveys. The international bilateral trade data were extracted at the 1996 six-digit harmonized system from Comtrade (United Nations, 2003) for 2000–2012. They encompass the imports of Brazil and other Latin American countries from China and from the remaining countries of the world (hereafter called ROW). The Brazilian national accounts data on total output level, imports and exports in local currency come from IBGE (2015). They are utilized in the calculation of the industry-level import penetration. The ROW (Chinese) import penetration is the ratio between imports from ROW (China) and apparent consumption, which is defined as production plus total imports minus total exports.

The Brazilian household survey (PNAD-Pesquisa Nacional por Amostra de Domicílios) and the demographic censuses of 2000 and 2010 provide worker-level data on demographic characteristics, industry affiliation, self-employment or wage employment, and job formality status. The different industry classifications used by each data source are harmonized using correspondence tables from CONCLA-IBGE (<https://concla.ibge.gov.br/>). This harmonization results in 26 manufacturing industries.

Turning to the descriptive statistics, the manufacturing import penetration increased in excess of 20 percent in 16 of the 26 manufacturing industries. The Chinese import penetration grew in 24 industries. This export boom resulted from China's increased access to foreign markets since its accession to the World Trade Organization in 2001 (Paz, 2018). Table 1 presents the summary statistics of the industry level Chinese and ROW import penetrations. We can see a substantial variability in these series at the industry level, with some industries having a 30 percent import penetration, while others almost no penetration. The average ROW import penetration slightly declined between 2000 and 2012, which was more than offset by the increase in the Chinese import penetration.

Table 2. Workers' descriptive statistics according to age group.

| Variable | Mean | Std. Dev. | Minimum | Maximum |
|--------------------|--------|-----------|---------|---------|
| <i>Age 15-29</i> | | | | |
| Age | 23.066 | 3.776 | 15 | 29 |
| Female | .305 | .461 | 0 | 1 |
| Married | .376 | .484 | 0 | 1 |
| Black | .063 | .242 | 0 | 1 |
| Years of school | 8.258 | 3.267 | 0 | 19 |
| High school degree | .247 | .431 | 0 | 1 |
| College degree | .021 | .142 | 0 | 1 |
| Informal | .216 | .411 | 0 | 1 |
| Self-employed | .078 | .269 | 0 | 1 |
| <i>Age 30-50</i> | | | | |
| Age | 38.605 | 5.864 | 30 | 50 |
| Female | .354 | .478 | 0 | 1 |
| Married | .707 | .455 | 0 | 1 |
| Black | .067 | .249 | 0 | 1 |
| Years of school | 7.091 | 3.889 | 0 | 19 |
| High school degree | .21 | .407 | 0 | 1 |
| College degree | .04 | .196 | 0 | 1 |
| Informal | .13 | .336 | 0 | 1 |
| Self-employed | .2 | .4 | 0 | 1 |
| <i>Age 51-65</i> | | | | |
| Age | 55.04 | 3.196 | 51 | 65 |
| Female | .405 | .491 | 0 | 1 |
| Married | .659 | .474 | 0 | 1 |
| Black | .066 | .248 | 0 | 1 |
| Years of school | 5.455 | 4.008 | 0 | 19 |
| High school degree | .134 | .341 | 0 | 1 |
| College degree | .031 | .172 | 0 | 1 |
| Informal | .137 | .344 | 0 | 1 |
| Self-employed | .417 | .493 | 0 | 1 |

Source: Author's calculations from IBGE's PNAD and censuses. Notes: Number of observations is 475, 515 for 15-29 years of age, 633,622 for 30-50 years of age, and 96,893 for 51-65 years of age. Variables other than age and years of school are presented as shares, where 0.305 means 30.5% for instance.

Table 2 shows the descriptive statistics of the workers' characteristics by age group. Younger workers are more educated and likely to be informal, and less likely to be females, married, and self-employed. The middle-aged workers are more likely to be married and the least likely to be informal workers, while the elder workers are more likely to be females and self-employed. The analysis now turns to the presentation of the empirical results.

4. Results

The first step of the control function approach is the OLS regressions of the endogenous regressors on the excluded instruments and additional controls for each workers' age group. The odd numbered columns of Table 3 show the estimates for the Chinese import penetration and the even numbered columns for the ROW import penetration. The coefficients of the excluded instruments have similar magnitudes and signs in all columns. The Latin American countries' Chinese share of imports is statistically significant and positive in the regressions for the Chinese import penetration. The Latin American countries' high-income-country share of

imports is statistically significant in the ROW import penetration regressions. The estimated residuals of these regressions are used as the control function terms included in Eq. 1.

Table 4 reports the multinomial logit model estimates of Eq. 1 without the control function terms. The results for self-employment and informal job outcomes are in the odd- and even-numbered columns, respectively. The Chinese import penetration seems unrelated to informality, though it is associated with a smaller likelihood of self-employment, having a larger magnitude for middle-aged workers and smaller for young workers. In column (1), a percentage point increase in the Chinese import penetration reduces the likelihood of self-employment relative to formal employment by a factor of 0.968. A percentage point increase in ROW import penetration increases the likelihood of self-employment for the young workers by a factor of 1.018. The ROW import penetration is positively and significantly associated with a higher informal job likelihood for all age groups. Its coefficient is larger for young workers, and smaller for middle-aged workers. Married workers are more likely to be self-employed and less likely to be informally employed. The more educated the workers are, the less likely they are to hold either self- or informal employment. Female workers are more likely to be self- or informally employed across all age groups. These results are mostly in line with the findings of Paz (2014, 2021) for informality and of Abdieva et al. (2019) for self-employment. For younger workers, the coefficients for *age* and *age*² taken together support the labor market entry conjecture by Maurizio (2015), as the chances of holding an informal job or self-employment falls with age. Now, these coefficients for middle-aged workers suggests an increase in the likelihood of self-employment and a decline for informality, corroborating the entrepreneurial motive hypothesized in Lévesque and Minniti (2006). For elder workers, the signs of the estimated coefficients are similar to those of younger workers, albeit with a smaller magnitude. This means that this job type seems less interesting for elder workers as in Moulton and Scott (2016), Coduras et al. (2018), and Mulders (2020).

The estimates in Table 5 are based on Eq. 1 with the control function terms. Since these terms are generated regressors, their standard errors are estimated using a 500-repetition bootstrap following Liu et al. (2010). The control function terms for the Chinese import penetration are statistically significant, except for self-employment of middle-aged and elder workers. Also, its sign switches from negative for young workers to positive for the other two age groups. The residuals for the ROW import penetration are always significant and negative, except that it is positive for self-employment of middle-aged workers. These results indicate that estimates without the control function terms in Table 4 are plagued by omitted variable bias, and this bias still persist after using age-based subsamples.

The estimated coefficients of the workers' characteristics in Table 5 have identical signs and similar magnitudes to those in Table 4. The estimated coefficient for Chinese import penetration switched signs for young workers. It is positively and significantly related to self-employment likelihood. For the middle-aged workers, Chinese imports reduces the likelihood of both self- and informal employment, and shows no relation for elder workers. The ROW import penetration estimated coefficients that were positive are the same of those in Table 4 with no sign switches. This positive association increased in magnitude for the informal employment across all age groups, and for self-employment among young workers. And this correlation remained not significant for self-employment of the other age groups.

5. Concluding remarks

This study investigates the impacts of import competition on manufacturing job type according to the age of the workers in Brazil. It uses 2000-2012 household-level survey data and a multinomial logit model to account for the formal, informal, and self-employment job types.

Table 3. Control function OLS regressions.

| Regressors \ Dependent Variable | (1) Chinese imp. penetration | (2) ROW imp. penetration | (3) Chinese imp. penetration | (4) ROW imp. penetration | (5) Chinese imp. penetration | (6) ROW imp. penetration |
|---|------------------------------------|--------------------------------|------------------------------------|--------------------------------|------------------------------------|--------------------------------|
| <i>Latin American countries' Chinese share of imports</i> | 10.357*** (2.589) | -10.915** (4.601) | 11.533*** (2.938) | -11.161** (4.334) | 12.167*** (3.124) | -11.849*** (4.220) |
| <i>Latin American countries' high-income-country share of imports</i> | -4.115 (2.735) | -10.771* (5.869) | -2.762 (2.103) | -12.109** (5.048) | -2.274 (1.859) | -14.461*** (4.112) |
| Age | 0.006 (0.008) | -0.020* (0.011) | -0.013*** (0.005) | 0.002 (0.010) | 0.022 (0.026) | -0.028 (0.057) |
| Age ² /100 | -0.010 (0.015) | 0.033* (0.020) | 0.016*** (0.006) | -0.001 (0.011) | -0.019 (0.024) | 0.026 (0.052) |
| Female | -0.020 (0.015) | -0.021 (0.019) | -0.033* (0.018) | -0.020 (0.024) | -0.076** (0.034) | -0.015 (0.044) |
| Married | -0.012** (0.004) | 0.007 (0.007) | -0.000 (0.007) | 0.033*** (0.011) | -0.008 (0.011) | 0.030** (0.015) |
| Black | 0.009 (0.006) | -0.007 (0.010) | 0.003 (0.004) | -0.008 (0.008) | 0.027* (0.014) | -0.036* (0.020) |
| Years of schooling | 0.001 (0.001) | -0.001 (0.002) | 0.004** (0.002) | -0.003 (0.003) | 0.002 (0.002) | 0.001 (0.002) |
| High school | -0.086* (0.045) | 0.115* (0.060) | -0.098** (0.050) | 0.116 (0.072) | -0.071* (0.039) | 0.063 (0.056) |
| College | -0.022 (0.042) | 0.010 (0.071) | -0.068 (0.051) | -0.008 (0.079) | -0.123 (0.075) | 0.052 (0.126) |
| Sample by age range | 15-29 | 15-29 | 30-50 | 30-50 | 51-65 | 51-65 |
| F-statistics | 7640 | 2478 | 8658 | 2575 | 5442 | 1122 |
| R-squared | 0.812 | 0.966 | 0.825 | 0.966 | 0.862 | 0.963 |
| Observations | 475,415 | 475,415 | 533,622 | 533,622 | 96,893 | 96,893 |

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Constant, year, industry, and state fixed effects are included in the model. Standard errors clustered at the industry level. Household survey weights used.

Table 4. Multinomial Logit specification based on Eq. 1 without control function.

| Regressors \ Outcome | (1) Self-employment | (2) Informal job | (3) Self-employment | (4) Informal job | (5) Self-employment | (6) Informal job |
|--------------------------|------------------------|----------------------|------------------------|----------------------|------------------------|----------------------|
| Chinese imp. penetration | -0.033*** (0.006) | -0.001 (0.004) | -0.054*** (0.004) | -0.002 (0.004) | -0.044*** (0.009) | -0.002 (0.010) |
| ROW imp. penetration | 0.018*** (0.005) | 0.035*** (0.003) | 0.003 (0.003) | 0.025*** (0.003) | 0.010 (0.006) | 0.033*** (0.006) |
| Age | -0.911*** (0.020) | -1.104*** (0.012) | 0.056*** (0.010) | -0.041*** (0.011) | -0.196** (0.082) | -0.322*** (0.100) |
| Age ² /100 | 1.969*** (0.043) | 2.141*** (0.026) | 0.005 (0.012) | 0.058*** (0.014) | 0.263*** (0.073) | 0.338*** (0.090) |
| Female | 0.703*** (0.014) | 0.212*** (0.010) | 0.686*** (0.009) | 0.430*** (0.010) | 1.089*** (0.021) | 0.569*** (0.029) |
| Married | 0.342*** (0.012) | -0.095*** (0.010) | 0.299*** (0.009) | -0.120*** (0.010) | 0.234*** (0.020) | -0.039 (0.025) |
| Black | -0.287*** (0.024) | -0.071*** (0.016) | -0.330*** (0.017) | -0.094*** (0.018) | -0.336*** (0.034) | -0.193*** (0.042) |
| Years of schooling | -0.095*** (0.002) | -0.102*** (0.002) | -0.018*** (0.002) | -0.093*** (0.002) | 0.023*** (0.003) | -0.039*** (0.004) |
| High school | 0.108*** (0.020) | -0.121*** (0.014) | 0.053*** (0.015) | 0.012 (0.017) | 0.015 (0.036) | 0.180*** (0.049) |
| College | 0.118** (0.056) | 0.329*** (0.037) | -0.392*** (0.027) | 0.185*** (0.032) | -0.623*** (0.058) | -0.006 (0.072) |
| Sample | 15-29 | 15-29 | 30-50 | 30-50 | 51-65 | 51-65 |
| Log likelihood | -308297 | -308297 | -384423 | -384366 | -79753 | -79753 |
| Observations | 475,415 | 475,415 | 533,622 | 533,622 | 96,893 | 96,893 |

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Constant, year, industry, and state fixed effects are included in the model. Standard errors are clustered at the industry level. Household survey weights used

Table 5. Multinomial Logit specification based on Eq. 1 with control function.

| Regressors \ Outcome | (1) Self- employment | (2) Informal job | (3) Self- employment | (4) Informal job | (5) Self- employment | (6) Informal job |
|-----------------------------|-------------------------------------|---------------------------------|-------------------------------------|---------------------------------|-------------------------------------|---------------------------------|
| Chinese imp. penetration | 0.033*** (0.010) | 0.006 (0.006) | -0.032*** (0.007) | -0.035*** (0.007) | -0.017 (0.015) | -0.019 (0.018) |
| ROW imp. penetration | 0.057*** (0.016) | 0.215*** (0.012) | -0.012 (0.010) | 0.112*** (0.011) | -0.019 (0.017) | 0.084*** (0.023) |
| Age | -0.911*** (0.019) | -1.101*** (0.012) | 0.056*** (0.010) | -0.042*** (0.011) | -0.196** (0.084) | -0.321*** (0.102) |
| Age ² /100 | 1.969*** (0.040) | 2.137*** (0.027) | 0.005 (0.012) | 0.059*** (0.014) | 0.263*** (0.075) | 0.336*** (0.091) |
| Female | 0.706*** (0.013) | 0.224*** (0.010) | 0.684*** (0.010) | 0.435*** (0.011) | 1.088*** (0.022) | 0.570*** (0.030) |
| Married | 0.342*** (0.013) | -0.099*** (0.009) | 0.301*** (0.010) | -0.126*** (0.010) | 0.237*** (0.020) | -0.045* (0.024) |
| Black | -0.286*** (0.024) | -0.069*** (0.016) | -0.330*** (0.017) | -0.093*** (0.017) | -0.337*** (0.032) | -0.191*** (0.039) |
| Years of schooling | -0.095*** (0.002) | -0.102*** (0.002) | -0.018*** (0.001) | -0.093*** (0.002) | 0.023*** (0.003) | -0.039*** (0.004) |
| High school | 0.110*** (0.020) | -0.141*** (0.014) | 0.058*** (0.014) | -0.003 (0.018) | 0.019 (0.038) | 0.177*** (0.047) |
| College | 0.118** (0.056) | 0.329*** (0.043) | -0.391*** (0.029) | 0.183*** (0.030) | -0.618*** (0.060) | -0.013 (0.069) |
| Residual column (1) Table 3 | -0.122*** (0.013) | -0.034*** (0.008) | -0.012 (0.010) | 0.112*** (0.011) | -0.019 (0.017) | 0.084*** (0.023) |
| Residual column (2) Table 3 | -0.059*** (0.016) | -0.196*** (0.012) | 0.056*** (0.010) | -0.042*** (0.011) | -0.196** (0.084) | -0.321*** (0.102) |
| Sample | 15-29 | 15-29 | 30-50 | 30-50 | 51-65 | 51-65 |
| Log likelihood | -308107 | -308107 | -384366 | -384366 | -79744 | -79744 |
| Observations | 475,415 | 475,415 | 533,622 | 533,622 | 96,893 | 96,893 |

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Constant, year, industry, and state fixed effects are included in the model. Standard errors are bootstrapped with 500 repetitions. Household survey weights used.

Import competition is measured as the Chinese import penetration and the rest of the world import penetration.

The estimates show that younger workers more likely to not be formal, middle-aged workers more inclined to self-employment, while elder workers are more likely to hold formal jobs. Imports affected the types of jobs available for each age group differently according to their origin. An increase in the Chinese or in the rest of the world import penetrations expand self-employment among young workers. Larger Chinese imports reduce self-employment for middle-aged workers and has no effect at all on the likelihood of holding an informal job in any age group. In contrast, imports from the rest of the world increase informality across all age groups, with a magnitude that declines on age. These heterogenous impacts of import competition across age groups imply that policies designed to mitigate import-induced job precarization need to be tailored by age group.

References

- Abdieva, R., Sulaimanova, B., and Karymshakov, K. (2019) Gender differences, risk attitude and entrepreneurship in Kyrgyzstan, *Economics and Business Letters*, 8(1), 17-30
- Almeida, R., Paz, L., and Poole, J. P. (2022) Precarization or protection? The impact of trade and labour policies on informality, *Journal of Development Studies*, 58(7): 1416–1435..
- Coduras, A., Velilla, J., and Ortega, R. (2018) Age of the entrepreneurial decision: Differences among developed, developing, and non-developed countries, *Economics and Business Letters*, 7(1), 36-46.
- Conover, E., Khamis, M., and Pearlman, S. (2021) *Job quality and labour market transitions: Evidence from Mexican informal and formal workers*, WIDER Working Paper 2021/23. Helsinki: UNU-WIDER.
- Costa, F., Garred, J., Pessoa, J. (2016) Winners and losers from a commodities-for-manufactures trade boom, *Journal of International Economics*, 102: 50–69.
- Dávalos, J. (2019) Trade openness effects on informality and the real exchange rate channel, *Applied Economics Letters*, 26(6), 506–510.
- Dix-Carneiro, R., Goldberg, P., Meghir, C., and Ulyssea, G. (2021) *Trade and informality in the presence of labor market frictions and regulations*. National Bureau of Economic Research Working Paper No. w28391.
- Facchini, G., Olarreaga, M., Silva, O., and Willmann, G. (2010) Substitutability and Protectionism: Latin America's Trade Policy and Imports from China and India, *The World Bank Economic Review*, 24(3), 446–473.
- Fields, G. S. (2020) *Informality and Work Status*, WIDER Working Paper 2020/159. Helsinki: UNU-WIDER.
- Iacovone, L., F. Rauch, and Winters, L. A. (2013) Trade as an engine of creative destruction: Mexican experience with Chinese competition, *Journal of International Economics*, 89(2), 379–392.
- IBGE (2015). Banco de Dados Agregados. Sistema IBGE de Recuperação Automática – SIDRA.
- Kapri, K. P. and Paz, L. (2019) The Effects of the Chinese Imports on Brazilian Manufacturing Workers. *Economies* 7(3), 76.
- Kucera, D. and Roncolato, L. (2008) Informal employment: Two contested policy issues. *International Labour Review*, 147(4), 321–348. <https://doi.org/10.1111/j.1564-913X.2008.00039.x>
- Levesque, M. and Minniti, M. (2006) The effect of aging on entrepreneurial behavior, *Journal of Business Venturing*, 21, 177–194.

- Liu, X., Lovely, M., and Ondrich, J. (2010) The Location Decisions of Foreign Investors in China: Untangling the effect of wages using a control function approach, *The Review of Economics and Statistics*, 92(1), 160–166.
- Maurizio, R. (2015) Transitions to Formality and Declining Inequality: Argentina and Brazil in the 2000s, *Development and Change*, 46(5), 1047–1079. <https://doi.org/10.1111/dech.12195>
- Moulton, J. G. and Scott, J. C. (2016) Opportunity or Necessity? Disaggregating Self-Employment and Entry at Older Ages, *Social Forces*, 94(4), 1539–1566.
- Mulders, J. O. (2020) Employers' age-related norms, stereotypes and ageist preferences in employment, *International Journal of Manpower*, 41(5), 523–534.
- Paz, L. (2014) The Impacts of Trade Liberalization on Informal Labor Markets: A Theoretical and Empirical Evaluation of the Brazilian Case, *Journal of International Economics*, 92(2), 330–348.
- Paz, L. (2018) The effect of import competition on Brazil's Manufacturing Labor Market in the 2000s: Are imports from China different?, *The International Trade Journal*, 32(1), 76–99.
- Paz, L. (2019) Chinese imports' impacts on Brazil's Inter-Industry Wage Premium, *Journal of Economic Studies*, 46(5), 1052-1064.
- Paz, L. (2021) How does import competition impact job type?, *Economics Bulletin*, 41 (3), 2063-2020.
- Sehnbruch, K., González, P., Apablaza, M., Méndez, R., and Arriagada, V. (2020) The Quality of Employment (QoE) in nine Latin American countries: A multidimensional perspective, *World Development*, 127(C), 104738. <https://doi.org/10.1016/j.worlddev.2019.104738>
- Simoes, N., Crespo, N., and Moreira, S. B. (2016) Individual determinants of self-employment entry: What do we really know?, *Journal of Economic Surveys*, 30(4), 783–806.
- United Nations (2003) Statistical Division. UN Comtrade. New York: United Nations.