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TRADE EXPOSURE, IMMIGRANTS AND WORKPLACE INJURIES

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Abstract

We study the effects of globalization on workplace accidents in the Italian manufacturing sector from 2008 to 2019. We focus on both the local intensity of import exposure to China and the share of foreign-born residents. To handle potential endogeneity concerns, we instrument the import exposure to China with that of other high-income countries and local immigration exposure with historical co-national local settlements. Our findings highlight a worsening of workplace safety following an increase in import competition, especially for male workers. An inspection of the channels suggests that the effect works through an increasing workload.

JEL Class.: F16, I1, J28, J61, R11.

Keywords: Workplace injuries, globalization, import competition, immigration, shift-share instruments.

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Trade exposure, immigrants and workplace injuries*

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1 Introduction

Globalization has strongly shaped national labor markets and its effects have been widely investigated in the last few decades (see, e.g., Feenstra and Hanson, 1996; Krugman, 2008; Autor et al., 2013). However, little attention has been paid to its effects on workplace safety and occupational health, although they may be significantly affected.

The theoretical relationship between workplace safety and globalization is unclear. In developing countries, extensive industrialization and the use of untrained workers in totally new tasks may increase the accident rate. In developed countries, instead, workplace accidents may decrease, especially in manufacturing, because riskier jobs are off-shored to developing countries. Alternatively, increasing international competition may reduce investments in both new technologies and workplace safety policies, weaken the protection of labor rights, and increase stress and perceived job insecurity (e.g., the risk of being fired). More flexible labor policies may weaken the commitment to occupational health and safety programs and rules (Neumayer and De Soysa, 2006), while the stress of global competition may induce employers to view the prevention of occupational injuries and the protection of workers' health as barriers to trade (Goldstein et al., 2001). This effect is likely to be centered on low-skilled workers, the ones most affected by adjustments in

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the labor market (Dippel et al., 2022).

Moreover, job safety may be affected by another aspect of globalization: immigration. Also in this case, theoretical explanations are not clear-cut. On the one hand, inflows of immigrants could add pressure on the labor supply, increasing stress and fear of job loss, thereby inducing native workers to accept more precarious and risky working conditions in order to stay in employment. Furthermore, immigrants tend to self-select into physically demanding jobs because of their lower risk aversion or their underestimation of workplace risk (Dávila et al., 2011; Orrenius and Zavodny, 2013), better health (Kennedy et al., 2015; Giuntella, 2017), and language barriers (Orrenius and Zavodny, 2009). Then, if immigrants are less educated and also less trained in safety measures and practices than the average native population, the probability of workplace injuries for both immigrant workers and their native co-workers may increase. On the other hand, immigration may have positive health spillovers for the native population (Giuntella and Mazzonna, 2015). An inflow of immigrants who take over from native workers jobs with higher injury risk may improve the workplace safety of natives, who switch to safer tasks or jobs with lighter physical burdens and fewer injury risks. Moreover, if younger and healthier immigrants replace older native workers in physically demanding tasks, they are less likely to be injured on the job than are older and unhealthier workers. As a result, workplace safety for natives may improve without increasing the number of workplace accidents involving immigrants. This would generate a positive overall welfare effect of immigration on occupational health. Finally, immigration may lead to positive health outcomes when the increased availability of low-wage workers helps mitigate the competitive pressure on firms by reducing labor costs, especially in more manual tasks for which local labor supply is scarce.

Our study aims to provide causal evidence on the relation between globalization and workplace safety in Italy by considering the role of different facets of globalization. On the one hand, we map sector-specific levels in trade with China by local labor market as a measure of local import exposure and competition shocks. Therefore, we study the effect on workplace safety of this local import exposure to the rise of China in world manufacturing exports. We employ other high-income countries' import shocks with China as an instrumental variable (IV) for the exposure to import competition of Italian provinces in order to abstract from unobserved domestic influences. On the other hand, we shed light on globalization's effect on workplace safety by jointly considering the role played by immigration in the manufacturing sector. In doing so, we instrument the foreign-born

population's share by means of a Bartik-style instrument based on the historical distribution of co-nationals.

Italy represents an extremely interesting case study for several reasons. First, the pattern of bilateral trade with China and its perceived competitiveness highlight the difficulties faced by some Italian manufacturing firms and those industrial districts more directly competing with Chinese products. Given their traditional specialization in low-skilled and labor-intensive products, several Italian firms have faced severe international competition in the past two decades because Chinese manufacturing imports tripled between 2002 and the onset of the financial crisis in 2008, and even after the crisis, they continued to grow steadily. In 2021, manufacturing imports from China were 33% higher than in 2008 and represented 40% of Italian manufacturing imports from low- and middle-income countries and 10% of total manufacturing imports. Second, in the same years, Italy experienced growing inflows of migrants. Third, 95% of the migrants were from less developed economies and were usually employed as low-skilled workers, especially in the manufacturing sector. Fourth, in terms of the rate of both fatal and non-fatal accidents at work, Italy records a high incidence: in 2019 the rate was above the median among the EU-27 countries, and the frequency of accidents causes great concern among both public opinion and policy-makers.[1] Hence, providing evidence on job safety in the globalization era is of utmost interest for socioeconomic, health and policy reasons.

To the best of our knowledge, only two studies have provided evidence on the effect of international competition on workers' safety. McManus and Schaur (2016) focused on manufacturing injuries in the US using plant-level data and Chinese import growth in 1996-2007 as a shock to competition. They found that the rise in Chinese import exposure increased injury and illness rates in competing industries in the medium run, especially for workers employed in smaller establishments. Blanton and Peksen (2017) examined the relationship between economic globalization and major industrial accidents in 137 countries from 1971 until 2012. They found a significant positive correlation between economic globalization and the probability of major industrial accidents. Their results underlined a trade-off between the pursuit of integration into the global economy and a key labor right like that to workplace safety.

In addition, the link between workplace safety and immigration has been explored by very few studies. Bauer et al. (1998), focusing on blue collar occupations, found

[1] See the figures reported in the Eurostat Statistics Explained on Accidents at Work Statistics on https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Accidents_at_work_statistics.

that a 1% increase in the employment share of foreigners was associated with a 0.4% decrease in severe accidents suffered by German natives, without immigrants being affected. Giuntella et al. (2019) considered the effects of immigration on the allocation of occupational physical burden and occupational health risk in the UK for the years 2003-2013. They found that a 10 percentage point increase in the share of immigrants in a local authority reduced the average physical burden of native males by 5% with respect to the mean. Dillender and McInerney (2020) determined that Mexican immigration to the US resulted in fewer workplace injuries for natives and fewer workers' compensation claims in general. Bellés-Obrero et al. (2021) found that in Spain an inflow of 1,000 immigrants decreased the incidence of workplace accidents by 4.2 for every 100,000 Spanish-born workers. Alacevich and Nicodemo (2024) found that migrant inflows led to a reduction in physical impairment and injury-related paid sick leave for native workers in Italy, independently of occupation and sector transitions, as a result of the reallocation of riskier tasks from native workers to migrant workers. When considering the effect of immigration flows on migrant workers' occupational health, the aforementioned studies did not detect significant impacts. Overall, these analyses have shown Pareto-improving effects of immigration on workplace safety for the total working population.

We contribute to this small but growing body of literature on the effects of globalization on workplace safety. With respect to the above mentioned studies, we assess the role of both trade exposure and immigration and inspect whether the potential negative effect of import competition on workers' safety is mitigated by the presence of immigrants in the province. Our findings also contribute to other research streams. Specifically, they add to the literature on the socioeconomic determinants of occupational health (see, e.g., Pouliakas and Theodossiou, 2013; van Ours, 2019). Among the most important determinants of workplace safety, recent studies have focused on the impact of fixed-term contracts (Giraudo et al., 2016; Picchio and van Ours, 2017; Palali and van Ours, 2017), environmental factors (Dillender, 2021; Park et al., 2021; Curci et al., 2023; Filomena and Picchio, 2024), and technological advances (Gunadi and Ryu, 2021; Gihleb et al., 2022). Lastly, our analysis complements the extensive literature investigating the impact of trade integration and immigration on labor market outcomes (see, e.g., Altonji and Card, 1991; Borjas, 1995; Autor et al., 2013; Dauth et al., 2014) and socioeconomic aspects, such as production structure (Mitaritonna et al., 2017; Casabianca et al., 2022); health outcomes (Giuntella and Mazzonna, 2015; Giuntella et al., 2018; Colantone et al., 2019; Lang et al., 2019; Fan et al., 2020; Pierce and Schott, 2020; Adda and Fawaz, 2020; Escarce and

Rocco, 2021), educational attainment (Ohinata and van Ours, 2013; Brunello and Rocco, 2013; Brunello et al., 2020), and voting behavior (Barone et al., 2016; Colantone and Stanig, 2018; Autor et al., 2020; Caselli et al., 2020; Dippel et al., 2022).

This article is organized as follows. Section 2 describes our sample and methodology. Section 3 presents the main findings and discusses them. Section 4 concludes and draws some policy implications.

2 Method

2.1 Data and sample

To shed light on the impact of economic globalization on workplace safety, we drew on different data sources. To measure workplace safety, we used microdata on workplace injuries gathered by the Italian Institute for Insurance against Occupational Accidents (INAIL), which is the Italian national agency that monitors work-related illness and injury and manages the mandatory insurance scheme against work-related accidents. These latter include workplace accidents, students' accidents at school, and accidents that occur while workers are commuting.[2] Firms are obliged to electronically communicate to INAIL every work-related accident, which is defined as an incident caused by a rapid and harmful action resulting in an injury whose recovery time, certified by a physician, exceeds three days from the day on which the accident occurred. The INAIL dataset that we used for our research contained daily information on all the work-related accidents which took place in Italy during the period 2008-2019, that is, before the COVID-19 pandemic. After dropping injuries that happened while commuting and keeping those which involved manufacturing workers older than 15, we collapsed the number of workplace accidents by province and year over the observed time window. We then divided the number of workplace injuries by employment in manufacturing in the same province-year obtained by the Italian National Institute of Statistics (ISTAT). Thus, we computed yearly provincial workplace injury rates per 1,000 workers. Similarly, we calculated injury rates by

[2]Some special categories of workers, like fire-fighters, police-officers, persons serving in the armed forces, and journalists, are not in the INAIL dataset because they are covered by other insurers. The workforce covered by INAIL comprises about 75-80% of total employment. For example, in 2018 (2021), INAIL covered 16,893 (17,101) workers out of 22,333 (21,849), i.e. 75.6% (78.3%). The number of workers covered by INAIL is taken from https://bancadatistatisticaoas.inail.it/analytics/saw.dll?Dashboard. Total employment is taken from the Labour Force Survey (Eurostat).

injury severity according to the number of days of absence of the injured worker. Furthermore, to obtain similar statistics in manufacturing by gender, age and nationality, we used the Italian Labour Force Survey (LFS) to retrieve employment levels according to these dimensions.[3]

We measured economic globalization by using data on two aspects related to the international movement of money and people which are outcomes of the world economy: local import exposure to international competition, and local immigration exposure. As regards the former, we gathered yearly Italian trade data in thousands of current US dollars from the World Integrated Trade Solution Database (WITS) of the World Bank. These data were available at the 2-digit level of International Standard Industrial Classification revision 3 (ISIC Rev. 3) sector level that we matched with the 2-digit Ateco 2002, the Italian classification of economic activities. To measure the intensity of local exposure to import competition, we followed the literature on the effects of globalization on labor market outcomes (Autor et al., 2013; Dauth et al., 2014) and voting behavior (Colantone and Stanig, 2018; Autor et al., 2020; Caselli et al., 2020; Dippel et al., 2022). Hence, we relied on the rise of China in the world economy and its accession to the World Trade Organization in 2001. Indeed, the pattern of bilateral trade with China is reflected in the difficulties faced by some Italian manufacturing sectors and those industrial districts that compete more directly with low-wage countries (Federico, 2014; Caselli et al., 2020). We exploited the variation in initial industry specialization across Italian provinces. To measure the province-specific trade shocks and assess local import exposure, we took the weighted sum of imports per worker across industries, where weights captured the relative importance of each industry in a given local area. We used provincial lagged industrial composition to map sector-specific trade shocks with China for each location. Formally, we built the measure of provincial exposure to import competition as the level of imports from China per worker of province p at time t as follows:

$$IMP_{pt}^{ITA-CHI} = \sum_{s=1}^{S} \frac{L_{ps}^{2001}}{L_{s}^{2001}} \times \frac{IMP_{st}^{ITA-CHI}}{L_{p}^{2001}} \tag{1}$$

where $IMP_{st}^{ITA-CHI}$ is the national level of imports in manufacturing industry s at time

[3]LFS is the quarterly survey of labor market conditions carried out by ISTAT. It covers a representative sample of almost 77,000 households and 175,000 individuals per quarter. The analysis conducted by gender, age and nationality covers the period 2009-2018 only, due to the unavailability of LFS data for the entire period.

t; L_p^{2001} is manufacturing employment in province p in 2001, which is the baseline year; L_{ps}^{2001}/L_s^{2001} is the share of employment in province p in manufacturing industry s out of the national level of employment in sector s in 2001.[4] Equation (1) clarifies that the difference in $IMP_{pt}^{ITA-CHI}$ across provinces derives from variation in provincial industry employment structure in the baseline year.

In order to measure the local exposure to immigration, we exploited the Demo-ISTAT database[5] to retrieve province-level records of the resident population on January 1 of each year. This source enabled us to compute the share of foreign residents in the total population for each province and each year over the time span of our analysis. Potential difficulties might arise from irregular immigration and the heterogeneity of migrants originating from both developed and developing countries.[6] Although our analysis focuses on the effect of regular migrants, because residence registries do not count undocumented ones, the spatial distribution and share of irregular migrants in Italy are closely correlated with those of regular migrants, both across provinces and over time (Bianchi et al., 2012; Bratti and Conti, 2018; Alacevich and Nicodemo, 2024). This means that our identification strategy was not likely to be affected by irregular migrants and our estimates could grasp their effect as well. Furthermore, the concern that migrants are heterogeneous, because they arrived from both developed and developing countries, should not have affected our estimates, because Italy is characterized by a tiny presence of foreigners from developed countries relative to those coming from developing regions. In the period under analysis, immigrants from developing countries represented 95% of total immigrants (Casabianca et al., 2022).

[4]The sectors in manufacturing and their classification codes are: 10-11) food and beverages; 13) textiles; 14) wearing apparel; 15) luggage, handbags and footwear; 16) wood and cork; 17) paper; 18) publishing and printing; 20-21) chemicals; 22) rubber and plastics; 23) non-metallic mineral products; 24) basic metals; 25) metal products; 26-27) electronic components; office machinery; radio and TV; medical instruments; 28) machinery; 29) motor vehicles; 30) transport equipment; 31-32) furniture.

[5]See `https://demo.istat.it` (last accessed, May 30th, 2024.)

[6]In regard to the former, with the immigration policy adopted in 2013, the Italian government allowed the legal entry of only seasonal and legal workers. This period was characterized by a significant increase of refugees and asylum seekers, who typically have very low labor force participation rates and who can be hired not before two months since their application. In regard to the latter issue, immigrants may originate from countries at different stages of development, be endowed with different skills and capabilities, and have different work attitudes. Consequently, they may heterogeneously affect workplace safety. For example, migrants from developed economies, who are presumably high-skilled, may be less likely to suffer injury in the workplace and may exert a positive effect even on native workers' occupational health. Low-skilled migrants from developing countries may instead negatively impact on workplace safety if they do not engage in safe practices.

To control for time-varying heterogeneity which may jointly determine injury rates, exposure to import competition and shares of foreigner residents, we modeled the workplace injury rate by including a set of covariates retrieved from ISTAT and Eurostat at provincial level, such as the GDP per capita, the number of firms per 1,000 inhabitants and the share of manufacturing in total value added. Because some sectors may be characterized by a higher share of informal workers, who are more likely to under-report workplace injuries, we also included the regional share of irregular workers in the vector of covariates to account for informal employment.

After matching yearly provincial workplace injury rates with the trade exposure variable, the local share of immigrant residents and the set of further controls, we obtained a final sample of 1,236 province-year-level observations coming from 103 Italian provinces observed over the period 2008-2019.[7] Table A.1 in the appendix shows summary statistics of the variables used in the empirical analysis. Figure A.1 in the appendix visualizes the variability of the workplace accident rates and the globalization measures across Italian provinces (2008-2019 averages).

2.2 Empirical strategy

To understand how workplace safety is affected by both import competition and immigration, we estimate the following equation for the workplace injury rate Y_{pt} in province p and year t, with $p = 1, \ldots, 103$ and $t = 2008, \ldots, 2019$,

$$Y_{pt} = \beta_1 IMP_{pt-1}^{ITA-CHI} + \beta_2 Immigrants_{pt-1} + \gamma X_{pt} + \delta_p + \lambda_t + \varepsilon_{pt}, \qquad (2)$$

where: $IMP_{pt-1}^{ITA-CHI}$ is the exposure to manufacturing imports from China in province p at time $t-1$; $Immigrants_{pt-1}$ is the number of immigrant residents per 1,000 total inhabitants in province p at time $t-1$; X_{pt} is the set of time-varying covariates; δ_p and λ_t are province and time fixed effects, respectively; ε_{pt} is the idiosyncratic error term. We hypothesized that globalization may affect workplace safety through its impact on the labor market, working conditions, and firms' strategies. Then, the temporal lag of one year was employed to account for the adjustment period required to respond to immigration and exposure to import competition.

[7] The number of Italian provinces has changed over time. There were 103 of them until 2001, 107 between 2001 and 2007, 110 between 2007 and 2016, and 107 once again after 2016. In this study, we use the administrative partition into 103 provinces.

In Equation (2), both exposure to manufacturing imports from China and immigration can be endogenous, for several reasons. We tackled their endogeneity by using shift-share (or "Bartik") instruments (Bartik, 1991; Altonji and Card, 1991; Blanchard and Lawrence, 1992; Card, 2001; Autor et al., 2013; Acemoglu and Restrepo, 2020; Autor et al., 2020): these consist of weighted averages of a common set of shocks, with weights reflecting initial heterogeneous shock exposure (Goldsmith-Pinkham et al., 2020).

Exposure to manufacturing imports from China may be endogenous because domestic demand and supply shocks may simultaneously affect trade exposure, labor market outcomes, and workplace safety regulations. Indeed, Hummels et al. (2023) pointed out that workplace injuries react to demand shocks, while other studies have found that injuries and the business cycle are related (see e.g. Boone and van Ours, 2006; Boone et al., 2011).

We addressed the potential endogeneity of a province's exposure to import competition by using a shift-share instrument based on imports from China recorded in other high-income countries. Indeed, the rise of China in the world economy induced greater import penetration for all trading partners. Import levels into other countries are expected to identify the exogenous, supply-driven component of rising competitiveness of China stemming from rising Chinese firms' productivity and decreasing barriers to trade and to purge the effect of possible shocks, which simultaneously affect Italian imports and local performance. This approach requires the assumption that import demand shocks in developed countries are not a primary cause of China's export surge (Autor et al., 2013). Our instrumental variable (IV) was computed as follows:

$$IMP_{pt}^{HIC} = \sum_{s=1}^{S} \frac{L_{ps}^{1991}}{L_{s}^{1991}} \times \frac{IMP_{st}^{HIC-CHI}}{L_{p}^{1991}} \tag{3}$$

where $IMP_{st}^{HIC-CHI}$ represents the level of imports of products by sector s from China into the other high-income countries. IMP_{pt}^{HIC} differs from Equation (1) in two respects. First, instead of Italian imports from China by industry, it displays imports from China by industry in other high-income countries. Following Dauth et al. (2014), we omitted Italy's neighbors and Eurozone members for two reasons: i) supply and demand shocks in these countries are likely to be too similar to those in Italy, and the instruments would not purge those shocks; ii) these countries are closely integrated with Italy in an economic and monetary union. Furthermore, we also omitted the US due to its leading role in the world economy. It is likely that shocks which change trade levels between those

countries and China also directly affect local exposure in Italy, violating the conditional exogeneity of the IV. Therefore, we selected Australia, Canada, Japan, New Zealand and South Korea and added the related measures of import exposure. Second, we used sectoral employment shares recorded in 1991, rather than in 2001, to further reduce endogeneity concerns stemming from the potential anticipated effects of future trade shocks on the industrial specialization of each local area (Autor et al., 2013).

Moreover, the immigration variable is likely to be endogenous in Equation (2). Immigrants may settle in provinces characterized by labor-intensive production processes, where their labor endowment may easily match local labor demand. Alternatively, immigrants may be attracted by provinces with high capital-intensive production processes, where wages are expected to be higher, and the economic system may be more dynamic and offer better work opportunities. To solve this potential endogeneity problem, we adopted a shift-share instrument following Altonji and Card (1991) and Card (2001). The purpose of this instrument is to disentangle the exogenous part of immigration inflows from the endogenous part, in order to obtain a variable which is correlated with the percentage change of the immigrant population but is orthogonal to the local specific shocks and trends in the labor market conditions. This approach exploits the observation that changes in immigration are closely linked to migrant networks, i.e. immigrants tend to move to areas where large groups of immigrants from their country of origin are already established (*enclave effect*). The exclusion restriction requires that, conditional on province fixed effects, year fixed effects and time-varying covariates, provincial shocks which attracted immigrants many years before the start of the sample period are uncorrelated with current provincial characteristics and shocks, which influence the health and labor market outcomes of both natives and immigrants. We believed that this requirement was likely to hold in our framework because, in the construction of the IV, we calculated the share of immigrants in the total resident population in a given province p and at time t by redistributing immigrants across provinces as per their distribution in 1997. Moreover, in our model specifications, we included provincial variables which controlled for time-varying local characteristics. Our IV was defined as follows:

$$Z_{pt} = \frac{1}{Pop_{p}^{1997}} \sum_{c=1}^{C} w_{pc}^{1997} \times Migrants_{ct} \tag{4}$$

where w_{pc}^{1997} is the share of the number of residency permits granted to migrants from

country c to province p out of total permits issued to immigrants from country c during the period 1995-1997; $Migrants_{ct}$ is the number of immigrants from country c residing in Italy in year t; Pop_p^{1997} is the total population of province p in 1997.[8]

Local labor market and economic shocks may be persistent over time. If these shocks affected the local industry employment shares in 1991 or the immigrant shares in 1997 and were correlated to economic and labor market changes and, therefore, to workplace injury rate variations, then the validity of our Bartik-style instruments would be violated. We checked the validity of our Bartik-style instruments by computing a set of correlations among them, the outcome variables, and the lagged values of the outcome variables and the covariates.

First, as suggested by Danieli et al. (2022), we used an indirect falsification or placebo test for the conditional exclusion and independent assumption based on negative controls. We regressed the instruments on the outcome variables and covariates measured 3 years earlier, conditional on year FE, province FE and the control variables used in the benchmark models, i.e. we estimated by Ordinary Least Squares (OLS) the following equation, with $p = 1, \ldots, 103$ and $t = 2012, \ldots, 2019$:

$$M_{pt-1} = \boldsymbol{\rho}' \mathbf{Y}_{pt-4} + \eta X_{pt-4} + \alpha X_{pt} + \delta_p + \lambda_t + u_{pt}, \tag{5}$$

where M_{pt-1} is IMP_{pt-1}^{HIC} or Z_{pt-1} and $\mathbf{Y}_{pt-4}$ is the vector containing the lagged realizations of all the outcome variables used in this study. Then, we tested the single and joint significance of lagged outcomes and lagged covariates in order to verify whether our instruments were balanced across provinces with respect to predetermined characteristics. The significance of the outcomes variables would point to feedback from workplace injury shocks to the instrument, which would invalidate its strict exogeneity assumption. If the instruments were correlated to lagged covariates, this relationship might be driven by some unobservables that also affected manufacturing labor markets and, therefore, workplace injury rates. Table A.2 in the appendix shows the estimates of Equation (5) and p-values of significance tests. We made our significance tests robust both to heteroskedasticity and within-province correlation and to the familywise error rate arising

[8] We did not use data on residency permits before 1995 because they were missing for 8 provinces. Both the weights w_{pc}^{1997} and the number of immigrants residing in Italy ($Migrants_{ct}$) were computed after grouping immigrants into 58 countries or areas according to the most detailed available information on their origins. These groups are presented in Table A.8 in appendix.

with multiple tests.[9] The figures in Table A.2 do not suggest a violation of the strict exogeneity assumption concerning our instruments.

Second, we estimated the main equations after including among the regressors also the two excluded instruments. As shown in Table A.3 in the appendix, we found that they are not significant, independently of the outcome variable chosen.

Third, similarly to Mitaritonna et al. (2017) and Casabianca et al. (2022), we inspected the correlation between the long difference in the instruments between 2018 and 2009 and the outcome variables recorded in 2008, the initial year, conditional on regional fixed effects. Table A.4 in the appendix shows that the initial values of the outcome variables do not correlate with the long difference in the instruments, further supporting the strict exogeneity of the instruments.

Fourth, we performed the checks proposed by Goldsmith-Pinkham et al. (2020) and Borusyak et al. (2022) for the validity of the excluded instruments. The exogeneity of industry employment shares discussed in Goldsmith-Pinkham et al. (2020) is unlikely to hold in the case of our shift-share instrument for import competition. Unobserved industry shocks (e.g., the onset of automation, the spread of ICT) may indeed plausibly affect local outcomes through the same mixture of exposure shares. Therefore, since shock orthogonality is a necessary and sufficient condition for the orthogonality of the shift-share instrument (Borusyak et al., 2022), we addressed the endogeneity of our measure of import competition by relying on the exogeneity of specific trade shocks $IMP_{st}^{HIC-CHI}$. To test their exogeneity, we regressed start-of-period observed province characteristics on the 2018-2009 change in the instrument in Equation (3). Table A.5 in the appendix reports the results. We found no statistically significant relationships between province characteristics and the change in the shift-share instrument, confirming the assumption of quasi-random assignment of trade shocks.

In order to determine the validity of Z_{pt} as an instrument for immigration, we followed Goldsmith-Pinkham et al. (2020), who showed that the 2SLS estimator with the shift-share IV is numerically equivalent to a GMM estimator with the local country shares as IV and a weight matrix constructed by national immigration flows. In this respect, using the shift-share IV is equivalent to using the shares w_{pc}^{1997} as IV, and then the exogeneity

[9] For single tests, we computed Romano and Wolf's (2005a; 2005b) step-down adjusted p-values robust to multiple hypothesis testing, with clusters at provincial level. To test the joint significance of lagged outcomes and lagged covariates both within equations and across equations, we used the Westfall-Young approach on the basis of Young's (2019) randomization-t procedure. We therefore report therefore the p-values for the null of complete irrelevance of lagged outcomes and lagged covariates.

condition should be interpreted in terms of the shares. The Bartik estimator can then be unpacked into a weighted sum of the just-identified IV estimators that use each country share w_{pc} as a separate instrument. The weights, called Rotemberg weights, depend on the covariance between the c-th instrument's fitted value of the endogenous variable and the endogenous variable itself. Our study is a typical setting in which migration origin country shares across locations measure differential exposure to common shocks and identification is based on the share exogeneity. We therefore computed Rotemberg weights and panel A of Table A.6 in the appendix shows that they mostly proved to be positive. It also shows that the top five origin areas are China, Egypt, Europe, India and Pakistan (panel C of Table A.6 in the appendix), which account for over 65% of the positive weights. The composition of the top five countries is not surprising and this is in accordance with the fact that the shares are closely correlated with shocks $Migrants_c$ (panel B of Table A.6 in the appendix). From panel B of Table A.6 we also learn that the Rotemberg weights are negatively correlated with the variation in country shares across locations (Var(w_c)). This suggests that the presence of countries with a high weight tends to vary less across locations, which is consistent with the existence of enclaves across provinces. Figure A.2 in the appendix further shows that the just-identified IV estimates with each country share w_{pc} as a separate IV are quite similar among countries.[10] This overall finding is reassuring in terms of the validity of Z_{pt} as an instrument for migration.

3 Results

3.1 Main findings

Table 1 shows both OLS and IV estimated coefficients of Equation (2). We detected a negative relationship between the share of foreign-born residents and the injury rate in manufacturing at provincial level, but the effect was not statistically significant at conventional levels. In contrast, a unit increase in the import competition with Chinese products (i.e., a $1,000 increase per employee) generates an increase in the workers' injury rate in manufacturing by 0.696 points from OLS and 1.788 points from 2SLS. Considering that on average in our sample there are 18.6 injuries per 1,000 workers, these effects give rise

[10] Table A.7 in the appendix reports the results concerning the effect of the immigration rate on the injury rate after using alternative estimators. The results are quite similar across alternative estimators which supposedly have better properties when many instruments are used, and the overidentification test always fails to reject the null.

to an increase in the injury rate from 3.7% to 9.6% relative to its sample mean. When the dependent variable is the number of days of work (per 1,000 workers) lost because of workplace injuries, a unit increase in import competition generates an increase of 25.6 lost days from OLS and 58.7 lost days from 2SLS per 1,000 workers. Relative to the sample mean, this translates into an increase of 3.8% and 8.6%, respectively.

In line with previous evidence reported by McManus and Schaur (2016), our baseline results support the thesis that workplace safety is reduced by international competition in the manufacturing sectors, the ones most affected by import competition with China. The Hausman test rejects the null hypothesis of exogeneity of trade exposure and immigration. Moreover, the larger magnitudes of 2SLS estimated coefficients of trade exposure are consistent with the thesis that OLS estimates of import competition are affected by unobserved demand shocks and understate the true impact of trade exposure (Autor et al., 2013; Dauth et al., 2014). In addition, the upward bias in OLS coefficients for immigration suggests a positive selection of migrants in those provinces characterized by better work opportunities and lower injury rates (Bellés-Obrero et al., 2021; Alacevich and Nicodemo, 2024). The first-stage coefficients for both immigration and trade exposure are statistically significant at the 1% level and, as expected, have positive signs. Their F-statistics (24.23 and 24.28, respectively) indicate that historical co-national local settlements and sector-level trends in trade exposure to China in other high-income countries are strong instruments.

We checked whether the impact of globalization is confined to mild workplace accidents or whether it also involves more serious injuries at work. To do so, we measured injury severity according to the number of days of absence from work caused by the workplace accident. Table 2 shows the results. We found that the negative effect of the exposure to Chinese import competition on workplace safety involves both accidents entailing less than 1 month of absence by the injured worker and more severe injuries: the former increase by 1.307 points per 1,000 workers (+10.5% with respect to the sample average), the latter by 0.480 points per 1,000 workers (+8% with respect to the sample average).[11] Since major accidents are much less affected by under-reporting because they are more difficult to hide or ignore (Picchio and van Ours, 2017; Bellés-Obrero et al., 2021), finding similar effects for mild and severe workplace injuries is reassuring about eventual biases stemming from under-reporting behavior and its possible endogeneity with respect

[11] Our findings are robust to the use of different thresholds for the severity of accidents, i.e. less than 1 and 2 weeks. These results are available from the authors upon request.

to greater exposure to import competition or immigration.

To test if globalization exerts heterogeneous effects according to individual characteristics, we used the ISTAT Labour Force Survey to compute the workplace accident rates in manufacturing by gender, age, and nationality. These analyses were restricted to the period 2009-2018 because of the LFS data at our disposal. The relative findings are presented in Table 3. The first exercise revealed that the negative impact of the exposure to Chinese import competition increases workplace injuries among male employees by 2.140 points per 1,000 workers, which is a 9% increase with respect to the sample mean (23.69). No statistically significant effects were instead detected for women. Gender differences and segregation in occupation and industries (Blau and Kahn, 2017) may explain this result, since men more likely to be employed in physically demanding jobs in manufacturing, which is the industry most exposed to international competition.[12] Analyses by workers' age showed that the negative effect of import competition on workplace safety is driven by workers aged between 30 and 54 years old, with a 13.4% increase in injuries with respect to the sample mean (19.14). Finally, the heterogeneity analysis by nationality revealed a statistically significant effect of import competition on native workers alone, which corresponded to a +8% relative to its sample mean (19.27).

In Table 4, we have divided the sample according to the intensity of the two treatments to assess whether the effect is different below and above the median of both immigration and import competition with China. Our findings in model (2) reveal that the positive effect of exposure to Chinese import competition on workplace accidents is statistically significant in those provinces where the international competition is above the median and where the share of foreign-born residents is the lowest (+1.669 per 1,000 workers). However, the results in model (4) highlight that the coefficient for trade exposure turns out to be insignificant and close to zero when the immigrant share is above the median. This finding prompts us to speculate that a higher proportion of foreign workers may alleviate the overall negative welfare impact of competitive pressure on Italian manufacturing firms. This is achieved by reducing labor costs, because immigrants are predominantly employed in low-wage, physically demanding jobs instead of the native population, and they are simultaneously less likely to sustain severe injuries (Alacevich and Nicodemo, 2024).

[12] In 2016, women represented 27% of total employment in manufacturing (Labour Force Survey, Eurostat).

Table 1: Immigration, import competition, and workplace accident rate in manufacturing

	OLS		2SLS	
	Coeff.	Std. Err.	Coeff.	Std. Err.
a) Dependent variable: workplace accident rate				
Immigrants per 1,000 inhabitants	-0.037	0.041	-0.049	0.098
Import competition, $IMP^{ITA-CHI}$	0.696***	0.215	1.788***	0.616
Hausman test,[(a)] p-value			0.038	
R-squared	0.715		0.707	
b) Dependent variable: lost days per 1,000 workers				
Immigrants per 1,000 inhabitants	-1.200	1.238	-3.011	4.788
Import competition, $IMP^{ITA-CHI}$	25.572***	8.244	58.700***	20.167
Hausman test,[(a)] p-value			0.043	
R-squared	0.538		0.528	
c) First stages				
Endogenous regressor:	Immigrants per 1,000 inhabitants		Import competition $IMP^{ITA-CHI}$	
Excluded instruments				
Z_{pt-1}	0.380***	0.060	0.000	0.002
IMP^{HIC}_{t-1}	0.140	0.107	0.084***	0.012
Kleibergen-Paap F-statistic	24.23		24.28	
Observations	1,236			

Notes: * p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01. Standard errors are clustered at provincial level. Controls include GDP per capita in logarithms, the number of firms per 1,000 inhabitants, the share of irregular workers, the share of manufacturing on total value added, year FE and province FE.

[(a)] We computed an Hausman test robust to heteroskedasticity and within-province correlation using the control function approach. After the estimation of the first stages, we computed the residuals and included them in Equation (2), which we estimated by OLS with standard errors clustered at provincial level. Then, we tested the joint significance of the residuals.

Table 2: Immigration, import competition, and workplace accident rate in manufacturing by injury severity

	Days off < 31		Days off ≥ 31	
	Coeff.	Std. Err.	Coeff.	Std. Err.
Immigrants per 1,000 inhabitants	-0.052	0.072	0.003	0.030
Import competition, $IMP^{ITA-CHI}$	1.307***	0.472	0.480**	0.191
R-squared	0.722		0.524	
Observations	1,236		1,236	

Notes: * p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01. Standard errors are clustered at provincial level. Controls include GDP per capita in logarithms, the number of firms per 1,000 inhabitants, the share of irregular workers, the share of manufacturing on total value added, year FE and province FE.

Table 3: Immigration, import competition, and workplace accident rate in manufacturing by individual characteristics

	Gender		Age			Nationality	
	Men	Women	16-29	30-54	55-64	Native	Foreign-born
Immigrants per 1,000 inhabitants	-0.035	-0.061	0.068	-0.005	0.050	0.056	-0.207
	(0.154)	(0.105)	(0.210)	(0.138)	(0.266)	(0.109)	(0.609)
Import competition, $IMP^{ITA-CHI}$	2.140**	0.697	-0.239	2.566**	2.796	1.546**	2.920
	(0.957)	(0.613)	(2.107)	(1.101)	(2.480)	(0.716)	(3.211)
R-squared	0.526	0.088	0.141	0.352	0.044	0.496	0.103
Observations	1,030	1,030	1,027	1,030	1,029	1,030	1,002

Notes: * p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01. Clustered standard errors at provincial level are in parentheses. Controls include GDP per capita in logarithms, the number of firms per 1,000 inhabitants, the share of irregular workers, the share of manufacturing on total value added, year FE and province FE. The time span is reduced to the period 2009-2018 due to LFS data availability on employment.

Table 4: Immigration, import competition, and workplace accident rate in manufacturing by treatment intensity

	(1) Low - Low		(2) Low immigr. - High imp. comp.		(3) High immigr - Low imp. comp.		(4) High - High	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Immigrants per 1,000 inhabitants	-0.484	0.479	-0.966**	0.448	-0.330	0.282	0.048	0.062
Import competition, $IMP^{ITA-CHI}$	3.778	2.511	1.669**	0.726	5.910	4.443	0.253	1.320
Kleibergen-Paap F-Stat. (Immigrants)	1.84		2.50		2.04		20.43	
Kleibergen-Paap F-Stat. (Import competition)	23.93		20.71		38.48		88.31	
R-squared	0.687		0.409		0.794		0.719	
Observations	366		252		252		366	

Notes: * p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01. Standard errors are clustered at provincial level. Controls include GDP per capita in logarithms, the number of firms per 1,000 inhabitants, the share of irregular workers, the share of manufacturing on total value added, year FE and province FE. Model 1 (4) reports the estimates for the subsample of observations with a level of immigration and of import competition above (below) the median. Model 2 reports the estimates for the subsample of observations with a level of immigration below the median and a level of import competition above the median. Model 3 reports the estimates for the subsample of observations with a level of immigration above the median and a level of import competition below the median.

3.2 Potential mechanisms

Workers' health may be affected by trade exposure through different channels. Previous studies have highlighted the mechanisms underlying the relationship between globalization and workplace safety.

Colantone et al. (2019) provided evidence of a strong negative effect of trade exposure on mental health of individuals that is likely to work through standard labor market mechanisms, such as a higher risk of job displacement and reduced wage growth, but also by means of decreased job satisfaction and worsened expectations about the future. In particular, they highlighted that increased import competition induces workers to perceive their jobs as being made more unstable and demanding by the competitive pressure from trade that firms transfer to employees in terms of an increased workload. Evidence shows that an increased workload impairs health (Hummels et al., 2023). At the same time, worsening labor market conditions and health outcomes have also been found to follow trade liberalization episodes (Pierce and Schott, 2020; Fan et al., 2020). These channels – which have been shown to be pathways for increased mental distress in individuals – may also be mechanisms that produce reduced workplace safety. Similarly, job insecurity may arise from the increasing use by firms of temporary contracts or from their implementation of downsizing measures in response to heightened import competition. There is evidence that job insecurity linked to contract type negatively impacts both mental and physical health, correlates with various adverse health conditions, and consequently may lead to a higher incidence of workplace injuries. This is attributed to psychological effects, such as a loss of identity and meaning associated with one's job, along with high stress levels, diminished motivation, and reduced adherence to safety protocols (see e.g. Pirani and Salvini, 2015; Cottini and Ghinetti, 2018; Green, 2020).

Furthermore, Lang et al. (2019) and Adda and Fawaz (2020) found that workers' mental and physical health worsens when they are more exposed to import competition, indicating that stress in the workplace is more likely than job loss to drive the main results. As additional mechanisms, Lang et al. (2019) also found that import exposure increases both the share of employees who cannot afford necessary health care and to spend time for self-care and recreation activities. These items of evidence suggest that increased stress at work, reduced income with which to pay for medical examinations and health care, as well as working while ill as a result of exposure to import competition, are likely to play a role also in explaining the increase in workplace injuries due to international competition.

Finally, McManus and Schaur (2016) found that the negative effect of exposure to Chinese import competition is greater after removing the most quality-differentiated industries, and it is concentrated among firms with reduced growth in capital investments. If firms decide to respond to greater import competition by pushing workers harder, or by reducing investments in workplace safety as a cost-saving strategy instead of upgrading technologies, their productivity may improve at the cost of greater risks in the workplace.

Therefore, it can be hypothesized that the main mechanisms driving the negative impact of global economic integration on occupational health involve firms' adaptive strategies. These strategies may include decreased investments in new technologies or safety standards and heightened demands on employees so that the firm can remain competitive internationally. Moreover, job insecurity, dissatisfaction, and severe workplace stress may cause the health and concentration of workers to deteriorate.

Since provincial level data on firms' investments in new technology, product quality and/or safety norms are not available from ISTAT, in this subsection we exploit worker-level information from the Italian Labour Force Surveys (LFS) for manufacturing industry in the years 2008-2018 in order to focus on the other channels and to test the increased workload and job insecurity as potential mechanisms in the IV estimates presented in Table 5.[13] We then retrieve the type of employment contract - whether fixed-term or permanent - as a measure of job security and use workers' participation in night shifts and their total number of hours worked to measure their workload.

Panel A of Table 5 shows that immigration and import competition have no effect on the probability of a worker being employed on a fixed-term contract. In addition, the probability of being involved in night shifts is lower for workers exposed to higher immigration, while it is higher for workers exposed to stronger import competition, although the latter effect is significant only at the 10% level. There is no significant relationship between immigration and import competition and the total working hours of manufacturing workers.

Although no effect emerges on the probability of being employed on a fixed-term contract, the effect of import competition and migration on working conditions may differ among workers on fixed-term contracts compared to workers on permanent ones, because the former may be more inclined to accept more night shifts and longer working

[13]Each specification includes controls for the individual's age gender and migration status as well as NACE Rev.2 2-digit sector dummies, province FE, year FE and further province level covariates. Standard errors are clustered at provincial level. First stage results for this set of estimates are not shown for the sake of brevity, but are available from the authors upon request.

Table 5: Employment contract, night shifts and working hours

A) All workers	All employment contracts			Fixed-term		Permanent	
	Fixed-term	Night shifts	Working hours	Night shifts	Working hours	Night shifts	Working hours
Immigrants per 1,000 inhabitants	0.201	-1.540**	0.272	-5.098**	2.622	-1.221*	-0.008
	(0.250)	(0.721)	(1.406)	(2.448)	(2.921)	(0.645)	(1.467)
Import competition, $IMP^{ITA-CHI}$	-0.001	0.012*	0.011	0.026*	-0.008	0.010	0.012
	(0.004)	(0.007)	(0.018)	(0.014)	(0.024)	(0.007)	(0.019)
Kleibergen-Paap F-Statistic (Immigrants)	7.395	7.396	7.443	5.873	5.973	7.552	7.591
Kleibergen-Paap F-Statistic (Import competition)	32.24	32.19	32.28	17.80	17.82	34.70	34.80
R-squared	0.150	0.089	0.020	0.083	0.018	0.091	0.020
Observations	325,341	325,014	321,957	32,829	32,432	292,185	289,525
B) Men	All employment contracts			Fixed-term		Permanent	
	Fixed-term	Night shifts	Working hours	Night shifts	Working hours	Night shifts	Working hours
Immigrants per 1,000 inhabitants	0.346	-2.148**	1.332	-7.512**	4.734	-1.704**	0.983
	(0.330)	(0.966)	(1.696)	(3.308)	(3.330)	(0.842)	(1.777)
Import competition, $IMP^{ITA-CHI}$	-0.002	0.019**	0.010	0.043**	-0.022	0.016**	0.012
	(0.004)	(0.008)	(0.021)	(0.020)	(0.030)	(0.008)	(0.021)
Kleibergen-Paap F-Statistic (Immigrants)	7.738	7.738	7.779	6.615	6.758	7.836	7.864
Kleibergen-Paap F-Statistic (Import competition)	24.90	24.84	24.87	15.43	15.44	26.16	26.20
R-squared	0.159	0.088	0.014	0.080	0.012	0.091	0.014
Observations	234,801	234,543	232,22	22,391	22,122	212,152	210,098

* p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01. Standard errors are clustered at provincial level. Controls include individual's age class, gender and migration status dummies, GDP per capita in logarithms, the number of firms per 1,000 inhabitants, the share of irregular workers, the share of manufacturing on total value added, 2 digit industry FE, year FE and province FE.

hours with a view to obtaining more stable working conditions in the future. We test this hypothesis in the last four columns, where we split the sample between fixed-term and permanent contract workers in order to determine whether the type of employment contract has a moderating role in the nexus between the two globalization forces and the working conditions of Italian manufacturing employees. Table 5 shows that import competition only affects the probability of being involved in night shifts for fixed-term workers (significant at 10%).

Panel B of Table 5 focuses on male workers, who, based on the above findings in Table 3, emerge as the most affected category of workers. The evidence from panel a is confirmed and reinforced. In particular, Panel b suggests that import competition has an effect on the probability of men's involvement in night shifts especially for fixed-term workers.

3.3 Robustness checks

To test the robustness of our findings, we performed a set of sensitivity checks. Their results are reported in Table 6.

First, we used an overidentified 2SLS specification to instrument Chinese import competition. Second, we constructed a measure of import competition based on low- and middle-income countries and used it in place of the Chinese exposure to take into account the role played by the other actors in the globalization phenomenon. These findings are

set out in columns (1) and (2) and are similar to the baseline ones. Third, we estimated the effect of import competition and immigration on workplace safety using two-year lags. Column (3) shows that the estimates are very close to the baseline findings. Fourth, we used different employment weights to compute our local measure of trade exposure to Chinese import competition by exploiting ASIA data on sectoral employment in 2008. Fifth, column (5) suggests that the main results are not affected by the inclusion of region-specific time trends, which are meant to capture cross-regional unobserved differences or shocks in workplace injuries over time. Finally, we estimated an alternative specification based on the long-difference model, accounting for the impact of changes in import competition and immigration on the change in workplace accident rates between 2008 and 2019. These results are reported in column (6) and are in line with the baseline findings.

Table 6: Robustness checks

	(1) Overid. 2SLS[(a)]	(2) Low-middle income countries	(3) 2-year lags	(4) Employment weights at 2008	(5) Region-specific time trend	(6) Long-difference Δ(2008-2019)
Immigrants per 1,000 inhabitants	-0.088	-0.014	-0.059	-0.078	0.048	-0.118
	(0.099)	(0.091)	(0.093)	(0.108)	(0.065)	(0.127)
Import competition $IMP^{ITA-CHI}$	1.854***	0.802***	1.713***	1.947**	1.325***	2.312***
	(0.523)	(0.252)	(0.640)	(0.758)	(0.445)	(0.835)
Kleibergen-Paap F-Statistic (Immigrants)	9.18	22.47	17.86	24.23	17.86	19.66
Kleibergen-Paap F-Statistic (Import Competition)	57.43	16.57	29.56	17.83	24.89	75.34
R-squared	0.704	0.697	0.708	0.689	0.342	0.827
Observations	1,236	1,236	1,236	1,236	1,236	103

Notes: * p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01. Clustered standard errors at provincial level are in parentheses. Specifications from (1) to (5) control for GDP per capita in logarithms, the number of firms per 1,000 inhabitants, the share of irregular workers, the share of manufacturing on total value added, year FE and province FE.

[(a)] Hansen J-Statistic (p-value) is 0.148.

4 Conclusions

This paper contributes to the growing literature on the impact of globalization on workplace safety by investigating the role of both immigration and trade exposure to Chinese import competition. Using provincial-level administrative data on workplace injury rates in Italy, we estimated the effects of the two facets of globalization on occupational health using an IV approach which addressed their potential endogeneity by means of Bartik-style instruments.

Although the negative relationship between immigration and workplace injury rates is not statistically significant at conventional levels, we found a worsening of workplace

safety following an increase in exposure to import competition in the Italian manufacturing sector. This effect was detected for both mild and severe workplace injuries, and it was concentrated on male, middle-aged, and native-born employees. To be noted is that the increase in workplace injuries as a result of import competition is detected in those provinces characterized by a lower share of immigrants, whereas this negative impact on workplace safety proves to be not statistically significant when also immigration is above the median. These results suggest that foreign workers may mitigate the overall negative welfare effect of competitive pressure. Relying on previous evidence, we suggest that potential underlying mechanisms are likely to be related to firms' responses to greater international competition, such as reduced investments in new technology or safety norms and increased workload per employee, along with greater job insecurity and increased stress in the workplace. In this regard, some evidence from worker-level estimates on LFS data for Italian manufacturing suggests that, while immigration seems to ease individual working conditions by reducing the incidence of night shifts, import competition appears to make them tougher by increasing the incidence of such a measure of the workload. In general, the workload of men on temporary contracts appears to be more responsive to globalization forces.

While public opinion often views immigration as one of the most pressing challenges for receiving countries, our findings underscore a potentially negative impact of import competition on welfare. These insights can help shape the policy debate and guide actions to mitigate the adverse effects of globalization.

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Appendix

Table A.1: Summary statistics across provinces, 2008–2019

	Mean	Std. Dev.	Min.	Max.
a. Outcome variables				
Workplace injury rate per 1,000 workers	18.563	9.163	4.429	71.272
Workplace severe injury rate ($>$ 30 days of absence) per 1,000 workers	6.087	2.613	1.890	22.667
Workplace non-severe injury rate ($\leq$ 30 days of absence) per 1,000 workers	12.475	7.106	2.025	54.987
Lost days per 1,000 workers	680.685	294.096	224.887	2,653.517
b. Globalization variables				
Immigrants per 1,000 inhabitants	74.987	39.227	8.490	207.159
Exposure to Chinese import competition per worker ($IMP^{ITA-CHI}$)	6.223	1.705	2.744	16.247
c. Control variables				
Natural log of GDP per capita	10.113	0.270	9.575	10.930
Share of manufacturing on total value added (%)	15.682	8.319	1.724	38.966
Number of firms per 1,000 inhabitants	5.587	1.164	3.008	14.076
Share of irregular workers (%)	12.969	4.316	7.073	23.246
Observations		1,236		
Number of provinces		103		
Number of years		12		

Table A.2: Indirect falsification test for conditional instrument validity based on negative controls

Dependent variable:	IMP^{HIC}_{pt-1}		Z_{pt-1}	
	Coeff.	p-value[(a)]	Coeff.	p-value[(a)]
Workplace injury rate$_{t-4}$	0.030	0.981	-0.032	0.990
Workplace severe injury rate$_{t-4}$	0.041	0.990	0.214	0.914
Lost days per 1,000 workers$_{t-4}$	-0.000	0.990	-0.013	0.120
Natural log of GDP per capita$_{t-4}$	0.416	0.990	3.587	0.990
Share of manufacturing on total value added$_{t-4}$	-0.067	0.986	0.167	0.538
Number of firms per 1,000 inhabitants$_{t-4}$	0.256	0.955	0.527	0.969
Share of irregular workers$_{t-4}$	0.335	0.097	-0.795	0.119
Young's (2019) randomization-t p-value of the null of complete insignificance[(b)]				
By equation	0.091		0.099	
Across equations	0.169			

Notes: * p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01. The number of observations is 824 from 103 provinces observed for 8 years from 2012 until 2019. The regression includes also province FE, year FE and further covariates at time t.

[(a)] Romano and Wolf's (2005a; 2005b) step-down adjusted p-values robust to multiple hypothesis testing, with clusters at provincial level (2,500 bootstrap replications).

[(b)] Westfall-Young approach on the basis of Young's (2019) randomization-t procedure with 2,500 replications.

Table A.3: Significance of the instruments in the main equation

Dependent variable:	Workplace injury rate		Workplace severe injury rate		Workplace non-severe injury rate		Lost days	
	Coeff.	p-value[(a)]	Coeff.	p-value[(a)]	Coeff.	p-value[(a)]	Coeff.	p-value[(a)]
IMP^{HIC}_{t-1}	0.142	0.096	0.043	0.096	0.099	0.135	1.130	0.332
Z_{t-1}	0.001	0.985	0.008	0.581	-0.008	0.804	-1.726	0.320
Young's (2019) randomization-t p-value of the null of complete insignificance[(b)]								
By equation	0.084		0.073		0.121		0.328	
Across equations	0.191							

Notes: * p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01. The number of observations is 1,236 from 103 provinces observed for 12 years from 2008 until 2019. The regression includes also immigrants per 1,000 inhabitants, exposure to Chinese import competition per worker ($IMP^{ITA-CHI}$), province FE, year FE and further covariates.

[(a)] Romano and Wolf's (2005a; 2005b) step-down adjusted p-values robust to multiple hypothesis testing, with clusters at provincial level (2,500 bootstrap replications).

[(b)] Westfall-Young approach on the basis of Young's (2019) randomization-t procedure with 2,500 replications.

Table A.4: Correlation between the 2018-2009 change in the instruments and outcomes in 2008

Dependent variable:	$\Delta IMP^{HIC}_{p,2018-2009}$		$\Delta Z_{p,2018-2009}$	
	Coeff.	p-value[(a)]	Coeff.	p-value[(a)]
Workplace injury rate$_{2008}$	-0.359	0.685	-0.895	0.733
Workplace severe injury rate$_{2008}$	0.370	0.741	4.500	0.733
Lost days per 1,000 workers$_{2008}$	0.014	0.591	-0.044	0.733
Young's (2019) randomization-t p-value of the null of complete insignificance[(b)]				
By equation	0.272		0.524	
Across equations	0.473			

Notes: * p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01. The number of observations is 103. The regression includes also regional FE.

[(a)] Romano and Wolf's (2005a; 2005b) step-down adjusted p-values robust to multiple hypothesis testing, with clusters at provincial level (2,500 bootstrap replications).

[(b)] Westfall-Young approach on the basis of Young's (2019) randomization-t procedure with 2,500 replications.

Table A.5: Province balance tests

Balance variables	Coeff.	Std. Err.
Natural log of GDP per capita$_{2008}$	0.002	0.021
Share of manufacturing on total value added$_{2008}$	-0.046	0.143
Number of firms per 1,000 inhabitants$_{2008}$	-0.025	0.045
Share of irregular workers$_{2008}$	-0.015	0.152
Immigrants per 1,000 inhabitants$_{2008}$	-0.237	0.683
Observations	103	

Notes: Regression coefficients of 2008 province-level covariates on the 2018-2009 change in the shift-share instrument for import competition, controlling for regional FE. We report the "exposure-robust" standard errors obtained following Adao et al. (2019).

Table A.6: Summary of Rotemberg Weights

Panel A: Negative and positive weights (α_c)					
		Sum	Mean	Share	
Negative		-0.023	-0.003	0.022	
Positive		1.023	0.020	0.978	
Panel B: Correlations of Country Aggregates					
	α_c	$Migrants_c$	$\hat{\beta}_2^c$	F_c	Var(w_c)
α_c	1				
$Migrants_c$	0.850	1			
$\hat{\beta}_2^c$	-0.020	-0.076	1		
F_c	0.019	-0.086	0.078	1	
Var(w_c)	-0.072	-0.074	-0.220	-0.055	1
Panel C: Top 5 Rotemberg weight countries					
		α_c	$Migrants_c$	$\hat{\beta}_2^c$	
China		0.199	5.30e+05	0.132	
Egypt		0.059	2.24e+05	0.100	
Europe		0.293	2.61e+06	-0.389	
India		0.056	2.60e+05	0.202	
Pakistan		0.049	1.72e+05	0.285	

Notes: This table reports statistics on Rotemberg weights α_c. Estimates are based on model 2 where $IMP^{ITA-CHI}$ is considered exogenous. Panel A reports statistics on the relative importance of negative and positive weights. Panel B reports correlations between the weights (α_c), the national component of the stock ($Migrants_c$), the just-identified coefficient estimates ($\hat{\beta}_2^c$), the first-stage F-statistics (F_c), and the variation in the origin country shares across locations (Var(w_c). Panel C reports the top 5 origin countries according to the Rotemberg weights. The $Migrants_c$ is the immigration share from 2008 to 2019, $\hat{\beta}_2^c$ is the coefficient of the just-identified regression.

Table A.7: Alternative estimators for immigrants share

	(1)	(2)
	β_2	Over-identifying Restrictions Test
1 - OLS	-0.04	
	(0.04)	
2 - 2SLS	-0.02	
	(0.09)	
3 - 2SLS (Shares w_c as IVs)	-0.03	628.33
	(0.04)	[0.59]
4 - MBTSLS	-0.03	
	(0.04)	
5 - LIML	-0.03	628.29
	(0.06)	[0.59]

Notes: This table reports a variety of estimates of the coefficient of immigrants share. The regressions are at the province-country-year level for the 2008-2019 period. Column (1) reports coefficient estimates of the baseline model 2 where $IMP^{ITA-CHI}$ is considered exogenous. The 2SLS row uses the baseline shift-share instrument of equation 5. The 2SLS (Shares as IVs) row uses each origin country share separately as an instrument. To account for the potential finite sample bias of 2SLS using all the shares as instruments, we further present two alternative estimators which supposedly have better properties with many instruments: the modified bias corrected 2SLS (MBTSLS) and the Limited Information Maximum Likelihood (LIML). The MBTSLS row uses the estimator of Anatolyev (2013) and Kolesár et al. (2015) with the same set of instruments. The LIML row shows estimates using the limited information maximum likelihood estimator with the same set of instruments. Standard errors are in parentheses and are constructed by bootstrap over provinces. In Column (2) we report the test for the over-identifying restrictions. P-values are in brackets.

Table A.8: Immigrants' origin

Macro-areas	58 countries/groups used
Africa	
North Africa	Morocco, Algeria, Egypt, Libya, Tunisia
East Africa	Eritrea, Ethiopia, Somalia, Mauritius, Other[(a)]
West Africa	Burkina Faso, Ivory Coast, Gambia, Ghana, Guinea, Mali, Nigeria, Senegal, Other[(b)]
Centre-South Africa	Camerun, Republic of Congo, Other[(c)]
Asia	
West Asia	Georgia, Iran, Iraq, Lebanon, Syria, Other[(d)]
East Asia	China, Philippines, Other[(e)]
Centre-South Asia	Afghanistan, Bangladesh, India, Pakistan, Sri Lanka, Other[(f)]
America	
North America	Canada, United States
Latin America	Argentina, Brazil, Colombia, Cuba, Dominican Republic, Ecuador, Peru, Other [(g)]
Oceania	Oceania[(h)]
Europe	
Extra EU	Albania, Bosnia and Herzegovina, North Macedonia, Moldova, Russia, Turkey, Ukraine, Other[(i)]
EU	28 EU countries plus Iceland, Liechtenstein, Norway, Monaco, San Marino, Switzerland, Vatican City[(j)]
Stateless	Individuals without any citizenship

Source: Our elaborations of ISTAT data.

[(a)] Other East Africa: Burundi, Comoros, Djibouti, Kenya, Madagascar, Malawi, Mozambique, Rwanda, Seychelles, Sudan, South Sudan, Tanzania, Uganda, Zambia, Zimbabwe.

[(b)] Other West Africa: Benin, Capo Verde, Guinea-Bissau, Liberia, Mauritania, Niger, Sierra Leone, Togo.

[(c)] Other Centre-South Africa: Angola, Botswana, Central African Republic, Chad, Democratic Republic of Congo, Equatorial Guinea, Eswatini, Gabon, Lesotho, Namibia, Sao Tomé and Principe, South Africa.

[(d)] Other West Asia: Armenia, Azerbaijan, Bahrain, Israel, Jordan, Kuwait, Oman, Palestine, Qatar, Saudi Arabia, United Arab Emirates, Yemen.

[(e)] Other East Asia: Brunei, Cambodia, Indonesia, Japan, Laos, Malaysia, Myanmar, Mongolia, North Korea, Singapore, South Korea, Taiwan, Thailand, Viet Nam.

[(f)] Other Centre-South Asia: Bhutan, Kazakhstan, Kyrgyzstan, Maldives, Nepal, Tajikistan, Turkmenistan, Uzbekistan.

[(g)] Other Latin America: Antigua and Barbuda, Bahamas, Barbados, Belize, Bolivia, Chile, Costa Rica, Dominica, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela.

[(h)] Oceania: Australia, Fiji, Kiribati, Marshall, Micronesia, Nauru, New Zealand, Palau, Papua New Guinea, Solomon, Tonga, Tuvalu, Vanuatu.

[(i)] Other Extra-EU: Andorra, Belarus, Kosovo, Montenegro, Serbia.

[(j)] Residence permits are not required for these countries.

Figure A.1: Accident rates (per 1,000 workers), exposure to Chinese import competition ($ per worker) and immigrants (per 1,000 inhabitants) across Italian provinces (2008-2019 averages)

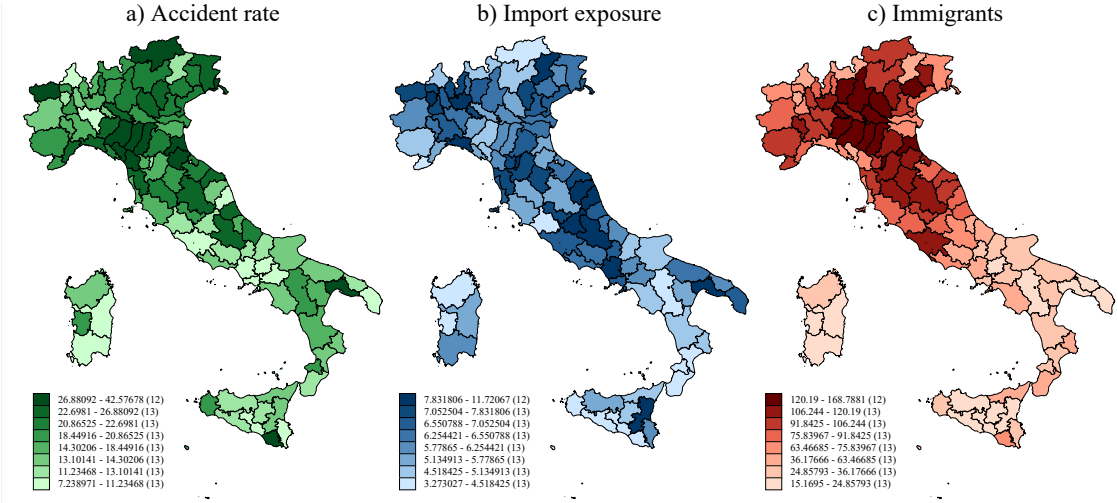
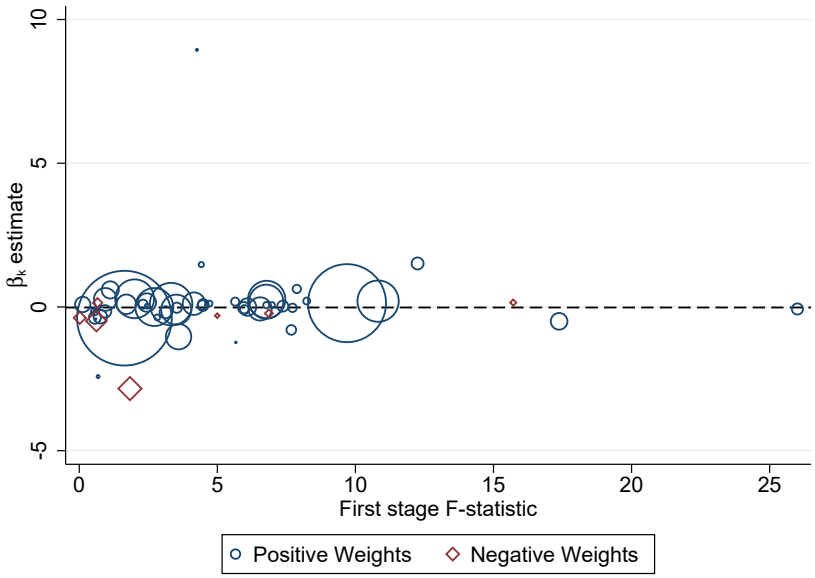


Figure A.2: Heterogeneity of just-identified IV estimates ($\hat{\beta}_2^c$)



Notes: This figure plots the relationship between each instrument's β_2^c, first-stage F-statistics, and the Rotemberg weights. Coefficient estimates are based on model 2 where $IMP^{ITA-CHI}$ is considered exogenous. Each circle is a separate instrument's estimate (country share). The y-axis plots the estimated β_2^c for each instrument and the x-axis plots the first-stage F-statistics. The size of the circles are scaled by the magnitude of the Rotemberg weights. The horizontal dashed line is plotted at the value of the overall β_2^c reported in the second column in the 2SLS (Bartik) row in Table A.7.