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Costs and Benefits of Trade Shocks: Evidence from Chilean Local Labor Markets * †

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Abstract

We study Chile's labor market responses to trade shocks during 1996-2006, exploiting spatial and time variations in trade exposure arising from initial differences in industry specialization across local labor markets and the evolution of shocks across industries. We take advantage of China's supply and demand's worldwide shocks to instrument for Chinese import competition and demand for Chilean exports. Our main finding is that increasing manufacturing import competition implied a significant rise in labor informality in more exposed local markets, especially among young and unskilled workers. These groups also suffered significant relative wage losses. Meanwhile, locations that benefited most from the increased demand for primary products experienced a relative increase in employment, particularly among young individuals, and reallocation from self-employment towards salaried jobs in the formal sector, along with relative wage gains among old-age workers. Interestingly, these areas experienced a smaller increase in tertiary education enrollment rates than less exposed areas.

JEL Classification: F14, F16, J23, J31, L60, O17, Q02, R12, R23.

Keywords: Trade Shocks, Local Labor Markets, Employment, Informality, Chile.

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I Introduction

The study of labor market responses to changes in trade flows has long been a subject of study in Economics. The literature has placed particular emphasis on the impact of trade shocks on certain labor market variables, such as employment and wages, stressing the differential impact across sectors, occupations and skill groups (Heckscher-Ohlin, Ricardo-Viner). In this paper, we depart from this approach and join a newer line of research that has focused on the effects of trade on individuals living in geographic areas with different patterns of industrial specialization.[1] These papers typically find substantial differences in the spatial distribution of the costs and benefits of trade.

We study the causal effect of trade shocks on Chilean local labor markets, exploiting spatial and time variations in trade exposure arising from initial differences in industry specialization across geographic locations and the evolution of shocks across industries. Besides considering typical outcomes such as employment, unemployment and wages, we focus on labor informality, a distinctive feature of labor markets in developing countries. We build upon recent research that finds that labor informality is a relevant margin of adjustment to trade shocks.[2] [3] We also explore the impact of trade shocks on tertiary schooling, in line with the literature that finds that trade liberalization amplifies initial differences in regional factor endowments over the long-run through its effects on human capital formation.[4]

Our main findings suggest that the costs and benefits of trade shocks depend on the local employment structure and vary considerably across sub-population groups. Locations with greater exposure to increasing import competition from China experienced a relative decline in manufacturing employment and wage losses for unskilled and young workers (mainly, in the service sector). Interestingly, labor informality plays a key role in the responses to trade shocks. In particular, we find that rising import competition implied a significant relative rise in labor informality, mainly among male, young and unskilled workers. On the benefits side, we find that locations specialized in the production and processing of primary products experienced a relative increase in employment, driven by the expansion of Chinese demand for Chilean exports. Employment growth mainly benefited young and male individuals. Interestingly, these areas also experienced a slower increase in tertiary education enrollment rates as compared to areas with less exposure.

For identification we exploit two sources of variation: (i) Chinese supply and demand shocks vary over time and across industries; and (ii) Chilean local labor markets (LLMs) exhibit different (pre-shock) patterns of industry specialization. Notably, Chinese demand

[1] Topalova (2010), Kovak (2013), Autor, Dorn, and Hanson (2013), Dauth, Suedekum, and Findeisen (2014), Costa, Garred, and Pessoa (2016), Dix-Carneiro and Kovak (2017), Caliendo, Dvorkin, and Parro (2019), among many others.

[2] Goldberg and Pavcnik (2003), Bosch, Goñi-Pacchioni, and Maloney (2012), Paz (2014), Arias, Artuc, Lederman, and Rojas (2018), Cruces, Porto, and Viollaz (2018), Dix-Carneiro and Kovak (2019).

[3] For a review of the relationship between informality and development see La Porta and Shleifer (2014) and Ulyssea (2020).

[4] See Atkin (2016), Greenland and Lopresti (2016), Blanchard and Olney (2017), Li (2018).

for Chilean exports was highly skewed towards the mining and manufacturing of basic precious and non-ferrous metals, mainly copper. For its part, Chinese supply shock in Chile was totally focused on manufacturing and, within this sector, was highly heterogeneous across industries.[5]

China's spectacular growth over the last several decades provides a unique opportunity to measure the causal effect of trade shocks on relevant outcomes. China's growth was mostly driven by strong investments in infrastructure, increases in total factor productivity, massive migration from rural to urban regions and an export-oriented strategy that placed China as one of the world's leading manufacturing producers and the main global consumer of primary products.[6] The growth in imports and exports driven by China's economic, political and institutional factors provides a potential exogenous shock to firms and workers from all over the world. The small size, considerable trade openness and flexible labor markets of the Chilean economy increase the suitability of this scenario to study the causal impact of trade-induced shocks on local labor market outcomes.

Our identification strategy is very close to the shift-share approach proposed by Bartik (1991).[7] We assume that LLMs are units with different exposures to a common set of industry shocks (driven by China's trade expansion) with local exposure given by initial industrial composition. In the case under study, we construct the pattern of industry specialization using 1992 census data -a date prior to China's significant expansion in global trade. This takes into account the fact that the shock may have affected Chilean industrial composition, as our estimates indeed suggest. On the supply side, we exploit the sharp increase in Chinese supply of manufactures as a competitive shock for Chilean locations specialized in manufacturing production. On the demand side, we take advantage of the strong expansion in Chinese demand for commodities as a demand shock for Chilean regions specialized in the production and processing of primary products. In order to consider the possible endogeneity of industry shocks, we use China's global supply and demand shocks as instruments for Chinese import competition and demand for exports. The exogeneity of local employment industrial composition is *a priori* more difficult to justify because it assumes that unobserved industry shocks do not affect regional outcomes through the same combination of exposure shares. We conduct several tests to justify this assumption and perform a robustness exercise applying the econometric framework developed by Borusyak, Hull, and Jaravel (2020). Under this framework, identification follows from the quasi-random assignment of shocks while exposure shares are allowed to be endogenous. Finally, and importantly, our estimates deliver relative effects across

[5]The leather, clothing and apparel, textiles and toy industries were highly exposed to Chinese import competition during 1996-2006 period; by comparison, sectors like machinery and equipment, computers, electronics and furniture were moderately exposed; the food, paper, and chemical industries were barely exposed.

[6]Many of these factors were driven by market-oriented reforms that began in the 1980s. For evidence on China's economic transition see Borensztein and Ostry (1996), Naughton (1996), Hsieh and Klenow (2009), Brandt, Van Biesebroeck, and Zhang (2012) and Hsieh and Ossa (2016).

[7]This method has also been used by other authors (e.g. Topalova (2010), Kovak (2013), Autor et al. (2013), Costa et al. (2016), Dix-Carneiro and Kovak (2017; 2019)).

locations but cannot account for the aggregate impact of the shocks, which depend on spillovers across geographic units and other general equilibrium effects (e.g. changes in input and output prices, firms productivity, and aggregate demand multiplier effects).[8]

The main dataset used throughout this paper is the Chilean national household survey (*Encuesta de Caracterización Socioeconómica Nacional-CASEN*) conducted by the Chile's Ministry of Planning (MIDEPLAN) every two or three years.[9] We also use information from Chilean demographic censuses (*Censo Nacional de Población y de Vivienda*) sourced from the Chile's National Institute of Statistics (*Instituto Nacional de Estadística-INE*). To construct measures of Chinese import competition (CIC) and Chinese demand for exports (CDE) at the industry-level we draw on three additional datasets: *Encuesta Nacional Industrial Anual-ENIA* (INE), Sectoral GDP from National Accounts elaborated by the Chilean Central Bank (*Banco Central de Chile-BCC*) and the BACI database (*Centre d'Etudes Prospectives et d'Informations Internationales-CEPII*).

The baseline estimation equation regresses each outcome variable (employment, unemployment and labor informality rates, average wages, hours worked, sectoral employment shares) on the Chinese supply and demand shocks. Since we include LLM and year fixed effects we are exploiting within-LLM variation over time. Our preferred specification also controls for preexisting trends. Since CDE and CIC are endogenous because industry shocks affecting the labor market might be correlated with shocks to import demand and export supply, we instrument these variables with China's average participation in manufacturing imports and in primary-manufacturing exports across all countries in the world except Chile.[10] The former instrument aims to capture China's supply-driven shocks as measured by its global average market share within specific manufacturing industries over time, and the latter is aimed at capturing China's demand-driven shocks as measured by its increasing participation in global demand for different products. The results of first-stage regressions show both instruments as having strong predictive power. The identifying assumptions behind this approach are: (i) China's import and export growth are not driven by Chilean demand and supply industry shocks (which is justified by the fact that Chile is a small economy); (ii) unobserved industry shocks are uncorrelated with LLM outcomes through the same combination of exposure shares than shock measures (which we assess by means of region- and industry-level balance tests); and (iii) trade shocks do not affect labor mobility across LLMs in the short-run. To verify the plausibility of the latter assumption, we study the causal impact of CIC and CDE on migration patterns.

Our main finding is that rising import competition led to a deterioration of labor market conditions in the short-run, which mainly affected young and unskilled individuals.

[8] See for instance Acemoglu, Autor, Dorn, Hanson, and Price (2016) and Caliendo et al. (2019).

[9] The CASEN survey is national in scope and includes information on more than 300 municipalities (*comunas*) which are aggregated into 61 LLMs.

[10] We present several robustness exercises, including one that uses different groups of countries to construct these instrumental variables (high-income, middle-income and Latin American countries).

These groups experienced a relative decline in manufacturing employment and wages, and a relative increase in labor informality (unregistered jobs with no access to social security). This is consistent with unskilled (mostly young) workers displaced by import competition relocating to new jobs, often in the service sector and under conditions of labor informality. Meanwhile, unskilled and older workers that remained employed in manufacturing experienced wage losses and rising rates of informality. Informality allows firms to reduce tax and other labor costs at the risk of being caught and forced to pay a fine. Facing stronger competition from imports, some firms may take that risk. Firms may also replace permanent employees with part-time workers and apprentices, and subcontract some production activities with other plants in the informal sector. On the other hand, workers may be more likely to accept an informal labor arrangement in the context of a weaker labor market. Additionally, we find that increasing import competition is associated with a moderate relative increase in the employment rate of young people with some tertiary education which, we argue, might be partially explained by the "added worker effect" hypothesis: as a result of the worsening labor conditions for some members of the household (e.g. old-age workers), secondary workers (e.g. children studying at university or a tertiary institute) may enter the labor market in order to ameliorate negative shocks. In fact, we find that locations facing larger import shocks experienced a relative decline in the fraction of individuals enrolled in tertiary education.

On the other hand, the main benefit from trade was a relative increase in employment in locations specialized in the production and processing of primary products, especially among young workers and males (both skilled and unskilled). Our estimates suggest that job opportunities for young individuals in the primary sector took the form of temporary contracts (presumably short-term or apprentices) instead of permanent wage jobs with social security contributions. In contrast, old-age workers experienced relative wage gains and reallocation from self-employment towards salaried jobs in the formal sector. Finally, locations favored by the demand shock experienced a lower relative rise in tertiary education enrollment, which may hinder local development through its effects on human capital formation. Overall, our findings reveal considerable heterogeneity in the spatial distribution of the costs and benefits of trade across sub-population groups.

Our research contributes to a vast literature that examines the impact of Chinese import competition on domestic workers, firms, and markets. Most papers in this field emphasize the negative effects of Chinese imports on employment and wages, which generally focus on the most vulnerable firms, workers, and in particular occupations.[11] The deterioration of labor market conditions driven by import competition can lead to worse health outcomes, an increase in crime rates and lower provisions of public goods in affected locations.[12] On the benefits side, manufacturing productivity may rise in response

[11] See Autor et al. (2013); Autor et al. (2014); Utar (2018); and Cabral, Martins, Pereira dos Santos, and Tavares (2021). For evidence at the firm-level, see Alvarez and Claro (2009), Pierce and Schott (2018), César and Falcone (2020).

[12] Lang, McManus, and Schaur (2016), Feler and Senses (2017), Dix-Carneiro, Soares, and Ulyssea (2018), Che, Xu, and Zhang (2018), Colantone, Crino, and Ogliari (2019), Autor, Dorn, and Hanson (2019),

to import competition through within-firm innovation and input reallocation towards more efficient plants (Utar and Torrez Diaz (2013), Bloom, Draca, and Van Reenen (2015)). Some workers might attempt to return to their education after losing their job to import competition (Utar (2018)) and young individuals may be more willing to finish secondary education (Greenland and Lopresti (2016)). Generally, consumers gain from trade due to lower prices (Traiberman (2019), Jaravel and Sager (2019)).

Our paper is most closely related to recent works that study the impact of both supply and demand shocks on local labor markets. Dauth et al. (2014, 2017) document that regions in Germany specialized in export-oriented industries experienced employment gains that outweighed the employment losses of regions specialized in import-competing industries (but net effects were driven by the rise of Eastern Europe rather than China) and conclude that globalization fostered manufacturing employment in Germany. Egger, Kaynak, and Zoller-Rydzek (2020) document that Turkish regions more exposed to increasing demand for exports from China experienced relative employment gains, while import-competing regions encountered very small effects on the labor market. Costa et al. (2016) suggest that Brazilian regions facing stronger import competition exhibited relative slower growth in manufacturing wages than less exposed areas, while regions specialized in commodities had the benefit of relative wage gains and shifts towards formal employment.

We contribute to this literature by providing causal evidence on the heterogeneous effects of trade shocks across sub-population groups by exploiting spatial and time variations in trade exposure across local labor markets in a small and open developing economy. Our results confirm previous findings in the literature and add some novel contributions regarding the roles played by labor informality and labor supply among secondary household members in response to import competition. In particular, we find that the informal sector acts as a buffer against a negative shock on the local labor market, and that secondary workers may enter the labor market to help ameliorate the shock.

The rest of the paper is organized as follows. Section II comments on the recent economic history and reforms of Chile and China and presents a brief theoretical discussion. We discuss the identification problem and the empirical strategy in Section III, and include a detailed description of the data and summary statistics. All empirical findings are presented and discussed in Section IV. We finish with some concluding remarks in Section V. Additional discussions, figures and tables are included in the Appendix.

Dell, Feigenberg, and Teshima (2019).

II Background and motivation

II.1 Recent economic history and reforms in Chile and China

After a period of state intervention and the implementation of an import-substitution policy regime in the 1960s and early 1970s, the Chilean military government carried out a large set of market-oriented reforms from 1974 to 1979. As part of the trade liberalization program, Chile eliminated most non-tariff barriers (NTBs) and reduced tariffs significantly.[13] Taken together, these reforms made Chile one of the most trade-oriented economies in Latin America at the beginning of the 1990s. As an example, Chile's trade-to-GDP ratio was 61.8 percent in 1990 compared to an average ratio of 33 percent across Latin American countries.[14]

The reforms also affected labor market regulations. The government banned unions and replaced collective bargaining with a wage-setting plan. The Labor Code approved in 1979 replaced national unions with firm-level ones, curtailed workers' rights to strike, and significantly reduced the costs of hiring and firing. A few modifications to the Labor Code were introduced in 1991, in the context of a new democratic government. Perhaps the most relevant was the increase in the limit on the wage compensation of fired workers, from five to eleven months of wages. Chile experienced a macroeconomic downturn between 1998 and 2001, which triggered an intense debate on labor regulations and ultimately led to the implementation of new changes in the labor laws in December 2001. The reform increased collective bargaining rights and extended some margins of flexibility related to hiring practices, apprenticeships, part-time jobs, and short-term contracts. Besides some changes in the compensation scheme, these reforms remained in place during the period under study. Overall, Chile is a small open economy with a relatively flexible labor market. The Chilean case provides a nice scenario in which to study the causal impact of trade shocks on the labor market.

On the other hand, China carried out a broad set of structural reforms beginning in the 1980s, which transformed its agrarian structure into a modern industrialized economy and a world-leading producer of manufactures. The main trade reforms pursued a dualistic regime characterized by import-substitution and export-promotion policies (Naughton, 1996). Alongside these reforms promoting economic growth and trade, the country's accession to The World Trade Organization (WTO) in December 2001 gave China the permanent status of most-favored nation among the WTO members. According to the World Bank's World Development Indicators, China's exports-to-GDP ratio increased from 5.9 percent in 1980 to a peak of 36 percent in 2006.

Much of China's growth was driven by massive migration from rural to urban

[13] While some tariffs exceeded 100 percent in 1974, five years later they were reduced to a uniform ad-valorem tariff of 10 percent. Tariffs increased 35 percent during the recession of 1982-84, but declined to 20 percent in 1985. NTBs were not applied during this transitory period. See Levinsohn (1999) and Pavcnik (2002).

[14] The World Bank, World Development Indicators database.

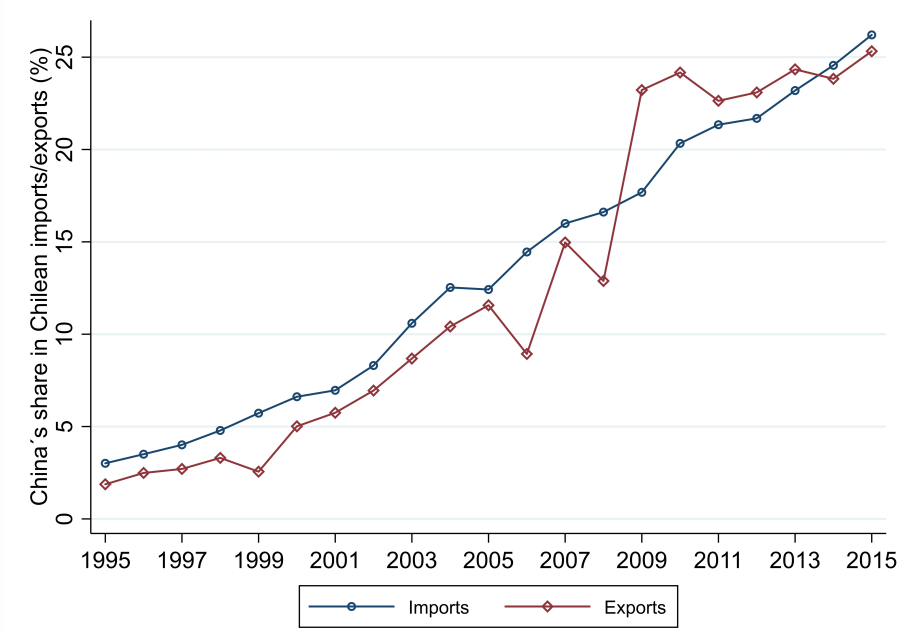
regions, strong investments in infrastructure, increased access to foreign technologies, intermediate inputs and capital goods, a massive inflow of foreign direct investment, and a stunning increase in total factor productivity (TFP). According to Brandt et al. (2012), China had an average annual growth in manufacturing TFP of 8 percent over the period 1998-2007. The growth in exports driven by these factors inherent to Chinese economic forces and institutions, provides a potential exogenous shock for firms and workers all over the world. Relatedly, China's income growth, urbanization, and increasing economic integration with the rest of the world, among other factors, brought about a sharp increase in Chinese demand for commodities (e.g. crude petroleum, soybeans, iron and copper), natural resource-intensive manufactures (refined fuels, refined metals and processed food products) and intermediate inputs and capital goods to supply its increasing manufacturing production. Overall, China has become one of the leading-sources of global supply and demand in many key sectors of international trade.

Figure 1 presents China's participation in Chilean imports and exports during the period 1995-2015. The graph illustrates the growing importance of China in Chilean international trade. While only 3 percent of Chilean imports were sourced from China in 1995, this fraction steadily increased over time reaching 7 percent in 2001, 14.5 percent in 2006 and 26.2 percent in 2015. On the exports side, the trend is similar. The fraction of Chilean exports delivered to China has grown from 1.9 percent in 1995 to 5.8 percent in 2001, 8.9 percent in 2006 and skyrocketed to 25.3 percent in 2015. Notably, China became the main destination of Chilean exports in 2007, and the most important source of Chilean imports in 2014 (after being in the second place of this rank since 2007, behind the U.S.). The export series exhibits a volatile behavior between 2005 and 2009, which might be related at least to two factors: (i) the global financial crisis, which severely affected Chilean exports; and (ii) the free trade agreement (FTA) signed by Chile and China in 2006, which established an immediate tariff reduction comprising 92% of Chilean exports to China. Given that both factors raise potentially serious endogeneity concerns, our main analysis limits the period under study to 1996-2006. However, we perform a robustness exercise extending the sample period beyond 2006 sequentially and conduct long-term estimates using census data for 1992, 2002, and 2012. The power of instrumental variables decreases considerably as we add years after 2006 to the sample, indicating that China's industry trends in global markets are less predictive of bilateral trade relations with Chile in the years following 2006.

Given that China mainly exports labor-intensive low-price consumer products, Chinese imports represent a competitive pressure for domestic producers. César and Falcone (2020) document that around 70 percent of Chinese exports to Chile during 1996-2006 were final consumption goods, whose import prices were on average significantly lower than those from other countries within detailed product categories. The authors find that Chilean manufacturing plants in industries more exposed to Chinese import competition exhibit a relative decline in revenues, employment and physical capital, and face a higher probability of exiting the market as compared to manufacturing plants in less

exposed industries (and that all these effects were stronger for plants with low initial levels of productivity). We use this piece of evidence as a motivation to study whether Chinese import competition (and Chinese demand for Chilean exports) have affected Chilean local labor markets differently. By assuming that labor is not mobile across LLMs, we are able to measure general equilibrium effects at the local level, considering that workers might move across firms, occupations, industries and formal-informal jobs in response to import supply and export demand shocks.

Figure 1
Evolution of China's participation in Chilean trade



Notes. China's import (export) share measured as the value of Chilean imports from (exports to) China divided by Chile's total imports (exports). Source. BACI.

II.2 Theoretical channels

China's supply and demand shocks in Chile are big enough to expect significant effects on the Chilean economy and, in particular, on its labor market. In this section we discuss along which dimensions China's rise might affect Chilean labor markets, considering potential effects on wages and employment, but also alternative adjustment channels, such as the informal sector. Theoretical predictions depend on certain assumptions about labor and capital mobility across firms, sectors and regions, which are key in shaping transitional dynamics between the short- and long-run. Empirical findings and the relevant mechanisms involved are context-specific, and depend on the nature of trade policy changes and its interaction with labor market institutions (Goldberg and Pavcnik (2003), Bacchetta, Ernst, and Bustamante (2009), Pavcnik (2017)).

The traditional comparative advantage model (Heckscher-Ohlin) highlights the potential disruptiveness of trade liberalization, assuming that labor is perfectly mobile across sectors. Countries' relative endowments of productive factors translate to the factor

content of traded goods and determine relative prices. Assuming that China is relatively abundant in unskilled labor and scarce in natural resources, its opening to trade represents an increase in world's supply of unskilled labor and a rise in world's demand for natural resources. Then, international prices should decline (increase) in unskilled labor (natural resources) intensive industries.[15]

However, the impact of trade can be heterogeneous across firms even if they belong to the same industry (Melitz (2003), Bernard, Eaton, Jensen, and Kortum (2003)). While some plants contract and exit the market in response to trade liberalization, others may grow substantially as trade fosters *within firm* productivity through several channels, such as access to intermediate inputs, capital goods and technologies from abroad, changes in the task content of production, product switching, quality-upgrading, skill-upgrading, scale economies and organizational changes.[16] In this context, trade impact is expected to be heterogeneous across workers as well, depending on their characteristics, those of the firm in which they work, and their joint adaptability to changes in the trade environment. Additionally, if there are frictions in the labor market, trade may affect the equilibrium levels of employment and unemployment (Davis and Harrigan (2011), Helpman, Itskhoki, and Redding (2010), Helpman and Itskhoki (2010)). Frictions to labor mobility may delay the adjustment process, reducing the potential welfare gains from trade, while frictions to capital mobility and agglomeration economies may amplify the short-term effects of trade over the long-run (Dix-Carneiro (2014), Dix-Carneiro and Kovak (2017)).

In the short-run, import shocks may force local firms to become more competitive in order to survive. Firms can potentially diminish labor costs by cutting workers' benefits, replacing permanent with part-time labor and subcontracting with other plants in the informal sector.[17] Some of these firms may exit the market (presumably, those with lower initial levels of productivity). If contracting plants are more intensive in the use of informal workers than surviving and expanding firms, trade may even reduce the share of labor informality. Paz (2014) develops a small open economy framework with heterogeneous firms in which tariffs affect firm's payroll-tax compliance decisions, and show that trade liberalization has an ambiguous effect on the employment share of informal workers, that depends mainly on initial labor market conditions (i.e. the lower the initial share of labor informality the more likely that trade liberalization increases labor informality). Recent search and matching models of informality allow for worker and firm heterogeneity, imperfect substitutability across workers within the firm, decreasing returns to scale,

[15] This is the spirit of the models proposed by Autor et al. (2013) and Costa et al. (2016). By assuming that each LLM is a small open economy, monopolistic competition in the traded sector, perfect competition in the non-traded sector, that production requires one homogeneous factor (labor) and that the stock of labor in each region is fixed, these models predict how changes in bilateral trade flows might affect local wages. Wages decline because of import competition and increase due to growth in exports. The magnitude of the shocks in a given region depends on the relative distribution of workers across industries.

[16] See for instance the theoretical contributions of Yeaple (2005), Verhoogen (2008), Bernard, Redding, and Schott (2011), and Caliendo and Rossi-Hansberg (2012).

[17] This argument can be theoretically justified with efficiency wage models (Shapiro and Stiglitz (1984)), assuming that firms face demand uncertainty and can hire workers from two pools (formal and informal) with different associated adjustment costs.

and convex vacancy-posting costs, and suggest that the interaction between the skill composition of labor and productivity may have first-order implications for the evolution of labor informality (Haanwinckel and Soares (2021)).

In this paper we do not aim to test the particular predictions of any of these models. Naturally, we expect that export demand shocks led to higher employment and wages in exposed locations, while import supply shocks led to an opposite effect, recognizing that the impact may vary across different sub-population groups and expecting that younger and more educated individuals adjust more easily to trade shocks. We also recognize that regions face both (trade-induced) supply and demand shocks, so the final effect of trade on local labor markets will depend on local workforce composition, firms' responses, patterns of labor and capital re-allocation and general equilibrium effects (e.g. sectoral linkages, demand multipliers) that, ultimately, will affect firms and workers differently depending on several unobserved economic primitives.

III Empirical strategy

III.1 Approach and identification

Our empirical approach exploits cross-local labor market variation in the evolution of Chinese import and export exposure stemming from the interaction of initial differences in local employment composition by industry and the temporal evolution of Chinese import competition and demand for exports across industries. LLMs with a higher initial participation of workers in largely exposed manufacturing industries such as textiles and toys/related products will be more exposed to the import competition shock, while LLMs with a higher share of workers employed in the mining of metal ores industry will be more exposed to the export demand shock. Patterns of industry specialization are constructed with data for 1992, some years before the period under study (1996-2006) to take into account that trade shocks may affect the employment distribution across industries.[18]

In order to study the effect of Chinese import competition and demand for exports on Chilean LLMs we estimate the following regression equation:

$$Y_{rt} = \beta_0 + \beta_1 CIC_{rt} + \beta_2 CDE_{rt} + \alpha_r + \delta_t + Y_{r,1992} \times \delta_t + \varepsilon_{rt} \quad (1)$$

where Y is an outcome of interest such as employment or informality rates and r and t index LLMs and time, respectively. CIC is a measure of Chinese import competition computed as the total value of imports from China divided by domestic absorption (production minus net exports). At the industry-level, it is computed as:

[18] For evidence on the impact of import competition on manufacturing employment see Bernard, Jensen, and Schott (2006) and Khandelwal (2010) (U.S.) and Alvarez and Claro (2009) (Chile).

$$CIC_{jt} = \frac{M_{jt}^{China}}{[Q_{jt} + M_{jt} - X_{jt}]} \tag{2}$$

where Q_{jt}, M_{jt} and X_{jt} are the value of production, imports, and exports, respectively, for industry j in year t.

CDE is a measure of Chinese demand for exports computed as the total value of exports to China divided by domestic production. At the industry-level, it is computed as:

$$CDE_{jt} = \frac{X_{jt}^{China}}{Q_{jt}} \tag{3}$$

To construct Chinese import competition and Chinese demand for exports at the LLM-level as required in equation (1), we interact the initial pattern of industrial composition in each LLM, as given by the local employment share in 1992 (w_{rj}^{1992}), with the value of CIC and CDE at the industry-level:

$$CIC_{rt} = \sum_{j} w_{rj}^{1992} CIC_{jt} \tag{4}$$

$$CDE_{rt} = \sum_{j} w_{rj}^{1992} CDE_{jt} \tag{5}$$

Dependent variables (Y_{rt}) are labor market outcomes such as the employment and unemployment rates, labor informality rates, (log) average hourly wages, (log) average hours worked, (log) average monthly wages, and the employment share of broad economic sectors (primary, manufacturing and services). To account for potential heterogeneous effects, we run separate regressions for different sub-population groups according to skill, age, gender and sector of employment. In all cases we include LLM (α_r) and year (δ_t) fixed effects and therefore exploit within LLM variation in the exposure to CIC and CDE over time. The preferred specification controls also for three types of preexisting trends: (i) the corresponding outcome variable, to address the concern that any result might represent the continuation of local trends beginning some years before the period under study; (ii) the sum of industry employment shares in the primary and manufacturing sectors, which were used to construct the shock variables (as recommended by Borusyak, Hull, and Jaravel (2020));[19] and (iii) female labor force participation (LFP). The regional balance test (presented in the Appendix) suggests that LLMs more exposed to CIC exhibit higher initial levels of female labor force participation (LFP), so we decided to account for these differences in the preferred specification.[20] Preexisting trends are constructed as the value

[19] Borusyak et al. (2020) refer to this case as the "incomplete shares" scenario because the sum of exposure shares varies across units (LLMs).

[20] This is in line with the fact that growing CIC have mainly affected highly populated regions with industrial clusters specialized in the production of manufactures.

of each variable in 1992 interacted with year fixed effects.

We weight each observation by the 1992 LLM share of national labor force. This estimation strategy provides average treatment effects that are weighted by workers instead of LLMs.[21]

A potential concern is that labor mobility across LLMs could bias our estimates if workers migrate across locations in response to trade shocks.[22] Unfortunately, the CASEN surveys do not include questions related to migration status until 2009. To partially alleviate this concern we cluster standard errors at the region level, allowing for spatial correlation of errors across LLMs within each region. The Chilean demographic censuses of 1992, 2002 and 2012 include information on migrants that we exploit to estimate the long-term effects of trade shocks on migration and, also, to control for preexisting trends in migration patterns across LLMs as a robustness check. Also, we take advantage of the fact that census data include demographic and employment information to estimate the impact of China's trade shocks on employment and unemployment rates over the long-run. Moreover, we run regressions for the participation in tertiary education to test the hypothesis that trade shocks might affect human capital at the local-level by changing the opportunity cost of schooling.[23]

To study the long-term effect of Chinese import competition and demand for exports on Chilean LLMs, we estimate regressions in changes (1992-2002, 2002-2012, and both changes together-*stacked changes*). The regression equation is the following:

$$\Delta Y_{r,t:t-1} = \beta_0 + \beta_1 \Delta CIC_{r,t:t-1} + \beta_2 \Delta CDE_{r,t:t-1} + X_{r,1992} + \varepsilon_r \tag{6}$$

where $\Delta Y_{r,t:t-1}$ is the change in the corresponding outcome variable at the LLM r (employment and unemployment rates, share of salaried workers, share of self-employment, share of population of working age attending tertiary education) and $X_{r,1992}$ are control variables measured at the initial year. The preferred specification controls for: (i) employment shares in manufacturing and primary sectors (used to construct the shock variables) and (ii) female LFP. Regressions in stacked changes control also for a period dummy. The construction of $\Delta CIC_{r,t:t-1}$ and $\Delta CDE_{r,t:t-1}$ follows the same logic of equations (4) and (5) with the difference that industry shocks are measured in changes:

[21] This strategy has also been used by Autor et al. (2013) and Costa et al. (2016). We present and discuss the results of unweighted regressions in the section of robustness exercises.

[22] Evidence for Brazil suggests that there is imperfect labor mobility across regions (Dix-Carneiro and Kovak (2017)). In contrast, findings for the U.S. show that LLMs more exposed to Chinese import competition exhibit a relative decline in population growth over the following decade (Greenland, Lopresti, and McHenry (2019)) which indicates that, absent population adjustments, the labor market impacts of import competition might have been even more severe than those estimated in the literature.

[23] Existing evidence suggests that high-skill intensive export shocks foster education, while low-skill's depress it, so trade may amplify initial differences in factor endowments over the long-run through its effects on human capital formation (Atkin (2016), Greenland and Lopresti (2016), Blanchard and Olney (2017), Li (2018)). Previously, related papers have studied the impact of trade liberalization on child labor and schooling in India (Edmonds and Pavcnik (2005), Edmonds, Pavcnik, and Topalova (2010)).

$$\Delta CIC_{r,t:t-1} = \sum_j w_{rj}^{1992} \Delta CIC_{j,t:t-1} \tag{7}$$

$$\Delta CDE_{r,t:t-1} = \sum_j w_{rj}^{1992} \Delta CDE_{j,t:t-1} \tag{8}$$

where $\Delta CIC_{j,t:t-1}$ measures the 1992-2002 (and the 2002-2012) change in CIC for manufacturing industry j and $\Delta CDE_{j,t:t-1}$ compute changes in CDE for primary or manufacturing industry j.

CIC_{rt} and CDE_{rt} are potentially endogenous because industry shocks affecting local outcomes (e.g. shocks to input or output markets, changes in preferences, technological advances) are correlated with demand of imports and supply of exports. These concerns are likely to be more serious over the long-run. Moreover, long-term estimates are run using a smaller sample than short-term's, missing within LLM variation in CIC and CDE over time.[24]

To account for endogeneity concerns, we apply an instrumental variable strategy that has been used in other related studies (e.g. Autor et al. (2013, 2014), Acemoglu et al. (2016), Costa et al. (2016)). Particularly, we instrument trade shock variables using the average of China's manufacturing import share (IS_{jt}^{China}) and the average of China's primary and manufacturing export share (ES_{jt}^{China}) across all countries in the world, except Chile. Specifically:

$$IS_{jt}^{China} = \frac{1}{C} \sum_{c \in C} \frac{M_{jtc}^{China}}{M_{jtc}^{World}} \tag{9}$$

$$ES_{jt}^{China} = \frac{1}{C} \sum_{c \in C} \frac{X_{jtc}^{China}}{X_{jtc}^{World}} \tag{10}$$

where M_{jtc}^{China} (X_{jtc}^{China}) is the industry-year value of country's c imports from (exports to) China, while M_{jtc}^{World} (X_{jtc}^{World}) is the industry-year value of country's c total imports from (exports to) all countries, including China. For robustness, we also calculate these variables using different groups of countries (C): middle-income, high-income, and Latin American countries.[25]

Intuitively, these variables serve as instruments for Chilean CIC and CDE if they are capable of capturing the supply and demand-driven shocks inherent to Chinese economic forces and institutions that allowed China to gain market share in both global supply (China's exports) and global demand (China's imports) of different products within specific manufacturing and primary industries over time. We use these variables to predict

[24] Another potential confound that is expected to be more serious over the long-run refers to compositional changes in local workforce.

[25] To categorize countries as middle-income or high-income we follow World Bank classifications.

CIC and CDE in Chilean industries. These variables are exogenous as they do not depend on the decisions of Chilean firms or consumers.

To construct both instrumental variables at the LLM-level, we calculate:

$$IV_{rt}^{CIC} = \sum_{j} w_{rj}^{1992} IS_{jt}^{China} \tag{11}$$

$$IV_{rt}^{CDE} = \sum_{j} w_{rj}^{1992} ES_{jt}^{China} \tag{12}$$

In the long-term analysis, we compute the instrumental variables in changes (1992-2002 and 2002-2012) replacing IS_{jt}^{China} by $\Delta IS_{j,t:t-1}^{China}$ and ES_{jt}^{China} by $\Delta ES_{j,t:t-1}^{China}$.

Recent contributions have discussed the validity of Bartik instruments in different research designs (Adão, Kolesar, and Morales (2019), Borusyak, Hull, and Jaravel (2020), Goldsmith-Pinkham, Sorkin, and Swift(2020)). Borusyak et al. (2020) develop an econometric framework in which identification follows from the quasi-random assignment of shocks while exposure shares are allowed to be endogenous. This framework seems appropriate in our context if we assume that industry shocks (i.e. China's supply and demand shocks to global trade) are exogenous to Chilean industries while local industry employment shares are not because unobserved industry shocks may affect regional outcomes through the same combination of exposure shares.[26] We perform balance tests at the industry and region levels and falsification tests that corroborate the plausibility of the identifying assumptions (see section A.2). Additionally, we conduct a robustness exercise by applying the econometric framework developed by Borusyak et al. (2020).

III.2 Data and descriptives

In order to implement the strategy outlined in the previous section, we combine different data sets: household surveys, census data, firm surveys and trade data. The Chilean national household survey (*Encuesta de Caracterización Socioeconómica Nacional-CASEN*) provides information on Chilean workers located throughout the country. It is conducted by Chile's Ministry of Planning (MIDEPLAN) every two or three years. We base our analysis on the 1992, 1996, 1998, 2000, 2003, and 2006 surveys. We also incorporate the 2009, 2011, 2013 and 2015 surveys to conduct a robustness exercise that extends the sample period beyond 2006. The employment module includes information on employment status, sources of labor income, hours worked, pension access, contractual situation, and municipality of residence (*comuna*), among other variables.

We adopt three alternative definitions for labor informality. First, we compute the share of salaried workers that have no right to receive a pension when retired, in the sense that they do not contribute to any pension fund. This is our preferred definition

[26] Adão et al. (2019) show that regression residuals are correlated across U.S. commuting zones with similar industrial composition independent of their geographic location.

because it is based on social security access, and it is also related to international standards suggested by the International Labour Organization (ILO). Second, we calculate the share of employed workers that have not signed a labor contract.[27] Third, we incorporate self-employed workers without a college degree to the group of informal workers in the first definition of informality. That allows us to consider a larger fraction of workers, not only salaried ones.

The sample is restricted to individuals aged 18 to 65. To identify markets at the local level we follow the definition of local labor markets (LLMs) proposed by Casado-Díaz, Rowe, and Martínez-Bernabéu (2017).[28] We construct all the relevant variables at the LLM-level using population weights and present a robustness exercise that uses municipalities (instead of LLMs) as the unit of analysis.[29]

Additionally, we use the 1992, 2002 and 2012 Chilean demographic censuses (*Censo Nacional de Población y de Vivienda*) sourced from Chile's National Institute of Statistics (*Instituto Nacional de Estadística-INE*). The 1992 Census is used to construct the initial pattern of industry specialization in each LLM, as measured by local employment shares at the two-digit industry-level. This variable is interacted with Chinese import competition (CIC) and Chinese demand for exports (CDE), which vary across industries and time (including the primary and manufacturing sectors).[30] It is worth noting that we have census data that includes a complete sample of the Chilean population, which reduces potential measurement errors. Other details related to the construction of relevant variables are discussed in the Appendix.

To construct CIC and CDE we use three additional data sets: *Encuesta Nacional Industrial Anual-ENIA* from INE, Sectoral GDP from National Accounts (*Banco Central de Chile-BCC*) and data on international trade flows from the BACI dataset elaborated by the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII). The ENIA covers the universe of Chilean manufacturing plants with ten or more employees and it is used to calculate the value of domestic production at the two-digit industry-year level. To construct CDE we take production for primary industries from National Accounts and manufacturing from ENIA.

[27] Both measures of labor informality are highly correlated at the LLM-level (the correlation coefficient is .94) and somewhat less correlated at the individual level (.75).

[28] The authors created a data set classifying 302 municipalities into 62 LLMs by means of an optimization algorithm based on evolutionary computation using commuting data from the Chilean Internal Migration Database (CHIM) and Censuses data for 1982, 1992 and 2002.

[29] The advantage of using municipalities is that we increase the number of observations. However, it comes at the cost of augmenting the standard errors of our estimates because municipalities are by definition smaller than LLMs and, in many cases, are part of deeply integrated economic clusters with high mobility of workers across neighboring municipalities.

[30] To perform the matching between household and census data we created a concordance table that assigns each three-digit industry reported in the 1992 Census to a single two-digit industry of the International Standard Industrial Classification (Rev. 4).

Trade variables

Figure 2 plots the evolution of CIC (top panel) and CDE (bottom panel). CIC was fully concentrated in manufacturing.[31] Industries most exposed to CIC were leather and related products, clothing and apparel, toys and other miscellaneous items, and textiles. The average annual growth in CIC across these industries range from 3.4 p.p. to 4.5 p.p.. Industries that were mildly exposed to Chinese competition were electrical equipment, machinery, computer, electronic and optical products, furniture and wood manufactures, fabricated metals, and rubber and plastic products. The average annual growth in CIC across these industries range from 0.6 p.p. to 1.8 p.p. The rest of the manufacturing industries were minimally exposed to Chinese import competition.

On the other side, Chile exports both commodities and processed primary products (which are included in manufacturing) to China. Noticeably, Chilean exports to China exhibit a high degree of concentration in a small number of products, mainly from the mining sector. On average during 1996-2006 one third of Chilean exports to China were primary products (within this group, almost 90 percent involved mining of non-ferrous metal ores such as copper) and two thirds were manufacturing products (57 percent are manufactures of basic precious and non-ferrous metals-mainly processed refined copper, 22 percent are products made of pulp, paper and paperboard and 11 percent are processed and preserved fish products). Costa et al. (2016) show that this kind of concentration is a common pattern of exports to China among developing economies. In this line, Figure 2 shows that industries most exposed to China's increasing demand for Chilean exports were mining of metal ores, manufacturing of refined basic metals, and manufacturing of paper products. On average the annual growth of CDE across these industries ranges from 0.55 p.p. to 0.23 p.p. In terms of economic magnitude, China's demand shock in Chile was far less pronounced than the import competition shock. Notably, the period under analysis includes the first years of the commodity boom. Although the international price of copper was highly stable until 2003, it largely increased thereafter (between 2003 and 2006 copper price doubled). Most of our results are robust to deflate export values using industry-specific international price deflators and, also, to shorten the sample period to 1996-2003.

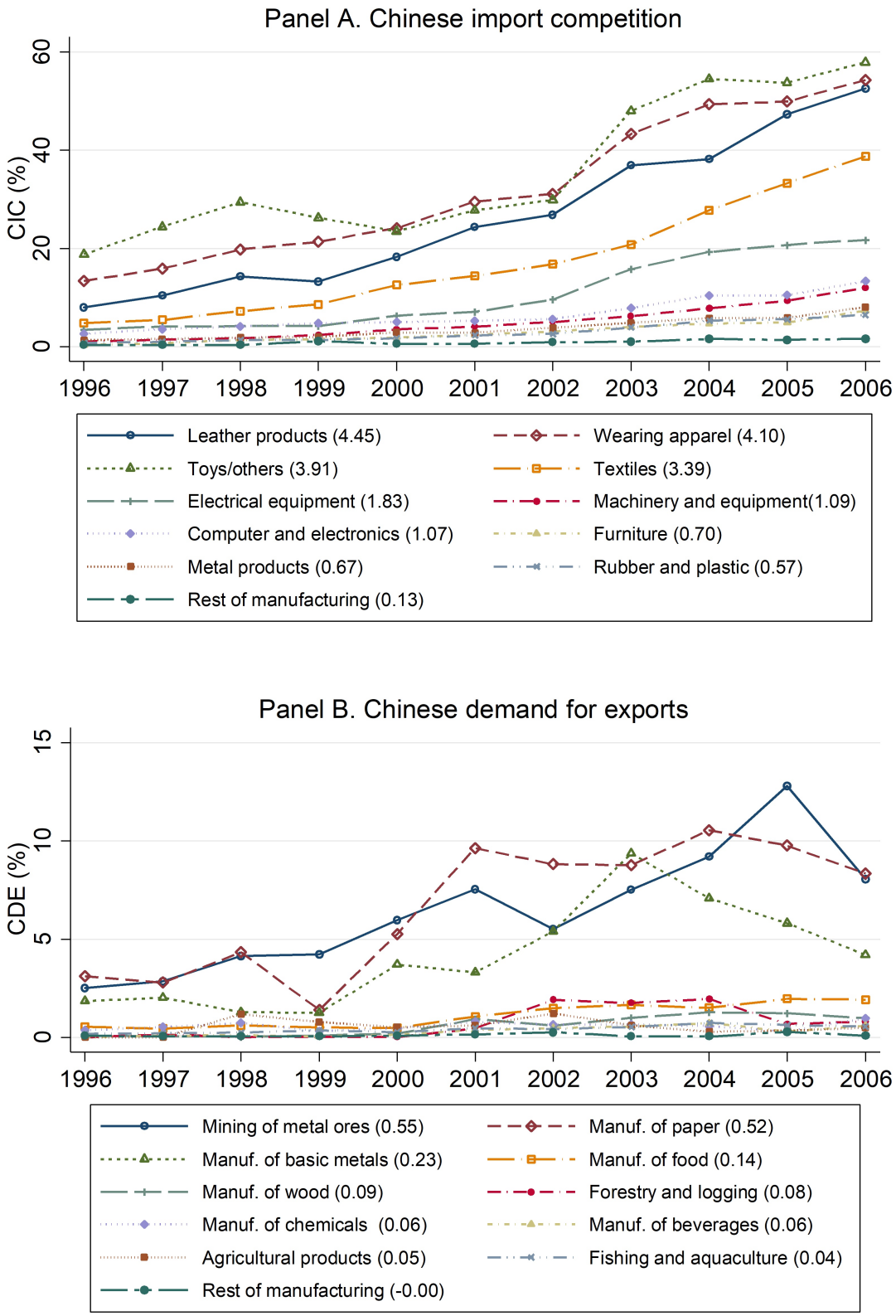
Figure 3 plots the spatial distribution of the average growth in CIC and CDE during 1996-2006 across Chilean LLMs. Darker colors correspond to LLMs that present a higher value of $\overline{\Delta CIC}$ and $\overline{\Delta CDE}$ and, therefore, are more exposed to each of these shocks. Note that we separate LLMs' exposition using different percentiles of the $\overline{\Delta CIC}$ and $\overline{\Delta CDE}$ distribution as thresholds (p5, p10, p25, p50, p75, p95). Chinese import competition was slightly more dispersed across the country than Chinese demand for exports, but concentrates in regions initially specialized in manufacturing production such as Santiago, Melipilla and La Ligua (in the Central region), Arica and Iquique (extreme

[31] On average during the period under study 99.7 percent of Chilean imports from China belong to manufacturing industries.

North) and Talca, Valdivia and Temuco (in the Central-South). On the other hand, LLMs more exposed to increasing demand from China are concentrated in regions specialized in mining; these are located along the Central-North axis, such as Tocopilla and Calama (North), Chañaral, Copiapo and Vallenar (Central-North) and Illapel, Rancagua and Cabildo (Central). The map also shows that regions more exposed to CIC are different than those that are more exposed to CDE. In fact, the unconditional correlation between CIC and CDE across LLMs is -0.05.

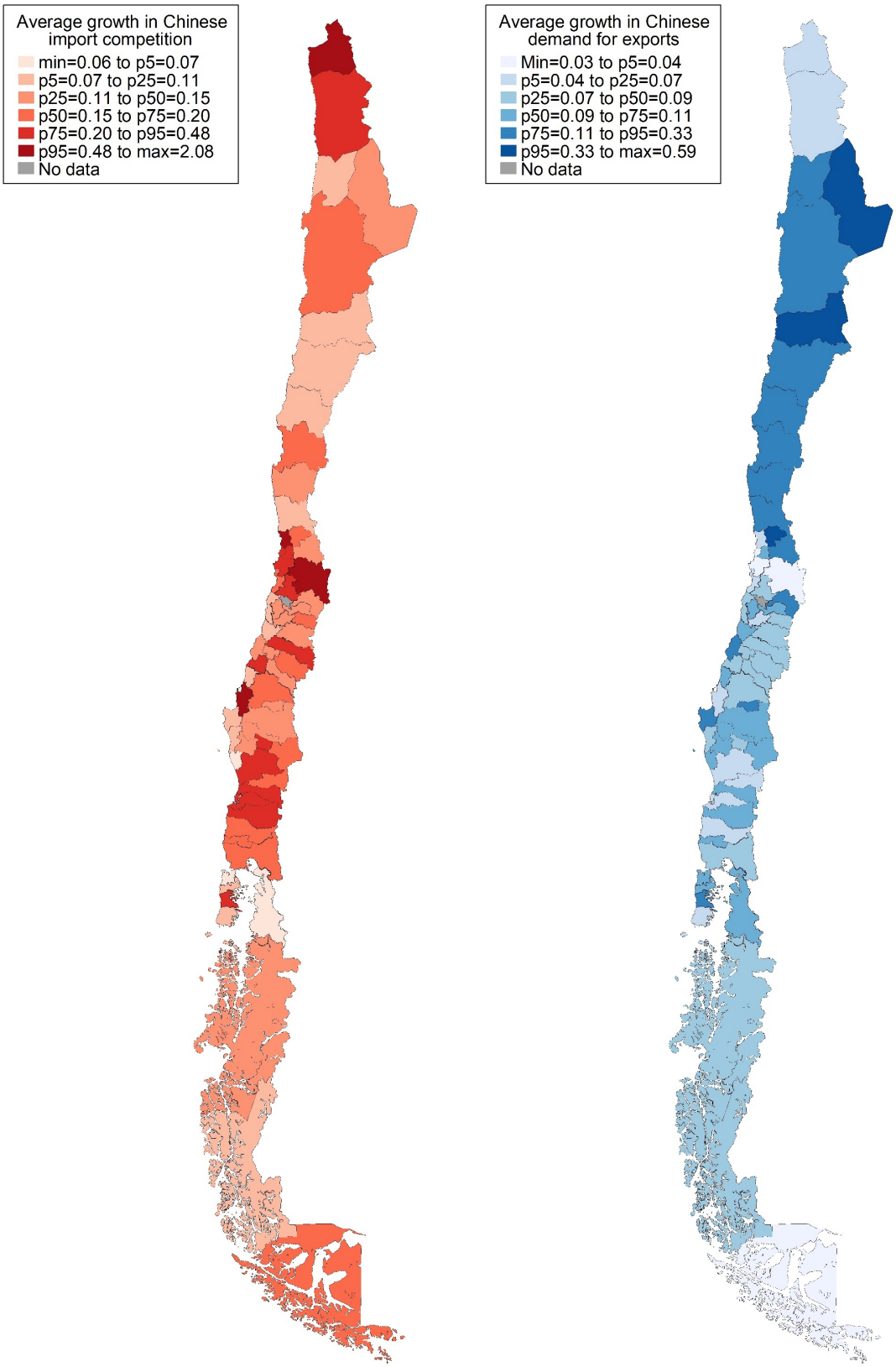
Pre-shock patterns of industry specialization, as given by initial employment shares w_{rj}^{1992}, explain .66 (.85) of the variation in CIC_{rt} (CDE_{rt}) while the remaining .34 (.15) is given by the variation in CIC_{jt} (CDE_{jt}) across industries over time.

Figure 2
Evolution of China's trade shocks across industries



Notes. Chinese import competition (CIC) measured as the value of imports from China divided by domestic absorption (production minus net exports). Chinese demand for exports (CDE) measured as the value of exports to China divided by domestic production. CIC and CDE vary at the two-digit ISIC, rev. 4. Industry average annual change in brackets. Sources. ENIA, National Accounts, BACI.

Figure 3
Spatial distribution of China's trade shocks



Notes. Chinese import competition-left (Chinese demand for exports-right) across LLMs measured as the interaction of local industry employment shares in 1992 and the evolution of CIC (CDE) across industries and time. This figure plots the average change in each of these variables across LLMs over time. LLMs are defined by Casado-Díaz et al. (2017). Sources. 1992 Chilean census, ENIA, National Accounts, BACI.

Labor market variables

Table 1 presents labor market statistics over time at the national-level, for all workers and separately for different sub-population groups according to skill level, age and gender. A worker is considered skilled if she has completed at least one year of university or tertiary education, and unskilled if her highest educational achievement is a high-school diploma or below.

Similarly to most countries, the structure of the Chilean labor force has moved away from primary and manufacturing sectors and towards the service sector: the share of employment in services increased 3.6 p.p. between 1996 (68.6 percent) and 2006 (72.2 percent).

As in most countries in Latin America, there is a clear pattern in Chilean labor markets: they were weaker between 1996 and 2000, and increasingly stronger between 2000 and 2006. The employment rate fell 1.9 p.p in the first period, and increased 4.6 p.p in the second. The unemployment rate changed accordingly: it climbed 4.7 p.p in the late 1990s and fell 3.1 p.p in the early 2000s. The contrast also shows up for informality (increased 1.6 p.p in the first period and fell 3 p.p in the second when using the pension definition – panel D), and for real wages (stagnant in the 1990s, and increasing in the 2000s), but not for hours of work, which decreased over the whole period.

There are gaps in favor of skilled workers in all labor market variables. These gaps widened in the late 1990s and shrunk in the early 2000s. Compared to unskilled workers, in 2006 the employment rate was 5 p.p higher, the unemployment rate 0.3 p.p lower, the informality rate (panel D) 10 p.p lower, and real wages 2.7 times higher among the group of skilled workers.

The labor market outcomes are weaker for younger workers (18-39) than for other segments. The gaps widened over the period under study in terms of employment, unemployment, and hours of work, but shrank in terms of informality (panel D) and real wages, in particular in the 2000s. Gender gaps are large in Chile: the employment rate for women is 32 p.p lower than for men, the informality rate (panel D) 7.5 p.p higher, and wages 14 percent lower. Some of these gaps have been shrinking over the period under study (e.g. employment), but some others are still growing. For instance the gap in informality between female and male workers grew from 5.1 p.p in 1996 to 7.5 p.p in 2006.

Table A4 in the Appendix shows the structure of the population of working age. Most workers in Chile are unskilled (74.3 percent), young (51 percent) and male (61.1 percent). However, the share of these groups have been falling over time, in line with rises in education levels, population age and the increasing labor force participation of women. Unskilled individuals are over-represented in the primary and the manufacturing sectors, young workers are slightly over-represented in manufacturing, and female workers are disproportionately employed in the service sector.

Finally, Table A5 presents descriptive statistics for the most relevant variables at the LLM level. There is considerable variability across LLM-year combinations for all variables, which is important since this is the variation we exploit in the main regression analysis. For instance, in the case of labor informality (pension definition) the inter-quartile range reaches 5.1 p.p., and it is higher for unskilled (6 p.p.) and young (6 p.p.) workers. The last panel shows statistics for trade shocks at the LLM level. For instance, a LLM-year in the first quartile of the CIC distribution presents an exposure of 0.38; that value rises to 2.02 in the third quartile (see Figure A1 in the Appendix for an illustration of the whole distribution). Chinese demand for exports has a mean of 0.31 and a standard deviation of 0.34. A LLM-year in percentile 25 presents an exposure of 0.13, a value that increases to 0.36 in percentile 75.

Table 1. Labor market statistics

	1996	1998	2000	2003	2006
Panel A. Employment structure by sector					
Primary	0.164	0.149	0.142	0.144	0.141
Manufacturing	0.150	0.140	0.141	0.133	0.137
Services	0.686	0.711	0.717	0.723	0.722
Panel B. Employment rate					
All	0.599	0.584	0.580	0.600	0.626
Skilled	0.649	0.647	0.651	0.642	0.666
Unskilled	0.586	0.567	0.560	0.587	0.614
Age 18-39	0.596	0.573	0.564	0.579	0.602
Age 40-65	0.605	0.599	0.603	0.628	0.653
Females	0.400	0.405	0.414	0.438	0.471
Males	0.812	0.778	0.759	0.774	0.793
Panel C. Unemployment rate					
All	0.057	0.099	0.104	0.097	0.073
Skilled	0.027	0.050	0.045	0.053	0.047
Unskilled	0.038	0.067	0.073	0.068	0.050
Age 18-39	0.045	0.079	0.081	0.080	0.066
Age 40-65	0.021	0.041	0.049	0.045	0.030
Females	0.074	0.115	0.118	0.122	0.092
Males	0.048	0.090	0.095	0.082	0.060
Panel D. Labor informality (pension def.)					
All	0.207	0.216	0.223	0.217	0.193
Skilled	0.107	0.099	0.112	0.131	0.122
Unskilled	0.235	0.255	0.262	0.249	0.219
Age 18-39	0.216	0.229	0.235	0.230	0.197
Age 40-65	0.190	0.194	0.203	0.198	0.188
Females	0.240	0.252	0.260	0.261	0.238
Males	0.189	0.195	0.200	0.188	0.163
Panel E. Labor informality (including self-employment)					
All	0.347	0.347	0.350	0.347	0.323
Skilled	0.096	0.087	0.099	0.115	0.106
Unskilled	0.413	0.423	0.429	0.425	0.397
Age 18-39	0.311	0.316	0.318	0.312	0.274
Age 40-65	0.406	0.393	0.393	0.390	0.376
Females	0.348	0.348	0.357	0.359	0.350
Males	0.347	0.347	0.345	0.340	0.306
Panel F. Average hours worked per week					
All	51.8	47.1	48.3	45.5	45.1
Skilled	48.0	44.7	46.4	43.8	43.2
Unskilled	52.6	47.8	48.9	46.1	45.7
Age 18-39	51.5	47.0	48.2	45.2	44.5
Age 40-65	52.2	47.3	48.5	46.0	45.7
Females	49.0	43.6	44.9	42.2	41.8
Males	53.2	49.2	50.3	47.5	47.1
Panel G. Average hourly wage					
All	1,484	1,426	1,466	1,502	1,562
Skilled	3,177	2,987	3,061	2,980	2,955
Unskilled	1,052	969	956	1,003	1,094
Age 18-39	1,345	1,287	1,273	1,348	1,463
Age 40-65	1,698	1,619	1,708	1,677	1,663
Females	1,339	1,290	1,248	1,345	1,418
Males	1,561	1,501	1,594	1,595	1,650

Notes. Wages measured in thousand Chilean pesos of 1995. Source: CASEN households surveys.

IV Results

IV.1 Short-term effects

IV.1.1 Traditional shift-share design

We begin this section by discussing the main results of the (relative) impact of trade shocks on local labor market outcomes. The first column in Table 2 presents OLS estimates, and columns (2) to (5) report 2SLS. The specifications in columns (3) to (5) control for a preexisting trend in the corresponding outcome variable. Columns (4) and (5) include a preexisting trend in local employment shares in manufacturing and primary sectors, and the preferred specification in column (5) also controls for a preexisting trend in female LFP.[32]

The results of the first-stage regressions imply a strong predictive power of both instrumental variables (Table A6). Regressions satisfy the weak IV tests for joint endogenous regressors (i.e. the Kleibergen-Paap Wald F test) and for individual endogenous regressors (i.e. the Sanderson-Windmeijer multivariate F test of excluded instruments).

Results reveal that the main margin of labor market adjustment to the import competition shock was labor informality. LLMs more exposed to growing CIC experienced a relative increase in the share of individuals working under informal labor arrangements. 2SLS are larger than OLS estimates, which is consistent with the existence of a negative correlation between Chile's import demand shocks and local labor demand for informal workers (that biases OLS estimates towards zero). Accounting for preexisting differences in labor informality across locations reduces the point estimates, but the coefficients remain statistically significant. Controlling for preexisting differences in female LFP across LLMs augments the magnitude of the estimated coefficients considerably, which suggests that labor informality has increased relatively more in exposed locations with lower initial levels of female LFP.[33] The point estimates in column 5 imply that a 0.41 p.p. increase in CIC (i.e. the median growth in CIC across LLMs) raises labor informality by 0.62 p.p., *ceteris paribus*. The relative increase is 0.68 p.p. under the contractual definition of labor informality, and 0.53 p.p. if we include non-professional self-employed as informal workers.[34]

As discussed previously, heightened import competition may induce some firms

[32] These controls take into account that the shift-share variables were calculated under the "incomplete shares" scenario, as defined by Borusyak et al. (2020), and that the regional balance test suggests that locations exposed to larger import shocks have on average a higher rate of female LFP.

[33] Accounting for initial differences in per capita income across LLMs (or in the share of migrants or employment rate) produces a similar increase in estimated coefficient for CIC. This led us to think that there might be a positive correlation between local economic conditions and import shocks, which, in any case, generate a downward bias on our estimates.

[34] The third definition of labor informality (Panel E) partially accounts for the potential mobility of (unskilled) workers from salaried towards self-employment jobs.

to replace formal with informal workers (at the risk of being caught and fined), or permanent laborers- with part-time employees and apprentices, and to reduce their costs by subcontracting some production activities with other firms in the informal sector.[35] At the same time, workers displaced by import competition may be more prone to accept a (new) job in the informal sector. Also, individuals joining the labor force in exposed locations may be more likely to accept an informal labor arrangement in the context of a weaker labor market. Our estimates suggest that these mechanisms may have been present in the Chilean case.

Growing Chinese import competition did not affect the relative employment and unemployment rates in more exposed locations. These findings suggest that workers displaced by import competition probably found new jobs, likely in the informal sector. From the results in Table 2 CIC does not seem to have reduced the relative average hourly or monthly wages significantly (these results are not robust to other specifications- see more on this later). Finally, more exposed locations experienced a relatively lower reduction in the average hours worked, which, as we discuss in the next section, may be related to the deterioration in labor conditions after the trade shock.

Our estimates suggest that China's increasing demand for Chilean exports implied a relative rise in the employment rate in more exposed LLMs. In particular, a 0.07 increase in CDE (i.e. the median growth in CDE across LLMs) augments the employment rate by 0.21 p.p., *ceteris paribus*. Local markets more exposed to CDE also experienced a relative increase in the average hours worked: an increase in CDE of 0.07 p.p. increases worked hours by 0.53 p.p., on average. Finally, export shocks are associated with a relative increase in the average monthly wage in exposed locations, although this effect turns out to be statistically significant only after accounting for initial differences in female LFP rates (or per capita income) across LLMs.

All of these findings prove to be highly robust across several exercises: excluding outliers, controlling for preexisting trends related to the economic and demographic structures of LLMs, extending the period under study beyond 2006, using specific groups of countries to construct the instrumental variables, and changing the unit of analysis, among many others. This discussion is presented in section A.3 of the Appendix.

[35] According to *Encuesta Nacional de la Coyuntura Laboral* (ENCLA), the fraction of Chilean plants that subcontract other firms (in the same industry) increased from 20.2 percent in 1998 to 24.1 percent in 2008 (and to 27.4 percent in 2011). Moreover, this has occurred with greater intensity in manufacturing (i.e. from 23.3 percent in 1998 to 33.8 in 2011). Additionally, this data shows that the probability of outsourcing increases significantly with firm size.

Table 2. Effects of the China shock on local labor market outcomes

	OLS	2SLS			
	(1)	(2)	(3)	(4)	(5)
Panel A. Employment rate					
CIC	0.0013	0.0017	0.0005	0.0004	0.0003
	(0.0018)	(0.0019)	(0.0026)	(0.0026)	(0.0026)
CDE	0.0296***	0.0310**	0.0328***	0.0321***	0.0299***
	(0.0070)	(0.0125)	(0.0120)	(0.0112)	(0.0103)
Panel B. Unemployment rate					
CIC	-0.0006	-0.0002	-0.0003	-0.0006	-0.0000
	(0.0014)	(0.0014)	(0.0014)	(0.0014)	(0.0024)
CDE	-0.0179	-0.0135	-0.0180	-0.0167	-0.0172
	(0.0118)	(0.0108)	(0.0111)	(0.0103)	(0.0115)
Panel C. Labor informality (pension definition)					
CIC	0.0106***	0.0135**	0.0106**	0.0106**	0.0152***
	(0.0039)	(0.0058)	(0.0051)	(0.0048)	(0.0058)
CDE	-0.0034	0.0245	0.0017	0.0053	-0.0087
	(0.0118)	(0.0267)	(0.0240)	(0.0221)	(0.0192)
Panel D. Labor informality (contractual definition)					
CIC	0.0094*	0.0118	0.0110**	0.0097*	0.0165***
	(0.0050)	(0.0072)	(0.0051)	(0.0051)	(0.0055)
CDE	0.0051	0.0263	-0.0066	-0.0041	-0.0226
	(0.0151)	(0.0332)	(0.0255)	(0.0235)	(0.0225)
Panel E. Labor informality (including self-employment)					
CIC	0.0077**	0.0110**	0.0075*	0.0075**	0.0129***
	(0.0037)	(0.0053)	(0.0044)	(0.0036)	(0.0041)
CDE	-0.0009	0.0195	-0.0065	-0.0006	-0.0228
	(0.0100)	(0.0232)	(0.0224)	(0.0184)	(0.0208)
Panel F. Log average hourly wage					
CIC	-0.0178	-0.0236	-0.0078	-0.0210	-0.0175
	(0.0125)	(0.0147)	(0.0204)	(0.0222)	(0.0150)
CDE	-0.0018	-0.0343	-0.0129	-0.0271	0.1147
	(0.0720)	(0.1345)	(0.1313)	(0.1078)	(0.1052)
Panel G. Log average hours worked					
CIC	0.0226***	0.0289***	0.0290***	0.0283***	0.0208***
	(0.0027)	(0.0034)	(0.0035)	(0.0032)	(0.0037)
CDE	0.0054	0.0719***	0.0697***	0.0645***	0.0763***
	(0.0208)	(0.0204)	(0.0211)	(0.0198)	(0.0234)
Panel H. Log average monthly wage					
CIC	-0.0138	-0.0153	-0.0035	-0.0154	-0.0149
	(0.0114)	(0.0136)	(0.0184)	(0.0169)	(0.0116)
CDE	-0.0510	-0.0173	0.0050	-0.0103	0.1313**
	(0.0410)	(0.1029)	(0.0995)	(0.0814)	(0.0518)
PT Dep. Var.	-	-	Yes	Yes	Yes
PT Exposure Shares	-	-	-	Yes	Yes
PT Female LFP	-	-	-	-	Yes

Notes. N=296. All regressions control for LLM and year fixed effects and are weighted by LLM's share of Chile's population of working age in 1992. Columns (2) to (5) are run by 2SLS, instrumenting CIC and CDE with China's world supply and demand shocks. Robust standard errors clustered by regions in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

IV.1.2 Exposure-weighted industry-level design (SSIV)

Recent contributions discuss the validity of Bartik instruments in different research designs.[36] We assess the plausibility of our assumptions conducting balance tests and falsification exercises (see section A.2). We argue that the exogeneity of industry shocks is very plausible in our context, while that of (pre-shock) local industry employment composition is *a priori* more difficult to justify. Borusyak et al. (2020) recently developed an econometric approach (SSIV) in which identification follows from the quasi-random assignment of shocks, while exposure shares are allowed to be endogenous. SSIV regression coefficients are obtained from an IV regression estimated at the level of the identifying variation (i.e. the industry shocks). Standard errors are asymptotically valid as long as the identification condition holds at the industry-level.[37]

In this section we implement the SSIV approach. The regressions are run at the industry-level (there are 155 observations: 31 industries along 5 years).[38] Results are shown in Table 3, which has the same structure as Table 2. All specifications control for preexisting trends in (i) the sum of employment shares of exposed industries in the traded sector (primary and manufacturing) in 1992, and (ii) the corresponding dependent variable. We control for a preexisting trend in female LFP from column (3) onwards. Columns (4) and (5) sequentially control for initial differences in the fractions of unskilled workers and migrants across LLMs. Regressions are weighted with industry-level weights obtained from the SSIV framework. Standard errors are clustered at the sector level.

All our results are robust to the implementation of this method. The precision of the estimates increases considerably, suggesting that unobserved shocks possibly bias our main estimates through a similar combination of exposure shares as shock variables. To compare the magnitude of the estimated coefficients we contrast the estimates in column 3 of Table 3 with those in column 5 of Table 2. In line with our main estimates in Table 2, we find that regions exposed to rising import competition experienced a relative increase in the informality rate. This result holds across all specifications and definitions. The magnitude of the estimated coefficients is somewhat larger in the SSIV than in the traditional design (30 percent higher in the case of the pension definition of informality). The results in Table 3 reveal a small positive effect of the import shock on employment (possibly due to an "added worker effect" that we discuss later), and a relative decline in hourly and monthly wages.[39] In regard to the impact of CIC on hours worked, the sign

[36] See Adão, Kolesar, and Morales (2019), Borusyak, Hull, and Jaravel (2020) and Goldsmith-Pinkham, Sorkin, and Swift(2020).

[37] Shock-level aggregates are obtained by averaging the outcome and treatment variables using exposure shares as weights. Borusyak et al. (2020)'s framework is motivated by an equivalence result: the orthogonality between a shift-share instrument and an unobserved residual can be represented as the orthogonality between the underlying shocks and an unobservable shock-level.

[38] The sectoral classification of the 31 industries is as follows: manufacturing (22), primary (8) and services (1). There is no variation within services because this sector is not subject to China's trade shocks (at least directly). We include the service sector because shock variables were constructed using industry shares based on 1992 total employment. Most of our results are robust to the exclusion of the service sector and also without controls for exposure shares (available upon request).

[39] Estimated coefficients for the effect of CIC on wages were negative but not statistically significant in

and magnitude of the estimated coefficients are very similar under both frameworks.

Secondly, the effect of the export shock on employment is somewhat higher in the SSIV than in the traditional design (the coefficient increases by 22.7 percent), while the estimated coefficient for CDE on unemployment becomes statistically significant, which suggests that the export shock causes a relative reduction of unemployment in exposed locations. Notably, the magnitude of this coefficient is lower than that of the employment rate, suggesting that the export shock may drive people that were outside the labor force (inactive or studying) into employment. Estimates in Table 3 imply that regions exposed to increasing demand for exports from China experienced a relatively large increase in hours worked and wages. Wage effects are statistically significant after controlling for a preexisting trend in female LFP and, in the case of hourly wages, after considering initial differences in the share of unskilled individuals. The effect of export shocks on informality is not robust neither across specifications nor across definitions.

the traditional estimation, and the magnitude of estimated SSIV coefficients increases considerably as compared to traditional estimates (by 2.7 to 3 orders of magnitude).

Table 3. Robustness of shift-share design: exposure-weighted industry-level aggregates

	OLS	2SLS			
	(1)	(2)	(3)	(4)	(5)
Panel A. Employment rate					
CIC	0.0017***	0.0022***	0.0021***	0.0020***	0.0047***
	(0.0005)	(0.0005)	(0.0006)	(0.0006)	(0.0007)
CDE	0.0333***	0.0360***	0.0367***	0.0354***	0.0308***
	(0.0019)	(0.0011)	(0.0002)	(0.0002)	(0.0002)
Panel B. Unemployment rate					
CIC	0.0014*	0.0012**	0.0014***	-0.0006	-0.0004
	(0.0008)	(0.0005)	(0.0002)	(0.0005)	(0.0009)
CDE	-0.0100***	-0.0102***	-0.0158***	-0.0197***	-0.0183***
	(0.0021)	(0.0008)	(0.0008)	(0.0013)	(0.0011)
Panel C. Labor informality (pension definition)					
CIC	0.0122***	0.0159***	0.0198***	0.0203***	0.0227***
	(0.0023)	(0.0031)	(0.0024)	(0.0024)	(0.0036)
CDE	-0.0037	0.0217***	0.0055	0.0075	0.0061**
	(0.0068)	(0.0080)	(0.0070)	(0.0065)	(0.0024)
Panel D. Labor informality (contractual definition)					
CIC	0.0131***	0.0145***	0.0186***	0.0196***	0.0193***
	(0.0019)	(0.0030)	(0.0021)	(0.0022)	(0.0026)
CDE	-0.0013*	0.0061	-0.0131*	-0.0126**	-0.0067***
	(0.0008)	(0.0071)	(0.0070)	(0.0061)	(0.0025)
Panel E. Labor informality (including self-employment)					
CIC	0.0080***	0.0099***	0.0146***	0.0145***	0.0170***
	(0.0027)	(0.0033)	(0.0020)	(0.0020)	(0.0017)
CDE	-0.0025	0.0038	-0.0138**	-0.0168**	-0.0165***
	(0.0059)	(0.0091)	(0.0059)	(0.0071)	(0.0043)
Panel F. Log average hourly wage					
CIC	-0.0249***	-0.0323***	-0.0534***	-0.0411***	-0.0477***
	(0.0035)	(0.0053)	(0.0059)	(0.0070)	(0.0143)
CDE	-0.0075	-0.0375**	0.0132	0.0623***	0.0594***
	(0.0123)	(0.0187)	(0.0086)	(0.0192)	(0.0121)
Panel G. Log average hours worked					
CIC	0.0192***	0.0281***	0.0226***	0.0220***	0.0212***
	(0.0002)	(0.0001)	(0.0013)	(0.0013)	(0.0025)
CDE	-0.0035	0.0715***	0.0815***	0.0738***	0.0755***
	(0.0138)	(0.0005)	(0.0006)	(0.0008)	(0.0017)
Panel H. Log average monthly wage					
CIC	-0.0184***	-0.0184***	-0.0400***	-0.0365***	-0.0337***
	(0.0039)	(0.0049)	(0.0045)	(0.0053)	(0.0075)
CDE	-0.0567***	-0.0131	0.0381***	0.0563***	0.0497***
	(0.0056)	(0.0155)	(0.0085)	(0.0158)	(0.0078)
KP F-stat	-	528.4	1,598	2,615	1,148
PT Female LFP	-	-	Yes	Yes	Yes
PT Share Unskilled	-	-	-	Yes	Yes
PT Share Migrants	-	-	-	-	Yes

Notes. N=155. Regression in column (1) run by OLS and those in columns (2) to (5) run by 2SLS. All regressions control for industry and year fixed effects. To run these regressions, original variables measured at the LLM-level are converted to exposure weighted industry-level variables applying the method developed by Borusyak, Hull and Jaravel (2020). *** p<0.01, ** p<0.05, * p<0.1.

IV.1.3 Heterogeneity across sub-population groups

To shed more light on the previous findings, we estimate equation (1) for different sub-population groups defined in terms of skill level, age and gender. Table 4 presents the estimates for our preferred specification, i.e. column 5 in Table 2 which includes LLM and year FE and controls for preexisting trends in the corresponding outcome variable, exposure shares and female LFP.[40]

The impact of rising import competition on labor informality was especially strong among unskilled, young and male workers. Point estimates indicate that a 0.41 p.p. rise in CIC increases the share of unskilled workers with no right to receive a pension when retired by 0.61 p.p., *ceteris paribus*. In the case of young workers this effect climbs to 0.74 p.p. These findings are consistent with the idea that young and unskilled workers are more prone to accept an informal arrangement than more educated and experienced workers in a context of weaker labor markets (e.g. they may have less bargaining power, less savings and/or more urgency to work). Notably, in the case of young workers, point estimates increase when we include non-professional self-employed individuals as informal workers (Panel E compared to C and D), which suggests that unskilled young individuals might be shifting from salaried jobs in the formal sector towards self-employment.

Increasing CIC generated a small relative decline in the employment rate of old-age workers in more exposed LLMs, and an even smaller relative increase in the unemployment rate, which suggests that a fraction of the old-age workers who lost their jobs to import competition left the labor market. On the contrary, rising CIC is associated with a moderate relative increase in the employment rate of young, skilled individuals (i.e. those with at least one year of tertiary education). These results are consistent with the "added worker effect" mechanism: when labor conditions for some members of the household (e.g. old-age displaced workers) worsen, secondary workers (e.g. children studying at university or tertiary institutes) may enter the labor market to ameliorate the negative shock.[41] Our long-term estimates, conducted using census data, are also in line with this hypothesis (see section IV.2.2). Finally, Table 4 also reveals that locations with greater exposure to CIC experienced a relatively lower reduction in the average hours worked by all groups, and a relative decline in hourly and monthly wages among unskilled and young workers.

The gains from China's increasing demand for exports in terms of employment and wages were also asymmetric across sub-population groups. Gains in relative employment were limited to young workers and males (both skilled and unskilled). Specifically, a 0.07 p.p. rise in CDE augments the relative employment rate of workers aged 18 to 39 by 0.36 p.p., *ceteris paribus*. In contrast, the increase in monthly wages in regions exposed to growing CDE took place especially among old-age workers: a 0.07 p.p. rise

[40] Most of these results are strongly robust to the exclusion of preexisting trends, and also to the inclusion of pre-trends in many other control variables. We discuss some of these exercises in the robustness section.

[41] Recent evidence for Argentina suggests that job losses by the male household head lead to a significant increase in the labor force participation of female partners and sons (Ciaschi (2020)).

in CDE increases monthly wages by 0.92 p.p. on average, and 1.36 p.p. for old-age workers.[42] Relatedly, more exposed locations benefited from a larger decline in labor informality of old-age workers and males, but only when considering the non-professional self-employed as informal (Panel E), which suggests that some of these workers might have moved from self-employment towards salaried jobs in the formal sector in response to new job opportunities created by the export shocks. Estimates in the next section suggest that this transition may have occurred primarily in the service sector.

[42] In line with the general result for all workers, these effects turn out to be statistically significant after controlling for a preexisting trend in female LFP (or in per capita income).

Table 4. Effects of the China shock on group-specific local labor market outcomes

	All	By education level		By age group		By gender	
	workers	Skilled	Unskilled	18-39	40-65	Females	Males
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A. Employment rate							
CIC	0.0003	0.0155***	-0.0027	0.0091***	-0.0092**	-0.0045	0.0008
	(0.0026)	(0.0041)	(0.0025)	(0.0021)	(0.0040)	(0.0044)	(0.0023)
CDE	0.0299***	0.0359**	0.0326***	0.0510***	0.0107	0.0273	0.0484***
	(0.0103)	(0.0157)	(0.0098)	(0.0119)	(0.0165)	(0.0195)	(0.0095)
Panel B. Unemployment rate							
CIC	-0.0000	0.0018	-0.0009	-0.0014	0.0030*	0.0007	-0.0003
	(0.0024)	(0.0015)	(0.0030)	(0.0031)	(0.0015)	(0.0041)	(0.0015)
CDE	-0.0172	-0.0196*	-0.0146	-0.0213	-0.0093	-0.0123	-0.0217***
	(0.0115)	(0.0102)	(0.0164)	(0.0149)	(0.0112)	(0.0168)	(0.0061)
Panel C. Labor informality (pension definition)							
CIC	0.0152***	0.0127**	0.0148**	0.0180***	0.0098**	0.0052	0.0200***
	(0.0058)	(0.0053)	(0.0061)	(0.0063)	(0.0044)	(0.0065)	(0.0067)
CDE	-0.0087	-0.0162	-0.0017	-0.0154	0.0016	0.0018	-0.0192
	(0.0192)	(0.0243)	(0.0190)	(0.0231)	(0.0187)	(0.0319)	(0.0221)
Panel D. Labor informality (contractual definition)							
CIC	0.0165***	0.0131**	0.0156***	0.0175***	0.0129***	0.0078	0.0211***
	(0.0055)	(0.0058)	(0.0056)	(0.0062)	(0.0045)	(0.0086)	(0.0050)
CDE	-0.0226	-0.0375**	-0.0069	-0.0370	0.0000	-0.0444	-0.0178
	(0.0225)	(0.0189)	(0.0206)	(0.0255)	(0.0212)	(0.0401)	(0.0203)
Panel E. Labor informality (including self-employment)							
CIC	0.0129***	0.0105**	0.0143***	0.0214***	0.0042	0.0063	0.0140***
	(0.0041)	(0.0047)	(0.0039)	(0.0064)	(0.0040)	(0.0058)	(0.0038)
CDE	-0.0228	-0.0108	-0.0256	-0.0063	-0.0415*	-0.0036	-0.0376**
	(0.0208)	(0.0221)	(0.0187)	(0.0257)	(0.0244)	(0.0344)	(0.0164)
Panel F. Log average hourly wage							
CIC	-0.0175	-0.0223	-0.0365***	-0.0289*	-0.0184	0.0005	-0.0242
	(0.0150)	(0.0194)	(0.0123)	(0.0170)	(0.0138)	(0.0211)	(0.0174)
CDE	0.1147	0.1829**	0.0788	0.0281	0.1388	0.1420*	0.1712
	(0.1052)	(0.0874)	(0.1256)	(0.1817)	(0.0919)	(0.0725)	(0.1163)
Panel G. Log average hours worked							
CIC	0.0208***	0.0121	0.0146***	0.0129***	0.0139***	0.0164***	0.0138***
	(0.0037)	(0.0093)	(0.0036)	(0.0042)	(0.0028)	(0.0037)	(0.0037)
CDE	0.0763***	0.0341	0.0487**	0.0691***	0.0082	0.0698**	0.0345
	(0.0234)	(0.0258)	(0.0213)	(0.0231)	(0.0210)	(0.0355)	(0.0222)
Panel H. Log average monthly wage							
CIC	-0.0149	-0.0209	-0.0293**	-0.0377***	0.0106	-0.0085	-0.0180
	(0.0116)	(0.0142)	(0.0118)	(0.0074)	(0.0135)	(0.0104)	(0.0120)
CDE	0.1313**	0.1361	0.0974	0.0023	0.1940***	0.1262**	0.1821***
	(0.0518)	(0.0847)	(0.0666)	(0.0690)	(0.0567)	(0.0523)	(0.0493)

Notes. N=296. 2SLS regressions including LLM and year fixed effects, and preexisting trends in the corresponding outcome variable, exposure shares and female LFP. Robust standard errors clustered by regions in parentheses. Regressions weighted by LLM's share of Chile's population of working age in 1992. *** p<0.01, ** p<0.05, * p<0.1.

IV.1.4 Heterogeneity across sub-population groups and economic sectors

This section extends the analysis by exploring heterogeneities across sectors - primary, manufacturing and services. Given that we lose statistical power when looking at specific groups within each sector at the local-level, these estimates should be read with some caution. Tables A7, A8 and A9 report the results for each of these sectors. Since the sample is restricted to employed individuals, we include regressions for the absolute (log) level of employment in each sector, instead of regressions for employment and unemployment rates.

Table A8 shows that increasing CIC caused a relative decline in the number of workers employed in manufacturing. Job losses were especially large for unskilled and young individuals, and somewhat larger for females than males.[43] Also, more exposed locations experienced a relative increase in labor informality in manufacturing, mainly among unskilled and old-age workers. Notably, in the contractual definition of informality, this effect is driven mainly by old-age and female workers, which might be connected with the subcontracting/outsourcing hypothesis.[44] We find a relative increase in labor informality in the primary (mainly for skilled, old-age and male workers) and service sectors (especially for skilled, young and male workers).

Locations exposed to increased import competition suffered a relative decline in the average wage of old-age workers employed in manufacturing (which is consistent with the relative increase in labor informality for this group). By contrast, they also experienced a relative increment in the average manufacturing wage of young and female workers, which may be the result of a compositional change.[45] Finally, we find a relative wage decline in the service sector (especially for young workers), which could be related to at least two hypothesis: the "added worker effect" and reallocation dynamics from manufacturing towards services.[46]

On the other hand, LLMs exposed to increased demand for exports experienced a relative rise in employment among young workers in the primary sector, in manufacturing employment (with a similar magnitude across different groups but statistically significant for males only) and in the number of old-age workers employed in services (Tables A7). Estimates for labor informality suggest that (new) job opportunities for young individuals in the primary sector took the form of temporary contracts (presumably short-term or apprentices) instead of permanent salaried jobs with social security contributions. On the contrary, formal service jobs may have been taken mainly by unskilled, old-age and male

[43] One reason is that women have a greater employment participation in exposed than unexposed manufacturing industries (e.g. wearing apparel, textiles, leather products).

[44] For instance, a large textile company might focus on management, design and commerce, while outsourcing to small and medium plants some stages of the production process (e.g. cutting, sewing, embroidery). As we previously argued, this is common in Chile (and even more so in manufacturing) and the intensity of outsourcing increased over the period under study.

[45] I.e. manufacturing workers that survived import competition might have on average higher skills and/or belong to more productive plants than displaced individuals.

[46] Papers that track workers' trajectories over time have found this kind of reallocation pattern in response to import competition or trade liberalization episodes (Utar (2018), Dix-Carneiro and Kovak (2019)).

workers that were previously self-employed. Finally, our estimates suggest that areas with greater exposure benefited from relative wage gains in the three sectors.

IV.1.5 Local employment structure

This section aims to further understand the short-term mechanisms of labor reallocation within LLMs. We start in Table A10 by exploring the impact of China's supply and demand shocks on the local employment structure across sectors.[47] The first column corresponds to OLS, while columns (2) to (4) refer to 2SLS. Column (3) controls for the share of primary and manufacturing employment in 1992 (that were used to construct the instrumental variables), while column 4 controls also for initial differences in female LFP. The results suggest that the competitive shock induced by increased import competition from China triggered a relative decline in the fraction of workers employed in manufacturing. Specifically, a 0.41 p.p. increase in CIC reduces the employment share in manufacturing by 0.59 p.p., *ceteris paribus*. Conversely, growing CIC is associated with a relative increase in the employment share of the service sector. A 0.41 p.p. increase in CIC rises the employment share in the service sector by 0.37 p.p. These results are in line with the idea that locations facing import shocks partially compensate the relative employment contraction in manufacturing with job expansion in services. Although positive, the impact of CIC on the employment share of the primary sector is statistically indistinguishable from zero in the preferred specification. On the other hand, increasing demand for exports from China did not affect the employment structure of Chilean LLMs. Results are very similar if we compute sectoral employment shares in terms of the local population of working age (i.e. including inactive and unemployed individuals) instead of the employed population, which reinforces the idea that labor reallocation may go from manufacturing towards services.

To assess whether the relative employment contraction occurs mainly in exposed industries, we run separate regressions for exposed and unexposed industries within each sector.[48] The service sector was disaggregated into construction, trade (including transport and storage) and the rest of services. We present these estimates in Table A11. In this table columns refer to dependent variables (employment share in each group) and panels correspond to different specifications. As expected, the results confirm that manufacturing industries more exposed to increasing import competition suffer a relative employment contraction. This result is highly robust across specifications. Panel A shows that these locations experienced a relative increase in the fraction of workers employed in services such as construction and trade. Controlling for initial differences in female LFP across LLMs increases the magnitude of the estimated coefficient for the trade

[47] This evidence should be taken as suggestive rather than conclusive because it may be the combined result of both supply and demand shocks as there might be spillovers across regions arising from inter-sectoral linkages.

[48] We separate exposed from unexposed industries according to the median growth in CIC (or CDE) across industries over time.

sub-sector (in line with the fact that females are more likely to work in this sector). In contrast, controlling for a preexisting trend in the corresponding outcome variable, but not in female LFP, turns the coefficient for the construction sector (where most workers are men) statistically significant. Overall, in the preferred specification (Panel D), the coefficients are statistically indistinguishable from zero, with the only exception of the negative coefficient for the employment share in exposed manufacturing industries.

We carry out separate regressions by gender (i.e. sectoral employment shares are calculated separately for males and females). This exercise is relevant considering that the period under study witnessed a major increase in the rate of female employment (from 40 percent in 1996 to 47.1 percent in 2006).[49] Results in Table A12 suggest that the employment structure across genders was differently affected by the imports shock. Although increasing CIC caused a relative reduction in the employment share in manufacturing for both genders, its effects on the primary and service sectors differ. In regions more exposed to CIC, the increase in the relative employment share of services was much larger for males than females. The results suggest that, unlike men, some of the displaced women reallocated into the primary sector as well.

Finally, we estimate the impact of trade shocks on the employment shares by labor relationship: waged employees, self-employed and employers. We present these estimates for all workers and separately by gender in Table A13. Even columns correspond to the preferred specification and uneven columns exclude the preexisting trend for female LFP. The results suggest that regions more exposed to import competition experienced a relative contraction in the fraction of waged employees, and that this effect concentrates mainly on males. Estimates in Panels B and C suggest that men losing their jobs as wage earners became self-employed and even employers. In this sense, there would be some potential for creative destruction in the face of import competition.[50] On the export side, regions more exposed to increasing demand from China experienced a relative increment in the fraction of employers. This effect concentrates on males also. Export shocks may generate business opportunities (both in the traded and non-traded sectors) that entail the creation of new firms (presumably small at the beginning) but do not substantially modify the local employment structure, at least in the short-run. Some of these companies may thrive and become job creators as they grow. In fact, in what follows, we show that the export shock has increased the employment share of salaried jobs over the long-run.

[49] Also, Table A4 highlights that females are less under represented in the service sector than in the manufacturing and primary sectors. On average, during 1996-2006 females represented 42.8 percent of employment in services, 28.5 percent in manufacturing and 15.6 percent in the primary sector. The three sectors saw an increase in female participation between 1996 and 2006 (3.4 p.p., 2.6 p.p. and 6.3 p.p., respectively).

[50] Additionally, import competition may increase within firm productivity through skill-upgrading and rising innovation in surviving firms, and also because of employment reallocation towards more technologically advanced firms (Utar and Torrez Diaz (2013), Bloom et al. (2015)).

IV.2 Long-term effects

This section explores the long-term impact of China's growing import competition and demand for exports on migration, employment outcomes, and schooling, by exploiting census data for 1992, 2002 and 2012. We study changes over time: 1992-2002 and 2002-2012. We present separate estimates for each sub-period and for both periods together (stacked changes). The first stage has much more statistical power in the first period than in the second (Table A14).[51] The weakening of the IV strategy might be related to at least three concurrent factors: the FTA that Chile and China signed in 2006, the international financial crisis of 2008-2009 and automation trends.[52] Additionally, over the long-run there is a greater chance that changes in labor composition or other unobserved factors introduce a bias in our estimates. Considering this, long-term results might be read with some caution.

IV.2.1 Migration

Table A15 presents the estimates for the change in local migration rate, defined as the fraction of migrants in LLM's population of working age in years 1987, 1997 and 2007.[53] Dependent and shock variables are expressed in changes that correspond to the periods 1987-1997 and 1997-2007.[54] Note that the second period almost coincides with the one we use in the short-term analysis (1996-2006). All specifications control for the employment share in the primary and manufacturing sectors, while even columns include a preexisting trend in female LFP. Regressions in stacked changes control also for a period dummy and the exposure shares in the second period (as recommended by Borusyak et al. (2020)). Our estimates in Table A15 suggest that China's import and export shocks did not affect migration rates differently across LLMs. This is reassuring as it indicates that migration patterns across LLMs should not contaminate our short-term estimates.

IV.2.2 Employment and education

Table A16 extends the analysis with census data to several labor and education outcomes. Additionally, in Table A17 we explore the existence of heterogeneous effects across different sub-population groups. The results suggest that LLMs exposed to increasing import competition experienced a relatively small rise in employment, along

[51] This is in line with the robustness exercise that extends the sample period sequentially until 2015 (see Table A20 discussed in Section IV.3.2).

[52] According to the International Federation of Robotics (IFR), Chile started to import robots for manufacturing production in 2006 (6 units). The operational stock of robots grew steadily in the following years reaching 97 robots in 2016.

[53] A migrant is an individual that moved from one LLM to another within the periods 1987-1992, 1997-2002 or 2007-2012; it is calculated using a retrospective question about the municipality of residence five years previous.

[54] International migrants are excluded from this definition because they were living in a different country in 1987, 1997 or 2007. However, they represent less than 10 percent of Chilean migrants in all these years.

with a relative increase in the share of salaried employees; but this effect occurs only in 2002-2012. In contrast, if we compare 1992 and 2002, locations facing growing CIC experienced a relative decrease (increase) in the employment (unemployment) rate.[55]

In line with our short-term estimates, we find that the imports shock caused a relative increase in the employment rate of skilled and young individuals. These locations also experienced a relatively minor rise in the share of working age individuals attending higher education.[56] We interpret these findings as partial evidence in favor of the "added worker effect" hypothesis. The labor supply of young and skilled individuals increases in the face of worsening labor conditions of other household members (e.g. old-age workers displaced by import competition) so secondary workers (e.g. young individuals studying at university or tertiary institutes) enter the labor market to ameliorate the negative shock.[57]

Regarding the demand shocks, we find that locations exposed to China's increasing demand for exports experienced a relative increase in employment, which holds in both periods, and in the share of salaried workers (which concentrates mainly in 2002-2012).

Results in Table A17 suggest that the export shock caused employment gains and shifts towards salaried jobs among all sub-population groups, which were somewhat stronger for young, skilled, male individuals. The magnitude of the estimated coefficients for the young more than doubles that for the old-age group. Similarly, while all groups in exposed locations exhibited a relative decline in unemployment, this effect was much stronger for unskilled individuals. The fact that the magnitude of the estimated coefficients for the impact of growing CDE on unemployment are considerably lower than that for the employment rate (especially in the case of skilled, young and males), indicates that new jobs were taken by individuals that were outside of the labor force (i.e. inactive or studying).

In this line, local markets exposed to larger export shocks experienced a relatively lower increase in the fraction of individuals studying at a tertiary institution or a university.[58] Effects are strong and even larger if we concentrate on young people (ages 18-30). These effects take place in both periods but are somewhat higher in 1992-2002. Our hypothesis is that export shocks have created new jobs that, in many cases, were taken by individuals that could otherwise be studying at a tertiary institute or university. In other words, export opportunities created jobs that raised the opportunity cost of schooling (Atkin (2016)). This evidence is consistent with export shocks biased towards

[55] Overall, short-term estimates suggest that the impact of CIC on relative employment and unemployment rates were statistically indistinguishable from zero, which we argue was driven mainly by labor reallocation towards informal jobs.

[56] This effect is much stronger for individuals aged 18-30 but, in this case, it concentrates in the second period.

[57] Greenland and Lopresti (2016) document large increments in U.S. high school graduation rates in LLMs most affected by import competition. While Utar (2018) finds that Danish workers displaced by import competition tried to return to complete education mostly after moving to the service sector. Importantly, workers enrolled in school to increase job prospects receive an education allowance from unemployment insurance.

[58] The fraction of the population under age 18-65 (18-30) enrolled in tertiary education increased from 12.9 (15.7) percent in 1992 to 23.4 (29.3) in 2002 and 32.8 (45.1) percent in 2012.

low-skill intensive industries (Blanchard and Olney (2017), Li (2018)). Overall, these findings deserve a more detailed study that is beyond the scope of this paper.

V Concluding Remarks

This paper studies the causal effect of trade shocks on local labor markets, exploiting spatial and time variations in trade exposure arising from initial differences in industry specialization across Chilean geographic locations and the evolution of shocks across industries. To account for the endogenous nature of trade we instrument Chinese import competition and demand for exports with China's trade patterns in the rest of the world. This strategy aims to capture supply and demand-driven shocks inherent to China's economic forces and institutions that allowed it to gain global market share within specific industries over time.

Our findings suggest that the local employment structure responds to trade shocks. Notably, locations with greater exposure to increasing import competition suffered a relative deterioration of labor market conditions, which mainly affected young and unskilled individuals. These groups are the most affected by job losses in manufacturing and, more generally, by a weaker labor market, which leads to relative wage declines and increases in labor informality. A small proportion of unskilled older workers who lost their jobs to import competition left the workforce, while those remaining employed in manufacturing suffered increases in labor informality and relative wage losses. Our evidence is consistent with the "added worker effect" hypothesis by which secondary workers (e.g. children studying at university or a tertiary institute) enter the labor market in order to ameliorate the worsening labor conditions of other members of the household (e.g. old-age workers).

We find that the informal sector acts as a buffer in response to import shocks. Increasing labor informality seems to be a strategy to cope with rising import competition. Informality allows firms to reduce taxes and other labor costs (at the risk of being caught and forced to pay a fine). Firms may also replace permanent with part-time employees and apprentices and subcontract some production activities with other plants in the informal sector. On the other hand, workers may be more likely to accept an informal labor arrangement in the context of a weaker labor market. Of course, this finding is not enough to claim optimality for informal labor arrangements, which brings many economic costs and inefficiencies (Dix-Carneiro, Goldberg, Meghir, and Ulyssea (2019), Ulyssea (2020)).

China's global trade expansion, in turn, caused a relative employment increment in local labor markets specialized in the production and processing of primary products. Employment gains mainly benefited young and male workers. These individuals took advantage of employment opportunities in the primary sector, mainly in the form of temporary contracts (presumably, short-term or apprentices). Old-age workers harnessed formal jobs in the service sector, improving their relative wages. Finally, these locations

experienced a relatively lower increase in tertiary education attendance than less-exposed areas, which could delay local development through its effects on human capital formation. We believe that this topic deserves further attention and represents an interesting avenue for future research.

Our results point out considerable heterogeneity across workers in the spatial distribution of the costs and benefits of trade. These findings are especially relevant for developing countries where exports exhibit a high degree of concentration in a few number of primary products, where informality and tax evasion are key policy issues, and where an important fraction of employment concentrates in low-competitive industries characterized by high informality.

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A Appendix

A.1 Data details

Labor market outcomes from household surveys

The employment rate is the proportion of persons employed in relation to the population of working age. Employed individuals are those that have worked during the last week and those who declared that they did not work but actually have a job. The unemployment rate is the fraction of individuals who did not work but have been looking for a job in the last two months in relation to active population. Active population includes both the employed and unemployed individuals.

To compute the average (or median) hourly wage, first we calculate the individual wage dividing the monthly salary by the number of hours worked per month.[59] Then we compute the average (or median) wage in each LLM and calculate its log. Wages are expressed in 1995 constant Chilean pesos using the Consumer Price Index published by the Chilean Central Bank.

Migration and employment outcomes from censuses data

The census contains information on individual's current and 5-year previous regions of residence, which allows to construct a measure of migration for 1987-1992, 1997-2002 and 2007-2012, defined as the fraction of population of working age that emigrated to a different LLM in each 5-year period. The migration rate includes local migrants only, which represent the great majority (almost 90 percent) of Chilean migrants in 1992, 2002 and 2012.

Additionally, we compute local employment and unemployment rates (adopting the same definition as in household surveys), the share of salaried workers in population of working age, the share of self-employed workers in population of working age, and the fraction of population (under ages 18-65 or 18-30) studying at a tertiary institution or university. These are individuals that report studying was their main activity in the last week.[60] The sector of employment is available in the 1992 and 2002 censuses but not in 2012. Also, no census includes information on labor incomes, social security benefits or contractual situation, so in this case we can not explore earnings or labor informality.

Trade variables

Information on bilateral trade flows is obtained from the CEPII-BACI database. These data contain annual information on bilateral trade values and quantities for more than

[59] The number of hours of work is asked in terms of weeks so we multiply this value by 4.28 to express it in monthly terms.

[60] This information is included in the question related to employment status.

5,000 products and 200 countries since 1995. Products are defined at the six-digit level of the Harmonized System International classification (that we match to the two-digit level of the ISIC using a concordance table provided by United Nations Statistical Division-UNSD).[61] Trade flows are denominated in thousands of current US dollars and converted to Chilean current pesos using the official exchange rate provided by the Chilean Central Bank.

We compute imports and exports flows at the two-digit industry-year level (according to the ISIC Rev. 4). To construct the measure of Chinese import competition (CIC) we merge the ENIA and BACI datasets. M_{jt} and X_{jt} in equation (2) are obtained by aggregating product-level information from BACI data, while Q_{jt} is measured by adding up plant-level information from INE-ENIA. We convert the information at the six-digit level of the HS to the two-digit level of the ISIC using correspondence tables from United Nations Statistics Division.

Similarly, we merge BACI, ENIA and sectoral GDP datasets to construct a measure of Chinese demand for exports (CDE) at the two-digit industry-year level.

A.2 Balance and pre-trend tests

In the first set of balance tests, we regress potential industry-level confounders directly on the shocks. This test has rarely been used in Bartik-type designs (Borusyak et al. (2020)). The idea is to test if the China's shocks do not predict variables related to employment structure and technology, so we can argue that these shocks are as-good-as-randomly assigned across industries. We obtain industry-level production variables from the 1996 *Encuesta Nacional Industrial Anual-ENIA* (INE). We compute the log average industry wage, the fraction of production workers, capital intensity (i.e. the stock value of capital divided by the number of workers) and the fraction of machinery in total investment. All these variables are calculated at the 2-digit ISIC Rev. 4 level, for manufacturing industries only. We regress each of these variables on the shocks, which are normalized to have a unit variance. Table A1 shows that industry variables are not significantly correlated with industry-level shocks.

In the second set of balance tests, we regress potential region-level confounders on the shift-share instruments (again, normalized to have a unit variance). These variables are the log average per capita income, the fraction of individuals with secondary education (or below) in population of working age, the share of workers under age 40-65 in population of working age, the fraction of individuals under age 18-30 assisting to tertiary education, the female employment rate, the percentage of migrants in population of working age and the fraction of Chile's population living in each LLM. The idea is to test if the Bartik-shock

[61] CEPII constructs the dataset using as input the COMTRADE database, elaborated by United Nations, which is based on direct reports of each country to the UNSD, and applies an harmonization procedure that reconciles the declarations of the exporter and the importer. For more information on the CEPII BACI database visit http://www.cepii.fr.

instruments do not predict LLM outcomes related to local economic and demographic structures, so we can be more confident that the shocks are as-good-as-randomly assigned across locations. These regressions control for the 1992 share of manufacturing and primary employment which were used to construct the shock variables. Estimates in Table A2 suggest that there is no statistically significant correlation between these variables and the shift-share instruments, with the only exception of the female employment rate. In particular, locations exposed to larger import shocks tend to have a higher female employment rate in 1992.[62] Moreover, given that Chile experienced a major increase in female LFP during the period under study, this unbalance might led to potential confounding effects if regions were subject to different labor supply dynamics. In this context, it is important to control for initial differences (pre-trends) in female LFP across LLMs. Additionally, we perform separate regressions by gender (section IV.1.3).

Finally, we conduct a pre-trend analysis at the LLM-level to test if past changes in labor market outcomes are correlated with the future changes in China's supply and demand shocks. We regress the average annual change in labor market outcomes during 1990-1994 on the average annual change in CIC and CDE during 1996-2006. We run these regressions by OLS and 2SLS. Results are very similar if we regress these variables directly on the instruments. Results in Table A3 suggest that there is no significant relationship between past changes in local employment, unemployment and informality rates, and future changes in location-specific trade shocks. The only exception is the log average hourly (or monthly) wage. Locations that were subsequently exposed to larger import supply shocks had a greater relative increase in labor incomes in the first years of the 90s. We conduct a robustness exercise (i.e. controlling for initial differences in labor incomes in the main regressions) to address potential endogeneity concerns related to this unbalance. All results remain virtually unchanged.

A.3 Robustness exercises

In this section we present and discuss the results of several robustness exercises carried out for the main regression analysis (which follows the traditional shift-share research design conducted at the LLM-level).

The first exercise aims to control for a potential bias in estimated coefficients arising from outliers in the shock variables. We order LLMs according to their exposure to Chinese import competition (measured by the average growth in CIC over time) and, separately, using their exposure to Chinese demand for exports. Then, we exclude the 5% extreme values in each of these distributions and run the baseline regressions. This exercise excludes 12 LLMs (the three with the highest and lowest exposures to CIC or CDE) and therefore runs the regressions using 49 instead of 61 LLMs.[63] We present these estimates in Table

[62] Results are very similar if we use other years of the period under study (1996-2006).

[63] The three LLMs with the highest exposure to Chinese import competition are La Ligua (the average growth in CIC is 2.08 p.p.), Santiago (1.03 p.p.) and Arica (0.66 p.p.). The three locations with the

A18. Results show that IVs have explanatory power (weak IV F-statistics are large). There is a considerable increase in the standard error of estimated coefficients, especially in the case of CDE for the employment rate. Given that point estimates increase to a much lower extent, estimated coefficients are not longer statistically significant. However, we find that the effect of the export shock on the relative unemployment rate is negative, statistically significant and large. On the other side, although we find that the magnitude of the estimated coefficients for the effect of Chinese import competition on labor informality increases substantially (by two to three orders of magnitude, depending on the definition adopted), the marginal effects are relatively similar to the baseline case. In the preferred specification (column 5), point estimates increases from 0.0152 to 0.0346 (Panel C-pension definition) and from 0.0129 to 0.0556 (Panel D-contractual definition), respectively. In these cases, a 0.13 p.p. increase in CIC (which is the median growth in CIC in this restricted sample) increases the fraction of salaried workers with no contributions to social security by 0.45 p.p. (and by 0.72 p.p. in the contractual definition). Additionally, this exercise suggests that increasing Chinese import competition caused a relative decline in the average hourly and monthly wages of workers living in more exposed locations. In the preferred specification, a 0.13 p.p. increase in CIC reduces the average hourly and monthly wages by about 1 percent, *ceteris paribus*.

The second robustness exercise consists on including preexisting trends of variables related to the economic and demographic structures of LLMs that might be potentially correlated with future Chinese import competition and demand for exports. These controls partially address a bias in estimated coefficients if they correlate with unobserved shocks affecting both trade shocks and labor market outcomes simultaneously. As before, preexisting trends are constructed as the value of the corresponding variable in 1992 interacted with year fixed effects. We include pre-trends for the average household per capita income (in logs), the fraction of old-age individuals in population of working age, the fraction of unskilled individuals in population of working age, the share of migrants in population of working age, and all of these variables together. Table A19 presents the estimates. Results for the effect of export shocks on the employment rate are robust to controlling for initial differences across locations in all of these variables. Including all preexisting trends together halves the magnitude of estimated coefficient (and the p-value is 1.03). Notably, running the regression with full controls for the employment rate of young workers returns an estimated coefficient of 0.035 with a p-value equal to 2.19. Estimates for the effect of import shocks on labor informality are highly robust to the inclusion of all of these control variables. It is worth mentioning that the economic magnitude of the estimates increases when we control for a preexisting trend in income or in the share of migrants, which might be explained by a positive correlation between local economic conditions and future CIC. In the same spirit, when controlling for these pre-trends, import competition causes a relative reduction in the average monthly wage of

greater exposure to Chinese demand for exports are Chañaral (the average growth in CDE is 0.59 p.p.), Cabildo (0.43 p.p.) and Calama (0.38 p.p.).

workers in more exposed LLMs. On the other side, the positive effect of the export shock on relative wages is highly robust to the inclusion of all of these pre-trends.

In the following exercise, we run the main regressions extending the sample period sequentially (up to 2015). Local labor market outcomes were obtained from the Chilean households surveys (CASEN) for 2009, 2011, 2013 and 2015. Table A20 presents the results. Column 1 shows the baseline specification for the period 1996-2006, and columns (2) to (5) present the estimates obtained from extending the sample period one year at a time. The table displays the preferred specification (which controls for LLM and year fixed effects, and preexisting trends in the corresponding outcome variable, exposure shares and female LFP). Notably, most of our results are robust to extending the sample period beyond 2006. The instruments lose predictive power as we add years to the sample (e.g. the Kleibergen-Paap F-statistic reduces considerably from one year to the next, reaching a value of 11.9 for the period 1996-2015).[64] This result is in line with long-term estimates (which show a much weaker first-stage in the period 2002-2012 than in 1992-2002). These results suggests that China's industry trends in global markets are less predictive of the evolution of bilateral trade flows between Chile and China in the years following 2006, which may be partially explained by by the FTA that Chile and China have signed at the end of 2005 and became effective in October 2006. Trade policy negotiations are potentially correlated with industry characteristics and labor market outcomes, so the clauses of the FTA might have altered bilateral trade flows in the following years. Additionally, the global financial crisis of 2008-2009 have strongly affected international trade patterns (reducing the level of trade flows and increasing their volatility). Automation trends, widespread in manufacturing production, could also be affecting trade flows differentially across industries depending on their relative rates of adoption of new technologies. Considering all of these factors, estimates beyond 2006 should be read with caution. Importantly, most of our results remain valid. In line with the weakening of the identification strategy, the magnitude of estimated coefficients decreases as we include more years to the sample.

In the next exercise we use different groups of countries to construct the instrumental variables (IVs). These estimates are shown in Table A21. Remember that we compute the IVs using the average participation of China in the imports and exports of all countries in the world, except Chile, because the idea is to capture China's supply and demand-driven shocks (inherent to Chinese economic forces) that allowed it to gain global market share within specific industries over time. We can calculate the average China's industry shares using different groups of countries as well. This exercise might alleviate endogeneity concerns related to a potential correlation between common shocks at the industry-level between Chile and different groups of economies. Using The World Bank's definition, we compute the IVs for middle-income economies (excluding Latin America), high-income and Latin American countries. Interestingly, our estimates exhibit robustness to the use

[64] This value is just above the recommended threshold of 10. The KP F-statistic depicted in the table corresponds to Panel A, but results are very similar if we look at these statistics for the different dependent variables.

of different sets of countries to compute the IVs. Estimated coefficients for the impact of import competition on labor informality are slightly higher than in the baseline scenario, while those for the effect of export shocks on employment rate are somewhat smaller. Overall, we believe that using all countries in the world is the preferred option because it implies a lower probability of industry-level common shocks between Chile and the rest of the world.[65]

Additionally, we show that our results are robust to changing the unit of analysis. Instead of LLMs, we calculate all relevant variables of equation 7 at the municipality-level (also known as *comunas*). Figure A2 in the Appendix presents a map showing the variation in CIC and CDE across municipalities. One advantage of running these regressions is that we count on a higher number of observations and therefore gain some statistical power in this direction. However, it might come at the cost of a larger measurement error because municipalities are on average smaller than LLMs and, in many cases, very spatially and economically integrated implying a high degree of labor mobility across neighboring municipalities.[66] In this case, estimated coefficients may present an attenuation bias. We cluster standard errors at the level of LLMs. Table A22 presents the results. Remarkably, most of our estimates remain robust to this exercise. Generally, estimated coefficients present a lower magnitude than the main estimates, which is consistent with the hypothesis of attenuation bias.

In the following exercise, we estimate an "unweighted-version" of the main regressions of the paper. Table A23 reports the unweighted estimates. In the preferred model, we weight each observation by the LLM share of population of working age in 1992 (as in Autor et al. (2013) and Costa et al. (2016)). This empirical strategy provides average treatment effects (ATE) that are weighted by workers instead of LLMs. While in this exercise we use no weights in the regressions, so that all LLMs weigh the same regardless of the size of their workforce. Results in Table A23 show that the positive employment effects of export shocks are robust not to using working-age population weights in the main regressions. On the other side, estimated coefficients for the effect of import shocks on labor informality are no longer statistically significant. Point estimates are somewhat smaller than in the baseline (weighted) regressions and standard errors rise by more than two orders of magnitude. This result might be explained by the fact that Chinese import competition occurs mainly in densely populated areas with presence of industrial clusters specialized in the production of manufactures (e.g. big cities and their surroundings areas, like Santiago and Arica) so estimates are weaker if we do not take into account differences in workforce size across LLMs. On the other side, estimates for the impact of CDE on labor market outcomes do not exhibit major changes.

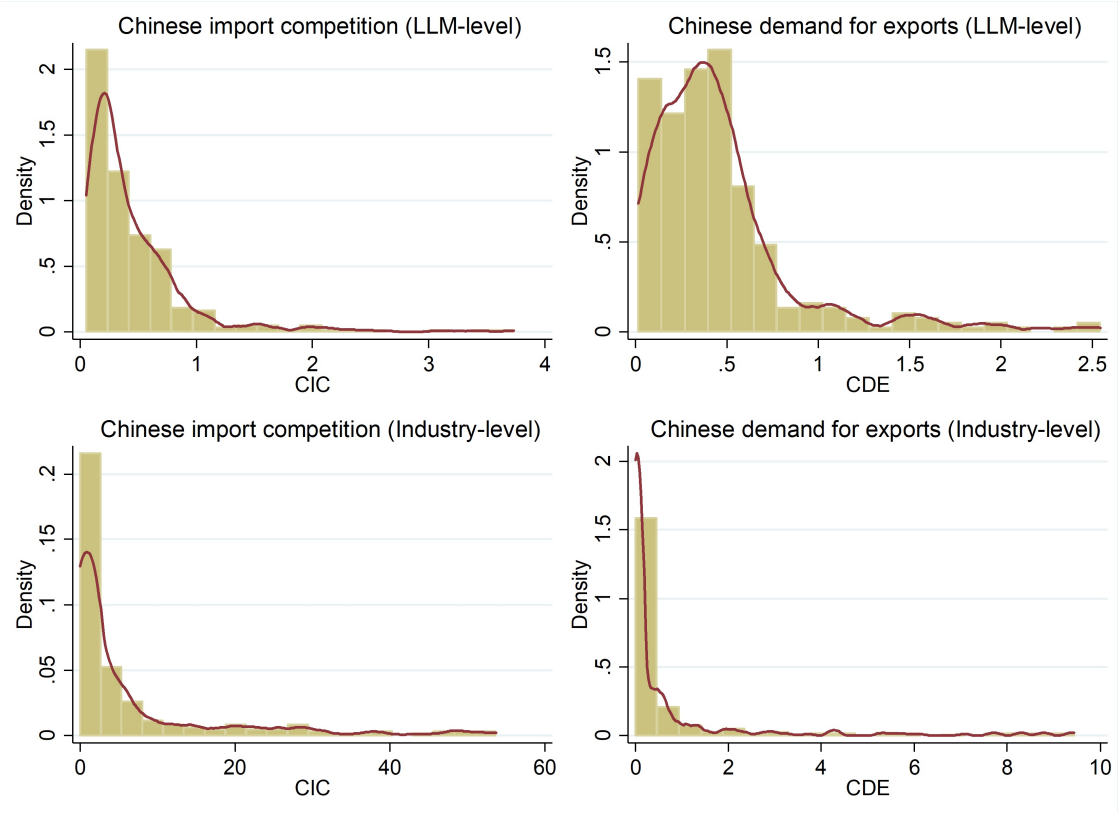
Finally, we run the main regressions of the paper using a balanced sample of LLMs (these estimates are shown in Table A24). The exercise restricts the sample to 57 LLMs

[65] Common shocks are perhaps more likely when using Latin American countries, given they have closer geographical, economic, commercial and cultural relations with Chile.
[66] On average, a LLM is formed by 4.7 municipalities.

that are observed in each of the five years (285 observations instead of 296). Estimated coefficients present very little variation compared to the preferred estimates in Table 2.

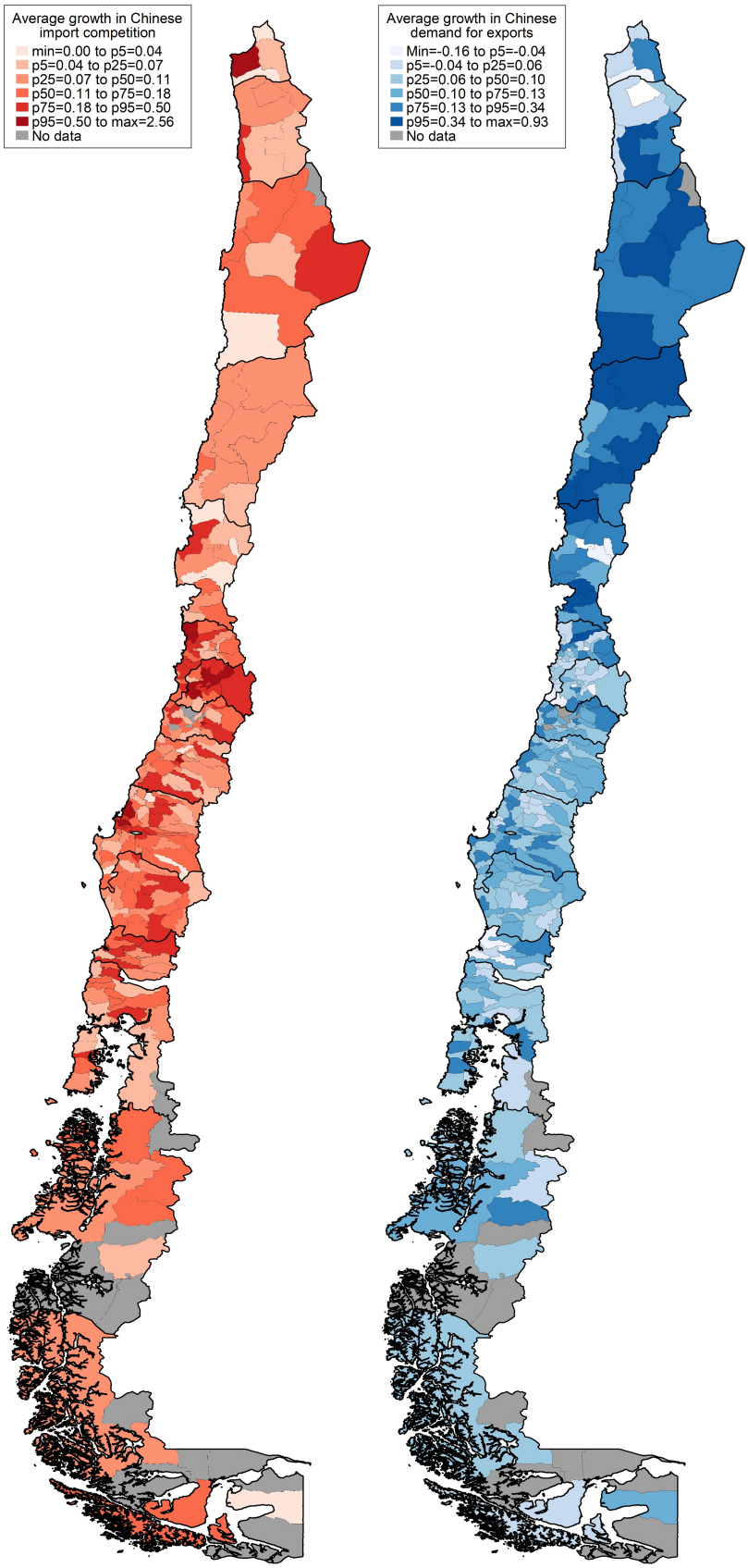
A.4 Additional figures

Figure A1
Distributions of China's trade shocks



Notes. Top panels present the distributions of Chinese import competition (left) and Chinese demand for exports (right) at the LLM-level in 1996-2006. Bottom panels depict the distributions of Chinese import competition (left) and Chinese demand for exports (right) at the two-digit ISIC rev. 4 industry-level in 1996-2006.

Figure A2
Spatial distribution of CIC and CDE at the municipality-level



Notes. Chinese import competition-left (Chinese demand for exports-right) across municipalities measured as the interaction of local employment share of each industry in 1992 and the evolution of CIC (CDE) across industries over time. This figure plots the average change in each of these variables across Chilean municipalities over time. Sources. 1992 Chilean Census, ENIA, National Accounts, BACI.

A.5 Additional tables

Table A1. Industry-level balance

	China's supply shock	China's demand shock
	(1)	(2)
Log average wage	-0.0365	-0.0328
	(0.0445)	(0.0501)
Share of production workers	0.0128	0.0092
	(0.0126)	(0.0178)
Capital intensity	-0.1249	-0.0619
	(0.1463)	(0.1708)
Share of investment in machinery	0.0248	0.0129
	(0.0537)	(0.0372)

Notes. Variables measured at the 2-digit ISIC Rev. 4. Sample comprises manufacturing industries in 1996 (N=20). Regressions weighted by industry employment shares. Robust standard errors. Source: Chilean manufacturing census (*Encuesta Nacional Industrial Anual-ENIA*).

Table A2. Region-level balance

	China's supply shock	China's demand shock
	(1)	(2)
Log(per capita income)	0.0615	-0.1052
	(0.0432)	(0.1272)
Share unskilled workers	-0.0094	0.0202
	(0.0106)	(0.0348)
Share old-age workers (age 40-65)	-0.0020	0.0024
	(0.0043)	(0.0187)
Share studying (age 18-30)	-0.0044	0.0204
	(0.0070)	(0.0311)
Female employment rate	0.0313***	0.0116
	(0.0092)	(0.0268)
Share migrants	-0.0091	-0.0320
	(0.0069)	(0.0193)
Share population	0.0266	0.0186
	(0.0274)	(0.0188)

Notes. Variables measured at the level of local labor markets (N=61) using the 1992 Chilean Census, except the log(per capita income) which was calculated using data from CASEN households survey. Robust standard errors clustered by region.

Table A3. Pre-trends: past change in local labor market outcomes on future shocks

	OLS	2SLS	
	(1)	(2)	(3)
Panel A. Employment rate			
CIC	-0.0033	-0.0018	0.0036
	(0.0067)	(0.0070)	(0.0163)
CDE	-0.0446	-0.0296	-0.0464
	(0.0413)	(0.0387)	(0.0290)
Panel B. Unemployment rate			
CIC	-0.0002	-0.0021	0.0077
	(0.0055)	(0.0063)	(0.0143)
CDE	0.0242	0.0158	0.0016
	(0.0248)	(0.0270)	(0.0220)
Panel C. Labor informality (pension definition)			
CIC	-0.0198	-0.0134	-0.0285
	(0.0136)	(0.0153)	(0.0179)
CDE	-0.0895	-0.0437	-0.0535
	(0.0664)	(0.0660)	(0.0665)
Panel D. Labor informality (including self-employment)			
CIC	0.0096	0.0131	-0.0036
	(0.0106)	(0.0123)	(0.0185)
CDE	0.0192	0.0440	0.0487
	(0.0365)	(0.0427)	(0.0442)
Panel E. Log average hourly wage			
CIC	0.1698***	0.1773***	0.1647**
	(0.0383)	(0.0302)	(0.0823)
CDE	-0.0838	-0.0681	0.0289
	(0.1739)	(0.1529)	(0.1640)
Panel F. Log average monthly wage			
CIC	0.2175***	0.2286***	0.1538**
	(0.0345)	(0.0301)	(0.0751)
CDE	-0.1516	-0.0759	0.0683
	(0.1681)	(0.1534)	(0.1477)
Weak IV F-stat		236.4	86.90
PT Exposure Shares	-	-	Yes

Notes. N=53. Average annual change in local labor market outcomes during 1990-1994 on average annual change in CIC and DCE during 1996-2006. In columns (2) and (3) these variables are instrumented using the average annual change in China's world supply and demand shocks. All regressions weighted by LLM's share of Chile's population of working age in 1992. Robust standard errors clustered by region.

Table A4. Demographic composition

	1996	1998	2000	2003	2006
Panel A. Population of working age					
Skilled	0.193	0.207	0.218	0.240	0.242
Unskilled	0.807	0.793	0.782	0.760	0.758
Age 18-39	0.608	0.595	0.579	0.559	0.531
Age 40-65	0.392	0.405	0.421	0.441	0.469
Females	0.516	0.521	0.517	0.516	0.518
Males	0.484	0.479	0.483	0.484	0.482
Panel B. Employed population					
Skilled	0.209	0.230	0.245	0.257	0.257
Unskilled	0.791	0.770	0.755	0.743	0.743
Age 18-39	0.604	0.585	0.562	0.539	0.510
Age 40-65	0.396	0.415	0.438	0.461	0.490
Females	0.344	0.361	0.369	0.376	0.389
Males	0.656	0.639	0.631	0.624	0.611
Panel C. Workers in the primary sector					
Skilled	0.067	0.078	0.088	0.090	0.087
Unskilled	0.933	0.922	0.912	0.910	0.913
Age 18-39	0.588	0.560	0.544	0.527	0.486
Age 40-65	0.412	0.440	0.456	0.473	0.514
Females	0.132	0.136	0.142	0.173	0.196
Males	0.868	0.864	0.858	0.827	0.804
Panel D. Workers in the manufacturing sector					
Skilled	0.167	0.178	0.218	0.196	0.199
Unskilled	0.833	0.822	0.782	0.804	0.801
Age 18-39	0.652	0.624	0.604	0.573	0.535
Age 40-65	0.348	0.376	0.396	0.427	0.465
Females	0.276	0.283	0.286	0.276	0.302
Males	0.724	0.717	0.714	0.724	0.698
Panel E. Workers in the service sector					
Skilled	0.252	0.271	0.281	0.300	0.299
Unskilled	0.748	0.729	0.719	0.700	0.701
Age 18-39	0.598	0.582	0.556	0.535	0.510
Age 40-65	0.402	0.418	0.444	0.465	0.490
Females	0.409	0.424	0.430	0.436	0.443
Males	0.591	0.576	0.570	0.564	0.557

Notes. A worker is skilled if she has completed at least one year of university or tertiary education, while she is unskilled if its highest educational achievement is a high-school diploma (or below). Source: CASEN household surveys.

Table A5. Descriptive statistics for local labor market outcomes

	Mean	SD	P10	P25	P50	P75	P90
Panel A. Employment structure by sector							
Primary	0.144	0.133	0.035	0.037	0.079	0.239	0.354
Manufacturing	0.139	0.044	0.082	0.106	0.156	0.181	0.195
Nontraded	0.716	0.106	0.548	0.661	0.764	0.796	0.808
Panel B. Employment rate							
All workers	0.601	0.049	0.531	0.566	0.615	0.642	0.657
Skilled	0.648	0.054	0.575	0.607	0.672	0.682	0.714
Unskilled	0.587	0.049	0.513	0.555	0.600	0.627	0.648
Age 18-39	0.585	0.049	0.514	0.551	0.603	0.623	0.643
Age 40-65	0.623	0.055	0.542	0.585	0.643	0.668	0.686
Females	0.431	0.077	0.331	0.373	0.437	0.493	0.510
Males	0.784	0.042	0.727	0.765	0.787	0.811	0.834
Panel C. Unemployment rate							
All workers	0.085	0.027	0.049	0.068	0.092	0.097	0.116
Skilled	0.064	0.027	0.032	0.050	0.062	0.073	0.098
Unskilled	0.092	0.030	0.055	0.070	0.097	0.112	0.128
Age 18-39	0.107	0.033	0.062	0.088	0.110	0.122	0.151
Age 40-65	0.056	0.023	0.028	0.040	0.059	0.075	0.081
Females	0.103	0.034	0.060	0.079	0.101	0.123	0.146
Males	0.074	0.027	0.041	0.057	0.078	0.092	0.101
Panel D. Labor informality (pension def.)							
All workers	0.211	0.053	0.173	0.182	0.196	0.233	0.284
Skilled	0.112	0.040	0.058	0.097	0.114	0.134	0.143
Unskilled	0.242	0.059	0.193	0.207	0.227	0.266	0.321
Age 18-39	0.222	0.063	0.175	0.188	0.203	0.247	0.312
Age 40-65	0.194	0.048	0.155	0.171	0.184	0.210	0.259
Females	0.252	0.050	0.218	0.225	0.237	0.271	0.314
Males	0.186	0.063	0.146	0.151	0.166	0.202	0.281
Panel E. Labor informality (including self-employment)							
All workers	0.341	0.070	0.296	0.300	0.310	0.372	0.441
Skilled	0.099	0.035	0.051	0.086	0.100	0.115	0.125
Unskilled	0.414	0.069	0.358	0.379	0.395	0.444	0.517
Age 18-39	0.305	0.074	0.254	0.258	0.280	0.333	0.418
Age 40-65	0.388	0.073	0.331	0.343	0.367	0.414	0.488
Females	0.355	0.058	0.312	0.317	0.324	0.383	0.433
Males	0.332	0.084	0.272	0.290	0.301	0.367	0.447
Panel F. Log hourly wage							
All workers	7.31	0.27	6.92	7.14	7.35	7.54	7.57
Skilled	7.97	0.28	7.60	7.73	8.02	8.20	8.28
Unskilled	6.95	0.19	6.71	6.84	7.00	7.05	7.12
Age 18-39	7.20	0.26	6.83	7.02	7.24	7.40	7.51
Age 40-65	7.43	0.30	6.99	7.22	7.50	7.69	7.71
Females	7.16	0.24	6.81	7.00	7.25	7.35	7.40
Males	7.35	0.31	6.90	7.15	7.39	7.62	7.64
Panel G. Trade shocks							
CIC (Chile)	1.51	1.51	0.19	0.38	1.04	2.02	3.74
China's supply shock (IV)	1.28	0.91	0.34	0.52	1.13	1.79	2.42
CDE (Chile)	0.31	0.34	0.07	0.13	0.23	0.36	0.64
China's demand shock (IV)	1.06	0.71	0.55	0.58	0.88	1.25	1.79

Notes. N=296. Statistics weighted by LLM's share of Chile's population of working age in 1992.

Table A6. First-stage regressions

	Specification 1		Specification 2		Specification 3	
	CIC	CDE	CIC	CDE	CIC	CDE
China's supply shock	2.2722***	-0.0514***	2.2421***	-0.0458***	2.0890***	-0.0343***
	(0.0566)	(0.0092)	(0.0554)	(0.0099)	(0.0700)	(0.0104)
China's demand shock	0.0868**	0.3360***	0.0645	0.3442***	0.1128***	0.3418***
	(0.0380)	(0.0146)	(0.0417)	(0.0124)	(0.0319)	(0.0133)
R-squared	0.982	0.789	0.984	0.819	0.988	0.836
SW F-stat	1890.2	615.1	1795.3	758.3	1125.6	672.6
KP F-stat	283.6		376.9		337.6	
PT Exposure Shares	-		Yes		Yes	
PT Female LFP	-		-		Yes	

Notes. N=296. The three specifications control for LLM and year fixed effects. Robust standard errors clustered by regions in parentheses. Regressions weighted by LLM's share of Chile's population of working age in 1992. SW is the F-statistic for the Sanderson-Windmeijer multivariate test of excluded instruments. KP is the Wald F-statistic for the Kleibergen-Paap test of excluded instruments. *** p<0.01, ** p<0.05, * p<0.1.

Table A7. Effects of the China shock on local labor market outcomes of workers employed in the primary sector

	All workers	By education level		By age group		By gender	
		Skilled	Unskilled	Age 18-39	Age 40-65	Females	Males
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A. Log employment							
CIC	-0.0331	-0.1105	-0.0318	-0.0574	-0.0134	-0.0105	-0.0144
	(0.0502)	(0.1432)	(0.0480)	(0.0561)	(0.0490)	(0.0464)	(0.0504)
CDE	0.1602	0.0464	0.1239	0.2634**	0.0423	0.3040	0.1720
	(0.1256)	(0.4126)	(0.1410)	(0.1248)	(0.1293)	(0.3785)	(0.1430)
Panel B. Labor informality (pension definition)							
CIC	0.0171	0.0364	0.0177	0.0131	0.0232*	-0.0525**	0.0188
	(0.0131)	(0.0357)	(0.0137)	(0.0139)	(0.0131)	(0.0265)	(0.0137)
CDE	-0.0040	0.0040	0.0137	0.0054	-0.0045	-0.0945	-0.0228
	(0.0356)	(0.1027)	(0.0348)	(0.0347)	(0.0461)	(0.1348)	(0.0383)
Panel C. Labor informality (contractual definition)							
CIC	0.0181*	0.0445***	0.0163	0.0097	0.0258**	-0.0119	0.0151
	(0.0101)	(0.0136)	(0.0111)	(0.0108)	(0.0113)	(0.0182)	(0.0099)
CDE	-0.0811**	0.0542*	-0.0742**	-0.0797**	-0.0445	-0.1536	-0.0858***
	(0.0345)	(0.0320)	(0.0374)	(0.0367)	(0.0404)	(0.0942)	(0.0316)
Panel D. Labor informality (including self-employment)							
CIC	0.0160*	0.0161*	0.0148*	0.0182	0.0163	-0.0641*	0.0185**
	(0.0093)	(0.0085)	(0.0080)	(0.0118)	(0.0101)	(0.0347)	(0.0092)
CDE	-0.0125	-0.0222	-0.0062	0.0247	0.0034	-0.2876	-0.0174
	(0.0568)	(0.0225)	(0.0476)	(0.0601)	(0.0380)	(0.2163)	(0.0489)
Panel E. Log average hourly wage							
CIC	-0.0169	-0.0695	-0.0142	-0.0491	-0.0233	0.0775	-0.0190
	(0.0363)	(0.0529)	(0.0253)	(0.0367)	(0.0407)	(0.0584)	(0.0374)
CDE	0.2020*	0.0417	0.2599**	-0.0098	0.1760	0.4922	0.2393**
	(0.1166)	(0.2960)	(0.1300)	(0.2802)	(0.1255)	(0.5370)	(0.1212)
Panel F. Log average hours worked							
CIC	0.0058	0.0116	0.0040	0.0104	-0.0004	0.0261	0.0040
	(0.0102)	(0.0190)	(0.0110)	(0.0105)	(0.0080)	(0.0198)	(0.0093)
CDE	0.0872**	0.1310*	0.0849**	0.1183***	0.0389	0.0589	0.0840***
	(0.0341)	(0.0783)	(0.0366)	(0.0351)	(0.0320)	(0.0833)	(0.0307)
Panel G. Log average monthly wage							
CIC	-0.0252	-0.0715*	-0.0289	-0.0646*	0.0011	0.1394***	-0.0309
	(0.0384)	(0.0380)	(0.0309)	(0.0353)	(0.0426)	(0.0521)	(0.0396)
CDE	0.1779*	0.1185	0.2113*	-0.1670	0.3073***	0.7807	0.2245**
	(0.1057)	(0.2070)	(0.1091)	(0.1907)	(0.1075)	(0.5604)	(0.1031)
N	295	134	295	295	289	263	295

Notes. 2SLS regressions including LLM and year fixed effects, and preexisting trends in the corresponding outcome variable, exposure shares and female LFP. Robust standard errors clustered by regions in parentheses. Regressions weighted by LLM's share of Chile's population of working age in 1992. *** p<0.01, ** p<0.05, * p<0.1.

Table A8. Effects of the China shock on local labor market outcomes of workers employed in the manufacturing sector

		By education level		By age group		By gender	
	All workers	Skilled	Unskilled	Age 18-39	Age 40-65	Females	Males
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A. Log employment							
CIC	-0.1526**	-0.0180	-0.1645**	-0.1713***	-0.1429	-0.1809***	-0.1282*
	(0.0662)	(0.0863)	(0.0735)	(0.0633)	(0.0928)	(0.0629)	(0.0766)
CDE	0.2281*	0.2225	0.2042	0.2521	0.1471	0.1913	0.2490**
	(0.1219)	(0.2151)	(0.1390)	(0.1912)	(0.1675)	(0.2250)	(0.1256)
Panel B. Labor informality (pension definition)							
CIC	0.0223**	-0.0380	0.0257***	0.0170	0.0264*	0.0233**	0.0191*
	(0.0099)	(0.0239)	(0.0085)	(0.0110)	(0.0145)	(0.0091)	(0.0113)
CDE	0.0077	-0.1958	0.0062	0.0195	-0.0888	0.0020	-0.0241
	(0.0413)	(0.2455)	(0.0565)	(0.0327)	(0.1414)	(0.0933)	(0.0464)
Panel C. Labor informality (contractual definition)							
CIC	0.0170**	-0.0115	0.0185**	0.0081	0.0341***	0.0400**	0.0165
	(0.0080)	(0.0136)	(0.0082)	(0.0100)	(0.0096)	(0.0189)	(0.0115)
CDE	0.0331	-0.0478	0.0445	0.0249	0.1693*	-0.0905	0.0186
	(0.0304)	(0.0837)	(0.0500)	(0.0320)	(0.0929)	(0.1414)	(0.0451)
Panel D. Labor informality (including self-employment)							
CIC	0.0124	-0.0091	0.0161	0.0049	0.0039	0.0191	0.0035
	(0.0101)	(0.0093)	(0.0112)	(0.0102)	(0.0168)	(0.0117)	(0.0127)
CDE	-0.0037	-0.0074	-0.0112	0.0374	0.0137	-0.0557	-0.0517
	(0.0596)	(0.0412)	(0.0891)	(0.0304)	(0.1421)	(0.1507)	(0.0534)
Panel E. Log average hourly wage							
CIC	0.0007	0.0212	-0.0262	0.1199***	-0.1500***	0.0540*	-0.0178
	(0.0214)	(0.0345)	(0.0175)	(0.0265)	(0.0352)	(0.0281)	(0.0183)
CDE	0.1841	0.6502*	0.0567	0.2008	0.1564	0.3518*	0.1594
	(0.1182)	(0.3340)	(0.0421)	(0.1645)	(0.1469)	(0.1851)	(0.1287)
Panel F. Log average hours worked							
CIC	0.0152*	-0.0060	0.0146*	0.0256***	0.0097	-0.0038	0.0227***
	(0.0084)	(0.0174)	(0.0087)	(0.0076)	(0.0076)	(0.0155)	(0.0059)
CDE	0.0932***	-0.0469	0.0936***	0.0912***	0.0813***	0.1647	0.0668**
	(0.0309)	(0.1269)	(0.0282)	(0.0265)	(0.0259)	(0.1565)	(0.0265)
Panel G. Log average monthly wage							
CIC	0.0042	0.0265	-0.0135	0.0509**	-0.0697**	0.0723**	-0.0114
	(0.0228)	(0.0356)	(0.0178)	(0.0255)	(0.0346)	(0.0349)	(0.0192)
CDE	0.1697***	0.5013*	0.0827	0.2093*	0.0041	0.3611*	0.1477**
	(0.0585)	(0.2882)	(0.1043)	(0.1163)	(0.2505)	(0.1970)	(0.0717)
N	287	79	286	282	241	210	277

Notes. 2SLS regressions including LLM and year fixed effects, and preexisting trends in the corresponding outcome variable, exposure shares and female LFP. Robust standard errors clustered by regions in parentheses. Regressions weighted by LLM's share of Chile's population of working age in 1992. *** p<0.01, ** p<0.05, * p<0.1.

Table A9. Effects of the China shock on local labor market outcomes of workers employed in the service sector

	All workers	By education level		By age group		By gender	
		Skilled	Unskilled	Age 18-39	Age 40-65	Females	Males
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A. Log employment							
CIC	-0.0122	0.0445	-0.0283	0.0008	-0.0265	0.0047	-0.0279
	(0.0555)	(0.0486)	(0.0637)	(0.0594)	(0.0558)	(0.0696)	(0.0480)
CDE	0.0886	0.1791	0.0703	0.0673	0.1303*	0.1218	0.0540
	(0.0767)	(0.1486)	(0.0656)	(0.0842)	(0.0704)	(0.0847)	(0.0991)
Panel B. Labor informality (pension definition)							
CIC	0.0061	0.0131***	0.0025	0.0165*	-0.0026	-0.0013	0.0130**
	(0.0054)	(0.0031)	(0.0084)	(0.0099)	(0.0024)	(0.0056)	(0.0057)
CDE	0.0060	0.0000	0.0048	-0.0135	0.0216	0.0146	-0.0141
	(0.0150)	(0.0207)	(0.0177)	(0.0221)	(0.0152)	(0.0257)	(0.0241)
Panel C. Labor informality (contractual definition)							
CIC	0.0071	0.0139**	0.0011	0.0145	-0.0075	0.0038	0.0128*
	(0.0085)	(0.0063)	(0.0092)	(0.0098)	(0.0053)	(0.0070)	(0.0077)
CDE	-0.0124	-0.0282	-0.0016	-0.0362	0.0130	-0.0320	-0.0134
	(0.0207)	(0.0228)	(0.0188)	(0.0315)	(0.0130)	(0.0288)	(0.0216)
Panel D. Labor informality (including self-employment)							
CIC	-0.0005	0.0068**	-0.0045	0.0108	-0.0100	-0.0025	0.0008
	(0.0035)	(0.0028)	(0.0055)	(0.0066)	(0.0063)	(0.0052)	(0.0041)
CDE	-0.0288	0.0090	-0.0401*	-0.0165	-0.0476*	0.0148	-0.0669***
	(0.0193)	(0.0175)	(0.0212)	(0.0237)	(0.0244)	(0.0245)	(0.0154)
Panel E. Log average hourly wage							
CIC	-0.0306**	-0.0402***	-0.0377***	-0.0645***	-0.0027	-0.0320**	-0.0320*
	(0.0126)	(0.0149)	(0.0138)	(0.0072)	(0.0136)	(0.0143)	(0.0167)
CDE	0.1627***	0.1946**	0.1203**	0.1722***	0.1807**	0.0855	0.2120***
	(0.0581)	(0.0812)	(0.0586)	(0.0589)	(0.0820)	(0.0709)	(0.0500)
Panel F. Log average hours worked							
CIC	0.0188***	0.0114	0.0211***	0.0185***	0.0193***	0.0147***	0.0212***
	(0.0024)	(0.0108)	(0.0028)	(0.0023)	(0.0035)	(0.0043)	(0.0025)
CDE	0.0344*	0.0153	0.0401**	0.0624***	-0.0054	0.0516	0.0288
	(0.0193)	(0.0285)	(0.0201)	(0.0210)	(0.0202)	(0.0416)	(0.0223)
Panel G. Log average monthly wage							
CIC	-0.0170*	-0.0357***	-0.0188**	-0.0426***	0.0142	-0.0276***	-0.0164
	(0.0095)	(0.0138)	(0.0086)	(0.0085)	(0.0132)	(0.0101)	(0.0119)
CDE	0.1538***	0.1357*	0.1324***	0.1188	0.1680***	0.0738	0.1945***
	(0.0468)	(0.0789)	(0.0396)	(0.0730)	(0.0516)	(0.0474)	(0.0399)
N	296	267	296	295	294	295	294

Notes. 2SLS regressions including LLM and year fixed effects, and preexisting trends in the corresponding outcome variable, exposure shares and female LFP. Robust standard errors clustered by regions in parentheses. Regressions weighted by LLM's share of Chile's population of working age in 1992. *** p<0.01, ** p<0.05, * p<0.1.

Table A10. Effects of the China shock on local employment structure by sector

	OLS		2SLS	
	(1)	(2)	(3)	(4)
Panel A. Share of workers employed in the primary sector				
CIC	0.0043	0.0056*	0.0062*	0.0055
	(0.0029)	(0.0033)	(0.0032)	(0.0035)
CDE	-0.0354***	-0.0097	-0.0054	-0.0051
	(0.0126)	(0.0306)	(0.0277)	(0.0267)
Panel B. Share of workers employed in the manufacturing sector				
CIC	-0.0149***	-0.0154***	-0.0149***	-0.0145***
	(0.0012)	(0.0017)	(0.0018)	(0.0021)
CDE	0.0076	0.0006	0.0038	0.0034
	(0.0072)	(0.0094)	(0.0100)	(0.0098)
Panel C. Share of workers employed in the services sector				
CIC	0.0106***	0.0099***	0.0086***	0.0091***
	(0.0023)	(0.0022)	(0.0021)	(0.0024)
CDE	0.0278**	0.0091	0.0016	0.0017
	(0.0134)	(0.0284)	(0.0233)	(0.0226)
PT Exposure Shares	-	-	Yes	Yes
PT Female LFP	-	-	-	Yes

Notes. All regressions control for LLM and year fixed effects. Columns (2) to (4) run by 2SLS, instrumenting CIC and CDE with China's world supply and demand shocks. Robust standard errors clustered by regions in parentheses. Regressions weighted by LLM's share of Chile's population of working age in 1992. *** p<0.01, ** p<0.05, * p<0.1.

Table A11. Effects of the China shock on local employment structure by industry exposure

	Share of workers employed in						
	Unexposed primary	Exposed primary	Unexposed manuf.	Exposed manuf.	Construc-tion	Trade, trans-port, storage	Other services
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A. PT Exposure Shares							
CIC	0.0005	0.0054	-0.0025*	-0.0123***	0.0047***	0.0046***	-0.0007
	(0.0008)	(0.0034)	(0.0014)	(0.0013)	(0.0015)	(0.0016)	(0.0026)
CDE	-0.0038	-0.0004	-0.0012	0.0049	0.0103	0.0042	-0.0127
	(0.0049)	(0.0298)	(0.0072)	(0.0048)	(0.0131)	(0.0137)	(0.0163)
Panel B. PT Exposure Shares + PT Female LFP							
CIC	0.0005	0.0040	-0.0027	-0.0122***	0.0038	0.0060***	0.0010
	(0.0008)	(0.0047)	(0.0023)	(0.0012)	(0.0024)	(0.0022)	(0.0039)
CDE	-0.0038	0.0012	-0.0010	0.0049	0.0119	0.0018	-0.0155
	(0.0049)	(0.0284)	(0.0066)	(0.0054)	(0.0143)	(0.0131)	(0.0158)
Panel C. PT Exposure Shares + PT Dep. Var.							
CIC	0.0005	0.0101*	-0.0024**	-0.0167***	0.0041***	0.0011	0.0018
	(0.0008)	(0.0055)	(0.0010)	(0.0041)	(0.0014)	(0.0014)	(0.0029)
CDE	-0.0038	-0.0117	0.0024	0.0102	0.0051	0.0072	-0.0203
	(0.0049)	(0.0369)	(0.0055)	(0.0073)	(0.0112)	(0.0126)	(0.0159)
Panel D. PT Exposure Shares + PT Female LFP + PT Dep. Var.							
CIC	0.0005	0.0102	-0.0019	-0.0166***	0.0027	0.0020	0.0040
	(0.0008)	(0.0067)	(0.0017)	(0.0043)	(0.0027)	(0.0018)	(0.0040)
CDE	-0.0038	-0.0109	0.0014	0.0106	0.0055	0.0058	-0.0250
	(0.0049)	(0.0358)	(0.0052)	(0.0077)	(0.0108)	(0.0128)	(0.0159)
N	202	296	292	295	296	296	296

Notes. All regressions control for LLM and year fixed effects and run by 2SLS, instrumenting CIC and CDE with China's world supply and demand shocks. Robust standard errors clustered by regions in parentheses. Regressions weighted by LLM's share of Chile's population of working age in 1992. *** p<0.01, ** p<0.05, * p<0.1.

Table A12. Effects of the China shock on local employment structure by sector and gender

	Males			Females		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Share of workers employed in the primary sector						
CIC	-0.0069***	-0.0052***	-0.0051***	0.0082**	0.0085**	0.0069*
	(0.0021)	(0.0016)	(0.0019)	(0.0040)	(0.0039)	(0.0041)
CDE	0.0129	0.0220	0.0233	-0.0030	-0.0005	0.0003
	(0.0176)	(0.0177)	(0.0185)	(0.0395)	(0.0382)	(0.0366)
Panel B. Share of workers employed in the manufacturing sector						
CIC	-0.0159***	-0.0156***	-0.0143***	-0.0148***	-0.0141***	-0.0141***
	(0.0018)	(0.0020)	(0.0020)	(0.0024)	(0.0025)	(0.0027)
CDE	-0.0010	0.0013	0.0002	0.0008	0.0046	0.0045
	(0.0191)	(0.0214)	(0.0207)	(0.0126)	(0.0138)	(0.0136)
Panel C. Share of workers employed in the services sector						
CIC	0.0231***	0.0210***	0.0198***	0.0065***	0.0056**	0.0071***
	(0.0024)	(0.0022)	(0.0025)	(0.0025)	(0.0022)	(0.0022)
CDE	-0.0134	-0.0248	-0.0246	0.0021	-0.0040	-0.0048
	(0.0274)	(0.0302)	(0.0297)	(0.0355)	(0.0310)	(0.0292)
PT Exposure Shares	-	Yes	Yes	-	Yes	Yes
PT Female LFP	-	-	Yes	-	-	Yes

Notes. All regressions control for LLM and year fixed effects and run by 2SLS, instrumenting CIC and CDE with China's world supply and demand shocks. Columns (1) to (3) correspond to males, and columns (4) to (6) refer to females. Robust standard errors clustered by regions in parentheses. Regressions weighted by LLM's share of Chile's population of working age in 1992. *** p<0.01, ** p<0.05, * p<0.1.

Table A13. Effects of the China shock on local employment structure by labor relationship and gender

	All		Males		Females	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Employment share of salaried workers						
CIC	-0.0070***	-0.0079***	-0.0071***	-0.0071***	-0.0007	-0.0020
	(0.0017)	(0.0021)	(0.0019)	(0.0021)	(0.0043)	(0.0043)
CDE	-0.0102	-0.0081	-0.0072	-0.0066	0.0047	0.0084
	(0.0129)	(0.0128)	(0.0141)	(0.0136)	(0.0146)	(0.0168)
Panel B. Employment share of self-employed workers						
CIC	0.0047**	0.0065***	0.0037**	0.0047**	0.0028	0.0054
	(0.0019)	(0.0020)	(0.0018)	(0.0019)	(0.0041)	(0.0037)
CDE	-0.0032	-0.0071	-0.0119	-0.0149	-0.0034	-0.0058
	(0.0136)	(0.0155)	(0.0150)	(0.0160)	(0.0148)	(0.0170)
Panel C. Employment share of employers						
CIC	0.0033***	0.0021	0.0044***	0.0038**	-0.0005	-0.0013
	(0.0012)	(0.0016)	(0.0011)	(0.0016)	(0.0017)	(0.0016)
CDE	0.0174**	0.0145*	0.0244***	0.0216**	-0.0036	-0.0035
	(0.0075)	(0.0082)	(0.0089)	(0.0097)	(0.0070)	(0.0065)
PT Female LFP	-	Yes	-	Yes	-	Yes

Notes. All regressions control for LLM and year fixed effects and a pre-trend in exposure shares. Regressions run by 2SLS, instrumenting CIC and CDE with China's world supply and demand shocks. Columns (1) and (2) correspond to all workers, columns (3) and (4) refer to males and (5) and (6) to females. Robust standard errors clustered by regions in parentheses. Regressions weighted by LLM's share of Chile's population of working age in 1992. *** p<0.01, ** p<0.05, * p<0.1.

Table A14. First-stage: long-term regressions using censuses data

	Specification 1		Specification 2		Specification 3	
	Δ CIC	Δ CDE	Δ CIC	Δ CDE	Δ CIC	Δ CDE
Panel A. 1992-2002						
Δ China's supply shock	2.2621***	-0.5794***	2.4763***	0.0433	2.2506***	-0.0202
	(0.0547)	(0.0916)	(0.1397)	(0.0404)	(0.0761)	(0.0834)
Δ China's demand shock	-0.0241*	0.2964***	-0.0457***	0.3172***	-0.0332***	0.3207***
	(0.0140)	(0.0489)	(0.0162)	(0.0193)	(0.0090)	(0.0164)
N	62		62		62	
R-squared	0.9844	0.7627	0.9879	0.9647	0.9933	0.9671
KP F-stat	25.83		140.63		178.94	
Panel B. 2002-2012						
Δ China's supply shock	1.9494***	-0.4066***	2.0321***	-0.1632	1.8991***	-0.2124
	(0.1078)	(0.1152)	(0.3974)	(0.1382)	(0.3362)	(0.1841)
Δ China's demand shock	-0.0257	0.4435***	0.0084	0.3888***	0.0435	0.4018***
	(0.0829)	(0.0763)	(0.0717)	(0.0567)	(0.0432)	(0.0468)
N	62		62		62	
R-squared	0.8721	0.8246	0.8904	0.9028	0.9199	0.9169
KP F-stat	19.57		16.49		17.44	
Panel C. Stacked changes						
Δ China's supply shock	2.0009***	-0.4458***	1.9245***	-0.2776***	1.8073***	-0.3269***
	(0.0967)	(0.1118)	(0.1490)	(0.0640)	(0.1342)	(0.0645)
Δ China's demand shock	-0.0167	0.4153***	0.0017	0.4050***	0.0033	0.4057***
	(0.0673)	(0.0726)	(0.0670)	(0.0476)	(0.0463)	(0.0393)
N	124		124		124	
R-squared	0.9169	0.8675	0.9257	0.9285	0.9406	0.9378
KP F-stat	25.3		26.11		31.02	
PT Exposure Shares	-		Yes		Yes	
PT Female LFP	-		-		Yes	

Notes. Regressions run by 2SLS, instrumenting changes in CIC and CDE with changes in China's world supply and demand shocks. Robust standard errors in parentheses. Regressions weighted by LLM's share of Chile's population of working age in 1992. Regressions in Panel C control for a period dummy and, in specifications 2 and 3, for the exposure shares in 2002 also. KP is the Wald F-statistic for the Kleibergen-Paap test of excluded instruments. *** p<0.01, ** p<0.05, * p<0.1.

Table A15. Long-term effect of the China shock on migration

	1987-1997		*1997-2007*		*Stacked changes*	
	(1)	(2)	(3)	(4)	(5)	(6)
Δ CIC	0.0028	-0.0005	0.0005	-0.0001	-0.0012	-0.0021
	(0.0073)	(0.0112)	(0.0022)	(0.0024)	(0.0014)	(0.0015)
Δ CDE	-0.0006	-0.0002	-0.0054	-0.0052	-0.0045	-0.0048
	(0.0100)	(0.0098)	(0.0096)	(0.0096)	(0.0084)	(0.0085)
N	62	62	62	62	124	124
KP F-stat.	33.50	24.70	43.70	37.10	73.40	57.60
PT Female LFP	-	Yes	-	Yes	-	Yes

Notes. All regressions control for exposure shares and are run by 2SLS, instrumenting changes in CIC and CDE with changes in China's world supply and demand shocks. Robust standard errors in parentheses. Regressions weighted by LLM's share of Chile's population of working age in 1992. Regressions in columns (5) and (6) control also for a period dummy and for the exposure shares in 2002. *** p<0.01, ** p<0.05, * p<0.1.

Table A16. Long-term effects of the China shock on local labor market outcomes

	Stacked changes (1992-2012)				*1992-2002*	*2002-2012*
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Δ Employment rate						
Δ CIC	0.0054**	0.0112***	0.0083*	0.0085*	-0.0177**	0.0154*
	(0.0026)	(0.0033)	(0.0044)	(0.0047)	(0.0086)	(0.0086)
Δ CDE	0.0174***	0.0324***	0.0376***	0.0376***	0.0418***	0.0306***
	(0.0055)	(0.0074)	(0.0078)	(0.0077)	(0.0107)	(0.0097)
Panel B. Δ Unemployment rate						
Δ CIC	-0.0042***	-0.0060***	-0.0067**	-0.0077**	0.0124*	-0.0068*
	(0.0016)	(0.0023)	(0.0034)	(0.0034)	(0.0064)	(0.0040)
Δ CDE	-0.0044	-0.0110**	-0.0137***	-0.0136***	-0.0441***	-0.0107**
	(0.0031)	(0.0048)	(0.0048)	(0.0047)	(0.0138)	(0.0052)
Panel C. Δ Share salaried workers						
Δ CIC	0.0067**	0.0121***	0.0137***	0.0136**	-0.0062	0.0150*
	(0.0032)	(0.0038)	(0.0051)	(0.0053)	(0.0099)	(0.0082)
Δ CDE	0.0189***	0.0321***	0.0360***	0.0360***	0.0124	0.0396***
	(0.0068)	(0.0088)	(0.0092)	(0.0092)	(0.0090)	(0.0122)
Panel D. Δ Share self-employed workers						
Δ CIC	0.0018	0.0023	-0.0030*	-0.0038*	-0.0013	0.0039
	(0.0013)	(0.0017)	(0.0018)	(0.0020)	(0.0054)	(0.0041)
Δ CDE	-0.0034**	-0.0023	-0.0013	-0.0013	0.0056	-0.0088***
	(0.0016)	(0.0023)	(0.0028)	(0.0027)	(0.0065)	(0.0029)
Panel E. Δ Share studying						
Δ CIC	-0.0024	-0.0037	-0.0081**	-0.0075**	0.0017	-0.0147**
	(0.0023)	(0.0028)	(0.0033)	(0.0033)	(0.0019)	(0.0067)
Δ CDE	-0.0139***	-0.0154***	-0.0164***	-0.0164***	-0.0158***	-0.0117**
	(0.0041)	(0.0049)	(0.0047)	(0.0047)	(0.0047)	(0.0058)
Panel F. Δ Share studying age 18-30						
Δ CIC	-0.0060	-0.0099	-0.0239***	-0.0233***	0.0040	-0.0343**
	(0.0049)	(0.0061)	(0.0078)	(0.0082)	(0.0064)	(0.0164)
Δ CDE	-0.0341***	-0.0397***	-0.0431***	-0.0432***	-0.0482***	-0.0327**
	(0.0083)	(0.0106)	(0.0109)	(0.0109)	(0.0131)	(0.0138)
N	124	124	124	124	62	62
KP F-stat.	-	25.30	26.11	31.02	178.94	17.44
PT Exposure Shares	-	-	Yes	Yes	Yes	Yes
PT Female LFP	-	-	-	Yes	Yes	Yes

Notes. Regressions in column (1) run by OLS and those in columns (2) to (6) run by 2SLS, instrumenting changes in CIC and CDE with changes in China's world supply and demand shocks. Regressions in columns (1) to (4) correspond to the periods 1992-2002 and 2002-2012 together, and control for a period dummy. All regressions weighted by LLM's share of Chile's population of working age in 1992. *** p<0.01, ** p<0.05, * p<0.1.

Table A17. Long-term effects of the China shock on group-specific local labor market outcomes

		By education level		By age group		By gender	
	All workers	Skilled	Unskilled	Age 18-39	Age 40-65	Females	Males
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A. Δ Employment rate							
Δ CIC	0.0085*	0.0185**	0.0064*	0.0128*	0.0020	0.0050	0.0095
	(0.0047)	(0.0081)	(0.0033)	(0.0069)	(0.0030)	(0.0035)	(0.0060)
Δ CDE	0.0376***	0.0466***	0.0280***	0.0501***	0.0222***	0.0222***	0.0387***
	(0.0077)	(0.0114)	(0.0055)	(0.0107)	(0.0049)	(0.0047)	(0.0102)
Panel B. Δ Unemployment rate							
Δ CIC	-0.0077**	-0.0087***	-0.0079**	-0.0084**	-0.0079***	-0.0064*	-0.0085**
	(0.0034)	(0.0025)	(0.0039)	(0.0040)	(0.0030)	(0.0033)	(0.0036)
Δ CDE	-0.0136***	-0.0085***	-0.0140***	-0.0184***	-0.0088**	-0.0126***	-0.0125**
	(0.0047)	(0.0028)	(0.0051)	(0.0051)	(0.0044)	(0.0044)	(0.0050)
Panel C. Δ Share salaried workers							
Δ CIC	0.0136**	0.0068	0.0128***	0.0162**	0.0094**	0.0043	0.0200***
	(0.0053)	(0.0085)	(0.0044)	(0.0074)	(0.0037)	(0.0036)	(0.0070)
Δ CDE	0.0360***	0.0556***	0.0282***	0.0462***	0.0235***	0.0218***	0.0379***
	(0.0092)	(0.0133)	(0.0083)	(0.0118)	(0.0070)	(0.0055)	(0.0116)
Panel D. Δ Share self-employed workers							
Δ CIC	-0.0038*	0.0066***	-0.0034	-0.0012	-0.0067***	0.0026*	-0.0108***
	(0.0020)	(0.0023)	(0.0023)	(0.0016)	(0.0025)	(0.0014)	(0.0041)
Δ CDE	-0.0013	-0.0086***	-0.0029	-0.0007	-0.0011	0.0011	-0.0052
	(0.0027)	(0.0032)	(0.0031)	(0.0021)	(0.0035)	(0.0015)	(0.0056)
Panel E. Δ Share studying							
Δ CIC	-0.0075**					-0.0066**	-0.0084**
	(0.0033)					(0.0030)	(0.0037)
Δ CDE	-0.0164***					-0.0136***	-0.0187***
	(0.0047)					(0.0039)	(0.0056)
Panel F. Δ Share studying age 18-30							
Δ CIC	-0.0233***					-0.0199**	-0.0260***
	(0.0082)					(0.0080)	(0.0087)
Δ CDE	-0.0432***					-0.0363***	-0.0479***
	(0.0109)					(0.0097)	(0.0124)

Notes. All regressions correspond to the periods 1992-2002 and 2002-2012 together, and control for a period dummy, exposure shares in 1992 and 2002 and female LFP in 1992. Regressions run by 2SLS instrumenting changes in CIC and CDE with changes in China's world supply and demand shocks, and weighted by LLM's share of Chile's population of working age in 1992. *** p<0.01, ** p<0.05, * p<0.1.

Table A18. Robustness to the exclusion of 5% extreme values in CIC and CDE

	OLS	2SLS			
	(1)	(2)	(3)	(4)	(5)
Panel A. Employment rate					
CIC	-0.0028	0.0045	0.0061	0.0051	0.0054
	(0.0078)	(0.0084)	(0.0095)	(0.0093)	(0.0096)
CDE	0.0348*	0.0376	0.0389	0.0402	0.0385
	(0.0194)	(0.0345)	(0.0304)	(0.0291)	(0.0273)
Panel B. Unemployment rate					
CIC	0.0078**	0.0062	0.0038	0.0069*	0.0065
	(0.0031)	(0.0043)	(0.0043)	(0.0041)	(0.0044)
CDE	-0.0185	-0.0270***	-0.0300***	-0.0268***	-0.0274***
	(0.0149)	(0.0074)	(0.0057)	(0.0057)	(0.0060)
Panel C. Labor informality (pension definition)					
CIC	0.0258***	0.0457**	0.0452**	0.0448**	0.0346*
	(0.0076)	(0.0225)	(0.0198)	(0.0197)	(0.0209)
CDE	0.0134	0.0686	0.0360	0.0365	0.0278
	(0.0237)	(0.0483)	(0.0370)	(0.0372)	(0.0375)
Panel D. Labor informality (contractual definition)					
CIC	0.0342***	0.0505**	0.0711***	0.0706***	0.0556**
	(0.0098)	(0.0243)	(0.0229)	(0.0218)	(0.0229)
CDE	0.0098	0.0648	-0.0148	-0.0182	-0.0273
	(0.0251)	(0.0576)	(0.0261)	(0.0266)	(0.0261)
Panel E. Labor informality (including self-employment)					
CIC	0.0303**	0.0603*	0.0662**	0.0665**	0.0527
	(0.0132)	(0.0309)	(0.0326)	(0.0312)	(0.0361)
CDE	0.0283	0.0874**	0.0534	0.0457	0.0307
	(0.0189)	(0.0374)	(0.0377)	(0.0310)	(0.0363)
Panel F. Log average hourly wage					
CIC	-0.0832***	-0.1175***	-0.1447***	-0.1288***	-0.0767**
	(0.0181)	(0.0147)	(0.0264)	(0.0317)	(0.0327)
CDE	-0.1241	-0.1841	-0.1699	-0.1519	0.0333
	(0.0842)	(0.1977)	(0.1897)	(0.1719)	(0.1083)
Panel G. Log average hours worked					
CIC	0.0235	0.0318*	0.0312**	0.0263	0.0554***
	(0.0156)	(0.0165)	(0.0158)	(0.0172)	(0.0134)
CDE	0.0184	0.1057***	0.0998***	0.1087***	0.1395***
	(0.0378)	(0.0265)	(0.0237)	(0.0261)	(0.0246)
Panel H. Log average monthly wage					
CIC	-0.0737***	-0.1160***	-0.1582***	-0.1335***	-0.0782**
	(0.0248)	(0.0269)	(0.0356)	(0.0300)	(0.0316)
CDE	-0.1588***	-0.1485	-0.1297	-0.0953	0.0709
	(0.0601)	(0.1686)	(0.1543)	(0.1385)	(0.0694)
KP F-stat.		236	255.2	373.8	171.6
PT Dep. Var.	-	-	Yes	Yes	Yes
PT Exposure Shares	-	-	-	Yes	Yes
PT Female LFP	-	-	-	-	Yes

Notes. These regressions exclude 12 LLMs out of the 61 LLMs included in the main sample. Excluded LLMs are the 6 with the highest and lowest exposure to CIC (measured by the average growth in CIC over time) plus the 6 LLMs with the highest and lowest exposure to CDE (measured by the average growth in CDE over time). Regressions weighted by LLM's share of Chile's population of working age in 1992.

Table A19. Robustness to the inclusion of additional pre-trends

		Including preexisting trends in:				
	Baseline	Per capita income	Share old-age	Share unskilled	Share migrants	(2) to (5)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Employment rate						
CIC	0.0003	-0.0004	-0.0007	0.0010	-0.0031	-0.0038
	(0.0026)	(0.0029)	(0.0030)	(0.0031)	(0.0040)	(0.0047)
CDE	0.0299***	0.0278**	0.0231***	0.0329***	0.0239*	0.0149
	(0.0103)	(0.0137)	(0.0087)	(0.0119)	(0.0126)	(0.0144)
Panel B. Unemployment rate						
CIC	-0.0000	-0.0004	-0.0001	-0.0012	0.0008	-0.0001
	(0.0024)	(0.0027)	(0.0024)	(0.0029)	(0.0033)	(0.0034)
CDE	-0.0172	-0.0191	-0.0170	-0.0205	-0.0144	-0.0174
	(0.0115)	(0.0138)	(0.0111)	(0.0132)	(0.0142)	(0.0161)
Panel C. Labor informality (pension definition)						
CIC	0.0152***	0.0171**	0.0133**	0.0159***	0.0197**	0.0173**
	(0.0058)	(0.0071)	(0.0057)	(0.0058)	(0.0080)	(0.0085)
CDE	-0.0087	-0.0003	-0.0193	-0.0056	-0.0000	-0.0066
	(0.0192)	(0.0244)	(0.0195)	(0.0190)	(0.0228)	(0.0301)
Panel D. Labor informality (contractual definition)						
CIC	0.0165***	0.0191***	0.0148***	0.0171***	0.0190**	0.0153**
	(0.0055)	(0.0065)	(0.0055)	(0.0055)	(0.0078)	(0.0077)
CDE	-0.0226	-0.0109	-0.0314	-0.0201	-0.0182	-0.0205
	(0.0225)	(0.0292)	(0.0264)	(0.0232)	(0.0267)	(0.0363)
Panel E. Labor informality (including self-employment)						
CIC	0.0129***	0.0167***	0.0106***	0.0123***	0.0169***	0.0139*
	(0.0041)	(0.0051)	(0.0036)	(0.0045)	(0.0063)	(0.0076)
CDE	-0.0228	-0.0163	-0.0378*	-0.0244	-0.0199	-0.0287
	(0.0208)	(0.0243)	(0.0210)	(0.0215)	(0.0228)	(0.0306)
Panel F. Log average hourly wage						
CIC	-0.0175	-0.0191	-0.0111	-0.0282*	-0.0275	-0.0447**
	(0.0150)	(0.0149)	(0.0158)	(0.0166)	(0.0170)	(0.0191)
CDE	0.1147	0.1095	0.1484	0.0783	0.1045	0.0717
	(0.1052)	(0.0991)	(0.1097)	(0.1072)	(0.1109)	(0.0920)
Panel G. Log average hours worked						
CIC	0.0208***	0.0209***	0.0217***	0.0209***	0.0233***	0.0280***
	(0.0037)	(0.0046)	(0.0043)	(0.0045)	(0.0065)	(0.0091)
CDE	0.0763***	0.0752***	0.0781***	0.0759***	0.0811***	0.0936***
	(0.0234)	(0.0251)	(0.0254)	(0.0255)	(0.0250)	(0.0313)
Panel H. Log average monthly wage						
CIC	-0.0149	-0.0140**	0.0029	-0.0210*	-0.0366***	-0.0204**
	(0.0116)	(0.0055)	(0.0084)	(0.0127)	(0.0114)	(0.0096)
CDE	0.1313**	0.1800***	0.2326***	0.1140**	0.1152***	0.1958***
	(0.0518)	(0.0423)	(0.0515)	(0.0539)	(0.0444)	(0.0467)

Notes. All regressions are run by 2SLS and include LLM and year FE, and preexisting trends in the corresponding outcome variable, exposure shares and female LFP. Columns (2) to (6) include also preexisting trends in other control variables, which are constructed as the value of the corresponding variable in 1992 interacted with year fixed effects. Regressions weighted by LLM's share of Chile's population of working age in 1992.

Table A20. Robustness to the extension of sample period

	1996-2006	1996-2009	1996-2011	1996-2013	1996-2015
	(1)	(2)	(3)	(4)	(5)
Panel A. Employment rate					
CIC	0.0003	-0.0003	0.0003	0.0039**	0.0052**
	(0.0026)	(0.0022)	(0.0015)	(0.0016)	(0.0022)
CDE	0.0299***	0.0186***	0.0167***	0.0121***	0.0095**
	(0.0103)	(0.0059)	(0.0057)	(0.0040)	(0.0037)
Panel B. Unemployment rate					
CIC	-0.0000	0.0036	0.0028	-0.0008	-0.0013
	(0.0024)	(0.0030)	(0.0023)	(0.0018)	(0.0019)
CDE	-0.0172	-0.0087*	-0.0083*	-0.0050	-0.0021
	(0.0115)	(0.0052)	(0.0048)	(0.0036)	(0.0030)
Panel C. Labor informality (pension definition)					
CIC	0.0152***	0.0098**	0.0101***	0.0049	0.0033
	(0.0058)	(0.0040)	(0.0032)	(0.0039)	(0.0042)
CDE	-0.0087	0.0038	0.0011	-0.0016	-0.0008
	(0.0192)	(0.0055)	(0.0057)	(0.0057)	(0.0050)
Panel D. Labor informality (contractual definition)					
CIC	0.0165***	0.0142**	0.0105**	0.0072*	0.0056
	(0.0055)	(0.0056)	(0.0042)	(0.0041)	(0.0041)
CDE	-0.0226	0.0031	0.0029	0.0041	0.0056
	(0.0225)	(0.0068)	(0.0069)	(0.0051)	(0.0043)
Panel E. Labor informality (including self-employment)					
CIC	0.0129***	0.0125***	0.0150***	0.0088***	0.0073***
	(0.0041)	(0.0036)	(0.0024)	(0.0026)	(0.0027)
CDE	-0.0228	0.0040	0.0018	-0.0020	-0.0015
	(0.0208)	(0.0053)	(0.0045)	(0.0049)	(0.0045)
Panel F. Log average hourly wage					
CIC	-0.0175	-0.0342**	-0.0410**	-0.0244	-0.0212
	(0.0150)	(0.0169)	(0.0168)	(0.0180)	(0.0186)
CDE	0.1147	0.0140	0.0127	0.0262	0.0202
	(0.1052)	(0.0661)	(0.0525)	(0.0354)	(0.0279)
Panel G. Log average hours worked					
CIC	0.0208***	0.0182***	0.0141***	0.0139***	0.0145***
	(0.0037)	(0.0023)	(0.0016)	(0.0024)	(0.0033)
CDE	0.0763***	0.0267***	0.0243***	0.0222***	0.0198***
	(0.0234)	(0.0089)	(0.0054)	(0.0063)	(0.0057)
Panel H. Log average monthly wage					
CIC	-0.0149	-0.0104	-0.0129**	-0.0138	-0.0196*
	(0.0116)	(0.0071)	(0.0062)	(0.0093)	(0.0109)
CDE	0.1313**	0.0439**	0.0374**	0.0263	0.0150
	(0.0518)	(0.0204)	(0.0183)	(0.0195)	(0.0164)
KP F-stat.	314.1	180.9	50.70	19.30	11.90
N	296	359	420	481	542

Notes. All regressions are run by 2SLS and include LLM and year FE, and preexisting trends in the corresponding outcome variable, exposure shares and female LFP. Regressions weighted by LLM's share of Chile's population of working age in 1992.

Table A21. Robustness to the use of different groups of countries in the IVs

	World (baseline)	Middle-income	High-income	Latin America
	(1)	(2)	(3)	(4)
Panel A. Employment rate				
CIC	0.0003	0.0000	0.0002	-0.0002
	(0.0026)	(0.0027)	(0.0025)	(0.0026)
CDE	0.0299***	0.0262***	0.0272**	0.0223*
	(0.0103)	(0.0101)	(0.0121)	(0.0116)
Panel B. Unemployment rate				
CIC	-0.0000	0.0006	0.0003	0.0006
	(0.0024)	(0.0022)	(0.0024)	(0.0025)
CDE	-0.0172	-0.0134	-0.0137	-0.0125
	(0.0115)	(0.0100)	(0.0118)	(0.0115)
Panel C. Labor informality (pension definition)				
CIC	0.0152***	0.0150***	0.0168***	0.0166**
	(0.0058)	(0.0057)	(0.0059)	(0.0067)
CDE	-0.0087	-0.0055	0.0025	-0.0073
	(0.0192)	(0.0177)	(0.0231)	(0.0270)
Panel D. Labor informality (contractual definition)				
CIC	0.0165***	0.0162***	0.0176***	0.0176***
	(0.0055)	(0.0054)	(0.0056)	(0.0055)
CDE	-0.0226	-0.0195	-0.0224	-0.0323
	(0.0225)	(0.0210)	(0.0324)	(0.0293)
Panel E. Labor informality (including self-employment)				
CIC	0.0129***	0.0129***	0.0131***	0.0137***
	(0.0041)	(0.0038)	(0.0043)	(0.0048)
CDE	-0.0228	-0.0221	-0.0273	-0.0200
	(0.0208)	(0.0208)	(0.0268)	(0.0244)
Panel F. Log average hourly wage				
CIC	-0.0175	-0.0148	-0.0255	-0.0118
	(0.0150)	(0.0142)	(0.0199)	(0.0168)
CDE	0.1147	0.1240	0.0469	0.2081*
	(0.1052)	(0.0962)	(0.1545)	(0.1196)
Panel G. Log average hours worked				
CIC	0.0208***	0.0206***	0.0225***	0.0204***
	(0.0037)	(0.0035)	(0.0050)	(0.0042)
CDE	0.0763***	0.0736***	0.1123***	0.0875***
	(0.0234)	(0.0231)	(0.0370)	(0.0258)
Panel H. Log average monthly wage				
CIC	-0.0149	-0.0120	-0.0180	-0.0053
	(0.0116)	(0.0112)	(0.0152)	(0.0127)
CDE	0.1313**	0.1477***	0.1154	0.2784***
	(0.0518)	(0.0552)	(0.0729)	(0.0846)
KP F-stat.	340	321	15	37

Notes. All regressions are run by 2SLS and include LLM and year FE, and preexisting trends in the corresponding outcome variable, exposure shares and female LFP. Regressions weighted by LLM's share of Chile's population of working age in 1992.

Table A22. Robustness to the change of unit of analysis (municipality-level)

	OLS	2SLS			
	(1)	(2)	(3)	(4)	(5)
Panel A. Employment rate					
CIC	0.0007	0.0001	-0.0018	-0.0024	-0.0021
	(0.0013)	(0.0016)	(0.0017)	(0.0023)	(0.0022)
CDE	0.0259***	0.0292**	0.0286**	0.0269**	0.0257**
	(0.0055)	(0.0114)	(0.0113)	(0.0109)	(0.0105)
Panel B. Unemployment rate					
CIC	-0.0002	0.0000	-0.0000	-0.0010	-0.0004
	(0.0012)	(0.0011)	(0.0010)	(0.0011)	(0.0011)
CDE	-0.0185**	-0.0230*	-0.0239*	-0.0206*	-0.0213*
	(0.0083)	(0.0130)	(0.0133)	(0.0116)	(0.0120)
Panel C. Labor informality (pension definition)					
CIC	0.0146***	0.0154***	0.0095**	0.0081**	0.0107**
	(0.0037)	(0.0049)	(0.0042)	(0.0041)	(0.0052)
CDE	0.0028	0.0041	-0.0151	-0.0076	-0.0116
	(0.0114)	(0.0220)	(0.0168)	(0.0172)	(0.0196)
Panel D. Labor informality (contractual definition)					
CIC	0.0131***	0.0130**	0.0092*	0.0048	0.0082
	(0.0037)	(0.0051)	(0.0049)	(0.0039)	(0.0053)
CDE	0.0089	0.0048	-0.0062	0.0024	-0.0000
	(0.0110)	(0.0241)	(0.0193)	(0.0177)	(0.0196)
Panel E. Labor informality (including self-employment)					
CIC	0.0102***	0.0114**	0.0074	0.0049	0.0087
	(0.0037)	(0.0050)	(0.0050)	(0.0045)	(0.0058)
CDE	-0.0005	-0.0116	-0.0211	-0.0160	-0.0204
	(0.0087)	(0.0182)	(0.0150)	(0.0152)	(0.0169)
Panel F. Log average hourly wage					
CIC	-0.0039	-0.0055	0.0105	0.0181	0.0122
	(0.0135)	(0.0163)	(0.0163)	(0.0163)	(0.0168)
CDE	0.0592	0.0392	-0.0037	-0.0042	-0.0062
	(0.0602)	(0.1118)	(0.0893)	(0.0834)	(0.0888)
Panel G. Log average hours worked					
CIC	0.0216***	0.0270***	0.0267***	0.0280***	0.0214***
	(0.0033)	(0.0033)	(0.0036)	(0.0041)	(0.0040)
CDE	0.0105	0.0704***	0.0719***	0.0690***	0.0692***
	(0.0263)	(0.0202)	(0.0203)	(0.0214)	(0.0170)
Panel H. Log average monthly wage					
CIC	-0.0041	-0.0039	0.0059	0.0146	0.0025
	(0.0110)	(0.0127)	(0.0118)	(0.0112)	(0.0126)
CDE	0.0039	0.0437	0.0213	0.0176	0.0157
	(0.0366)	(0.0885)	(0.0750)	(0.0676)	(0.0755)
KP F-stat.		432.8	385.4	667.1	591.4
PT Dep. Var.	-	-	Yes	Yes	Yes
PT Exposure Shares	-	-	-	Yes	Yes
PT Female LFP	-	-	-	-	Yes

Notes. This table reports the estimates of equation 1 calculating all the variables at the municipality-level (also known as *comunas*) instead of at the LLM-level (Table 2). Regressions weighted by municipality's share of Chile's population of working age in 1992. Robust standard errors clustered at the LLM-level.

Table A23. Robustness to the non-use of weights

	OLS	2SLS			
	(1)	(2)	(3)	(4)	(5)
Panel A. Employment rate					
CIC	0.0014	0.0009	0.0009	0.0010	0.0008
	(0.0019)	(0.0028)	(0.0023)	(0.0025)	(0.0026)
CDE	0.0161*	0.0217**	0.0274***	0.0272***	0.0280***
	(0.0093)	(0.0097)	(0.0094)	(0.0091)	(0.0093)
Panel B. Unemployment rate					
CIC	-0.0057**	-0.0049	-0.0051	-0.0052	-0.0049
	(0.0025)	(0.0034)	(0.0032)	(0.0033)	(0.0034)
CDE	-0.0150	-0.0123	-0.0181	-0.0174	-0.0175
	(0.0117)	(0.0125)	(0.0137)	(0.0140)	(0.0141)
Panel C. Labor informality (pension definition)					
CIC	0.0070	0.0119	0.0121	0.0111	0.0113
	(0.0074)	(0.0115)	(0.0111)	(0.0111)	(0.0105)
CDE	-0.0009	0.0126	-0.0092	-0.0067	-0.0174
	(0.0153)	(0.0277)	(0.0267)	(0.0263)	(0.0242)
Panel D. Labor informality (contractual definition)					
CIC	0.0048	0.0100	0.0126	0.0101	0.0100
	(0.0092)	(0.0131)	(0.0140)	(0.0133)	(0.0124)
CDE	0.0050	0.0210	0.0018	-0.0028	-0.0141
	(0.0179)	(0.0343)	(0.0349)	(0.0334)	(0.0335)
Panel E. Labor informality (including self-employment)					
CIC	0.0046	0.0196	0.0200	0.0187	0.0177
	(0.0075)	(0.0169)	(0.0174)	(0.0167)	(0.0143)
CDE	-0.0059	0.0155	-0.0082	-0.0076	-0.0384
	(0.0158)	(0.0286)	(0.0295)	(0.0285)	(0.0238)
Panel F. Log average hourly wage					
CIC	-0.0239	-0.0336	-0.0272	-0.0235	-0.0200
	(0.0239)	(0.0268)	(0.0282)	(0.0268)	(0.0222)
CDE	0.0137	-0.1135	-0.0490	-0.0600	0.0390
	(0.0789)	(0.1363)	(0.1459)	(0.1306)	(0.1049)
Panel G. Log average hours worked					
CIC	0.0084*	0.0111	0.0118	0.0109	0.0104
	(0.0046)	(0.0083)	(0.0086)	(0.0087)	(0.0087)
CDE	0.0042	0.0321	0.0320	0.0265	0.0478**
	(0.0174)	(0.0212)	(0.0212)	(0.0185)	(0.0226)
Panel H. Log average monthly wage					
CIC	-0.0177	-0.0275	-0.0257	-0.0214	-0.0200
	(0.0211)	(0.0285)	(0.0300)	(0.0275)	(0.0238)
CDE	-0.0148	-0.0481	-0.0001	-0.0022	0.0998**
	(0.0386)	(0.0793)	(0.0849)	(0.0779)	(0.0479)
KP F-stat.		178.4	127.3	133.6	417.6
PT Dep. Var.	-	-	Yes	Yes	Yes
PT Exposure Shares	-	-	-	Yes	Yes
PT Female LFP	-	-	-	-	Yes

Notes. This table is analogous to Table 2 except for the fact that it does not weight each observation by the share of population of working age in each LLM in 1992.

Table A24. Robustness to the use of a balanced panel

	OLS	2SLS			
	(1)	(2)	(3)	(4)	(5)
Panel A. Employment rate					
CIC	0.0013	0.0017	0.0005	0.0004	0.0003
	(0.0018)	(0.0019)	(0.0027)	(0.0027)	(0.0027)
CDE	0.0295***	0.0308**	0.0326***	0.0319***	0.0297***
	(0.0070)	(0.0126)	(0.0121)	(0.0113)	(0.0104)
Panel B. Unemployment rate					
CIC	-0.0005	-0.0001	-0.0002	-0.0005	0.0004
	(0.0014)	(0.0014)	(0.0014)	(0.0015)	(0.0025)
CDE	-0.0178	-0.0129	-0.0172	-0.0159	-0.0161
	(0.0118)	(0.0110)	(0.0112)	(0.0104)	(0.0116)
Panel C. Labor informality (pension definition)					
CIC	0.0106***	0.0135**	0.0105**	0.0105**	0.0151***
	(0.0039)	(0.0058)	(0.0051)	(0.0048)	(0.0059)
CDE	-0.0035	0.0247	0.0013	0.0047	-0.0088
	(0.0119)	(0.0269)	(0.0240)	(0.0219)	(0.0191)
Panel D. Labor informality (contractual definition)					
CIC	0.0094*	0.0117	0.0110**	0.0097*	0.0166***
	(0.0050)	(0.0072)	(0.0051)	(0.0051)	(0.0055)
CDE	0.0050	0.0262	-0.0066	-0.0041	-0.0223
	(0.0151)	(0.0334)	(0.0256)	(0.0235)	(0.0225)
Panel E. Labor informality (including self-employment)					
CIC	0.0078**	0.0110**	0.0075*	0.0075**	0.0130***
	(0.0037)	(0.0053)	(0.0044)	(0.0036)	(0.0041)
CDE	-0.0010	0.0195	-0.0066	-0.0004	-0.0221
	(0.0101)	(0.0233)	(0.0224)	(0.0184)	(0.0206)
Panel F. Log average hourly wage					
CIC	-0.0169	-0.0220	-0.0053	-0.0184	-0.0152
	(0.0122)	(0.0141)	(0.0192)	(0.0211)	(0.0146)
CDE	-0.0010	-0.0258	-0.0024	-0.0167	0.1216
	(0.0717)	(0.1328)	(0.1280)	(0.1050)	(0.1051)
Panel G. Log average hours worked					
CIC	0.0227***	0.0291***	0.0293***	0.0285***	0.0210***
	(0.0027)	(0.0033)	(0.0034)	(0.0031)	(0.0036)
CDE	0.0057	0.0731***	0.0708***	0.0655***	0.0770***
	(0.0208)	(0.0202)	(0.0211)	(0.0198)	(0.0235)
Panel H. Log average monthly wage					
CIC	-0.0132	-0.0140	-0.0016	-0.0134	-0.0133
	(0.0111)	(0.0129)	(0.0171)	(0.0155)	(0.0108)
CDE	-0.0497	-0.0102	0.0135	-0.0018	0.1365***
	(0.0405)	(0.1006)	(0.0953)	(0.0768)	(0.0509)
KP F-stat.		304.6	337.2	491.7	351.3
PT Dep. Var.	-	-	Yes	Yes	Yes
PT Exposure Shares	-	-	-	Yes	Yes
PT Female LFP	-	-	-	-	Yes

Notes. This table restricts the sample to the 57 LLMs that are observed in each of the five years of the period 1996-2006. Regressions weighted by LLM's share of Chile's population of working age in 1992.