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The China Shock and Employment in Portuguese Firms

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The China Shock and Employment in Portuguese Firms [1]

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Abstract:

This paper considers the effects of Chinese import competition on firm-level labor market outcomes in Portugal. We examine direct competition in the Portuguese market and indirect competition Portugal's largest export markets in Western Europe. Using rich employer-employee data matched to firm-level trade transactions, we measure the degree to which different Portuguese firms faced Chinese import competition, based on firm product mix and distribution of sales across countries. We find economically and statistically significant employment declines in firms with more exposure to Chinese competition in European export markets, but minimal effects of direct competition in Portugal. Our findings also suggest a centrally important role for Portugal's stringent labor market regulations in limiting firms' ability to adjust to competitive shocks. In our earlier sample period (1995-2000), firms have limited ability to adjust employment, hours, or wages, and the primary adjustment margin is firm exit. In the later period (2000-2007), when more flexible temporary contracts comprise a larger share of employment, we find employment reductions among more exposed firms. Those employment reductions are entirely accounted for by changes in temporary employment, with no effect on permanent employment. We expect these findings to be informative for other peripheral European countries that had specialized in labor-intensive manufacturing industries operating under inflexible labor market regimes.

JEL Classification Codes: F14; F16; F66; J21; J31

Keywords: Trade and Labor Market Interactions, Labor Force and Employment, Wage Differentials

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1. Introduction

An extensive literature documents the labor market effects of increased competition from Chinese trade, but the measured effects differ quite substantially across countries.[6] For example, in contrast to the reductions in manufacturing employment Autor et al. (2013) find in the US, a series of papers by Dauth et al. (2014, 2017, 2018) find more positive effects in the German labor market. They argue that German imports of intermediate inputs from China primarily displace imports from other low-wage exporters, such as those in peripheral Europe. To the extent that these displacement effects are quantitatively important, they could partly explain the poor performance of labor markets in countries on the European periphery in recent decades.

In this paper, we focus on the effects of Chinese competition on employment in Portugal, examining both the effects of direct competition in the Portuguese market and indirect competition in five of Portugal's largest export markets in Western Europe. In contrast with much of the literature on Chinese trade competition, our unit of analysis is the firm, rather than the region or industry. We merge Portugal's matched employer-employee database with firm-level trade transactions, providing measures of each Portuguese firm's sales of detailed products in each country. This information allows us to measure the extent to which each firm is exposed to Chinese competition, based on the firm's product mix and distribution of sales across countries.[7] The employer-employee data provide extensive information on each firm's workforce and allow us to follow firms over time, making it possible to document the relative impact of Chinese competition on firm employment outcomes and to decompose those responses into various adjustment margins.

We find that Portuguese firms that are more exposed to indirect competition from China in Western European export markets exhibit economically and statistically significant declines in employment. In contrast, the effects of direct competition in Portugal are generally much smaller and statistically indistinguishable from zero. We separate our analysis into two time periods: 1995-2000 and 2000-2007 and find quite distinct responses to trade competition in the two periods. In 1995-2000, more exposed firms respond by exiting the market (the extensive margin) with no measurable effect on employment growth (the intensive-margin) among surviving firms. During this time period, most Portuguese firms faced extremely stringent labor regulations making it difficult to lay off workers or reduce their wages or hours, leaving exit as the only feasible adjustment margin for many firms.

During 2000-2007 the margins are reversed; we find minimal effects on survival, but significant employment declines among surviving firms facing larger increases in Chinese competition in export markets. Given the stringent regulations on worker dismissals, these intensive margin effects are surprising. In order to understand them, we decompose the overall employment responses into those among permanent workers, who enjoy extensive employment protections, and temporary workers, who do not. The employment responses were entirely accounted for by changes in temporary employment, showing that the increase in the share of temporary employees between 1995 and 2007 appears to have substantially increased the flexibility of Portuguese employment, such that in the latter period exposed firms contracted rather than exiting. These results highlight the importance of labor regulations in mediating the effects of import competition.

Portugal provides an informative context in which to evaluate the effects of increasing competition from China. First, it is a small open economy with a comparative advantage more similar to China than other developed economies (Cabral and Esteves, 2006). Second, it is a useful case in which to revisit the direct effects examined by the previous literature but also to illustrate the less well documented export-displacement effects, given its

[6] For a thorough review of the literature on the labor market effects of Chinese trade competition, see Autor et al. (2016).

[7] As in the prior literature, we construct an instrument for Chinese competition in Portugal or Western Europe using changes in Chinese trade with a different country, in this case the US.

strong reliance on export markets in Western Europe. Third, Portugal's labor market regime is highly restrictive, particularly in comparison to other Western European countries. As just mentioned, these labor market restrictions play an important role in shaping the Portuguese labor market's response to Chinese trade competition. Finally, the remarkable matched employer-employee data and firm-level trade data available to researchers studying the Portuguese economy allows us to construct a unique firm-level measure of exposure to Chinese competition in particular markets and to observe detailed margins of labor market adjustment across Portuguese firms.

Our paper contributes to the broad literature on the labor market consequences of import competition from China. Following the seminal contribution of Autor et al. (2013), the early papers in this literature focused on the negative impacts on import-competing regions or industries in high-income countries. More recent work has expanded the scope to consider effects in export markets (Dauth et al. (2014); Feenstra et al. (2017)) and shifts between manufacturing and service industries (Bloom et al., 2019) that at least partly offset the losses associated with import competition. While these papers have focused on the effects of direct Chinese import competition in high-income economies, our context is different. Portugal is a relatively low-wage exporter of intermediate goods that are quite similar to those in which China has a comparative advantage. We find that competition in export markets is more important than direct competition in Portugal, a feature that is likely to apply to other relatively low-wage countries in peripheral Europe.

Following the initial work in the literature focusing on the US economy, a large number of papers examine the effects of Chinese competition in European countries[8] The Portuguese context allows us to document the costly side effects of restrictive labor market policies in driving the margins of adjustment to trade competition, with firms responding to competition during 1995-2000 primarily by exiting the market and temporary workers with minimal labor protections bearing the brunt of employment declines during 2000-2007.

Our paper is most similar to the contemporaneous work of Cabral et al. (2018), who also examine the effects of direct Chinese import competition in Portugal and indirect competition in European export markets. As in our study, they find minimal effects of direct import competition in Portugal and substantial effects of increased competition in export markets. Yet, the two papers differ in important and complementary ways. While Cabral et al. focus on worker outcomes using variation in competition across industries, we examine firm-level outcomes using variation based on each firm's mix of products and destinations. This approach allows us to examine various firm-level adjustment margins including firm exit; employment, hours, and hourly wages; and permanent vs. temporary worker employment. Our firm-level perspective highlights the importance of labor market restrictions in driving these margins of adjustment to import competition, which likely appear in other countries with heavily regulated labor markets.

The remainder of the paper is organized as follows. Section 2 provides background on the various regulations limiting adjustment in Portugal's labor market and the importance of exports in the Portuguese economy. Section 3 describes our data sources and empirical approach. Section 4 discusses our empirical findings, and Section 5 concludes.

[8]See Mion and Zhu (2013) on Belgian firms; Ashournia et al. (2014) on skill-wage gaps and Utar (2014) on firms in Denmark; Hakkala and Huttunen (2016) on workers in Finland; Malgouyres (2017) on local labor markets in France; Dauth et al. (2014, 2017, 2018) on local labor markets and workers in Germany; Balsvik et al. (2015) on unemployment in Norway; Pereira (2016) on local labor markets in Portugal; Donoso et al. (2015) on local labor markets in Spain; and Flückiger and Ludwig (2015) on employment and unemployment in 22 European countries; among others.

2. Background

2.1. Portugal's Labor Market

Although it has been closely connected to the core economies of Western Europe by geography, culture, and trade linkages throughout its existence, Portugal's institutional development diverged sharply from the rest of Western Europe in the 1930s.[9] Founded in the first decade of the 20th century, the Portuguese republic was politically and economically unstable. A military coup brought Minister of Finance António de Oliveira Salazar to power, and he reconstituted Portugal as an authoritarian state that he ruled with an iron hand. This dictatorship finally collapsed in 1974, not long after the death of its founder.

Given the degree to which workers' political and social rights were repressed during the long decades of dictatorship, it is perhaps not surprising that the new government sought to enshrine high levels of worker protections in the democratic constitution and in the labor laws and regulations subsequently enacted. These laws strongly prioritized employment security over labor market flexibility. It became nearly impossible for employers of any size to fire workers or reduce their hours or nominal wages. Employees also benefitted from a favorable legal environment for collective bargaining and substantial participation in enterprises (Bover et al., 2000; Cardoso and Branco, 2017).

Although these restrictions were relaxed somewhat during the late 1980s and early 1990s, regular employees in all but the smallest firms continued to enjoy extremely strong labor protections, making it difficult for them to be dismissed, either for cause or in cases of financial distress. As an example, for a firm with more than 20 employees to dismiss a worker required a lengthy judicial process including providing the worker and their union a lengthy and detailed report explaining the reason for dismissal, interviewing witnesses chosen by the worker, lengthy delays for court rulings, and significant severance payments (Martins, 2009).[10] These requirements substantially increased the expected cost of labor faced by the firm, above and beyond the worker's nominal wage. Based on the OECD's official measure, Portugal had the second most restrictive labor market regime among OECD members (behind only Turkey) throughout our sample period of 1995-2007, with substantially less flexibility than other Western European countries, as shown in Figure 1.

Alongside these quite rigid regular employee contracts, Portuguese employment law allows for more flexible temporary contracts, which have somewhat lower severance requirements and do not require the extensive administrative and judicial procedures associated with terminating a permanent job (Centeno and Novo, 2012). Temporary contracts include fixed-term contracts with a pre-specified termination date and contracts for workers hired from temporary work agencies (OECD, 1994). Fixed-term contracts, introduced in Portugal in 1976, are only permitted in particular situations: replacement of temporarily absent permanent workers, exceptional workload, seasonal work, temporary projects, business start-ups, the launching of new activities of uncertain duration, and recruiting long-term unemployed workers and first-time job seekers. They generally have a minimum duration of six months and a maximum duration of three years, and contracts may only be renewed twice, potentially imposing tighter overall duration constraints for shorter contracts (Martins, 2016).[11] Work through temporary work agencies is also legally restricted to seasonal activities and substitution of absent workers. In certain circumstances, these

[9] For a comprehensive history of Portugal through the 1990s, see Corkhill (2002).

[10] Dismissed employees were entitled to receive a severance payment of one month per year worked, with a minimum of three months' salary. In 1989/1991, it became easier to lay off a group of workers in a collective dismissal, with the minimum number of workers dependent upon the firm size. Nonetheless, collective dismissals were relatively uncommon during our sample period, accounting for less than 15% of total dismissals (Bover et al., 2000).

[11] The maximum duration is two years for business start-ups and the launching of new activities, and 18 months when hiring first-time job seekers. In 2003, the duration of fixed-term contracts was extended to six years. After our sample period, the duration was reduced back to three years in 2009, and during 2012-13 renewal and maximum duration limits were extended in an effort to maintain employment levels during the Portuguese recession and European Debt Crisis (Martins, 2016).

contracts can be renewed for an additional 12 months. It is possible for temporary workers to transition to a permanent contract, and employers appear to use temporary contracts to screen workers, while workers use them as a means of job search (Portugal and Varejão, 2009; Varejão and Portugal, 2004). It is considered fraudulent to hire temporary workers for a permanent job, but doing so has nonetheless become a common practice even in the public sector Cardoso and Branco (2017). In spite of these various restrictions, temporary employment contracts provide employers with much more flexibility than those for permanent regular employees.

As shown in Figure 2, the share of jobs in temporary contracts increased during our sample period from 10 percent in 1995 to 22 percent in 2007. Figure 3 shows that most of this increase is driven by fixed-term contracts, which accounted for 16 percent of total employment in 1998 and 21 percent in 2007, well above the average level in the 15 EU member states. A potential driver of increased reliance on temporary workers late in our sample period is a 2004 reform that reduced the firm size threshold above which firms face large dismissal costs from 20 to 10 (Centeno and Novo, 2012). By increasing firing costs for permanent workers in firms with between 10 and 20 workers, this reform made temporary contracts relatively more attractive. This increased reliance on temporary workers will help explain important differences between the first and second halves of the sample period in the effects of import competition on workforce adjustment (see Section 4).

2.2. Portuguese Exports and Chinese Trade

Despite these extensive labor market rigidities, early in our sample period Portugal benefited from its position as a relatively low cost manufacturer with privileged access to the core European markets. As shown in Figure 4, manufacturing employment represented a large but declining share of total employment during our sample period: 34 percent in 1995, falling to 23 percent in 2007. Figure 5 shows that a very large share of Portuguese manufacturing activity was driven by exporting. Manufacturing accounted for nearly all of Portuguese export activity, with manufacturing exports comprising between 84 percent and 90 percent of total exports. During our sample period, manufacturing exports also accounted for a large share of gross manufacturing output: 37 percent in 1995, 43 percent in 2003, and 38 percent in 2007. Hence, developments in Portugal's key export markets were likely to have a large impact on the manufacturing sector and on the labor market as a whole.

As Portugal prepared to join the European currency union during the mid-to-late 1990s, reductions in inflation and currency risk caused domestic interest rates to decline sharply, fueling a debt-propelled boom in investment and consumption (Blanchard, 2007). Large current account deficits emerged in this period; at first they were easily financed by a surge of capital inflows (including bank lending) from the rest of Western Europe. However, these international liabilities eventually became unsustainable, particularly after adopting the euro in 1999. This made it impossible to depreciate the Portuguese currency relative to its European trading and investment partners, even as trade competition increased. This loss of Portuguese export competitiveness coincided with the beginning of a boom in Chinese exports to Western Europe. The value of China's nominal exports to the 15 original member states of the EU (excluding Portugal) already exceeded the value of Portugal's exports by the early 1990s, and China's export growth to the EU sharply accelerated in the late 1990s (Figure 6), even as Portugal's export growth stagnated.[12] This significant degree of Chinese competition in Portugal's export markets and the longstanding concentration of Portugal's exports in commodity categories that were among the first to be dominated by China (Cabral and Esteves, 2006) meant that Portugal may have felt the impact of Chinese competition even during our earlier sample period, 1995-2000, before China's accession to the WTO in 2001. We also consider a later sample period, 2000-2007, which saw even larger increases in Chinese exports to the EU, but precedes the potentially confounding factors of the European sovereign debt crisis.

[12] Authors' calculations based on EUROSTAT international trade data.

3. Data and Empirical Approach

Our empirical objective is to compare the evolution of employment-related outcomes for Portuguese firms that were differentially exposed to import competition from China. We consider the effects of Chinese competition in Portugal, the firms' domestic market, and in Portugal's main export markets in Western Europe. Specifically, we consider France, Germany, Italy, Spain, and the UK, which accounted for approximately 70 percent of total goods exports during our 1995-2007 sample period.[13] We refer to this group collectively as the EU5.[14]

In order to implement our empirical analysis, we merge longitudinal firm-level workforce information from a matched employer-employee database with i) firm-level data on production and export transactions and ii) national trade data, yielding a dataset covering two time periods: 1995-2000 and 2000-2007. This section describes our empirical approach and data sources, with details of data construction in Appendix B.

3.1. Data and Measurement

We begin by measuring changes in Chinese import competition for product j in market c as the change in China's share of imports to that market:

$$\Delta IS_{cjt} \equiv \frac{\Delta M^{Ch}_{cjt}}{M_{cjt_0}} \tag{1}$$

The change in China's import share (IS) is the change in imports from China (M^{Ch}) during the relevant time period t (1995-2000 or 2000-2007) over the initial (t_0 = 1995 or 2000) level of imports from all sources.[15] We consider changes in Chinese import competition in the following markets, indexed by c: Portugal, the EU5, and the US (to generate the instrumental variable described below). We calculate (1) using trade data from EUROSTAT and UN Comtrade, which provide bilateral trade flows by product. As described in Appendix B, we aggregate 6-digit HS products as necessary to ensure consistent product codes across datasets and years, yielding a classification with 2,512 consistently identifiable products.

We then use this product-level measure to construct firm-level measures of exposure to Chinese import competition in Portugal and the EU5. Each firm faces a different degree of Chinese competition because of differences in product mix and differences in the distribution of sales across countries. We define the increase in Chinese import competition in the Portuguese market facing an individual firm i during period t as

$$FCS^P_{it} \equiv \sum_j \phi^P_{ij} \Delta IS_{Pjt}, \qquad \text{where } \phi^P_{ij} \equiv \frac{Y_{ijt_0} - X_{ijt_0}}{Y_{it_0}.} \tag{2}$$

This firm-level China shock in the Portuguese market (FCS^P) is a weighted average of changes in China's share of imports to Portugal across products j. The weights, ϕ^P_{ij}, reflect the share of initial firm sales (Y_{it_0}) accounted for by each product j's domestic sales in Portugal (where $Y_{ijt_0} - X_{ijt_0}$ is initial domestic sales, i.e. total sales of product j minus exports of the product).[16] Note that if a firm exports, the sum of the weights across products will be strictly less than one. This feature captures the fact that more export-intensive firms are less exposed to competition in the Portuguese market than are purely domestic firms who do not serve customers in foreign markets. Variation in (2)

[13] Authors' calculations based on EUROSTAT international trade data.
[14] As of this writing, the UK remains a member of the European Union.
[15] We use the change in import share as our competition measure rather than using import penetration due to a lack of consistent and reliable data on product-level output across EU5 countries.
[16] Because the output measure in the firm production database, *Inquérito Anual à Produção Industrial* (IAPI) is "produced output," it omits sales related to carry-along trade, so a firm can appear to export more than it produces. To deal with this issue, when $Y_{ijt_0} < X_{ijt_0}$, we behave as if the true value of sales precisely equals exports, so the weight for that product in (2) will be zero. This approach applies to (3) as well.

therefore derives both from differences in product mix and from differences in exposure to the Portuguese market.

Of course, the rise of Chinese exports can impact the Portuguese labor market not only through intensifying competition in the domestic market, but also in foreign markets where Portuguese firms compete with China. In the Portuguese context, this third-market effect is particularly relevant due to the similar level of product specialization between Portuguese and Chinese exports (Cabral and Esteves, 2006). We define firm i's increase in Chinese import competition in the EU5 market using a weighted-average paralleling (2), but with weights based on the product mix of firm exports to the EU5.

$$FCS^E_{it} \equiv \sum_j \varphi^E_{ij} \Delta IS_{Ejt}, \qquad \text{with } \varphi^E_{ij} \equiv \frac{X^E_{ijt_0}}{Y_{it_0}}, \tag{3}$$

This firm-level China shock in the EU5 market (FCS^E) is a weighted average of changes in China's share of imports to the EU5, with weights, φ^E_{ij}, reflecting the share of initial firm sales accounted for by each product's exports to the EU5. For firms with zero exports to the EU5, this measure will be zero, since the firm does not directly face competition from China in the EU5 market. Variation in (3) across firms comes from differences in the mix of products exported to the EU5 and from differences in the importance of the EU5 as a market for each firm.[17]

The firm-level China shocks defined in (2) and (3) form the independent variables of interest in our analysis, allowing us to observe differences in outcomes for firms facing more or less competition from China in the Portuguese and EU5 markets. Computing these firm-level shocks requires information on total firm sales by product and on firm exports by product and destination. Firm sales by product come from the *Inquérito Anual à Produção Industrial* (IAPI), which is a mandatory survey covering all but the smallest Portuguese firms. Firm-level exports by detailed product and trading partner come from the *Comércio Internacional* (CI) database, which reports trade transactions for all firms with nontrivial imports or exports the current or preceding year.[18] This information allows us to calculate ϕ^P_{ij} in (2) and φ^E_{ij} in (3).

We examine the effects of these firm-level China shocks on firms' employment outcomes, which come from the administrative database *Quadros de Pessoal* (QP). This remarkable matched employer-employee dataset covers nearly all firms and employees in the Portuguese private sector, as it is based on a mandatory annual survey collected by the Portuguese Ministry of Employment and Social Security from all firms with at least one employee. For the month of October in each year, the data report each employee's contract type (full-time, part-time, furlough/paid leave, etc.), hours, and earnings. We use this information to observe firm survival along with firm-level wagebill, employment, average hourly wages, and average hours per worker, allowing us to observe the margins along which surviving firms adjust their wagebill in response to trade competition. The database also includes a variety of other firm characteristics such as entry year, location, main industry, sales, and number of employees, which will serve as controls in our empirical analysis. All monetary values are expressed in 2007 euros, using the Consumer Price Index from Statistics Portugal.

Our sample includes firms active in 1995 or 2000, located in mainland Portugal (omitting those in the Azores and Madeira islands), and appearing in both the QP employer-employee data and the IAPI trade data in either 1995 or 2000. The match rate between QP and IAPI is extremely high. Of the firms in IAPI, we match 93.5 percent in 1995 and 93.0 percent in 2000 to their corresponding entries in QP. This process generates a set of 9,261 unique firms: 5,958 in 1995 and 8,021 in 2000, with many firms appearing in both time periods.

[17] While our main analysis utilizes all firms, including those with zero exports to the EU5, Appendix C.4 restricts the analysis to the subsample of firms with strictly positive initial sales in both Portugal and the EU5, finding very similar results.

[18] See Appendix B for details on IAPI and CI firm coverage and product classifications.

3.2. Empirical Approach

We examine the effects of Chinese import competition on firm-level employment outcomes using the following specification.

$$\Delta \ln y_{it} = \beta_0 + \beta_P FCS_{it}^P + \beta_E FCS_{it}^E + \Gamma' X_{it} + \varepsilon_{it} \quad (4)$$

The dependent variable is the change in log employment outcome for firm i, including wagebill, employment, average hourly wages, and average hours per worker. We estimate (4) separately for each time period t (1995-2000 or 2000-2007).[19] FCS_{it}^P and FCS_{it}^E are the firm-level China shocks defined in (2) and (3), and we anticipate that Chinese import competition will displace Portuguese activity such that β_P, $\beta_E < 0$. X_{it} is a vector of firm-level controls, including beginning-of-period firm age and age squared, share of workers with a college education, sales, number of establishments, industry fixed effects (including 10 1-digit industries), and region fixed effects (including 5 NUTS-2 regions). When including these fixed effects, our analysis effectively compares outcome growth across firms in the same industry and region but with different product mixes or different distributions of sales across countries. Because the outcomes are expressed as a long-differences, these controls allow for differential trends across industries, regions, and firm characteristics. ε_{it} is the error term.

Using the change in log outcome addresses the skewed distribution of firm size and admits a convenient decomposition. Since the wagebill is the product of employment, average hourly wages, and average hours per worker, the change in log wagebill is the sum of changes in logs of employment, hourly wages, and hours per worker. The linearity of (4) thus implies that the regression coefficients for the change in log wagebill will precisely equal the sum of regression coefficients across the other outcomes, allowing us to decompose the margins along which firms adjust their wagebill when facing import competition at home and in export markets.

While the change in log formulation is essential to decomposing firms workforce-related responses to import competition, it implies that we can only estimate (4) on the subset of firms that survive to the end of the sample period. Firms that exit will have undefined log wagebill (along with its components) at the end of the period, so the dependent variable will be undefined. We therefore supplement the analysis in (4) by running a parallel Probit specification in which the dependent variable is an indicator for firm survival until the end of the relevant period (either 2000 or 2007).[20] This allows us to observe firms' extensive-margin response (survival vs. exit) and their intensive-margin response (changing wagebill etc. conditional on survival) to import competition. We also present Tobit regressions in Appendix C.3 addressing the simultaneous determination of the intensive and extensive margins effects, with similar results to those in the main analyses.

During the period of analysis, China experienced productivity gains, transitioned to a market oriented economy, and had its quotas and other trade barriers eliminated due to its accession to WTO.[21] An important concern is that the change in China's share of Portugal and EU5 imports may reflect not only these changes in Chinese supply factors but also changes in demand or changes in Portuguese supply. For example, if EU5 and Portuguese consumers' tastes shift toward products for which China has a comparative advantage, its import share may increase along with that of Portuguese firms producing similar products, biasing our results upward.[22]

[19] We exclude years after 2007 to avoid potential confounding effects of the Portuguese economic and sovereign debt crises spanning 2008-2014.

[20] Appendix C.2 presents linear probability models for firm survival, finding similar results to the Probit models discussed in the main text.

[21] See Branstetter and Lardy (2008) for a detailed discussion of the factors that drove China's export growth.

[22] Note that since we use changes in import *shares* as our product-level shock measure, this endogeneity concern is less serious than it would be if we used changes in import levels, but we address the concern nonetheless.

To isolate the effects of productivity growth and falling trade barriers in China as opposed to EU5 or Portuguese demand shocks, we follow an approach similar to that of Autor et al. (2013). We instrument for the change in Chinese import share in Portugal or the EU5 using measures based on increases in China's share of U.S. imports.

$$IVFCS_{it}^{P} \equiv \sum_{j} \phi_{ij}^{P} \Delta IS_{Ujt} \tag{5}$$

$$IVFCS_{it}^{E} \equiv \sum_{j} \varphi_{ij}^{E} \Delta IS_{Ujt} \tag{6}$$

where ΔIS_{Ujt} is the change in China's share of U.S. imports for product j and period t, calculated following (1). By restricting attention to variation in Chinese import share that is common across Portugal, EU5 and the U.S., we reduce the likelihood that the observed relationships are driven by EU5 and Portugal demand shocks in favor of variation based on changes in Chinese supply. In the empirical analysis below, we present instrumental-variables versions of all results, with the corresponding OLS or Probit results presented in Appendix C.1.

Table 1 presents descriptive statistics for the outcomes, shocks, instruments, and controls just described, separately for 1995-2000 and 2000-2007. Figure 4 shows that manufacturing employment was relatively stable during the late 1990s but fell substantially during the 2000s. This aggregate pattern is reflected in our firm samples as well, with high rates of firm survival and modest changes in workforce outcomes in 1995-2000 and lower rates of firm survival and substantial employment declines during 2000-2007. The shock measures show that firms faced substantial increases in China's import share, both in Portugal and in the EU5, and that the shock in European markets was much larger in the latter period. Note also that the standard deviations are quite large, reflecting the fact that some firms faced much larger shocks than others. For example, while the mean of the EU5 shock during 2000-2007 was only 0.078, the firm at the 95th percentile faced a shock of 0.533.[23] We therefore have quite a bit of variation across firms in their exposure to increased competition from China. We also note that by virtue of including firms that appear in both the QP and IAPI datasets, our sample represents relatively large firms, primarily in manufacturing.[24]

4. Results

4.1. Firm Survival and Wagebill Effects

We begin by examining the overall effects of Chinese import competition in Portugal and the EU5 on the Portuguese workforce. In Tables 2 and 3, we examine the change in log firm wagebill and firm survival by estimating (4). In order to isolate the effects of Chinese supply shocks from potentially confounding demand shocks in Portugal or the EU5, we utilize the instrumental variables in (5) and (6), constructed using the change in China's share of US imports (corresponding OLS and Probit results are available in Appendix C.1). At the outset, note that while the instruments are quite strong in the 2000-2007 period (first-stage F-statistics ranging from 38.5-48.0), the instruments are weaker in the earlier 1995-2000 period (first-stage F-statistics ranging from 3.4-4.5). Because we have two endogenous variables and two instruments, Stock and Yogo (2005) show that a first-stage F-statistic of 4.58 is large enough to ensure that a 5-percent test is no larger than 15 percent. In our richest specification in column (6), the first-stage F-statistic of 4.47 is very close to this critical value, reducing weak-instrument concerns. Nonetheless, we encourage the reader to interpret these earlier-period results with care.

[23] The shocks in Portugal and the EU5 are minimally correlated with each other, making their effects separately identifiable. In 1995-2000 the correlation coefficient is -0.0091 and in 2000-2007 it is 0.014. The instrument correlations are similarly small: 0.0066 in 1995-2000 and -0.030 in 2000-2007.

[24] 94 percent of firms in our 1995-2000 sample and 92 percent in the 2000-2007 sample are in manufacturing.

Table 2 focuses on the 1995-2000 time period. Columns (1)-(3) examine the extensive-margin effects of Chinese competition on firm survival using IV-Probit (Appendix C.2 shows linear probability models with similar results). We sequentially add controls across columns, with column (3) including the richest set of initial firm characteristics, including industry and region fixed effects. In that case, we find minimal effect of the direct China shock in the Portuguese market, but a statistically significant decline in the probability of firm survival for firms facing increased Chinese competition in EU5 markets. The average marginal effect associated with $\hat{\beta}_E = -0.976$ in column (3) is -0.163.[25] Evaluating this effect at the mean EU5 shock of 0.029 (Table 1) implies a decline in survival probability of 0.5 percentage points relative to a firm facing zero shock. This is a modest but nontrivial effect given the baseline survival rate of 90.5 percent (Table 1). An alternative means of judging the magnitude of this effect is to calculate the predicted decline in survival probability for each individual firm based on its marginal effect and the shock it faced, and then multiply by the firm's initial wagebill. Summing across firms and comparing to the total initial wagebill for all firms in the sample, we find that the decline in survival probability driven by the EU5 shock accounts for an expected decline in the aggregate wagebill of 0.97 percent.[26] This difference is substantial in comparison to the aggregate increase in the wagebill increased of 4.2 percent during 1995-2000.

Columns (4)-(6) of Table 2 present intensive margin effects, estimating (4) using the change in log wagebill as the dependent variable and sequentially adding controls. Although the shock effects are unexpectedly positive, none is significantly distinguishable from zero, and the magnitudes are very small. For example, $\hat{\beta}_E = 0.0882$ in column (6) implies that the wagebill for a firm facing the mean EU5 shock of 0.029 would increase by 0.26 percent in comparison to a firm facing zero shock. The lack of intensive-margin effect during this time period is not surprising, given the extreme rigidities in the Portuguese labor market, inhibiting firms from adjusting employment, wages, or hours. The results in Table 2 suggest that firms facing import competition in the EU5 had little recourse but to shut down, leading to small but statistically identifiable declines in firm survival rates.

This situation is reversed in Table 3; we find small and statistically insignificant extensive-margin effects of EU5 shocks on Portuguese firm survival, but significant negative effects on the change in log wagebill among surviving firms. These intensive-margin effects are very robust to changing the set of controls across columns (4)-(6). The estimate $\hat{\beta}_E = -0.153$ in column (6) implies that the wagebill for a firm facing the mean EU5 shock of 0.078 would decrease by 1.19 percent in comparison to a firm facing zero shock. This is a nontrivial effect, accounting for 9.3 percent of the realized decline in aggregate wagebill during 2000-2007. An alternative means of evaluating the magnitude of the effect accounts for potential correlation between the shocks and initial firm wagebill; implied effects may be larger if shocks are more incident upon initially larger firms. We take the predicted change in wagebill due to the EU5 shock for each firm, sum across firms, and compare to the total initial wagebill across all firms.[27] This procedure implies that the EU5 shock reduced the aggregate wagebill by 1.31 percent due to wagebill reductions among surviving firms. Both approaches imply important effects of Chinese import competition in EU5 markets on the wagebilll for Portuguese firms. As in the earlier period, Chinese competition in Portugal has minimal effects on Portuguese firms employment at the extensive or intensive margin.

4.2. Channels of Adjustment

The results thus far show that while Chinese imports to Portugal seem to have had little effect on employment outcomes for Portuguese firms, increased import competition in EU5 markets drove important declines in the

[25] The marginal effect of the Chinese import shock in country c for firm i is $\phi(\hat{\boldsymbol{\beta}} X_i) \cdot \hat{\beta}_c$, and we then average this marginal effect across firms in the sample to calculate the average marginal effect.

[26] To be precise, we calculate $\left(\sum_i \phi(\hat{\boldsymbol{\beta}} X_i) \cdot \hat{\beta}_c \cdot FCS^c_{it} \cdot \text{wagebill}_{it_0}\right) / \left(\sum_i \text{wagebill}_{it_0}\right)$

[27] To be precise, we calculate $\left(\sum_i (\exp(\hat{\beta}_c \cdot FCS^c_{it}) - 1) \cdot \text{wagebill}_{it_0}\right) / \left(\sum_i \text{wagebill}_{it_0}\right)$.

wagebill for Portuguese firms, particularly among surviving firms in the 2000-2007 period. Given the stringent regulations in the Portuguese labor force, how were firms able to adjust their wagebill? Tables 4 and 5 decompose the intensive-margin wagebill effects into three channels: employment, average hours per worker, and average hourly wage. Because the wagebill is the product of these three channels, the change in log employment is the sum of the change in log of each channel. Therefore, the regression coefficient estimates presented in columns (2)-(4) in Tables 4 and 5 precisely sum to the corresponding wagebill coefficients in column (1).

We find minimal adjustment along any of these margins in 1995-2000 (Table 4). This is consistent with the lack of significant overall wagebill effects during this time period. In Table 5, however, we see that the 2000-2007 wagebill effects of import shocks in the EU5 are driven entirely by declines in employment. The effects of FCS_{it}^{E} on the change in log wagebill (column (1)) and employment (column (2)) are nearly identical. This finding is consistent with the rigidity of hours and wages in the Portuguese labor market, but raises the question of how firms were able to adjust employment in the face of rising trade competition given the significant barriers to laying off workers in Portugal.

Recall from Section 2 and Figures 2 and 3 that labor market reforms in the early 2000s led to an increase in the share of temporary worker, particularly fixed-term contract workers, who lack many of the employment protections afforded to regular workers. Starting in 2000, the QP data provide information on contract type, allowing us to further decompose the 2000-2007 employment effect into components driven by changes in employment for permanent workers and temporary workers. In order to implement a proper decomposition, we switch from the change in log employment to the proportional change in employment, allowing us to take advantage of the fact that overall employment is the sum of permanent and temporary employment.

$$\frac{\text{employment}_{it_1} - \text{employment}_{it_0}}{\text{employment}_{it_0}} = \frac{\text{permanent}_{it_1} - \text{permanent}_{it_0}}{\text{employment}_{it_0}} + \frac{\text{temporary}_{it_1} - \text{temporary}_{it_0}}{\text{employment}_{it_0}} \tag{7}$$

Column (1) of Table **??** shows how the proportional change in employment responded to Chinese import shocks, with similar results to the change in log employment in column (2) of Table 5. Columns (2) and (3) of Table **??** decompose this effect into those driven by changes in permanent and temporary employment, showing that the employment effects of EU5 shocks were driven almost entirely by declines in temporary employment. The temporary employment coefficient accounts for 93 percent of the overall employment coefficient.

These findings suggest an important role for labor market policies in driving Portuguese firms' responses to changing import competition. In the 1995-2000 period, when firms had minimal ability to adjust any dimension of their workforce, they responded to import competition primarily by shutting down the firm. After the labor market reforms of the early 2000s gave firms more flexibility in hiring temporary workers, the survival margin became much less important, and firms primarily responded by adjusting the employment of temporary workers rather than exiting the market entirely.

The preceding results are all robust to a variety of alternative choices regarding the empirical specification and firm sample. In Appendix C.2 we present alternative extensive-margin analyses using linear probability models rather than the Probit models shown in the main text. Appendix C.3 presents Tobit models jointly estimating the extensive and intensive margin effects of Chinese import competition. Finally, in Appendix C.4, we consider a restricted sample of firms, keeping only those with strictly positive initial sales in both Portugal and the EU5. This restriction avoids comparisons between exporters and non-exporters that appear in the broader sample in our main analysis. In all cases, the estimates are quantitatively similar and the qualitative conclusions discussed here are confirmed.

5. Conclusion

Our findings make clear that competition from Chinese trade had a substantial effect on employment-related outcomes for Portuguese firms. Yet, that competition was most important not in the Portuguese market itself, but in Western European export markets. This conclusion is consistent with the findings of Cabral et al. (2018) and supports the interpretation proposed by Dauth et al. (2014) that Chinese competition in Germany primarily displaced other intermediate input suppliers (such as those in Portugal) rather than competing directly with German firms.

Our firm-level design also allows us to document the importance of Portugal's stringent labor market regulations in determining the margins firms had available to adjust to these shocks. In our earlier sample period (1995-2000), firms primarily responded to competition by exiting the market, since reducing employment, hours, or wages was extremely costly. Over time, however, Portuguese firms were able to take advantage of temporary labor contracts to avoid some of these adjustment costs. In our later sample period (2000-2007), when temporary contracts were more prevalent, firms responded to competition by reducing temporary employment, rather than by exiting the market.

In its struggles to contend with the China shock, Portugal likely had much in common with other nations on the European periphery. We expect the effects that we document here in the Portuguese context are also informative regarding those in nations like Greece, Italy, and Spain, where clusters of relatively labor-intensive manufacturing industries operating under inflexible labor market regimes faced a wave of low-cost competition in their traditional European export markets. As the China shock hit these economies, it drove unemployment up and exports down. The worsening budget deficits and current account deficits that emerged in the aftermath of these shocks made peripheral Europe all the more vulnerable to the crisis of investor confidence that arrived in the wake of the global financial crisis. While the European sovereign debt crisis certainly cannot be blamed on China, there is little doubt that the combination of the China shock and inflexible labor markets were a contributing factor.

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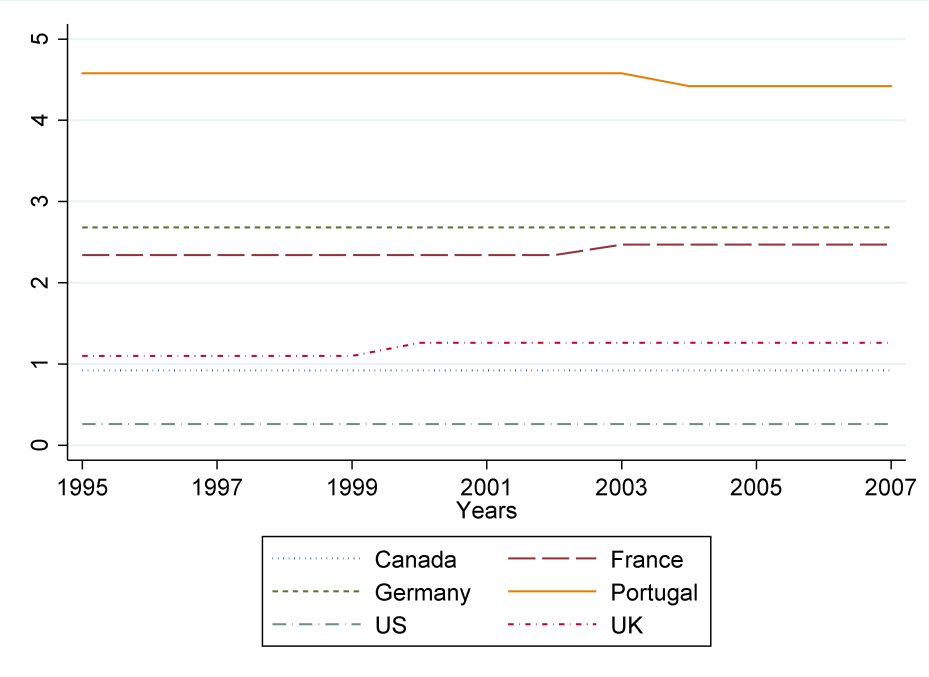
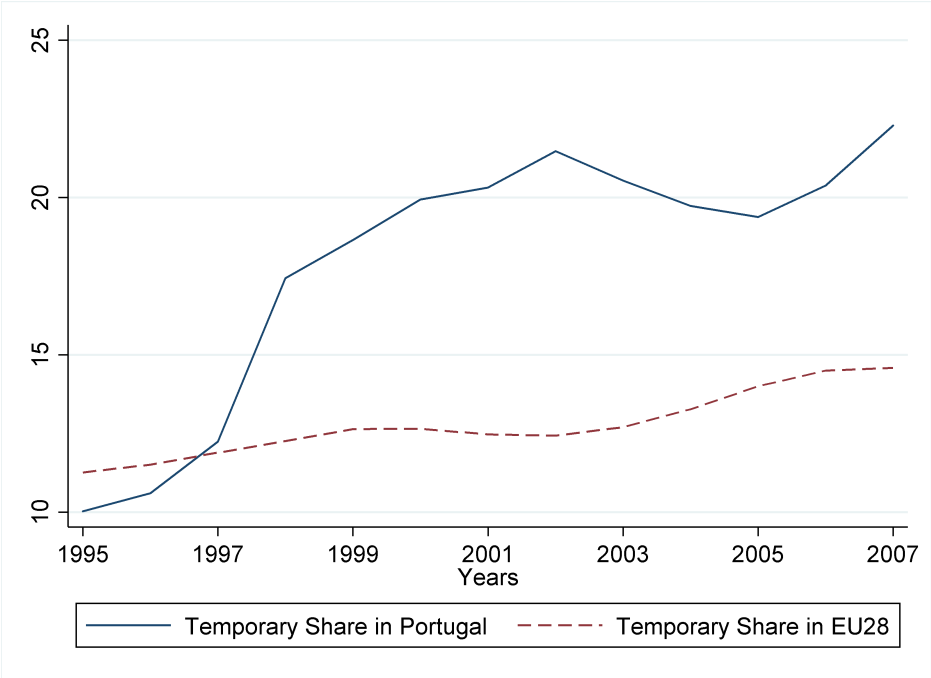
A. Appendix

Figure 1: **Strictness of Employment Protection, 1995-2007**



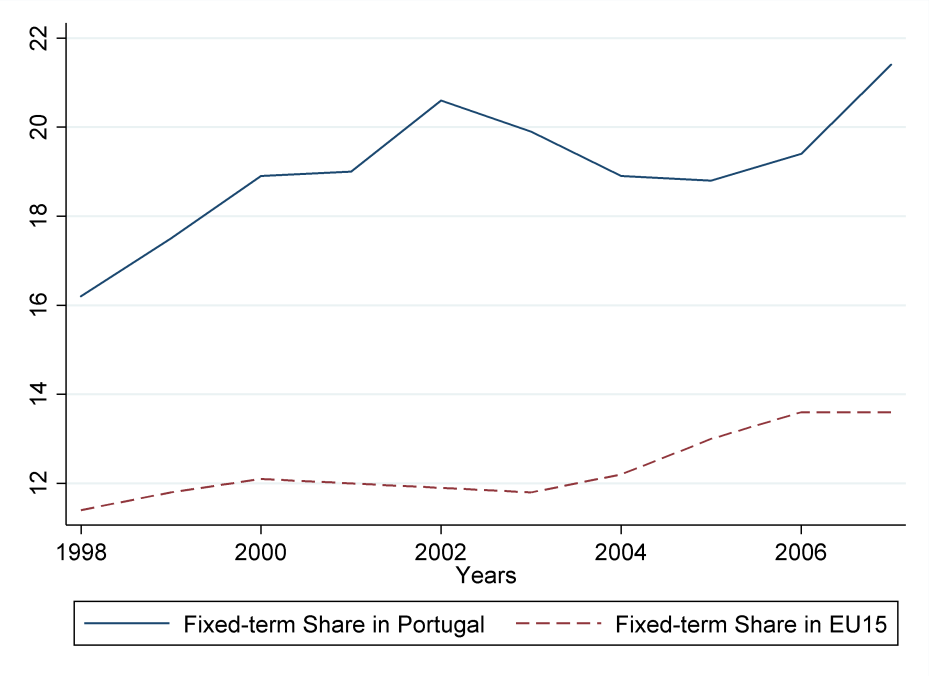
Source: OECD index of employment restrictions for individual and collective dismissals (regular contracts) from the OECD Indicators of Employment Protection Legislation.

Figure 2: **Share of Temporary Employment Contracts, 1995-2007**



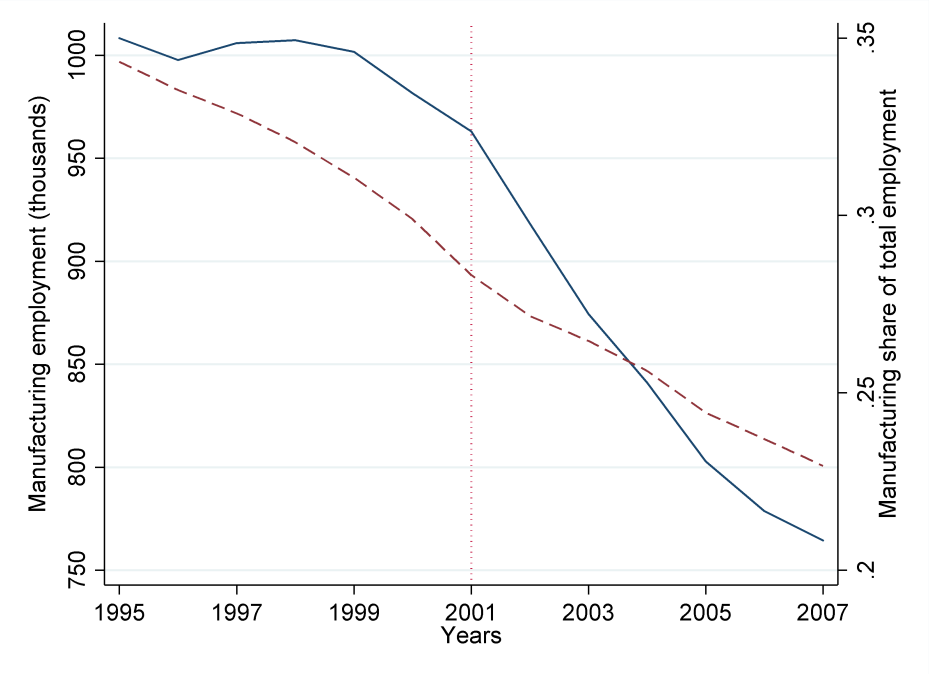
The figure plots temporary employment contracts' share of total dependent contracts for Portugal and the EU28 between 1995 and 2007 using data from the OECD annual Labour Force Statistics program.

Figure 3: **Share of Fixed-Term Contracts, 1998-2007**



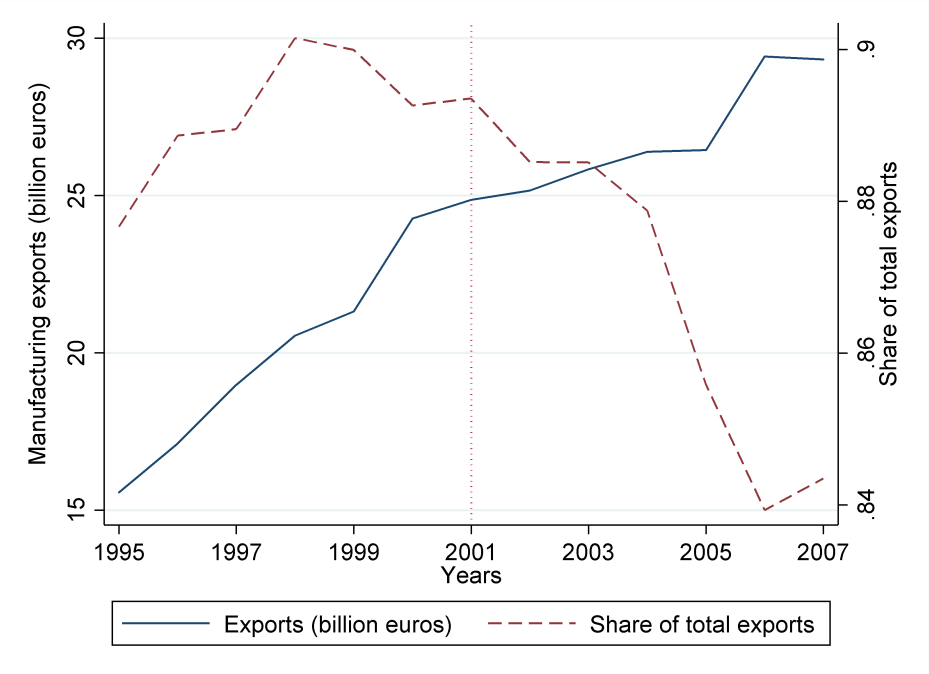
The figure plots the fixed-term contracts share of the total number of employees for Portugal and EU15 between the second quarter 1998 and 2007 for individuals between 20 and 64 years of age, using EUROSTAT employment statistics data.

Figure 4: **Portuguese Manufacturing Employment, 1995-2007**



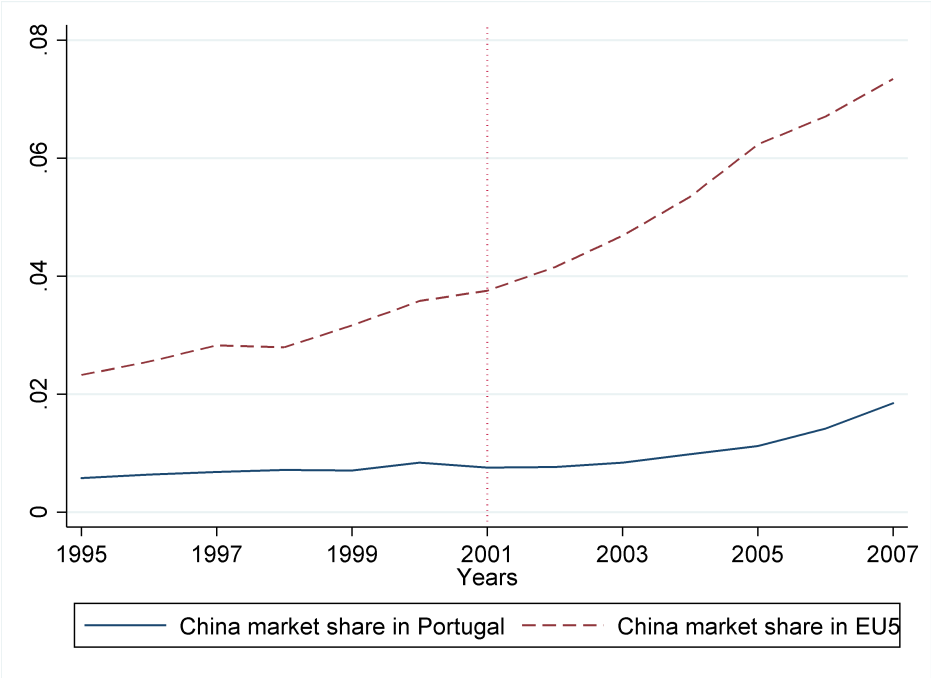
Authors' calculations based on *Quadros de Pessoal*. Manufacturing employment (solid blue line) is measured in thousands on the left axis, while manufacturing's share of total employment (dashed red line) is on the right axis. The sample includes mainland Portugal, excluding Azores and Madeira islands. Manufacturing employment includes employees working in industries 1500 - 3699 (ISIC rev2.1).

Figure 5: **Portuguese Manufacturing Exports, 1995-2007**



Authors' calculations based on *Comércio Internacional* data. Manufacturing exports (solid blue line) are measured in billions of euros on the left axis, while manufacturing's share of total exports (red dashed line), is measured on the right axis. Manufacturing exports include products with 2-digit Combined Nomenclature (CN) codes between 29 and 96.

Figure 6: **China Import Share,1995-2007**



Authors' calculations based on EUROSTAT trade data. The figure plots China share of imports in Portugal and in EU5 (Spain, France, Italy, Germany, and the United Kingdom). Manufacturing imports include products with 2-digit Combined Nomenclature (CN) codes between 29 and 96.

Table 1. **Descriptive Statistics**

	1995-2000		2000-2007	
	mean	std. dev.	mean	std. dev.
	(1)	(2)	(3)	(4)
Firm Outcomes				
Survival indicator	0.905	0.293	0.809	0.393
Δ ln(wagebill)	0.042	0.519	-0.128	0.656
Δ ln(employment)	-0.062	0.493	-0.181	0.629
Δ ln(hours per worker)	0.149	0.185	0.037	0.190
Δ ln(hourly wage)	-0.045	0.093	0.016	0.095
Firm-level China Shocks and Instruments				
Shock in Portugal (FCS^P)	0.142	1.562	0.121	0.597
Shock in EU5 (FCS^E)	0.029	0.140	0.078	0.265
Instrument in Portugal ($IVFSC^P$)	0.251	0.661	0.815	1.160
Instrument in EU5 ($IVFSC^E$)	0.029	0.127	0.105	0.356
Controls (beginning of period)				
Age	27.07	19.32	26.87	19.39
Age-squared	1105.8	1965.9	1098.0	2199.0
Share College	0.017	0.045	0.026	0.060
Sales / 1M (2007 euros)	7.72	33.01	7.32	41.65
Establishments	1.581	3.652	1.481	3.472

"Firm Outcomes" and "Firm-level China Shocks and Instruments" refer to changes during 1995-2000 in columns (1) and (2) and during 2000-2007 in columns (3) and (4). "Controls" refer to levels in the beginning of each period, i.e. 1995 in columns (1) and (2) and 2000 in columns (3) and (4). The 1995-2000 sample has 5,958 firm observations, except the change in log outcomes, which only cover the 5,391 firms surviving until 2000. The 2000-2007 sample has 8,021 firm observations, except the change in log outcomes, which only cover the 6,487 firms surviving until 2007.

Table 2. **Wagebill Effects 1995-2000, IV-Probit and IV**

	Extensive Margin (IV-Probit)			Intensive Margin (IV)		
	(1)	(2)	(3)	(4)	(5)	(6)
Shock in Portugal	0.444**	0.507***	0.0358	0.161	0.108	0.00626
	(0.225)	(0.163)	(0.381)	(0.132)	(0.127)	(0.103)
Shock in EU5	-0.526	-0.434	-0.976***	0.145	0.137	0.0882
	(0.427)	(0.407)	(0.315)	(0.136)	(0.128)	(0.116)
Age/1K		-1.962	-2.725		-7.286***	-7.137***
		(2.190)	(2.742)		(0.754)	(0.708)
Age-squared/10K		0.148	0.196		0.336***	0.334***
		(0.228)	(0.308)		(0.0717)	(0.0671)
Share College		0.00952	-0.363		0.308*	0.255
		(0.412)	(0.507)		(0.164)	(0.157)
Sales/1B		3.951**	5.521***		-0.157	-0.139
		(1.889)	(1.604)		(0.234)	(0.218)
Establishments		0.0171	0.0353**		-0.000757	0.000510
		(0.0115)	(0.0156)		(0.00202)	(0.00189)
Constant	0.967**	0.820*	1.595***	0.0136	0.179***	-0.0579
	(0.442)	(0.426)	(0.495)	(0.0227)	(0.0272)	(0.128)
Industry FE (10)	No	No	Yes	No	No	Yes
Region FE (5)	No	No	Yes	No	No	Yes
Observations	5958	5958	5958	5391	5391	5391
Exogeneity Test p-value	0.00421	0.00162	0.0154	0.343	0.446	0.746
First-stage F				3.596	3.396	4.469

This table measures the effects of increased Chinese import share in Portugal and the EU5 on the survival of Portuguese manufacturing firms (columns (1)-(3)) and the change in wagebill for surviving firms (columns (4)-(5)) for the time period 1995-2000. The dependent variable in columns (1)-(3) is an indicator for firm survival, while in columns (4)-(6) it is the change in log wagebill. The Chinese import competition shocks in Portugal and the EU5 are defined in equations (2) and (3). We instrument for these shocks using measures based on Chinese import competition in the US, defined in equations (5) and (6). Corresponding Probit and OLS results are available in Appendix Table 7. Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3. **Wagebill Effects 2000-2007, IV-Probit and IV**

	Extensive Margin (IV-Probit)			Intensive Margin (IV)		
	(1)	(2)	(3)	(4)	(5)	(6)
Shock in Portugal	-0.341*	-0.242	-0.335	-0.0674	-0.124	0.0587
	(0.207)	(0.214)	(0.226)	(0.108)	(0.108)	(0.118)
Shock in EU5	0.00763	-0.0269	0.0600	-0.154***	-0.155***	-0.153***
	(0.0881)	(0.0887)	(0.0927)	(0.0462)	(0.0459)	(0.0469)
Age/1K		2.102	1.997		-8.307***	-8.465***
		(1.456)	(1.457)		(0.767)	(0.756)
Age-squared/10K		-0.280**	-0.272**		0.338***	0.344***
		(0.115)	(0.115)		(0.0656)	(0.0646)
Share College		0.169	-0.0730		0.606***	0.621***
		(0.272)	(0.279)		(0.145)	(0.150)
Sales/1B		5.702***	5.854***		0.179	0.273
		(1.309)	(1.320)		(0.181)	(0.179)
Establishments		0.0108	0.0126		0.00197	0.00171
		(0.00755)	(0.00766)		(0.00222)	(0.00220)
Constant	0.893***	0.818***	0.427**	-0.108***	0.0652***	-0.270**
	(0.0180)	(0.0349)	(0.212)	(0.0156)	(0.0207)	(0.117)
Industry FE (10)	No	No	Yes	No	No	Yes
Region FE (5)	No	No	Yes	No	No	Yes
Observations	8021	8021	8021	6487	6487	6487
Exogeneity Test p-value	0.0201	0.0873	0.0399	0.211	0.135	0.310
First-stage F				48.00	47.69	38.46

This table measures the effects of increased Chinese import share in Portugal and the EU5 on the survival of Portuguese manufacturing firms (columns (1)-(3)) and the change in wagebill for surviving firms (columns (4)-(5)) for the time period 2000-2007. The dependent variable in columns (1)-(3) is an indicator for firm survival, while in columns (4)-(6) it is the change in log wagebill. The Chinese import competition shocks in Portugal and the EU5 are defined in equations (2) and (3). We instrument for these shocks using measures based on Chinese import competition in the US, defined in equations (5) and (6). Corresponding Probit and OLS results are available in Appendix Table 8. Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4. **Intensive Margin Decomposition 1995-2000, IV**

	Wagebill	Employment	Hours Per Worker	Hourly Wage
	(1)	(2)	(3)	(4)
Shock in Portugal	0.00626	0.0590	-0.0420*	-0.0107
	(0.103)	(0.0996)	(0.0236)	(0.0377)
Shock in EU5	0.0882	0.101	-0.0382	0.0252
	(0.116)	(0.112)	(0.0265)	(0.0425)
Age/1K	-7.137***	-7.248***	0.136	-0.0250
	(0.708)	(0.682)	(0.161)	(0.258)
Age-squared/10K	0.334***	0.345***	-0.00812	-0.00312
	(0.0671)	(0.0646)	(0.0153)	(0.0245)
Share College	0.255	0.435***	0.116***	-0.296***
	(0.157)	(0.152)	(0.0359)	(0.0574)
Sales/1B	-0.139	-0.0945	-0.0615	0.0167
	(0.218)	(0.210)	(0.0496)	(0.0795)
Establishments	0.000510	0.000690	-0.000387	0.000207
	(0.00189)	(0.00182)	(0.000432)	(0.000691)
Constant	-0.0579	-0.135	0.0271	0.0496
	(0.128)	(0.124)	(0.0293)	(0.0469)
Industry FE (10)	Yes	Yes	Yes	Yes
Region FE (5)	Yes	Yes	Yes	Yes
Observations	5391	5391	5391	5391
Exogeneity Test p-value	0.746	0.612	0.0698	0.955
First-stage F	4.469	4.469	4.469	4.469

This table decomposes the wagebill effects in column (6) of Table 2 into employment, hours, and hourly wage channels. Column (1) replicates column (6) of Table 2. Corresponding OLS results are available in Appendix Table 9. Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5. **Intensive Margin Decomposition 2000-2007, IV**

	Wagebill	Employment	Hours Per Worker	Hourly Wage
	(1)	(2)	(3)	(4)
Shock in Portugal	0.0587	0.0589	0.00354	-0.00373
	(0.118)	(0.113)	(0.0174)	(0.0348)
Shock in EU5	-0.153***	-0.156***	0.00470	-0.00131
	(0.0469)	(0.0449)	(0.00690)	(0.0138)
Age/1K	-8.465***	-8.643***	-0.0720	0.250
	(0.756)	(0.725)	(0.111)	(0.223)
Age-squared/10K	0.344***	0.353***	-0.00473	-0.00420
	(0.0646)	(0.0619)	(0.00951)	(0.0190)
Share College	0.621***	0.638***	-0.0365*	0.0195
	(0.150)	(0.144)	(0.0221)	(0.0442)
Sales/1B	0.273	0.0688	-0.0217	0.226***
	(0.179)	(0.172)	(0.0263)	(0.0527)
Establishments	0.00171	0.00148	-0.000391	0.000624
	(0.00220)	(0.00211)	(0.000324)	(0.000647)
Constant	-0.270**	-0.111	-0.0394**	-0.120***
	(0.117)	(0.113)	(0.0173)	(0.0346)
Industry FE (10)	Yes	Yes	Yes	Yes
Region FE (5)	Yes	Yes	Yes	Yes
Observations	6487	6487	6487	6487
Exogeneity Test p-value	0.310	0.243	0.232	0.851
First-stage F	38.46	38.46	38.46	38.46

This table decomposes the wagebill effects in column (6) of Table 3 into employment, hours, and hourly wage channels. Column (1) replicates column (6) of Table 3. Corresponding OLS results are available in Appendix Table 10. Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6. **Permanent vs. Temporary Employment 2000-2007, IV**

	(1) Overall Employment	(2) Permanent Employment	(3) Temporary Employment
Shock in Portugal	0.0607	0.0433	0.0175
	(0.103)	(0.0892)	(0.0566)
Shock in EU5	-0.0867**	-0.00601	-0.0807***
	(0.0409)	(0.0354)	(0.0224)
Age/1K	-7.488***	-5.554***	-1.934***
	(0.661)	(0.571)	(0.362)
Age-squared/10K	0.319***	0.251***	0.0685**
	(0.0564)	(0.0487)	(0.0309)
Share College	1.077***	1.035***	0.0416
	(0.131)	(0.113)	(0.0719)
Sales/1B	0.0265	0.140	-0.114
	(0.156)	(0.135)	(0.0856)
Establishments	-0.000337	0.000407	-0.000744
	(0.00192)	(0.00166)	(0.00105)
Constant	0.0738	-0.0744	0.148***
	(0.103)	(0.0886)	(0.0562)
Industry FE (10)	Yes	Yes	Yes
Region FE (5)	Yes	Yes	Yes
Observations	6475	6475	6475
Exogeneity Test p-value	0.810	0.526	0.0541
First-stage F	38.27	38.27	38.27

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

B. Data Appendix

B.1. Data Sources

The *Quadros de Pessoal* (QP) are based upon a mandatory survey submitted annually to the Portuguese Ministry of Employment and Social Security by firms with at least one employee. Firms disclose their responses to the QP survey to their employees and labor unions, allowing workers to ensure the accuracy of the data. Firms failing to report worker information must pay a fine between €200 and €1,500. The full sample includes an average of 227,000 firms and 2 million individuals each year, covering nearly all firms and employees in the Portuguese private sector. QP data are available from 1986 until 2012, excluding 1999 and 2001. During our sample period of 1995-2007. the reference month regarding the employee data is October of each year. In each year, firms report their entry year, location, main industry, number of employees, number of establishments, initial capital stock, ownership structure, and sales. At the worker level, the database contains information on gender, age, education, occupation, type of contract, working hours, and earnings for the month of October. Individuals and firms each appear with a unique identifier, making it possible to track firms and workers over time and to track workers across firms.

The *Inquérito Anual à Produção Industrial* (IAPI) is a mandatory survey, collected by Statistics Portugal (*Instituto Nacional de Estatistica* – INE). This database collects annual information on outputs, inputs, and energy sources. The survey targets the largest firms operating in the mining and quarrying, manufacturing, and electricity, gas, and water industries. These firms account for approximately 90 percent of the total sales of each 5-digit industry code, using *Classificação das Actividade Económicas (CAE)* Revision 2 and Revision 2.1. The survey also includes all firms with more than 20 employees, as long as the sample of firms is not too large (less than 17,000 firms per year). If the number of firms that account for 90 percent of the total sales in an industry is less than 5, this industry is not surveyed, to ensure confidentiality. The product-level information includes sales and production by good, reported using a 12-digit PRODCOM classification, with approximately 5,300 different products. The IAPI data are available for the period between 1992 and 2014.

Comércio Internacional (CI) is a firm-level international trade database, collected by Statistics Portugal (INE). This database records individual trade transactions on a monthly basis between 1990 and 2014. We collapse these transactions to the firm, trading partner country, product, year level. In order to appear in the dataset, a firm's intra-EU trade must exceed specified import and export value thresholds. For example, in 2010, firms were obliged to report their intra-EU transactions the their volume of exports and imports in the previous year or current year were higher than €250,000 and €300,000, respectively. Throughout the sample period, the thresholds were set to ensure that the CI database overall includes 97 percent of intra-EU exports and 95 percent of intra-EU imports.

To compute China's import share in the EU5 (France, Spain, Italy, U.K. and Germany) and in the U.S., we use EUROSTAT and UN Comtrade databases, respectively. EUROSTAT provides yearly trade flows for each 8-digit Combined Nomenclature (CN) product for each EU member and its trading partners. Comtrade provides similar information for the U.S. at the 6-digit Harmonized System (HS) product level. We use EUROSTAT rather than Comtrade for the EU5 because EUROSTAT total imports and exports matched those provided by each EU5 country's Statistics Office.

B.2. Firm Sample

We examine two samples of firms - one focused on firms active in 1995 and the other focused on firms active in 2000. We include firms located in mainland Portugal (omitting those in the Azores and Madeira islands) that appear both in QP and IAPI in either 1995 or 2000. Of course, many firms appear in both time periods, so there is quite a bit of overlap between the two samples.

Some firms merge or acquire other firms, while others spin off a portion of their activities. We identify a firm as merged, acquired, or involved in a spin-off if more than 25 employees and more than 40 percent of its workforce moves to another firm. When this happens, we merge the firms and treat them as if they were a single firm throughout the relevant period. This procedure leads us to construct 263 merged firms during our sample period.

B.3. Firm Age

The QP data record the year of firm entry, which we use to calculate the firm age. In cases where the firm employs workers whose firm accession year is prior to the recorded firm entry year, we use the earlier year for our measure of firm entry.

B.4. Worker Sample

The QP data include all employees working in the private sector, excluding self-employed workers. We include all workers with the exception of a small number of fisherman who report positive earnings but zero hours.

B.5. Interpolation

In spite of the fines described above, firms occasionally fail to report worker information. This occurs in 14.4 percent (1995), 8.8 percent (2000), and 1.7 percent (2007) of firm observations. In these cases, we linearly interpolate the firm's employment and wagebill between the adjacent years.

When calculating firm wagebill, our main analysis interpolates wages and hours for a small number of employees reporting zero earnings and zero hours. If these workers are furloughed, we interpolate their annual earnings, subtracting two months' pay under the assumption that firms delay furloughed workers' wages by the maximum legal limit of two months. If workers are on leave, we assume that their full salary is paid by the government, and interpolate their full wages. In interpolating these wages, we use similar workers in the same firm when available, otherwise we interpolate using similar workers in the same industry.

B.6. Matching Across Datasets

We merge firm-level workforce information from QP with firm product-level information from IAPI and trade information from CI using a concordance between the firm identifiers in each dataset provided by INE. Of the firms in IAPI, in 1995 or 2000 (our sample restriction) we match 93.5 percent (1995) and 93.0 percent (2000) to information in QP. This process generates a set of 9,261 unique firms: 5,958 in 1995 and 8,021 in 2000, with many firms appearing in both time periods.

We also match product codes across PRODCOM, CI, EUROSTAT and UN Comtrade. We do so using concordance tables from the EUROSTAT RAMON Metadata Server and aggregate products as necessary to ensure consistent definitions across years and datasets, following a procedure similar to that in Van Beveren et al. (2012). This process yields a classification with 2,512 uniquely and consistently identified products across datasets. This classification and related concordances are available upon request.

B.7. Deflating

All monetary values in the paper are quoted in year 2007 Euros, deflated using the Consumer Price Index from INE.

C. Supplementary Results

C.1. Probit and OLS Results

The following tables present Probit and OLS results corresponding to the instrumental variables results shown in the main text. Note that the qualitative conclusions are quite similar to those presented in the main text.

Table 7. **Wagebill Effects 1995-2000, Probit and OLS**

	Extensive Margin (Probit)			Intensive Margin (OLS)		
	(1)	(2)	(3)	(4)	(5)	(6)
Shock in Portugal	0.0611	0.0680	0.0418	0.00254	0.00227	0.00187
	(0.0493)	(0.0500)	(0.0488)	(0.00432)	(0.00426)	(0.00422)
Shock in EU5	-0.200	-0.208	-0.203	0.0269	0.00587	0.0105
	(0.142)	(0.142)	(0.145)	(0.0521)	(0.0513)	(0.0512)
Age/1K		-2.406	-2.564		-7.288***	-7.154***
		(2.688)	(2.777)		(0.713)	(0.708)
Age-squared/10K		0.180	0.200		0.332***	0.334***
		(0.298)	(0.313)		(0.0677)	(0.0672)
Share College		-0.0599	-0.375		0.292*	0.256*
		(0.514)	(0.498)		(0.155)	(0.155)
Sales/1B		5.252***	5.398***		-0.214	-0.138
		(1.577)	(1.584)		(0.211)	(0.209)
Establishments		0.0236*	0.0364**		-0.00123	0.000456
		(0.0140)	(0.0158)		(0.00186)	(0.00187)
Constant	1.309***	1.291***	1.575***	0.0404***	0.200***	-0.0552
	(0.0235)	(0.0533)	(0.497)	(0.00726)	(0.0152)	(0.129)
Industry FE (10)	No	No	Yes	No	No	Yes
Region FE (5)	No	No	Yes	No	No	Yes
(Pseudo) R-squared	0.00108	0.00688	0.0216	0.000113	0.0316	0.0531
Observations	5958	5958	5958	5391	5391	5391

Probit and OLS results corresponding to IV-Probit and IV results in Table 2. Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8. **Wagebill Effects 2000-2007, Probit and OLS**

	Extensive Margin (Probit)			Intensive Margin (OLS)		
	(1)	(2)	(3)	(4)	(5)	(6)
Shock in Portugal	0.0223	0.0253	0.0171	0.0138	0.0176	0.0165
	(0.0296)	(0.0300)	(0.0299)	(0.0130)	(0.0128)	(0.0128)
Shock in EU5	-0.149***	-0.158***	-0.0992*	-0.106***	-0.114***	-0.0996***
	(0.0572)	(0.0573)	(0.0589)	(0.0314)	(0.0310)	(0.0313)
Age/1K		1.710	1.621		-8.474***	-8.413***
		(1.442)	(1.459)		(0.748)	(0.748)
Age-squared/10K		-0.262**	-0.258**		0.349***	0.342***
		(0.115)	(0.116)		(0.0645)	(0.0643)
Share College		0.182	-0.00910		0.625***	0.600***
		(0.274)	(0.280)		(0.143)	(0.146)
Sales/1B		6.019***	6.269***		0.195	0.264
		(1.320)	(1.334)		(0.179)	(0.178)
Establishments		0.0116	0.0134*		0.00252	0.00169
		(0.00757)	(0.00773)		(0.00218)	(0.00218)
Constant	0.883***	0.813***	0.445**	-0.122***	0.0465***	-0.273**
	(0.0172)	(0.0342)	(0.213)	(0.00861)	(0.0172)	(0.118)
Industry FE (10)	No	No	Yes	No	No	Yes
Region FE (5)	No	No	Yes	No	No	Yes
(Pseudo) R-squared	0.000907	0.00654	0.0137	0.00191	0.0290	0.0443
Observations	8021	8021	8021	6487	6487	6487

Probit and OLS results corresponding to IV-Probit and IV results in Table 3. Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9. **Intensive Margin Decomposition 1995-2000, OLS**

	Wagebill	Employment	Hours Per Worker	Hourly Wage
	(1)	(2)	(3)	(4)
Shock in Portugal	0.00187	0.00137	0.000963	-0.000467
	(0.00422)	(0.00399)	(0.000764)	(0.00153)
Shock in EU5	0.0105	0.00892	-0.0219**	0.0234
	(0.0512)	(0.0484)	(0.00927)	(0.0186)
Age/1K	-7.154***	-7.286***	0.154	-0.0218
	(0.708)	(0.669)	(0.128)	(0.257)
Age-squared/10K	0.334***	0.345***	-0.00813	-0.00312
	(0.0672)	(0.0635)	(0.0121)	(0.0244)
Share College	0.256*	0.421***	0.128***	-0.293***
	(0.155)	(0.146)	(0.0280)	(0.0563)
Sales/1B	-0.138	-0.125	-0.0364	0.0230
	(0.209)	(0.198)	(0.0379)	(0.0761)
Establishments	0.000456	0.000468	-0.000249	0.000237
	(0.00187)	(0.00177)	(0.000338)	(0.000679)
Constant	-0.0552	-0.131	0.0259	0.0495
	(0.129)	(0.122)	(0.0233)	(0.0467)
Industry FE (10)	Yes	Yes	Yes	Yes
Region FE (5)	Yes	Yes	Yes	Yes
(Pseudo) R-squared	0.0531	0.0592	0.0299	0.0102
Observations	5391	5391	5391	5391

OLS results corresponding to IV results in Table 4. Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10. **Intensive Margin Decomposition 2000-2007, OLS**

	Wagebill	Employment	Hours Per Worker	Hourly Wage
	(1)	(2)	(3)	(4)
Shock in Portugal	0.0165	0.0164	0.000778	-0.000696
	(0.0128)	(0.0123)	(0.00189)	(0.00377)
Shock in EU5	-0.0996***	-0.100***	-0.00353	0.00403
	(0.0313)	(0.0300)	(0.00461)	(0.00922)
Age/1K	-8.413***	-8.590***	-0.0709	0.248
	(0.748)	(0.717)	(0.110)	(0.220)
Age-squared/10K	0.342***	0.351***	-0.00488	-0.00403
	(0.0643)	(0.0616)	(0.00947)	(0.0189)
Share College	0.600***	0.617***	-0.0357*	0.0193
	(0.146)	(0.140)	(0.0216)	(0.0432)
Sales/1B	0.264	0.0603	-0.0215	0.226***
	(0.178)	(0.171)	(0.0263)	(0.0525)
Establishments	0.00169	0.00147	-0.000409	0.000638
	(0.00218)	(0.00209)	(0.000322)	(0.000644)
Constant	-0.273**	-0.113	-0.0390**	-0.120***
	(0.118)	(0.113)	(0.0173)	(0.0346)
Industry FE (10)	Yes	Yes	Yes	Yes
Region FE (5)	Yes	Yes	Yes	Yes
(Pseudo) R-squared	0.0443	0.0458	0.00928	0.0141
Observations	6487	6487	6487	6487

OLS results corresponding to IV results in Table 5. Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11. **Permanent vs. Temporary Employment 2000-2007, OLS**

	Overall Employment	Permanent Employment	Temporary Employment
	(1)	(2)	(3)
Shock in Portugal	0.00660	0.0115	-0.00489
	(0.0112)	(0.00966)	(0.00612)
Shock in EU5	-0.0714***	-0.0309	-0.0406***
	(0.0273)	(0.0236)	(0.0150)
Age/1K	-7.431***	-5.527***	-1.905***
	(0.653)	(0.564)	(0.358)
Age-squared/10K	0.316***	0.249***	0.0673**
	(0.0561)	(0.0485)	(0.0307)
Share College	1.060***	1.031***	0.0285
	(0.128)	(0.111)	(0.0701)
Sales/1B	0.0186	0.137	-0.119
	(0.156)	(0.135)	(0.0853)
Establishments	-0.000433	0.000303	-0.000735
	(0.00191)	(0.00165)	(0.00104)
Constant	0.0730	-0.0733	0.146***
	(0.103)	(0.0887)	(0.0562)
Industry FE (10)	Yes	Yes	Yes
Region FE (5)	Yes	Yes	Yes
R-squared	0.0529	0.0433	0.0174
Observations	6475	6475	6475

OLS results corresponding to IV results in Table **??**. Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

C.2. Linear Probability Model Extensive Margin Results

The following table shows extensive margin firm-survival analysis using linear probability models rather than IV-Probit. Note that the qualitative results are very similar to those in the IV-Probit analyses in Tables 2 and 3.

Table 12. **Extensie Margin Effects - IV Linear Probability Model**

	1995-2000			2000-2007		
	(1)	(2)	(3)	(4)	(5)	(6)
Shock in Portugal	0.0658	0.0790	-0.00533	-0.0986	-0.0814	-0.112*
	(0.0676)	(0.0709)	(0.0577)	(0.0616)	(0.0614)	(0.0669)
Shock in EU5	-0.165**	-0.159**	-0.203***	-0.00387	-0.00598	0.0172
	(0.0677)	(0.0697)	(0.0626)	(0.0238)	(0.0237)	(0.0247)
Age/1K		-0.315	-0.277		0.842**	0.831*
		(0.428)	(0.394)		(0.424)	(0.426)
Age-squared/10K		0.0270	0.0231		-0.0811**	-0.0786**
		(0.0416)	(0.0383)		(0.0367)	(0.0368)
Share College		0.0268	-0.0286		0.0983	0.0260
		(0.0927)	(0.0878)		(0.0752)	(0.0778)
Sales/1B		0.355***	0.322***		0.300***	0.300***
		(0.134)	(0.123)		(0.109)	(0.110)
Establishments		0.00191	0.00261**		0.00201	0.00224*
		(0.00118)	(0.00109)		(0.00131)	(0.00132)
Constant	0.900***	0.898***	0.950***	0.821***	0.798***	0.683***
	(0.0113)	(0.0147)	(0.0720)	(0.00870)	(0.0113)	(0.0625)
Industry FE (10)	No	No	Yes	No	No	Yes
Region FE (5)	No	No	Yes	No	No	Yes
Observations	5958	5958	5958	8021	8021	8021
Exogeneity Test p-value	0.0114	0.00980	0.00944	0.0240	0.0475	0.0227
First-stage F	4.323	4.107	5.272	59.38	59.28	50.47

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

C.3. Tobit Wagebill Analysis

The following tables present analyses of the effects of Chinese import competition that simultaneously address firm survival and changes among surviving firms. We estimate IV-Tobit models in Table 13 and standard Tobit models in Table 14. The dependent variable is the wagebill at the end of the period divided by the wagebill at the beginning of the period. Because all firms in the relevant sample are active at the beginning of the period, this measure is defined for all observations. Firms that shut down have a value of zero for this ratio, so we estimate a Tobit corner-solution model with a truncation point at zero. As shown in the main text, the intensive and extensive margin effects generally differ, with strong extensive margin effects in 1995-2000 and strong intensive margin effects in 2000-2007. Because the Tobit model admits a single parameter for both of these margins, we prefer the more flexible approach taken in the main text.

Table 13. **Wagebill Effects 1995-2000 and 2000-2007, IV-Tobit**

	1995-2000			2000-2007		
	(1)	(2)	(3)	(4)	(5)	(6)
Shock in Portugal	0.109	0.0740	-0.141	-0.261*	-0.275*	-0.153
	(0.187)	(0.188)	(0.169)	(0.141)	(0.141)	(0.150)
Shock in EU5	-0.291	-0.287	-0.341*	-0.0920*	-0.0976*	-0.0515
	(0.190)	(0.187)	(0.186)	(0.0546)	(0.0543)	(0.0552)
Age/1K		-10.05***	-10.11***		-5.793***	-5.986***
		(1.133)	(1.158)		(0.972)	(0.952)
Age-squared/10K		0.505***	0.506***		0.181**	0.192**
		(0.110)	(0.112)		(0.0839)	(0.0822)
Share College		0.856***	0.592**		0.925***	0.752***
		(0.246)	(0.258)		(0.172)	(0.174)
Sales/1B		0.458	0.352		0.630**	0.699***
		(0.353)	(0.360)		(0.245)	(0.241)
Establishments		0.00118	0.00274		0.00378	0.00328
		(0.00311)	(0.00318)		(0.00296)	(0.00291)
Constant	1.015***	1.217***	1.126***	0.789***	0.893***	0.546***
	(0.0312)	(0.0390)	(0.211)	(0.0200)	(0.0258)	(0.141)
Industry FE (10)	No	No	yes	No	No	yes
Region FE (5)	No	No	yes	No	No	yes
Observations	5958	5958	5958	8021	8021	8021
Exogeneity Test p-value	0.227	0.381	0.235	0.0658	0.0500	0.208

This table presents IV-Tobit models in which the dependent variable is the end-of-period wagebill over the beginning-of-period wagebill. When a firm exits, this ratio is zero, so we estimate models with a truncation point at 0. Corresponding Tobit results (without instrumental variables) appear in Table 14. Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14. **Wagebill Effects 1995-2000 and 2000-2007, Tobit**

	1995-2000			2000-2007		
	(1)	(2)	(3)	(4)	(5)	(6)
Shock in Portugal	0.00353	0.00360	0.00209	0.0132	0.0173	0.0140
	(0.00695)	(0.00687)	(0.00685)	(0.0167)	(0.0165)	(0.0165)
Shock in EU5	-0.0849	-0.112	-0.0809	-0.151***	-0.155***	-0.115***
	(0.0786)	(0.0777)	(0.0778)	(0.0381)	(0.0378)	(0.0381)
Age/1K		-9.963***	-10.02***		-6.207***	-6.174***
		(1.120)	(1.116)		(0.935)	(0.933)
Age-squared/10K		0.500***	0.507***		0.206**	0.203**
		(0.108)	(0.108)		(0.0815)	(0.0811)
Share College		0.849***	0.630***		0.946***	0.786***
		(0.242)	(0.244)		(0.169)	(0.171)
Sales/1B		0.410	0.416		0.679***	0.730***
		(0.336)	(0.335)		(0.240)	(0.238)
Establishments		0.00108	0.00333		0.00459	0.00356
		(0.00299)	(0.00302)		(0.00287)	(0.00287)
Constant	1.024***	1.221***	1.118***	0.761***	0.869***	0.549***
	(0.0112)	(0.0236)	(0.204)	(0.0107)	(0.0213)	(0.141)
Industry FE (10)	No	No	Yes	No	No	Yes
Region FE (5)	No	No	Yes	No	No	Yes
Pseudo R-squared	0.0000976	0.00825	0.0139	0.000815	0.00583	0.0119
Observations	5958	5958	5958	8021	8021	8021

This table presents Tobit models in which the dependent variable is the end-of-period wagebill over the beginning-of-period wagebill. When a firm exits, this ratio is zero, so we estimate models with a truncation point at 0. Corresponding IV-Tobit results appear in Table 13. Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

C.4. Results for Firms With Sales in Portugal and the EU5

A potential concern with the empirical analysis presented in the main text is that we include firms with no initial exports to the EU5. For these firms, the value of FCS_{it}^{E} in (3) is zero by definition, since they are not exposed to the EU5 market. If non-exporters had systematically different performance than exporters during our sample period, the inclusion of these firms without exports to the EU5 might confound our results. In order to rule out this possibility, Tables 15 - 19, repeat all of the results in the main text on a restricted set of firms with strictly positive initial sales in Portugal and the EU5. When comparing outcomes among these firms, all of which initially sold products in both Portugal and the EU5, we find very similar results to those using the larger sample in the main text.

Table 15. **Wagebill Effects 1995-2000, IV-Probit and IV**

	Extensive Margin (IV-Probit)			Intensive Margin (IV)		
	(1)	(2)	(3)	(4)	(5)	(6)
Shock in Portugal	0.936**	1.028***	0.708	0.298**	0.244*	0.165
	(0.429)	(0.395)	(0.550)	(0.148)	(0.147)	(0.139)
Shock in EU5	-0.980*	-0.738	-1.266**	0.366**	0.232	0.136
	(0.548)	(0.572)	(0.578)	(0.184)	(0.190)	(0.181)
Age/1K		-0.925	-1.207		-9.005***	-8.501***
		(3.923)	(4.458)		(1.376)	(1.364)
Age-squared/10K		0.0478	0.0171		0.420***	0.385***
		(0.341)	(0.387)		(0.103)	(0.101)
Share College		0.933	0.662		0.849**	0.803**
		(1.012)	(1.209)		(0.347)	(0.367)
Sales/1B		2.611*	2.848*		-0.201	-0.167
		(1.442)	(1.588)		(0.270)	(0.263)
Establishments		0.0859	0.123**		-0.00480	-0.00287
		(0.0558)	(0.0623)		(0.00808)	(0.00784)
Constant	1.093***	0.880***	4.419	-0.0485	0.187***	-0.0537
	(0.283)	(0.313)	(347.9)	(0.0314)	(0.0542)	(0.390)
Industry FE (10)	No	No	Yes	No	No	Yes
Region FE (5)	No	No	Yes	No	No	Yes
Observations	1675	1675	1675	1525	1525	1525
Exogeneity Test p-value	0.0000887	0.000223	0.000231	0.0840	0.215	0.520
First-stage F				21.89	20.47	22.56

This table measures the effects of increased Chinese import share in Portugal and the EU5 on the survival of Portuguese manufacturing firms (columns (1)-(3)) and the change in wagebill for surviving firms (columns (4)-(6)), using the subsample of firms with strictly positive initial sales in both Portugal and the EU5. The dependent variable in columns (1)-(3) is an indicator for firm survival, while in columns (4)-(6) it is the change in log wagebill. The Chinese import competition shocks in Portugal and the EU5 are defined in equations (2) and (3). We instrument for these shocks using measures based on Chinese import competition in the US, defined in equations (5) and (6). Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 16. **Wagebill Effects 2000-2007, IV-Probit and IV**

	Extensive Margin (IV-Probit)			Intensive Margin (IV)		
	(1)	(2)	(3)	(4)	(5)	(6)
Shock in Portugal	0.648***	0.748***	0.537*	0.0830	0.0142	-0.00672
	(0.248)	(0.233)	(0.283)	(0.140)	(0.138)	(0.141)
Shock in EU5	-0.135	-0.114	-0.0703	-0.282***	-0.343***	-0.327***
	(0.124)	(0.126)	(0.137)	(0.0709)	(0.0713)	(0.0723)
Age/1K		0.497	-0.111		-9.718***	-9.606***
		(2.360)	(2.496)		(1.305)	(1.304)
Age-squared/10K		-0.115	-0.120		0.372***	0.354***
		(0.146)	(0.156)		(0.0840)	(0.0845)
Share College		0.310	-0.0223		1.189***	1.169***
		(0.463)	(0.493)		(0.281)	(0.296)
Sales/1B		5.219***	5.655***		0.126	0.149
		(1.432)	(1.539)		(0.202)	(0.203)
Establishments		-0.0274	-0.0291		-0.0245**	-0.0278**
		(0.0185)	(0.0195)		(0.0113)	(0.0115)
Constant	0.752***	0.664***	0.608	-0.0831***	0.185***	0.192
	(0.105)	(0.132)	(0.647)	(0.0295)	(0.0508)	(0.338)
Industry FE (10)	No	No	Yes	No	No	Yes
Region FE (5)	No	No	Yes	No	No	Yes
Observations	2127	2127	2127	1727	1727	1727
Exogeneity Test p-value	0.0370	0.0174	0.181	0.133	0.0706	0.0555
First-stage F				27.27	26.48	25.34

This table measures the effects of increased Chinese import share in Portugal and the EU5 on the survival of Portuguese manufacturing firms (columns (1)-(3)) and the change in wagebill for surviving firms (columns (4)-(6)), using the subsample of firms with strictly positive initial sales in both Portugal and the EU5. The dependent variable in columns (1)-(3) is an indicator for firm survival, while in columns (4)-(6) it is the change in log wagebill. The Chinese import competition shocks in Portugal and the EU5 are defined in equations (2) and (3). We instrument for these shocks using measures based on Chinese import competition in the US, defined in equations (5) and (6). Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 17. **Intensive Margin Decomposition 1995-2000, IV**

	Wagebill	Employment	Hours Per Worker	Hourly Wage
	(1)	(2)	(3)	(4)
Shock in Portugal	0.165	0.206	0.00487	-0.0465
	(0.139)	(0.136)	(0.0188)	(0.0433)
Shock in EU5	0.136	0.212	-0.0167	-0.0594
	(0.181)	(0.177)	(0.0244)	(0.0562)
Age/1K	-8.501***	-8.074***	0.237	-0.664
	(1.364)	(1.332)	(0.184)	(0.424)
Age-squared/10K	0.385***	0.372***	-0.00439	0.0177
	(0.101)	(0.0990)	(0.0137)	(0.0315)
Share College	0.803**	1.167***	0.0687	-0.433***
	(0.367)	(0.358)	(0.0495)	(0.114)
Sales/1B	-0.167	-0.0959	-0.127***	0.0562
	(0.263)	(0.257)	(0.0356)	(0.0818)
Establishments	-0.00287	-0.00486	0.000608	0.00138
	(0.00784)	(0.00766)	(0.00106)	(0.00243)
Constant	-0.0537	-0.217	-0.0184	0.182
	(0.390)	(0.381)	(0.0526)	(0.121)
Industry FE (10)	Yes	Yes	Yes	Yes
Region FE (5)	Yes	Yes	Yes	Yes
Observations	1525	1525	1525	1525
Exogeneity Test p-value	0.520	0.293	0.999	0.460
First-stage F	22.56	22.56	22.56	22.56

This table decomposes the wagebill effects in column (6) of Table 15 into employment, hours, and hourly wage channels, using the subsample of firms with strictly positive initial sales in both Portugal and the EU5. Column (2) replicates column (6) of Table 15. Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 18. **Intensive Margin Decomposition 2000-2007, IV**

	Wagebill	Employment	Hours Per Worker	Hourly Wage
	(1)	(2)	(3)	(4)
Shock in Portugal	-0.00672	-0.0103	-0.00764	0.0112
	(0.141)	(0.141)	(0.0164)	(0.0398)
Shock in EU5	-0.327***	-0.289***	-0.00206	-0.0357*
	(0.0723)	(0.0724)	(0.00844)	(0.0205)
Age/1K	-9.606***	-9.337***	0.0191	-0.288
	(1.304)	(1.305)	(0.152)	(0.369)
Age-squared/10K	0.354***	0.347***	-0.00993	0.0168
	(0.0845)	(0.0845)	(0.00986)	(0.0239)
Share College	1.169***	1.264***	-0.0263	-0.0689
	(0.296)	(0.296)	(0.0345)	(0.0837)
Sales/1B	0.149	0.00140	-0.0187	0.167***
	(0.203)	(0.203)	(0.0237)	(0.0573)
Establishments	-0.0278**	-0.0289**	-0.00171	0.00281
	(0.0115)	(0.0115)	(0.00134)	(0.00324)
Constant	0.192	0.130	0.0195	0.0426
	(0.338)	(0.339)	(0.0395)	(0.0957)
Industry FE (10)	Yes	Yes	Yes	Yes
Region FE (5)	Yes	Yes	Yes	Yes
Observations	1727	1727	1727	1727
Exogeneity Test p-value	0.0555	0.0860	0.601	0.576
First-stage F	25.34	25.34	25.34	25.34

This table decomposes the wagebill effects in column (6) of Table 16 into employment, hours, and hourly wage channels, using the subsample of firms with strictly positive initial sales in both Portugal and the EU5. Column (2) replicates column (6) of Table 16. Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 19. **Permanent vs. Temporary Employment 2000-2007, IV**

	Overall Employment	Permanent Employment	Temporary Employment
	(1)	(2)	(3)
Shock in Portugal	-0.0627	0.0771	-0.140*
	(0.149)	(0.131)	(0.0725)
Shock in EU5	-0.144*	-0.0504	-0.0935**
	(0.0766)	(0.0673)	(0.0373)
Age/1K	-7.162***	-4.899***	-2.263***
	(1.380)	(1.214)	(0.672)
Age-squared/10K	0.254***	0.193**	0.0610
	(0.0894)	(0.0786)	(0.0435)
Share College	2.521***	2.225***	0.296*
	(0.313)	(0.276)	(0.152)
Sales/1B	-0.136	-0.0590	-0.0766
	(0.215)	(0.189)	(0.104)
Establishments	-0.0358***	-0.0223**	-0.0135**
	(0.0121)	(0.0107)	(0.00591)
Constant	0.108	0.199	-0.0905
	(0.358)	(0.315)	(0.174)
Industry FE (10)	Yes	Yes	Yes
Region FE (5)	Yes	Yes	Yes
Observations	1727	1727	1727
Exogeneity Test p-value	0.822	0.796	0.0406
First-stage F	25.34	25.34	25.34

This table presents a decomposition of the overall employment effects seen in column (2) of Table 18 into margins due to permanent employment and temporary employment, using the subsample of firms with strictly positive initial sales in both Portugal and the EU5. The dependent variables in this table are expressed in proportional changes, rather than changes in logs, in order to admit an additive decomposition of overall employment into permanent and temporary components. Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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