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# The Heterogeneous Impacts of Import Competition on Mexican Manufacturing Plants*


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## ABSTRACT


We study the impact of import competition on Mexican firm outcomes between 2003 and 2013 by exploiting variation in import penetration across industries. Focusing on the increase in import competition from China that Mexico experienced during this period, we find that the trade shock induced a decline in employment, sales, exports, and productivity. Importantly, the results show that the average impact hides significant heterogeneity effects, with smaller and less efficient plants experiencing the largest adjustments, while the most efficient plants exhibited relatively minor effects and, for some outcomes, no effects at all. The existence of heterogeneous impacts across establishments is consistent with other sets of findings—for instance, that the productivity gap between small and large plants has been increasing over time and that the reallocation of resources has been productivity-enhancing, particularly in sectors that have experienced large-scale import penetration from China.



**JEL No.** F14, F61, L25, L60

**Key words:** import competition, manufacturing plants, productivity



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# 1. INTRODUCTION

Ever since China emerged as an exporting superpower more than a decade ago, countries around the globe have been jittered by news of companies laying off workers, selling assets and property, informalizing operations, or closing down altogether. At the same time, there have been other stories that have taken longer to reach the front pages of newspapers but are equally important, regarding companies that have increased their focus on improving design or quality, reduced excess costs, adjusted profit margins, and potentially became more efficient, all as the result of Chinese competition. These are two sides of the same coin that characterize what modern trade theory has emphasized for years, namely that trade shocks may have heterogeneous impacts on firms not only because trade exposures differ across industries but also because within narrowly defined industries, plants might respond differently when faced with the same shock. Focusing on a developing country, Mexico, this paper seeks to uncover some of this firm heterogeneity in response to the rising import penetration from China. Mexico is a particularly interesting case because it has a pattern of specialization traditionally biased toward the production of manufacturing goods. Additionally, the growth in imports from China has been persistent: China's import share increased more than 15 percentage points between 1998 and 2014 and currently stands at 17%.

The objective of this analysis is to measure the impact of import exposure to China on Mexican manufacturing activity, paying particular attention to the extent to which such impacts differ across plants of different characteristics. We assess the impacts on five different variables: employment, sales, exports, the capital-labor ratio, and productivity.

Starting with employment, there is already evidence for both developed and developing countries, indicating that greater industry exposure to China tends to be associated with slower plant employment growth. For instance, Bernard et al. (2006), Mion and Zhu (2013), and Alvarez and Claro (2008) show for the cases of the US, Belgium, and Chile, respectively, that the larger the import penetration in the current period, the smaller the subsequent growth of employment at the plant level. We follow these authors and relate import penetration measures from China with plant employment growth. We do this after controlling for various plant characteristics. Importantly, we examine whether the effects differ across different groups of establishments.

A second variable that is highly correlated with employment is real sales. There is already evidence showing that the impact of China on manufacturing economic activity is very noticeable when it comes to the establishment's sales. For example, using Mexican data, Iacovone, Rauch, and Winters (2013) show that the real sales of the average firm in Mexico were compressed sharply as a result of the China shock. Interestingly, the authors find evidence of heterogeneity in the sense that smaller plants were more adversely affected. We follow these authors in exploring the impact of China on the growth of real sales. Besides some methodological aspects (discussed in more detail below), the main difference between the two papers is the period of analysis: Iacovone, Rauch, and Winters (2013) focus on the first stage of the China shock (1994–2004), while our study addresses a more recent period (2003–2013).

The third outcome that we examine is firm export performance. Mexican exports could be affected by Chinese competition in export destination markets.[1] Indeed, there is already evidence indicating that the import penetration of China in the US has impacted Mexican exporters negatively (Iacovone, Rauch and Winters, 2013). In this paper, we examine the impact of Chinese competition in third markets on Mexican exports. We also examine the impact of Chinese competition in Mexico on exports. Trade theory does not provide predictions about the latter, but one can conjecture that if the competition from China in Mexico sufficiently disrupts firm operations, such as by reducing operations and scaling down in the home market and pushing up the average cost curve, this might affect many of firm outcomes, including its exports. There is, however, potentially a second effect that might work in the opposite direction: faced with increased foreign

[1] The US is the main destination market for Mexico concentrating around 90% of the manufacturing exports.

competition at home, firms might turn into their exports to compensate for the loss of sales in the domestic market. The net impact of Chinese competition on exports in Mexico might depend on the relative sizes of these forces.

The fourth aspect that we study is whether firms became more capital-intensive as a consequence of the increased competition from China. This is related to an adjustment mechanism outlined by Bernard et al., (2006), that firms might alter their output mix to cope with the imports from low-wage, labor-abundant countries. Specifically, firms might move away from the production of labor-intensive goods and this might result in capital and skill deepening. Alvarez and Claro (2008) test these hypotheses for the case of Chile and found no robust supporting evidence. In this paper, we examine the potential relationship between capital deepening and Chinese competition paying special attention to the possible existence of heterogeneous effects across groups of firms.[2]

The fifth impact that we study is on total factor productivity (TFP). Similar to capital deepening, one channel by which the competition from China might affect productivity is related to changes in the output mix. For example, import competition might lead firms to engage in product upgrading which might require enhancements in productivity. Case studies of US firms becoming more efficient as a result of foreign competition date back several decades. For example, Japanese competition has been frequently cited as the main factor forcing US automakers to become more productive (McKinsey, 1993). More systematic evidence using plant-level data also show that import competition generally tends to foster more efficient production, the so-called import discipline effect (Pavcnik, 2002; Muendler, 2002; Levinsohn, 2003; Fernandes 2007; López-Córdova and Mesquita Moreira, 2004). Note that in principle, import competition can also induce negative effects on productivity, for instance, if lower profits reduce the resources that the firm channels to engage in innovation activities. In the particular case of Mexico, a recent study about the NAFTA agreement shows that this liberalization episode spurred productivity growth among manufacturing plants, with plants closer to the technology frontier benefiting disproportionally more (Iacovone, 2012). Analyses relating the trade shock from China with productivity growth at the firm level are much rarer. Alvarez and Claro (2008), for example, study the import penetration of China in Chile and found no statistically significant effects on plant TFP growth. In this paper, we study whether the increased exposure to China has generated an impact on the productivity of manufacturing firms in Mexico and also whether the effect might differ according to firm characteristics.

Note that the impacts from China that we have mentioned so far are mostly related to the import competition channel, that is, the impacts that plants in Mexico experience when they compete head-to-head with goods exported by China. But the emergence of China as a giant factory of manufacturing goods might also imply that Mexican firms could benefit from a potentially large scope of cheap intermediate inputs that could reduce their production costs. To examine the role of the intermediate inputs channel, we follow Mion and Zhu (2013) and construct plant measures of outsourced inputs by calculating the ratio of the establishment's imports of intermediate goods from China to the establishment's sales. The strategy requires us to merge the Mexican manufacturing survey dataset with Mexican custom's data. The result of this merge is a rich database that combines information on the characteristics of the plant with detailed information on its international trade transactions. This merge, however, presents some limitations. For instance, the resulting dataset is more limited in terms of the number of years and in the number of plant characteristics available in the panel (to be elaborated more below). Accordingly, our examination of the intermediate input channel is presented on a separate set of regressions.

We study the impact of China on Mexican firm outcomes between 2003 and 2013 by exploiting variation in Chinese import penetration across industries. We found that the increased competition from China induces a decline in employment, sales, exports, and productivity. We also find evidence of capital deepening.

[2] Unfortunately, our dataset does not allow us to explore issues related to skill intensity.

Importantly, the results show that the average impact hides significant heterogeneity effects, with smaller and less efficient plants suffering the largest adjustments while the most efficient plants exhibiting relatively minor effects and for some outcomes no effects at all. The existence of heterogeneous impacts across establishments is consistent with other sets of findings, for instance, that the productivity gap between small and large plants has been increasing over time and that resources tend to flow from low- to high-productivity plants, particularly in sectors that have experienced large import penetrations from China.

Our paper contributes to a growing body of analyses that examine the impact of the rising competition from China in other countries. One strand of this literature examines the impact of the Chinese competition by exploiting variation in import exposure across local labor markets (Autor, et al., 2013; Acemoglu, et al., 2015; Mendez, 2015; Feler and Senses, 2016; Costa et al., 2016 and Chiquiar, Covarrubias and Salcedo, 2017). Another strand of the literature identifies the effects by exploiting variation in Chinese import competition at the industry level (Bernard, Jensen and Schott, 2006 and Mion and Zhu, 2013), an approach that has been applied to Latin American countries in Alvarez and Claro (2008), Iacovone, Rauch and Winters (2013) and Caamal-Olvera and Rangel-Gonzalez (2015). As mentioned before, our paper is particularly related to Iacovone, Rauch, and Winters (2013) who also examine the impact of Chinese import competition on Mexican firm-level outcomes. Nevertheless, our study differs from Iacovone, Rauch, and Winters (2013) in at least two important respects: we cover a more recent period of time (2003–2013 versus 1994–2004) and we analyze the impacts not only on sales and exports but also on other firm variables, like employment, the capital-labor ratio and productivity.

The rest of the paper is divided as follows. Section 2 describes the empirical methodology used in the analysis. This section also provides a description of the various datasets and a preliminary summary of the statistics. Section 3 presents the results of the econometric analysis and discuss the main findings. Section 4 provides some concluding remarks.

## 2. EMPIRICAL METHODOLOGY AND DATA DESCRIPTION

In order to assess the impact of the import penetration from China at the plant level, we start with the following baseline specification along the lines of the work in Bernard et al. (2006), Mion and Zhu (2013), and Alvarez and Claro (2008):

$$\Delta Y_{it} = \beta_1 IP_{jt-1} + X'_{it-1}\beta_2 + \theta_i + \theta_t + e_{it} \quad (1)$$

where $\Delta Y_{ijt}$ is the one-year percentage change in variable *Y* of plant *i* in year *t*; $IP_{jt-1}$ is the import exposure to China in industry *j*; $X'_{it-1}$ is a vector of plant-level characteristics (more details below), and $\theta_i$ and $\theta_t$ are plant and year fixed effects to control for time-invariant plant characteristics and economy-wide shocks that may affect all plants at the same time, respectively. Finally, $e_{it}$ is the error term that is clustered at the level of variation of the import exposure variable.

Import exposure is constructed as follows:

$$IP_{jt-1} = \frac{M_{jt-1}^{china}}{Y_{jt-1}+M_{jt-1}-E_{jt-1}} \quad (2)$$

where $M_{jt-1}^{china}$ are Mexican imports from China in industry *j* and $Y_{jt-1} + M_{jt-1} - E_{jt-1}$ is the apparent consumption of the industry, measured as total industry output ($Y_{jt-1}$) plus total industry imports ($M_{jt-1}$) minus total industry exports ($E_{jt-1}$). For comparison purposes, we also present results from a simpler import penetration measure, the Chinese share of Mexican industry *j* imports ($M_{jt-1}^{china}/M_{jt-1}$).

One concern in estimating equation (1) is that exposure to China might not be driven entirely by an increase in China's import penetration but instead might be partly the result of internal shocks affecting Mexican import demand. We are interested only in the supply-driven component of Mexican imports from

China, which implies that we find an adequate instrument for $IP_{jt-1}$. We instrument Mexican imports from China using the imports of other nations from China. A similar strategy is employed in Acemoglu et al. (2015), Autor et al. (2013), and Iacovone et al. (2013). Specifically, we instrument (2) using the Chinese share of Latin American imports.[3]

## A. Data Description

We employ Mexican plant-level data from the manufacturing sector for 2003–2013.[4] The dataset consists of two surveys, the *Encuesta Industrial Anual* (EIA), covering 2003–2009, and the newer version of this, the *Encuesta Annual de la Industria Manufacturera* (EAIM), covering 2009–2013. These surveys were conducted by the Mexican statistics agency, the *Instituto Nacional de Estadística y Geografía* (INEGI). In these surveys, establishments are coded with a unique identifier which guarantees their traceability across the entire period. The surveys are statistically representative at the national level by economic sector. Methodological changes in the EAIM led to an expansion of the sample size relative to the EIA. The new inclusions in the EAIM correspond to maquiladora establishments that were not captured in the EIA. To maintain the consistency of the panel between the EIA and the EAIM, we exclude these maquiladora establishments from the analysis.[5, 6] The dataset encompasses an average of 6,500 plants per year and it contains detailed information on plant characteristics, such as employment, output, intermediate inputs, and capital stock, among other variables.

The industry classification in the manufacturing survey is at the 6-digit North American Industry Classification System (NAICS). We work with a total of 276 industries in the manufacturing sector. The international trade data on imports and exports that are required to calculate the import penetration measure in (2) come from the UN Comtrade Database. This database is originally disaggregated at the 6-digit HS classification and is converted to the NAICS classification using the concordance in Pierce and Schott (2012). The industry output used in the import penetration variable is obtained from the Mexican Economic Census. The Mexican Economic Census comprises the entire universe of manufacturing activity. It is therefore a more appropriate dataset than the annual survey for characterizing the output required for the apparent consumption that appears in expression (2).[7] All the plant's controls and the variables needed to calculate TFP come from the manufacturing survey. The physical capital of the plant is constructed by adding five types of capital stocks available in the survey (structures, vehicles, machinery, computer equipment, and office furniture). The output and the intermediate inputs variables are deflated to 2008 prices using wholesale prices obtained from INEGI, while capital stocks are deflated separately by indices for structures and for machinery and equipment, also from INEGI.

We employ the methodology in Levinsohn and Petrin (2003) to construct the measure of TFP at the plant level. We follow the authors and use the consumption of electricity as the control for unobservable productivity shocks. Since there are no prices at the firm level, it is worth acknowledging that this is revenue-based productivity. The well-known shortcoming of revenue-based productivity measures is that they may cofound

[3] The selection of LAC countries is based on the argument that a shock in Mexico is likely to be uncorrelated with Latin American countries' import demand from China due to the relatively limited trade linkages between Mexico and Latin America. LAC consists of the following countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Jamaica, Nicaragua, Panama, Peru, Paraguay, Uruguay, and Venezuela. Note that we do not have data on production by industry for LAC countries—therefore, instead of constructing import penetration for LAC with industry absorption as the denominator, we use the Chinese share of LAC's imports. It is worth mentioning that this is a frequent measure of import penetration. Iacovone et al. (2013) employs a similar instrument in their IV regressions. We also employ the same instrument when we use the Chinese share of Mexican imports as our alternative import penetration variable.

[4] While the dataset is at the plant level, we continue to use the terms "plant," "firm," and "establishment" indistinctively throughout the paper

[5] We do not have a code to identify maquiladoras precisely. Accordingly, we matched the year 2009 from the EIA with the year 2009 from the EAIM and excluded the observations from the EAIM that are not included in the EIA. Moving forward, we include any new entry in the EAIM starting in 2010.

[6] Utar and Torres Ruiz (2013) explore the Chinese impact on Mexican maquiladoras. In particular, they provide evidence that Chinese competition in the US has a detrimental impact on maquiladoras' employment and sales.

[7] The census is available every five years from 1998 to 2013. We therefore use linear interpolation to create a yearly series of outputs.

true productivity changes and price changes, which should be taken into consideration when we interpret the results. Appendix B presents the results of the Levinsohn-Petrin estimator.

In the next subsection, we show summary statistics for some of the variables employed in the estimation of equation (1).

## B. Some Preliminary Statistics

Table 1 shows some patterns of cross-industry and cross-time variation behind the Chinese share of Mexican imports. The table reveals that the share varies substantially across both industries and time. The largest import exposures are observed in the textiles and apparel industries (313, 314, 315 and 316) but also in industries like computer and electronic equipment (334) and electrical equipment (335). Remarkably, the advance in Chinese import penetration was not limited to a few low-tech labor-intensive industries, but instead encompassed a wide range of manufacturing sectors with different characteristics.[8] Table 1 also shows the average annual growth rate of employment by industry. Interestingly, the largest declines in employment are observed in labor-intensive industries related to textiles and apparel (313, 314, and 315).

One of the objectives of this paper is to uncover the potential existence of heterogeneity regarding the impacts of Chinese competition on Mexican manufacturing plants. It is therefore worth providing some summary statistics of the degree of plant heterogeneity (or dispersion) that is present in the dataset in this section. We can, in principle, analyze the dispersion behind any of the dependent variables, but a key place to focus the discussion is on plant productivity. This is because the existence of dispersion in productivity might entail some policy implications—for instance, it might imply that there is room to improve the overall productivity of the sector (or the economy) by reallocating resources from low- to high-productivity plants.

Table 2 shows a measure of productivity dispersion, consisting of the average (across all sectors) of the productivity ratio between establishments in the 90th and 10th percentiles.[9] The first column shows that in 2003, the establishments in the 90th percentile were on average about 2.09 times more productive than the establishments in the 10th percentile, a sizable difference. Busso, Madrigal, and Pagés (2013) use an alternative measure of TFP based on Hsieh and Klenow (2009) and find a very similar measure of dispersion for Mexico in 2004. [10] Admittedly, it is not uncommon to find high- and low-productivity firms coexisting within narrowly defined industries, as has been reported in other studies (see Pagés, 2010). It has been argued, for example, that a variety of policies can induce a misallocation of resources, generating persistent differences in productivity across plants (Hsieh and Klenow, 2009).

The rest of table 2 shows that the dispersion across establishments in Mexico has been increasing over time, with the establishments in the 90th percentile being 2.38 times more productive than those in the 10th percentile in 2013. A relevant question in the context of this paper is whether there is a relationship between the increase in productivity dispersion observed and the increase in import penetration from China. Addressing this question satisfactorily goes beyond the scope of this paper. Nevertheless, in the next section, we will present some exercises that suggest the existence of a relationship. For example, finding evidence that the China shock has a relatively greater effect on establishments with lower productivity levels than on higher productivity plants could be consistent with an increase in the productivity dispersion that we observe.

A second aspect to examine before measuring the impact of China is whether the reallocation of resources among manufacturing plants has been productivity-enhancing. In keeping with what has been discussed above, if Chinese competition exerts a larger negative impact on the least efficient plants, one could imagine

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[8] In the regression analysis of section 3, import penetration is calculated at the 6-digit NAICS level. This is the level of industry disaggregation used in the EAIM.

[9] Productivity dispersion is first calculated across plants within defined industries (3-digit NAICS) and then aggregated using industry employment as weights.

[10] The authors use Mexican census data to calculate measures of dispersion based on revenue TFP as in Hsieh and Klenow (2009). They find that in 2004, establishments in the 90th percentile were on average 2.08 times more productive than establishments in the 10th percentile.

that there might be a reshuffling of resources from those plants to more efficient establishments in the industry. We now present an exercise that examines whether the year-to-year reallocation of resources among manufacturing plants has enhanced or eroded productivity. Again, analyzing whether there is a relationship between such reallocations of resources and import penetration from China is beyond the scope of this project, because these reallocations might be affected by many other factors. Nevertheless, it can be informative to look at general trends. For the purpose of this exercise, we employ the cross-section decomposition introduced by Olley and Pakes (1996). Specifically, for any sector in year *t*, we decompose the average weighted TFP as follows:

$$TFP_t = \sum_i s_{it}(TFP_{it}) = \overline{TFP_t} + \sum_i (s_{it} - \overline{s_t})(TFP_{it} - \overline{TFP_t}) \qquad (3)$$

where $s_{it}$ is the share in sector employment of plant *i* in year *t*, and a bar over a variable denotes a mean overall plant in that sector and year.[11] The expression indicates that the average weighted TFP in the sector can be decomposed into two terms: the unweighted average productivity and a covariance component representing the contribution from the reallocation of market share across plants with different productivity levels within the sector.

The results for aggregate productivity, the unweighted average productivity, and the covariance term are reported by sector in table 3.[12] We follow Pavncik (2002) and normalize the figures so they can be interpreted as growth relative to 2003. As shown in column 1, aggregate productivity gains over the span of 10 years range from 20.7% in textiles to -10.3% in metal products. By comparing columns 2 and 3, we can see that in most sectors, the bulk of the aggregate productivity growth comes from the average increase in plant productivity (column 2) rather than from the reallocation of resources across plants (column 3). For instance, the 10.1% increase in aggregate productivity in the plastic and glass sector derives mainly from the average growth in plant productivity of 8.5% (a contribution of 84%), and the remaining 1.6% comes from the reallocation of resources across plants. The exceptions are in the wood and paper sector, where the productivity-enhancing reallocation contributes more than 90% to the aggregate productivity growth, and in metal products, where the positive reallocation term lessens the steep decline in the average plant productivity observed in that sector.

The fact that the reallocation channel's contribution to aggregate productivity is not very large in most sectors might be a signal of widespread frictions in Mexico. For the purposes of this paper, however, it is interesting to see that, albeit small, the reallocation terms tend to be productivity-enhancing (that is, they have positive values in most years) in all the sectors that experienced large import penetrations from China, that is, textiles, machinery, plastics, and glass and metal products (see tables 3 and 4). As mentioned before, testing the role of China behind these findings is beyond the scope of this analysis. Nevertheless, the general trends point to productivity-enhancing reallocations in which resources tend to flow from low- to high-productivity plants. In the next section, we will examine whether there is heterogeneity in the impacts of China across plants with different productivity levels. Evidence that less efficient plants are more affected by Chinese competition might be consistent with such productivity-enhancing reallocations.

## 3. ESTIMATION RESULTS

Table 5 presents the results of our baseline specification. Column 1 shows the impact on Mexican manufacturing employment from Chinese competition when this is measured as the imports from China to Mexican industry absorption. As in Bernard et al. (2006) and Alvarez and Claro (2008), employment growth is negatively related to the initial level of employment and positively related to the initial levels of TFP and the capital-labor ratio. The impact of the import penetration variable is negative and significant. The estimated

[11] $s_{it}$ can also be plant's *i* share in sector output. We follow Bartelsman, Haltiwanger, and Scarpetta (2013) and use employment.

[12] The sectors encompass the following NAICS 3-digit industries: food (311 and 312), textiles (313, 314, 315 and 316), wood and paper (321 and 322), chemicals (324 and 325), plastic and glass (326 and 327), metal products (331 and 332), and machinery (333, 334, 335 and 336).

coefficient implies that a 1-percentage-point increase in the import penetration measure reduces annual employment growth in the average plant by 0.43 percentage points. Column 2 shows the result when we employ our alternative import penetration measure, China's share of Mexican imports. The estimated coefficients and the significance levels of all the variables are very similar to those in the first column. As a comparison, table C.1 in appendix C shows the OLS estimates for the same regressions. The coefficients for import penetration from China are negative but they only significant when we employ China's share as the import penetration measure. Even in this case, the coefficient estimates are smaller in absolute value, suggesting that addressing the endogeneity problem eliminates a downward bias in the estimated impact.[13]

One general concern with the specification in (1) is that the increased import penetration from China might just reflect more general overall import penetration in Mexico, not only from China. That is, Mexico's import penetration from many other countries may also be increasing as well. If this is the case, the import variable from China might be capturing penetration from other countries as well, possibly overstating its effect. Figure 1, however, shows that this is not the case. Overall import penetration in Mexico (measured as total imports from all the countries over Mexico's apparent consumption) has remained relatively stable during the period of analysis, hovering at around 50%–55%. Figure 1 also shows a noticeable increase in import penetration from China. Importantly, this increase in Chinese import penetration comes mainly at the expense of US import penetration, which has been declining over time. It is also worth mentioning that the import penetration of other major trade partners, like Europe, LAC, and Canada (not shown), have remained relatively stable during the period of analysis at 6%, 2%, and 1.3%, respectively.

**FIGURE 1. IMPORT PENETRATION IN MEXICO**

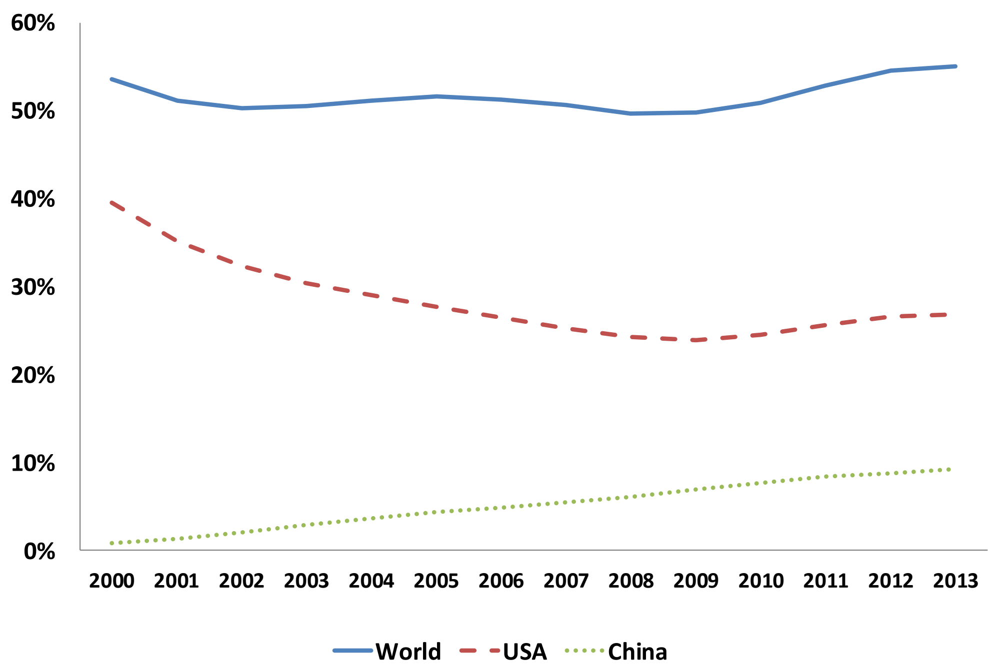


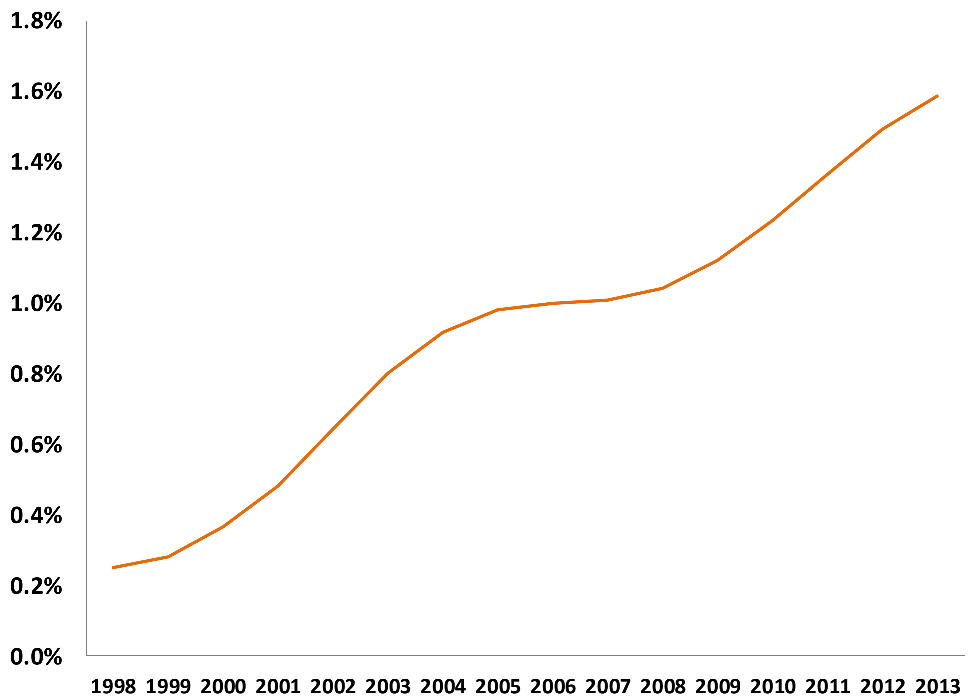

Figure 3 shows import penetration by sector. According to the figure, there are indeed some sectors, like food and chemicals, in which overall import penetration has increased, but these are sectors in which the competition from China has been marginal or has not risen during the period of analysis. In the sectors that

[13] The downward bias of the OLS estimation is a common result in this literature (see Iacovone et al., 2013; Autor et. al, 2013) that arises from potential demand shocks that may raise domestic production (as imports from China increase), thus mitigating the negative impacts of increased Chinese import penetration. The IV regression controls for this bias by shutting down the domestic demand shock channel.

experienced the largest increases in import competition from China—textiles and machinery—the overall import penetration either remained stable (machinery) or declined (textiles).

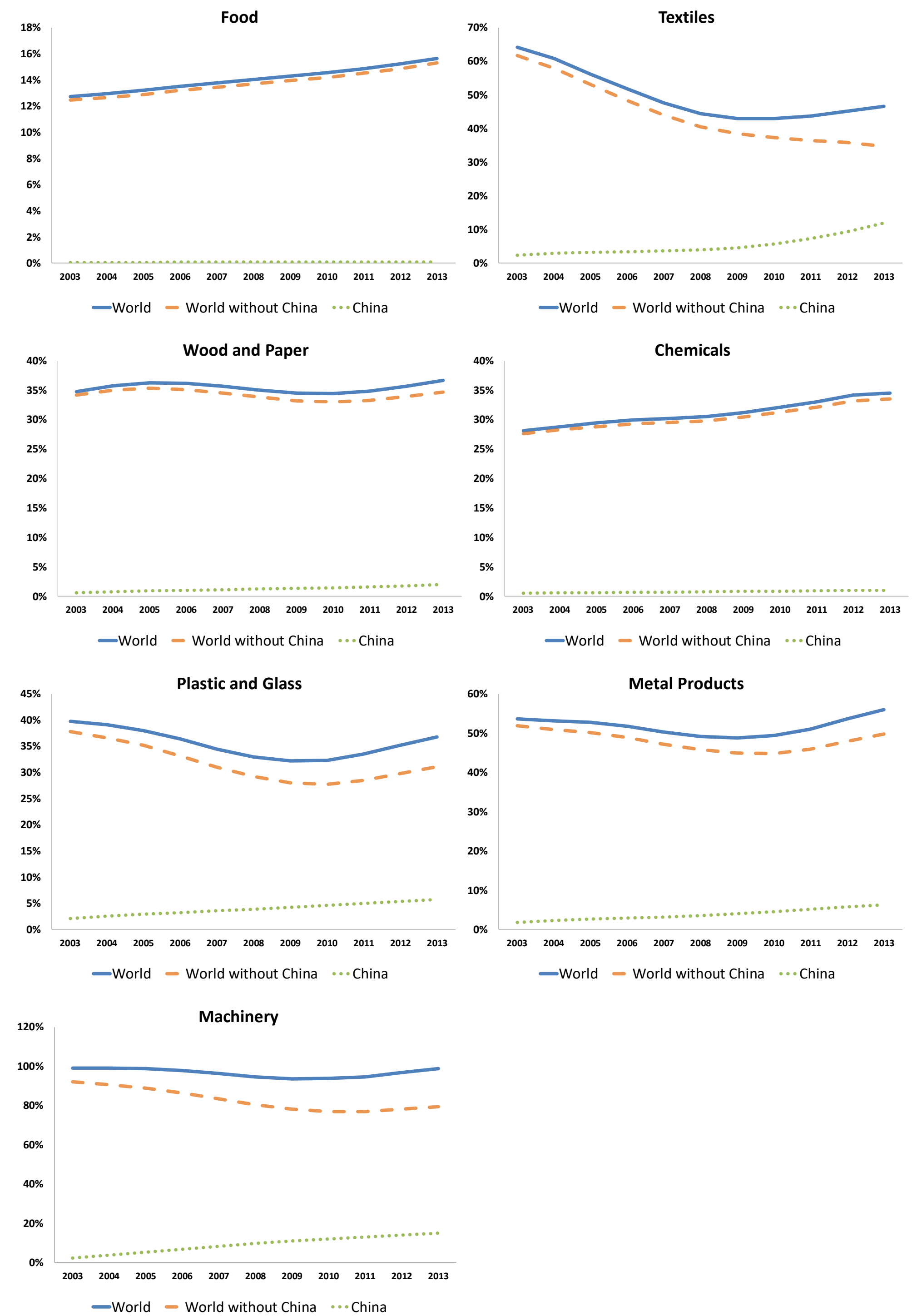
Nevertheless, we still include an additional import penetration in the regression, which is import penetration in Mexico from low-wage countries. As mentioned in Bernard et al. (2006), these countries tend to export manufacturing goods in labor-intensive industries which are presumably in direct competition with Mexican production. We followed Bernard et al. (2006) and considered that a country with per-capita GDP of below 5% of that of the US is a low-wage country, which accrues to a set of 50 countries. Figure 2 shows that although the import penetration from these countries is relatively small, it has increased considerably during the period of analysis. The results shown in columns 3 and 4 indicate that the impact from the import penetration of these countries on employment is also negative but not statistically significant, while the effects from China remain relatively similar to those in columns 1 and 2.

**FIGURE 2. IMPORT PENETRATION IN MEXICO FROM LOW-WAGE COUNTRIES**




In table 6 we present the impacts on other plant-level outcomes, namely real (domestic) sales, exports, the capital-labor ratio, and TFP. For each outcome, we show the estimates when we employ our preferred import penetration measure (absorption) as well as the alternative measure (share). Similarly to Iacovone, Rauch, and Winters (2013), columns 1 and 2 indicate that real sales are negatively affected by the China shock. Together with the results from table 5, this provides evidence that the competition from China made the average plant shrink in terms of both employment and sales. Columns 3 and 4 show the results for exports. Both measures of Chinese competition present similar results with coefficients that are negative and statistically significant. The results suggest that import penetration in Mexico has had a net detrimental effect on the firm’s total exports. Columns 5 and 6 present some evidence of capital deepening. According to the results, plants seem to have become more capital-intensive in order to cope with exposure from China.

## FIGURE 3. IMPORT PENETRATIONS IN MEXICO BY SECTOR




Finally, we find that productivity is negatively affected by the China shock (columns 7 and 8). It is worth mentioning that recent trade theory with firm heterogeneity does not offer any particular prediction regarding the effects of import competition at home on firm exports. Therefore, as mentioned in the introduction, we advance some conjectures that may be consistent with the findings. One potential interpretation is that competition from China may induce lower profits at the plant level, which could result in cuts to innovation activities. Another possibility is that the disruption created by the China shock pushes the plant to operate at suboptimal levels, at least in the short run, which erodes its efficiency. However, an alternative explanation is that this negative effect on productivity might only reflect a reduction in mark-ups, given our revenue-based measure of TFP. Indeed, we cannot rule out some combination of these effects. Interestingly, we will see in the next subsection that the impacts differ greatly across plants with different characteristics, in that lower-capability plants generally bear the most negative effects.

## A. Heterogeneous Impacts Across Groups of Establishments

So far, we have measured the impact of China on all establishments in the surveys. But the average effects can mask potential heterogeneous impacts across different groups. We now present the results for when effects are separated by groups of establishments according to size. Using total employment as a measure of size, we create two groups: firms whose size is below the median, which for simplicity we refer to as small firms, and firms whose size is greater than the median, which we refer to as large firms. [14] For the estimation, we create a dummy variable that is equal to 1 for the large firms and 0 for small firms. We interact this variable with the import penetration measure and include both the uninteracted and interacted variables in the specification (the same is done for the instrument). The impact for small firms is given by the coefficient in the first row, while the impact for large firms is given by the sum of the two coefficients. Table 7 presents the results. The estimations include all the controls as in the previous tables, but they have been omitted from the table for the sake of space.

According to the results, firms that are smaller than the median experience a much larger negative impact from China in terms of both employment and sales. For instance, according to column 1, a 1-percentage-point increase in the import penetration measure reduces employment growth by 0.5 percentage points among small plants and by only 0.038 percentage points among large plants (-0.5007 + 0.4639 = -0.038). In fact, the F-test that the sum of the coefficients is equal to zero cannot be rejected in the case of employment, indicating that large firms did not suffer negative impacts on employment. Regarding sales, the coefficients in column 2 imply that a 1-percentage-point increase in the import penetration measure reduces real sales growth by 0.85 percentage points among small plants and by 0.61 percentage point among large plants (-0.8543 + 0.2481 = -0.606). In this case, the F-test that the sum of the coefficients is equal to zero is rejected at the 5% level of significance: large firms therefore experienced some loss in sales, but much less than small plants. The results for exports are also heterogeneous, with smaller plants exhibiting the largest impacts (see column 3).

In column 4 we analyze heterogeneous responses in terms of the capital-labor ratio. The result shows that the capital-labor ratio increases more among small firms than among large firms. Specifically, a 1-percentage-point increase in the import penetration measure raises the capital-labor ratio by about 0.44 percentage points among small plants and by 0.06 percentage points among large plants (0.4434 - 0.3856 = 0.0578). At first, it might seem odd that capital deepening was found to be more pronounced among small plants. However, it is possible that this result is mainly due to adjustments in labor. Note from column 1 that the China shock generated a much larger adjustment in employment among small plants than among large plants. Consequently, the downward adjustment in employment induced a larger increase in the capital-labor ratio among small plants than large plants, ceteris paribus the behavior in the capital stock. Column 5 shows the result for TFP. This time, we found no evidence of heterogeneous impacts. The lack of significance of the coefficient for the interaction term suggests that the effects on productivity do not differ between the two groups of plants. In the next table, we reassess these results using an alternative plant group.

The results in table 7 are important because they show that, in general, firms adjust differently to competition from China. We can examine how the results hold up when we repeat the exercise using a different variable to create the two groups. Specifically, we repeat the exercise after splitting the sample by

[14] The groups are created based on the median employment of all the establishments in the sector the plant belongs to.

plant productivity. We define the two groups according to whether the plant's TFP is below or above the median.[15] The results are shown in table 8. Once again, we find clear patterns of heterogeneous responses to the China shock. For example, the negative impact on employment among the less efficient plants is more than three times larger than the impact among the more efficient plants. Specifically, a 1-percentage-point increase in the import penetration measure reduces annual employment growth by 0.47 percentage points among the low-productivity plants and by 0.139 percentage points among the high-productivity plants (-0.472 + 0.333 = -0.139). Similarly to the results in table 7, the F-test that the sum of the coefficients is equal to zero cannot be rejected, indicating that the more efficient firms did not suffer negative impacts on employment. No evidence of heterogeneity was found with respect to sales or exports, but significant differences were found in terms of the capital-labor ratio and TFP. The results for the capital-labor ratio are consistent with those in table 7, indicating that capital intensity increased relatively more at the less efficient plants.

Regarding TFP, the negative impact on the productivity of the less efficient plants was found to be more than five times larger than on that of the more efficient plants. Indeed, the F-tests that the sum of the coefficients is equal to zero (for the case of the capital-labor ratio and for the case of TFP) cannot be rejected, indicating that the more efficient firms did not experience any impact on either their capital-labor ratio or their productivity. It is interesting to note from our results that the China trade shock negatively affected the productivity of many large plants (table 7) but not the productivity of the more efficient plants (table 8). This suggests that there are a number of large plants in Mexico that are not very efficient. In recent models of international trade, large plants tend to be efficient, but in practice, this is not always observed in the data. Addressing the reasons behind this in the case of Mexico goes beyond the scope of this paper, but some studies have argued that this situation can arise if there are policies that induce misallocation and that specifically harm large establishments by discouraging them to engage in investments that raise plant productivity (Hsieh and Klenow, 2014).[16]

The results from tables 7 and 8 indicate that the disruption induced by the China shock was mostly concentrated among smaller and less productive plants. This is to be expected: generally speaking, these are the plants that find it most difficult to compete against imports from China given their low levels of competency and efficiency.

It is also worth noting that the results in table 7 and 8 are compatible with some of the stylized facts presented in tables 2 and 3, namely that the TFP gap between the high- and low-productivity plants has been increasing over time, and that there has been some reallocation of resources from low- to high-productivity plants, particularly in the sectors experiencing significant competition from China.

## B. The Role of Upstream Inputs

As we mentioned in the introduction, the emergence of China could provide Mexican firms with a potentially large source of cheap intermediate inputs that could reduce their production costs. Therefore, even though Chinese competition might negatively impact plants' operations, they might also experience positive effects due to the availability of these cheap intermediate inputs. To examine the role of the intermediate inputs channel, we follow Mion and Zhu (2013) and construct plant measures for offshored inputs from China. Specifically, the offshoring of establishment *i* from China is measured as the ratio of the establishment's imports from China to the establishment's sales:

$$OFF_{it} = \frac{IMP_{it}^{china}}{Sales_{it}} \qquad (4)$$

To address a potential endogeneity concern related with this measure, we follow Mion and Zhu (2013) in using the exchange rate as an instrument, based on the idea that movements in the exchange rate are mainly

[15] The groups are created relative to the median productivity of all the establishments in the sector the plant belongs to.

[16] For instance, Levy (2010) argues that payroll taxes in Mexico are more stringently enforced among large plants.

driven by financial and macroeconomic determinants. Specifically, we employ the following expression for the instrument:

$$IVOFF_{it} = \delta_{it} \cdot \log\left(EXCH_t^{china}\right) \qquad (5)$$

where $EXCH_t^{china}$ is the bilateral exchange rate between China and Mexico and $\delta_{it}$ is China's share in the firm's total imports. The idea behind the weight is that if the firm only imports from China, the behavior of the exchange rate with China should have a large impact on outsourcing to it (see Mion and Zhu, 2013).

Constructing the offshoring measure at the firm level requires us to employ a dataset that merges the Mexican manufacturing survey with Mexican customs data. Such a dataset was recently put together by the Mexican statistics agency, INEGI. However, for technical reasons related to the merging procedure, the final dataset is only available for 2007–2013, while our previous regressions were for 2003–2013. Additional technical and confidentiality issues limit the number of plant characteristics available in the panel. This implies that in our regressions we can only control for firm size (employment) but not for TFP or the capital-labor ratio, as in the previous regressions. Additionally, the sector associated with the establishment is limited to the 3-digit NAICS level instead of the 6-digit NAICS level that we used before. Accordingly, in these new regressions, we measure import penetration from China at the 3-digit NAICS level.

The results for the impact on the growth of employment are shown in table 9. Column 1 shows the effect of the import penetration variable while column 2 adds the effect of offshoring. As shown in the table, none of the coefficients are statistically significant. In column 3, we interact these variables with the "Large" dummy variable (similarly to the exercises in table 7) to explore whether some of the effects arise for a subgroup of the plants. Again, none of the results are significant.

The lack of results in table 9 is not entirely surprising. The new dataset requires us to run the regressions for a much shorter time period, we cannot control for some of the firm characteristics, and we are now measuring import penetration at a more aggregated level. Given these data limitations, we still cannot rule out the existence of offshoring effects from China. Accordingly, we now present an additional exercise that seeks to measure the role of the intermediate inputs channel in an alternative way.

While the plant-level measure of offshoring used by Mion and Zhu (2013) is the most direct approach for capturing the role of imported inputs from China, we can try a different route. Acemoglu et al. (2015), for example, construct upstream industry measures of Chinese import penetration using input-output linkages. The following expression presents these authors' approach to measuring import penetration from China in the upstream industries that sell intermediate inputs to industry *j*:

$$IP_{jt}^{Upstream} = \sum_r \frac{u_{rj}}{\sum_r u_{rj}} \cdot IP_{rt} \qquad (6)$$

where $u_{rj}$ is the value of "upstream" industry *r* used in US$1 of industry *j*, and $IP_{rt}$ is the import penetration from China in industry *r* at time *t*. Accordingly, expression (6) is a weighted average of the import penetrations in all the industries that provide inputs to industry *j* where the weights are based on the input-output linkages. Expression (6) is attractive because we can now employ the original dataset over the longer time period, we can use the full set of controls, and we can measure import penetration at the 6-digit NAICS level.

Expression (6) could capture, albeit indirectly, a potential upstream effect that is more general than just the offshoring of inputs to China. For instance, larger import competition from China in upstream industries in Mexico might expand input supply but it might also put downward pressure on local input prices. This could benefit firms in the industries that consume those inputs (Goldberg, Khandelwal, Pavncik, and Topalova, 2010). Indeed, this positive effect could occur even if the firm purchasing those inputs does not import anything from China. There is, however, an additional potential effect that goes in the opposite direction. If the Chinese competition in upstream industries destroys existing long-term relationships for specialized inputs because domestic input suppliers shrink or stop operations, then the firm in the purchasing industry might be negatively affected (Acemoglu et al., 2015). Accordingly, the direction of the effect of increased Chinese competition in upstream industries is generally ambiguous.

We construct upstream measures of import penetration from China using a Mexican input-output table for the year 2008 prepared by INEGI. The table is disaggregated at the 6-digit NAICS level, which is the same level of disaggregation as the import penetration variable that we use. We construct the IV for this variable analogously, that is, a weighted average of the IVs of the import penetrations in all the industries that provide inputs to industry *j*, while the IV for each of these industries is defined as before, that is, the Chinese share of Latin American imports in that industry (see the instrument for expression 2).

Before presenting the results, it is worth mentioning that Iacovone, Rauch, and Winters (2013) also examine the role of Chinese competition in upstream inputs in Mexico using input-output linkages.[17] The authors analyze the impact of competition in upstream inputs on domestic sales at the product level and the impact on the total sales of the plant. Regarding the latter, the authors find that, similarly to competition from China in the same sector as the plant, competition from China in upstream industries generates a negative impact on the total sales of the plant. Interestingly, the authors find that this negative impact is smaller for larger plants, which they interpret as evidence that larger plants are more capable of making use of Chinese inputs.

Our results are presented in table 10. We focus on domestic sales to make a direct comparison with the results in Iacovone, Rauch, and Winters (2013). Including import penetration from China in upstream industries in the regression does not modify the results for import penetration in the same sector as the plant, which continues to be negative and significant. The coefficient for import penetration in upstream industries has a positive sign but is not statistically significant at conventional levels. In column 2, we interact import penetration in upstream industries with the "Large" dummy variable (similarly to the exercise in table 7) to explore potential heterogeneous effects between small and large plants. We still do not find any significant effect for the uninteracted or interacted terms.[18] Finally, similarly to the findings for sales, the results for the rest of the variables (not reported) show that the impacts from the increased competition in upstream industries are not statistically significant at conventional levels.

## C. Effects Through Third Markets

Having established that Chinese competition in Mexico generates an array of effects on employment, sales, exports, capital deepening, and productivity, we now expand our analysis to also add the potential impact through Chinese competition in third markets. This is most obvious for the case of exports. Specifically, if Chinese competition increases significantly in the main destination markets for Mexican exports, then exports to those markets could be negatively impacted. Given that about 90% of Mexican manufacturing exports go to the US, we focus on how Chinese import penetration in the US has affected Mexican outcomes. We analyze the impact not only on exports but also on all the other variables. It is worth mentioning that China's penetration in the US has risen sharply: its import share increased more than 7 percentage points between 2003 and 2013.

First, we start by constructing an import penetration of China in the US that is analogous to expression (2). That is:

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[17] The computations in Iacovone, Rauch, and Winters (2013) are different to ours. For instance, they weight the input-output coefficient of each upstream sector "g" by its import share and then by the Chinese share in imports for that sector, which effectively results in the ratio of Chinese imports of sector "g" to output in that sector. We weight the input-output coefficient of each upstream sector "g" by the ratio of Chinese imports for sector "g" to apparent consumption in that sector. An additional difference is the input-output table employed, with Iacovone, Rauch, and Winters (2013) using a 32-sector I-O table while we use a 286-sector I-O table

[18] Even though the coefficients for upstream import penetration are not statistically significant at conventional levels, judging only by their signs and magnitudes, one could argue that, if anything, larger plants might benefit more than smaller plants from the upstream effect, as in Iacovone, Rauch, and Winters (2013).

$$IPUS_{jt-1} = \frac{M_{jt-1}^{usachi}}{Y_{jt-1}^{usa}+M_{jt-1}^{usa}-E_{jt-1}^{usa}} \quad (7)$$

The international trade data required to construct expression (7) again comes from the UN Comtrade Database, while the output data comes from the NBER-CES Manufacturing Industry Database. The measure is constructed at the same 6-digit NAICS level.

In our first set of regressions, we include China's import penetration in Mexico and in the US separately. The results of the regressions, which include the traditional controls (employment, the capital-labor ratio, productivity, and the penetration of other low-wage countries) are shown in table 11. As before, we use an IV for the import penetration of China in Mexico. We do not instrument the import penetration of China in the US on the argument that Mexico is too small to exert any significant change in the overall US demand for imports. As shown in table 11, the inclusion of import penetration in the US only turns out to be statistically significant in the regression for capital deepening. On the other hand, import penetration from China in Mexico remains negative and significant in the regressions for employment, sales, and capital deepening. In general, the effects are estimated less precisely when both import penetrations enter simultaneously.

One alternative approach, followed by others in the literature, is to include only one measure of import exposure that consists on the sum of the domestic and international exposures to Chinese exports (see, for example, Autor, Dorn, and Hanson, 2013). Specifically, we construct the import exposure as the sum of $IP$ and $IPUS$ as follows:

$$IP'_{jt-1} = \frac{M_{jt-1}^{china}}{Y_{jt-1}+M_{jt-1}-E_{jt-1}} + \left(\frac{M_{jt-1}^{usamex}}{M_{jt-1}^{usa}}\right) \cdot \frac{M_{jt-1}^{usachina}}{Y_{jt-1}^{usa}+M_{jt-1}^{usa}-E_{jt-1}^{usa}} \quad (8)$$

where $M_{jt-1}^{usa}$ and $M_{jt-1}^{usamex}$ are the US total imports in industry *j* and the US imports from Mexico in industry *j*, respectively. The rest of the variables are defined as before. The second part of expression (8) captures the import penetration of China in the US, weighted by the share of US spending on Mexican goods ($M_{jt-1}^{usamex}/M_{jt-1}^{usa}$). A similar weighting scheme is used in Autor, Dorn, and Hanson (2013). Essentially, the second part of the expression states that Mexican exposure to Chinese competition through the US increases with the share of US expenditure on Mexican products.[19]

We now run the regressions with *IP'* and examine the results for employment, sales, exports, capital deepening, and productivity. The idea is to compare the impacts when we use this new measure of import exposure (*IP'*) relative to those reported earlier when we employed *IP*. This will allow us to assess how important the impact that emanates through the US is. Table 12 shows the findings. Row (a) shows the results for each outcome when we employ *IP'*. For comparison purposes, row (b) shows the results when we employ *IP*, which are taken from table 5 and 6. All the regressions include the traditional controls.

Except for the coefficient for the capital-labor ratio, all the coefficients are statistically significant and show the right signs. In general, the coefficient estimates tend to be smaller in absolute values, which is consistent with the fact that the import penetration has been scaled up in the new measure. We observe a relatively moderate increase in the impacts when we add the Chinese competition that emanates through the US. Take, for instance, the impact on sales: the estimated coefficient in column 2 of row (a) indicates that a 1-percentage-point increase in import penetration induces a decline in sales growth of 0.64 percentage points. Between 2003 and 2013, the annual increase in the median import penetration (across industries) was 0.48 percentage points; therefore, the combined import penetration generated an annual decline in sales growth of 0.305 percentage points [-0.636 x 0.48 = -0.305]. Looking only at import penetration in Mexico, the estimated annual

[19] One way to think about this expression is to consider an extreme case: if Mexico does not export any good from industry *j* to the US ($M_{jt}^{usamex}/M_{jt}^{usa} = 0$), then the increase in Chinese import penetration in the US in industry *j* does not entail an increase in import penetration in Mexico through the US market.

decline in sales growth between 2003 and 2013 due to the China shock was 0.281 percentage points.[20] Therefore, accounting for the US effect increases the negative impact on sales from Chinese competition by 8%. Similar calculations for employment, exports, and productivity show that accounting for the US effect increases the negative effects of Chinese competition on these variables by 1.7%, 19.3%, and 32.7%, respectively.

## 4. CONCLUDING REMARKS

We study China's impact on Mexican firm outcomes between 2003 and 2013 by exploiting variation in Chinese import penetration across industries. We found that increased competition from China induces a decline in employment, sales, exports, and productivity. We also find evidence of capital deepening, which may support the argument that firms change their output mix by moving away from the production of labor-intensive goods. In practice, however, the increase in the capital-labor ratio might be the result of the downward adjustment observed in employment.

The results show that the average impact hides significant heterogeneity effects, with smaller and less efficient plants suffering the largest adjustments, while the most efficient plants exhibit relatively minor effects and, for some outcomes, no effects at all. The existence of heterogeneous effects across establishments is consistent with other sets of findings—in particular, that the productivity gap between small and large plants has been increasing over time and that, for the most part, the reallocation of resources has been productivity-enhancing in the sense that resources tend to flow from low- to high-productivity plants, particularly in sectors that have experienced significant import penetration from China.

Import competition can improve the reallocation of resources across the economy, but the distributional effects of this reallocation can also create tensions with socioeconomic implications. A modern trade agenda should navigate these waters, potentially implementing specific trade-assistance programs without jeopardizing the trade gains that come from improved resource allocation. A potential trade-assistance program that is consistent with this goal, for example, could focus on displaced workers from declining sectors by helping them to reskill and identify new employment matches in expanding sectors.

[20] Between 2003 and 2013, the annual increase in median import penetration in Mexico was 0.326 percentage points.

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TABLE 1. SUMMARY STATISTICS

| NAICS | Import share from China (%) 2003 | 2008 | 2013 | Average annual growth rate of employment (%) 2003-2013 |
|---|---|---|---|---|
| 311 Food | 1.0 | 3.1 | 2.5 | 0.3 |
| 312 Beverage and Tobacco | 0.2 | 0.0 | 0.1 | -3.3 |
| 313 Textile Mills | 2.5 | 9.7 | 14.6 | -4.0 |
| 314 Textile Product Mills | 2.5 | 11.2 | 24.4 | -3.7 |
| 315 Apparel | 2.7 | 10.8 | 32.8 | -4.1 |
| 316 Leather and Allied Products | 7.3 | 13.6 | 23.0 | -0.2 |
| 321 Wood Products | 3.6 | 8.2 | 10.3 | -3.8 |
| 322 Paper | 1.1 | 2.3 | 4.0 | -0.2 |
| 323 Printing | 2.3 | 5.7 | 8.0 | -1.6 |
| 324 Petroleum and Coal | 1.7 | 0.3 | 0.4 | 0.0 |
| 325 Chemicals | 2.0 | 3.6 | 5.1 | -0.9 |
| 326 Plastic and Rubber | 2.1 | 7.2 | 10.4 | 1.0 |
| 327 Nonmetallic Mineral Products | 3.5 | 10.3 | 12.2 | -0.3 |
| 331 Primary Metal Manufacturing | 2.0 | 4.9 | 7.9 | 2.5 |
| 332 Fabricated Metal Products | 2.7 | 9.4 | 13.9 | -2.2 |
| 333 Machinery | 2.2 | 7.3 | 12.5 | 2.5 |
| 334 Computer and Electronic Equipment | 12.9 | 26.8 | 38.3 | -1.7 |
| 335 Electrical Equipment | 11.0 | 23.7 | 28.0 | -0.4 |
| 336 Transportation Equipment | 3.1 | 6.7 | 7.6 | 3.3 |
| 337 Furniture and Related Products | 8.1 | 16.7 | 22.5 | -2.0 |
| 339 Miscellaneous Manufacturing | 15.2 | 29.1 | 36.3 | -0.9 |
| Average | 4.3 | 10.0 | 15.0 | -0.9 |
| St. Dev | 4.1 | 8.1 | 11.7 | 2.2 |

TABLE 2. DISPERSION OF TFP

| | 2003 | 2006 | 2009 | 2013 |
|---|---|---|---|---|
| Percentiles 90 - 10 | 2.09 | 2.10 | 2.23 | 2.38 |

## TABLE 3: PRODUCTIVITY GROWTH DECOMPOSITION

| | Year | Aggregate productivity | Unweighted productivity | Reallocation term |
|---|---|---|---|---|
| **Food** | 2003 | 0.000 | 0.000 | 0.000 |
| | 2004 | 0.035 | 0.027 | 0.007 |
| | 2005 | 0.036 | 0.052 | -0.016 |
| | 2006 | 0.036 | 0.062 | -0.027 |
| | 2007 | 0.060 | 0.107 | -0.047 |
| | 2008 | 0.051 | 0.108 | -0.057 |
| | 2009 | 0.113 | 0.116 | -0.003 |
| | 2010 | 0.192 | 0.161 | 0.031 |
| | 2011 | 0.203 | 0.181 | 0.021 |
| | 2012 | 0.200 | 0.193 | 0.007 |
| | 2013 | 0.167 | 0.178 | -0.010 |
| **Textiles** | 2003 | 0.000 | 0.000 | 0.000 |
| | 2004 | 0.089 | 0.083 | 0.006 |
| | 2005 | 0.052 | 0.054 | -0.002 |
| | 2006 | 0.092 | 0.087 | 0.006 |
| | 2007 | 0.133 | 0.133 | 0.000 |
| | 2008 | 0.085 | 0.085 | 0.000 |
| | 2009 | 0.170 | 0.087 | 0.083 |
| | 2010 | 0.195 | 0.205 | -0.010 |
| | 2011 | 0.173 | 0.154 | 0.019 |
| | 2012 | 0.181 | 0.182 | -0.001 |
| | 2013 | 0.207 | 0.184 | 0.023 |
| **Wood & Paper** | 2003 | 0.000 | 0.000 | 0.000 |
| | 2004 | 0.047 | 0.020 | 0.027 |
| | 2005 | 0.010 | 0.009 | 0.002 |
| | 2006 | 0.071 | -0.025 | 0.097 |
| | 2007 | 0.090 | -0.007 | 0.097 |
| | 2008 | 0.080 | -0.005 | 0.085 |
| | 2009 | 0.032 | -0.060 | 0.092 |
| | 2010 | 0.115 | 0.039 | 0.076 |
| | 2011 | 0.053 | -0.055 | 0.108 |
| | 2012 | 0.058 | -0.001 | 0.059 |
| | 2013 | 0.140 | 0.010 | 0.130 |
| **Chemicals** | 2003 | 0.000 | 0.000 | 0.000 |
| | 2004 | -0.080 | -0.021 | -0.059 |
| | 2005 | -0.013 | 0.047 | -0.060 |
| | 2006 | -0.090 | -0.004 | -0.086 |
| | 2007 | -0.063 | 0.025 | -0.087 |
| | 2008 | -0.068 | -0.016 | -0.052 |
| | 2009 | 0.032 | 0.072 | -0.040 |
| | 2010 | -0.091 | 0.039 | -0.130 |
| | 2011 | -0.003 | 0.105 | -0.108 |
| | 2012 | -0.014 | 0.066 | -0.080 |
| | 2013 | -0.062 | 0.019 | -0.082 |

| | Year | Aggregate productivity | Unweighted productivity | Reallocation term |
|---|---|---|---|---|
| **Plastic & Glass** | 2003 | 0.000 | 0.000 | 0.000 |
| | 2004 | 0.087 | 0.032 | 0.056 |
| | 2005 | 0.039 | 0.019 | 0.021 |
| | 2006 | 0.117 | 0.101 | 0.016 |
| | 2007 | 0.141 | 0.108 | 0.033 |
| | 2008 | 0.050 | 0.023 | 0.027 |
| | 2009 | 0.038 | -0.018 | 0.056 |
| | 2010 | 0.091 | 0.093 | -0.001 |
| | 2011 | 0.041 | 0.075 | -0.034 |
| | 2012 | 0.139 | 0.145 | -0.006 |
| | 2013 | 0.101 | 0.085 | 0.016 |
| **Metal products** | 2003 | 0.000 | 0.000 | 0.000 |
| | 2004 | -0.049 | -0.072 | 0.024 |
| | 2005 | -0.107 | -0.082 | -0.026 |
| | 2006 | -0.055 | -0.052 | -0.003 |
| | 2007 | -0.094 | -0.094 | 0.000 |
| | 2008 | -0.099 | -0.118 | 0.019 |
| | 2009 | -0.195 | -0.231 | 0.037 |
| | 2010 | -0.128 | -0.134 | 0.007 |
| | 2011 | -0.110 | -0.114 | 0.004 |
| | 2012 | -0.069 | -0.079 | 0.010 |
| | 2013 | -0.103 | -0.164 | 0.060 |
| **Machinery** | 2003 | 0.000 | 0.000 | 0.000 |
| | 2004 | 0.039 | 0.042 | -0.003 |
| | 2005 | 0.051 | 0.049 | 0.003 |
| | 2006 | 0.109 | 0.078 | 0.031 |
| | 2007 | 0.092 | 0.054 | 0.038 |
| | 2008 | 0.092 | 0.052 | 0.040 |
| | 2009 | -0.008 | -0.100 | 0.093 |
| | 2010 | 0.122 | 0.034 | 0.088 |
| | 2011 | 0.163 | 0.062 | 0.100 |
| | 2012 | 0.181 | 0.102 | 0.079 |
| | 2013 | 0.127 | 0.086 | 0.040 |

### TABLE 4: IMPORT SHARES BY BROAD SECTORS

| | Average import share from China (2003-2013) |
|---|---|
| **Textiles** | 12.3% |
| **Machinery** | 9.7% |
| **Plastic & Glass** | 7.6% |
| **Metal products** | 7.2% |
| **Wood & Paper** | 3.4% |
| **Chemicals** | 3.3% |
| **Food** | 1.9% |

## TABLE 5: EFFECTS ON EMPLOYMENT

| | *Absorption* | *Share* | *Absorption* | *Share* |
|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** |
| **Import penetration from China** | -0.4289*** | -0.3599*** | -0.3258*** | -0.3661*** |
| | (0.120) | (0.088) | (0.145) | (0.130) |
| **Import penetration from other l-w countries** | | | -0.5685 | -0.0148 |
| | | | (0.551) | (0.197) |
| **Log of employment** | -0.2581*** | -0.2571*** | -0.2575*** | -0.2571*** |
| | (0.010) | (0.009) | (0.010) | (0.009) |
| **Log of TFP** | 0.0358*** | 0.0359*** | 0.0361*** | 0.0358*** |
| | (0.003) | (0.003) | (0.003) | (0.003) |
| **Log of K/L** | 0.0335*** | 0.0328*** | 0.0336*** | 0.0327*** |
| | (0.003) | (0.003) | (0.003) | (0.003) |
| **Year fixed effect** | yes | yes | yes | yes |
| **Plant fixed effects** | yes | yes | yes | yes |
| **Observations** | 59012 | 59012 | 59012 | 59012 |
| **$R^2$** | 0.245 | 0.267 | 0.254 | 0.267 |
| **Weak identification test F statistic** | 19.5 | 52.4 | 7.1 | 7.3 |

Notes: The dependent variable is the annual growth (in logs) of employment. The main explanatory variable is the import penetration of China in Mexico measured as the ratio of imports of Mexico from China to Mexican industry absorption (Absorption) or to Mexican imports (Share). The regressions also control for the import penetration of other low-wage countries in Mexico which are measured in similar ways. The instruments in all the regressions are the share of China in LAC's imports and the share of other low-wage countries in LAC's imports. The control variables are start-of-period employment, TFP and the capital-labor ratio, all in logs. All regressions also include a year fixed effect and a plant fixed effect. All standard errors are clustered by the industry-year level. The weak identification test is the Kleibergen-Paap Wald F statistic

***; **; * significant at the 1%, 5% and 10% level respectively

## TABLE 6: EFFECTS ON SALES, EXPORTS, CAPITAL INTENSITY, AND PRODUCTIVITY

| | Sales | | Exports | | Capital /labor | | TFP | |
|---|---|---|---|---|---|---|---|---|
| | *Absorption* | *Share* | *Absorption* | *Share* | *Absorption* | *Share* | *Absorption* | *Share* |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| **Import penetration from China** | -0.7614*** | -0.8359*** | -0.8987** | -0.8062** | 0.2978* | 0.3061* | -0.3966* | -0.4228** |
| | (0.240) | (0.214) | (0.4535) | (0.367) | (0.166) | (0.167) | (0.211) | (0.204) |
| **Import penetration from other l-w countries** | -0.8315 | 0.1846 | 3.3014 | 1.3596 | -0.3582 | -0.2608 | 0.1136 | 0.2462 |
| | (0.835) | (0.285) | (5.039) | (1.599) | (0.523) | (0.191) | (0.770) | (0.278) |
| **Log of employment** | -0.1443*** | -0.1432*** | -0.2258*** | -0.2297*** | 0.0716*** | 0.0708*** | 0.0140 | 0.0152 |
| | (0.011) | (0.011) | (0.030) | (0.029) | (0.012) | (0.012) | (0.011) | (0.010) |
| **Log of TFP** | -0.1838*** | -0.1842*** | -0.1715*** | -0.1712*** | -0.0146*** | -0.0145*** | -0.5614*** | -0.5615*** |
| | (0.011) | (0.011) | (0.014) | (0.014) | (0.004) | (0.004) | (0.012) | (0.012) |
| **Log of K/L** | -0.0318*** | -0.0333*** | -0.0408*** | -0.0428*** | -0.2991*** | -0.2986*** | -0.0436*** | -0.0445*** |
| | (0.006) | (0.005) | (0.014) | (0.013) | (0.011) | (0.011) | (0.006) | (0.005) |
| **Year fixed effect** | yes | yes | yes | yes | yes | yes | yes | yes |
| **Plant fixed effects** | yes | yes | yes | yes | yes | yes | yes | yes |
| **Observations** | 58863 | 58863 | 18987 | 18987 | 58863 | 58863 | 58217 | 58217 |
| **$R^2$** | 0.188 | 0.222 | 0.146 | 0.172 | 0.239 | 0.244 | 0.322 | 0.327 |
| **Weak identification test F statistic** | 7.7 | 7.1 | 8.5 | 5.1 | 8.1 | 7.3 | 8.2 | 7.4 |

Notes: The dependent variable is the annual growth (in logs) of sales (1 and 2), exports (3 and 4), capital-labor ratio (5 and 6) and TFP (7 and 8). The main explanatory variable is the import penetration of China in Mexico measured as the ratio of imports of Mexico from China to Mexican industry absorption (Absorption) or to Mexican imports (Share). The regressions also control for the import penetration of other low-wage countries in Mexico which are measured in similar ways. The instruments in all the regressions are the share of China in LAC's imports and the share of other low-wage countries in LAC's imports. The control variables are start-of-period employment, TFP and the capital-labor ratio, all in logs. All regressions also include a year fixed effect and a plant fixed effect. All standard errors are clustered by the industry-year level. The weak identification test is the Kleibergen-Paap Wald F statistic

***; **; * significant at the 1%, 5% and 10% level respectively

### TABLE 7: HETEROGENEOUS EFFECTS BY FIRM SIZE

| | Employment | Sales | Exports | Capital /labor | TFP |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| **Import penetration from China** | -0.5007*** | -0.8543*** | -1.6195*** | 0.4434** | -0.3575* |
| | (0.162) | (0.256) | (0.561) | (0.175) | (0.211) |
| **Import penetration from China x Large** | 0.4639*** | 0.2481* | 0.9841** | -0.3856** | -0.1028 |
| | (0.140) | (0.148) | (0.394) | (0.164) | (0.149) |
| **Year fixed effect** | yes | yes | yes | yes | yes |
| **Plant fixed effects** | yes | yes | yes | yes | yes |
| **Observations** | 59012 | 58863 | 18987 | 58863 | 58217 |
| **$R^2$** | 0.254 | 0.192 | 0.192 | 0.239 | 0.321 |

Notes: The dependent variable is the annual growth (in logs) of employment(1), sales (2), exports (3), capital-labor ratio (4) and TFP (5). The main explanatory variable is the import penetration of China in Mexico measured as the ratio of imports of Mexico from China to Mexican industry absorption as well as its interaction with a dummy variable that is equal to 1 if the employment of the plant is larger than the median. The regressions also control for the import penetration of other low-wage countries in Mexico (results not shown). The instruments in all the regressions are the share of China in LAC's imports and the share of other low-wage countries in LAC's imports. The control variables are start-of-period employment, TFP and the capital-labor ratio, all in logs (results not shown). All regressions also include a year fixed effect and a plant fixed effect. All standard errors are clustered by the industry-year level.

***; **; * significant at the 1%, 5% and 10% level respectively

## TABLE 8: HETEROGENEOUS EFFECTS BY FIRM PRODUCTIVITY

| | Employment | Sales | Exports | Capital /labor | TFP |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| **Import penetration from China** | -0.4720*** | -0.8173*** | -0.9836** | 0.3929** | -0.6259*** |
| | (0.1500) | (0.2439) | (0.4509) | (0.1672) | (0.2222) |
| **Import penetration from China x High** | 0.3336*** | 0.1276 | 0.1451 | -0.2165** | 0.5155*** |
| | (0.0628) | (0.1316) | (0.2280) | (0.0948) | (0.1677) |
| **Year fixed effect** | yes | yes | yes | yes | yes |
| **Plant fixed effects** | yes | yes | yes | yes | yes |
| **Observations** | 59012 | 58863 | 18987 | 58863 | 58217 |
| **$R^2$** | 0.251 | 0.188 | 0.146 | 0.241 | 0.321 |

Notes: The dependent variable is the annual growth (in logs) of employment(1), sales (2), exports (3), capital-labor ratio (4) and TFP (5). The main explanatory variable is the import penetration of China in Mexico measured as the ratio of imports of Mexico from China to Mexican industry absorption as well as its interaction with a dummy variable that is equal to 1 if the TFP of the plant is larger than the median. The regressions also control for the import penetration of other low-wage countries in Mexico (results not shown). The instruments in all the regressions are the sahre of China in LAC's imports and the sahre of other low-wage countries in LAC's imports. The control variables are start-of-period employment, TFP and the capital-labor ratio, all in logs (results not shown). All regressions also include a year fixed effect and a plant fixed effect. All standard errors are clustered by the industry-year level.

***; **; *significant at the 1%, 5%and 10%level respectively

## TABLE 9: THE IMPACT OF OFFSHORING, MEASURED AT THE FIRM LEVEL

| | Employment (1) | Employment (2) | Employment (3) |
|---|---|---|---|
| **Import penetration from China** | -0.4815 | 0.9991 | 2.6821 |
| | (0.7992) | (1.2618) | (12.658) |
| **Offshoring from China** | | -0.0808 | 0.0843 |
| | | (0.074) | (0.911) |
| **Import penetration from China x Large** | | | 0.0382 |
| | | | (0.429) |
| **Offshoring from China x Large** | | | -0.2815 |
| | | | (1.769) |
| **Year fixed effect** | yes | yes | yes |
| **Plant fixed effects** | yes | yes | yes |
| **Observations** | 34849 | 34849 | 34849 |
| **$R^2$** | 0.427 | 0.413 | 0.414 |

Notes: The dependent variable is the annual growth (in logs) of employment (1-3). The main explanatory variables are the import penetration of China in Mexico measured as the ratio of imports of Mexico from China to Mexican industry absorption, and the offshoring from China measured as the firm's purchases of China goods as a share of the firm's imports. The regressions also control for the import penetration of other low-wage countries in Mexico as well as for start-of-period employment in logs (results not shown). The instruments are the Chinese import share in LAC's imports, other low-wage countries share in LAC's imports and an import-shared weighted exchange rate between Mexico and China (see text). The main explanatory variables are also interacted with a dummy variable (Large) that is equal to 1 if the employment of the plant is larger than the median. All regressions also include a year fixed effect and a plant fixed effect. All standard errors are clustered by the industry-year level.

***; **; * significant at the 1%, 5% and 10% level respectively

## TABLE 10: UPSTREAM IMPORT PENETRATION, EFFECTS ON SALES

| | (1) | (2) |
|---|---|---|
| **Import penetration from China** | -0.8323** | -0.8141** |
| | (0.369) | (0.398) |
| **Upstream import penetration from China** | 0.1671 | -0.0624 |
| | (0.551) | (0.624) |
| **Upstream import penetration from China x Large** | | 0.4576 |
| | | (0.410) |
| **Year fixed effect** | yes | yes |
| **Plant fixed effects** | yes | yes |
| **Observations** | 58863 | 58863 |
| **$R^2$** | 0.181 | 0.176 |

Notes: The dependent variable is the annual growth (in logs) of sales. The main explanatory variable is the import penetration of China in Mexico measured as the ratio of imports of Mexico from China to Mexican industry absorption, the import penetration of China in upstream industries (see text for definition) as well as its interaction with a dummy variable that is equal to 1 if the employment of the plant is larger than the median. The regressions also control for the import penetration of other low-wage countries in Mexico (results not shown). The instruments are the share of China in LAC's imports, the share of other low-wage countries in LAC's imports and the share of China in LAC's imports in upstream industries (see text). The control variables are start-of-period employment, TFP and the capital-labor ratio, all in logs (results not shown). All regressions also include a year fixed effect and a plant fixed effect. All standard errors are clustered by the industry-year level.

***; **; * significant at the 1%, 5% and 10% level respectively

## TABLE 11: IMPORT PENETRATION IN MEXICO AND THE US

| | Employment | Sales | Exports | Capital /labor | TFP |
|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| **Import penetration from China in Mexico** | -0.6127* | -1.5561** | -1.3387 | 0.7903* | -0.7574 |
| | (0.370) | (0.706) | (1.001) | (0.427) | (0.516) |
| **Import penetration from China in the US** | 0.3628 | 1.0457 | 0.5547 | -0.623* | 0.4617 |
| | (0.306) | (0.6499) | (1.034) | (0.359) | (0.4315) |
| **Year fixed effect** | yes | yes | yes | yes | yes |
| **Plant fixed effects** | yes | yes | yes | yes | yes |
| **Observations** | 59012 | 58863 | 18987 | 58863 | 58217 |
| $R^2$ | 0.221 | 0.074 | 0.192 | 0.239 | 0.321 |

Notes: The dependent variable is the annual growth (in logs) of employment(1), sales (2), exports (3), capital-labor ratio (4) and TFP (5). The main explanatory variable is the import penetration of China in Mexico measured as the ratio of imports of Mexico from China to Mexican industry absorption and the import penetration of China in the US measured as the ratio of imports of the US from China to US industry absorption. The regressions also control for the import penetration of other low-wage countries in Mexico (results not shown). The instruments in all the regressions are the Chinese import share in LAC's imports and other low-wage countries share in LAC's imports. The control variables are start-of-period employment, TFP and the capital-labor ratio, all in logs (results not shown). All regressions also include a year fixed effect and a plant fixed effect. All standard errors are clustered by the industry-year level.

***; **; * significant at the 1%, 5% and 10% level respectively

## TABLE 12: COMBINED IMPORT PENETRATION FROM CHINA IN MEXICO AND THE US

| | Employment | Sales | Exports | Capital /labor | TFP |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| **(a) Combined import penetration in Mexico** | -0.2560** | -0.6365*** | -0.8284** | 0.1624 | -0.4066** |
| **and in the US** | (0.115) | (0.203) | (0.421) | (0.136) | (0.183) |
| **(b) Import penetration in Mexico only** | -0.3258*** | -0.7614*** | -0.8987** | 0.2978* | -0.3966* |
| | (0.145) | (0.240) | (0.4535) | (0.166) | (0.211) |
| **Year fixed effect** | yes | yes | yes | yes | yes |
| **Plant fixed effects** | yes | yes | yes | yes | yes |
| **Observations** | 59012 | 58863 | 18987 | 58863 | 58217 |
| **$R^2$** | 0.221 | 0.074 | 0.192 | 0.239 | 0.321 |

Notes: The dependent variable is the annual growth (in logs) of employment(1), sales (2), exports (3), capital-labor ratio (4) and TFP (5). The main explanatory variable is the import penetration of China in Mexico and in the US (row a) and the import penetration of China in Mexico only (row b). See text for definitions of these variables and the instruments. All the regressions also control for the import penetration of other low-wage countries in Mexico as well as the start-of-period employment, TFP and the capital-labor ratio, all in logs (results not shown). All regressions also include a year fixed effect and a plant fixed effect. All standard errors are clustered by the industry-year level.

***; **; * significant at the 1%, 5% and 10% level respectively

## APPENDIX A: DATA DESCRIPTION AND SOURCES

| Variable | Description | Source |
|---|---|---|
| Import share from country i in Mexico | Share of country i in Mexican imports, at the 6-digit NAICS level | Based on Comtrade from UN |
| Import penetration from country i in Mexico | Mexican imports from country i divided by Mexican apparent consumption (output + imports - exports), at the 6-digit NAICS level | Based on Comtrade from UN and Mexican Economic Census from INEGI |
| Instrument for import share and import penetration variables: Import share from country i in LAC | Average share of country i in the imports of 17 Latin American countries (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Jamaica, Nicaragua, Panama, Peru, Paraguay, Uruguay, and Venezuela), at the 6-digit NAICS level | Based on Comtrade from UN |
| Growth rate of employment | Annual log change of employment, at the establishment level | Based on EIA and EAIM from INEGI |
| Growth rate of sales | Annual log change of domestic sales, at the establishment level | Based on EIA and EAIM from INEGI |
| Growth rate of exports | Annual log change of exports, at the establishment level | Based on EIA and EAIM from INEGI |
| Growth rate of capital per worker | Annual log change of capital per worker, at the establishment level | Based on EIA and EAIM from INEGI |
| Growth rate of productivity | Annual log change of TFP, at the establishment level | Based on EIA and EAIM from INEGI |
| TFP | Levinsohn and Petrin measure of TFP (revenue-based), at the establishment level | Based on EIA and EAIM from INEGI |
| Offshoring from China | Ratio of establishment's imports from China to the establishment's sales | Based on "Perfil de las Empresas Manufactureras de Exportación" from INEGI |
| Instrument for offshoring variable | Bilateral exchange rate between Mexico and China multiplied by the share of China in the establishment's total imports | Based on "Perfil de las Empresas Manufactureras de Exportación" from INEGI and IMF |
| Import penetration from China in upstream industries | Weighted average of the import penetrations in all the industries that provide inputs to industry j where the weights are based on the input-output linkages | Based on Comtrade from UN and Mexican Economic Census and input-output table from INEGI |
| Import penetration from China in the US | US imports from China divided by US apparent consumption (output + imports - exports), at the 6-digit NAICS level | Based on Comtrade from UN and NBER-CES Manufacturing Industry Database |

# APPENDIX B: TFP ESTIMATION

This appendix shows the results of applying the Levinsohn and Petrin methodology to estimate production functions so as to subsequently recover a measure of TFP. We employ the case in which the dependent variable represents value-added, and electricity consumption is the proxy variable. In order to ensure sufficient observations in the estimation of each individual production function at the sectoral level, we consider eight sectors defined as in table B.1. Table B.2 presents the results of the estimations.

### TABLE B.1: SECTOR DEFINITION

| Sector | | NAICS 3-digit industries |
|---|---|---|
| **(1)** | Food | 311, 312 |
| **(2)** | Textiles | 313, 314, 315, 316 |
| **(3)** | Wood & Paper | 321, 322 |
| **(4)** | Chemicals | 324, 325 |
| **(5)** | Plastic & Glass | 326, 327 |
| **(6)** | Metal Products | 331, 332 |
| **(7)** | Machinery | 333, 334, 335, 336 |
| **(8)** | Other | 323, 337,339 |

## TABLE B.2 PRODUCTION FUNCTION ESTIMATIONS

| Dep var: ln(va) | Food | Textiles | Wood & paper | Chemicals | Plastic & Glass | Metal products | Machinery | Other |
|---|---|---|---|---|---|---|---|---|
| **Ln (employment)** | 0.4905*** | 0.7927*** | 0.7253*** | 0.4714*** | 0.5380*** | 0.6203*** | 0.6667*** | 0.7772*** |
| | (0.032) | (0.023) | (0.045) | (0.042) | (0.039) | (0.036) | (0.031) | (0.031) |
| **Ln (capital)** | 0.2570*** | 0.1601*** | 0.1212** | 0.2481*** | 0.2081*** | 0.1719*** | 0.2621*** | 0.2082*** |
| | (0.035) | (0.029) | (0.053) | (0.061) | (0.032) | (0.033) | (0.059) | (0.066) |
| **Observations** | 12343 | 12479 | 5082 | 5831 | 11063 | 7043 | 9248 | 6336 |

# APPENDIX C: ADDITIONAL REGRESSIONS USING OLS

## TABLE C.1: OLS ESTIMATIONS

| | *Absorption* | *Share* | *Absorption* | *Share* |
|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** |
| **Import penetration from China** | -0.0109 | -0.1121*** | -0.001 | -0.1016** |
| | (0.010) | (0.041) | (0.011) | (0.042) |
| **Import penetration from other l-w countries** | | | -0.5598 | -0.1723 |
| | | | (0.560) | (0.108) |
| **Log of employment** | -0.2554*** | -0.2559*** | -0.2554*** | -0.2561*** |
| | (0.009) | (0.009) | (0.009) | (0.009) |
| **Log of TFP** | 0.0365*** | 0.0363*** | 0.0366*** | 0.0365*** |
| | (0.002) | (0.002) | (0.002) | (0.002) |
| **Log of K/L** | 0.0330*** | 0.0329*** | 0.0332*** | 0.0330*** |
| | (0.003) | (0.003) | (0.003) | (0.003) |
| **Year fixed effect** | yes | yes | yes | yes |
| **Plant fixed effects** | yes | yes | yes | yes |
| **Observations** | 59012 | 59012 | 59012 | 59012 |
| **$R^2$** | 0.267 | 0.267 | 267 | 0.267 |

Notes: The dependent variable is the annual growth (in logs) of employment. The main explanatory variable is the import penetration of China in Mexico measured as the ratio of imports of Mexico from China to Mexican industry absorption (Absorption) or to Mexican imports (Share). The regressions also control for the import penetration of other low-wage countries in Mexico which are measured in similar ways. The control variables are start-of-period employment, TFP and the capital-labor ratio, all in logs. All regressions also include a year fixed effect and a plant fixed effect. All standard errors are clustered by the industry-year level

***; **; * significant at the 1%, 5% and 10% level respectively