Trade with Low Income Countries and U.S. Industry and Inflation*

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Abstract

When labor abundant nations grow, their exports increase more in labor intensive than in capital intensive sectors. We utilize this difference in how exports are affected by growth to identify the causal effect of trade with low income countries (LICs) on U.S. inflation and productivity. In our panel covering 325 6-Digit NAICS industries from 1997 to 2006, OLS estimations suggest that increases in U.S. imports from nine LICs are associated with increasing producer prices and a mild productivity gain. In stark contrast, our two-stage least square specifications predict that LIC exports are associated with strong downward pressure on prices and a large effect on productivity. When LIC exporters capture 1% of U.S. market share, producer prices decrease by more than 5%, with about half of this change due to productivity growth and half due to reduction of markups.

Keywords: Low-Wage Country Import Competition, Comparative Advantage, Globalization (JEL F1)

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China and other poor, yet rapidly growing nations now account for a fifth of global trade and over a third of U.S. imports. What is the effect of the trade with these low income countries (LICs) on inflation, productivity, and industry structure in developed economies?

The standard approach taken in the literature to identify the causal effect of trade relies on natural experiments, such as one-time tariff reductions. While natural experiment studies such as Trefler (2004) have greatly enhanced our understanding of trade's one-time impact, the narrow event window of these experiments limits their ability to capturing cumulative effects of phenomena such as "globalization." Moreover, the regime change experiment, due to the paucity of natural events, is not a viable strategy to examine the block impact of trade with the newly developing world.[1]

The contribution of this paper is to develop an instrumentation strategy that can establish the causal effect of the gradual increase in LIC-trade on the U.S. Our approach is motivated by the most basic force of trade, comparative advantage. The classical theory of trade predicts that countries should specialize in industries that intensively use relatively abundant factors. We document below that this relation also holds at the margin: if a country's output capacity increases, this increase leads to higher exports of goods that are intensive in the factors the country is abundant in.

We first show that labor intensity can explain changes in trade flows between individual LICs and the United States, while it fails to explain trade flows between the United States and other developed economies. In contrast, skill intensity can explain trade flows between developed economies, but has no power in explaining bilateral LIC-U.S. trade. From these counterfactuals, we conclude that also marginal trade flows are well explained by differences in factor endowments and construct a measure of import flows implied by comparative advantage and aggregate growth in low income countries.

Second, we develop an empirical framework that abstracts from sector-specific trends and aggregate fluctuations. Due to this difference-in-difference approach, the identifying restriction necessary to establish the causal effect of trade only requires that U.S. demand shocks are not

[1] We are not aware of one-time events that induced a sizeable increase in LIC imports. For example, China's accession to the WTO in 2001 was not followed by an exceptional increase in trade flows. Mexico's accession to NAFTA is an exception, which has been analyzed among others by Hanson (2003).

systematically biased towards labor intensive goods. The latter assumption seems reasonable ex ante, but can also be tested by investigating whether imports from developed nations were systematically biased towards labor intensive goods, which is not the case (rather: the opposite).

We next present out results and document that LIC trade has had a profound impact on U.S. prices. OLS regressions predict a significant **positive** correlation between changes in LIC import share and changes in U.S. producer prices. In contrast, the IV regressions document a profound **negative** relation between these two variables. In two-stage least square estimation, we find that a 1 percentage point increase in the U.S. market share of LIC imports is associated with a decrease of prices by 5.8%.

We next decompose this price-dampening effect into the contribution of productivity and markup reductions. Concerning sectoral productivity, we find that both the OLS and the IV estimates predict significant productivity growth when LIC imports increase, but that the magnitude of the IV estimates is much larger. In the OLS regression, an 1 % increase of LIC market share is estimated to lead to a productivity increase of 0.4%. The IV estimate of this coefficient is 2.5%, i.e. around sixfold. This large productivity gain is in accordance with Bernard et al. (2007), who predict that productivity growth is especially large if trade is motivated by comparative advantage in addition to the Ricardian motive. The point estimates for markups suggest that when LICs capture 1% of U.S. market share, the profit margins of domestic producers decrease by 2%. The latter result, however, is not statistically significant.

The paper is organized as follows. Section 1 discusses the relation of our approach to the existing literature. Section 2 documents that imports from these countries can be explained by comparative advantage. Section 3 lays down the empirical framework and the identifying assumption. Section 4 presents empirical results of LIC's impact for the following U.S. sectoral variables: producer prices, productivity, markups, and wages. Section 5 highlights the effect of imports from China. Section 6 Section 7 offers concluding remarks.

1 Relation to the Literature

The developing economies examined in this study are China, Brazil, Indonesia, India, Malaysia, Mexico, Philippines, Thailand, and Vietnam. As documented in Figure 1, in 2006 these nine countries accounted for imports worth more than 5.5% of U.S. GDP, equivalent to roughly a third of total U.S. imports. Even more impressive is the growth rate of trade with this group of countries: in 1997, they accounted for imports worth only 2.5% of U.S. GDP.

Because of these staggering trends, many empirical studies examine the impact that trade with LICs, and in particular with China, had on industry structure and price levels in developed economies.[2] Studies based on micro data that are closest to our investigation are Chen et al. (2006), Bernard et al. (2006), Glatzer et al. (2006), Kamin et al. (2006), WEO (2006), and Wheeler (2008). Ball (2006), Borio and Filardo, (2007), Ihrig et al. (2007), and Pain et al. (2006) use more-conventional specifications of Phillips curves to determine the role of foreign output gaps on domestic inflation. A common finding is that trade with these countries had only a mild effect on prices in developed economies.

We argue that the existing literature fails to establish the true effect of trade since trade flows are endogenous to local demand conditions. For example, when a sector in the United States experiences a positive demand shock, prices increase, thereby inducing an increase of imports from LICs. The negative influence of LIC imports on prices is compounded with the positive effect that U.S. demand has on LIC import flows.[3] establish the causal effect of trade, in what follows below we thus instrument for marginal trade flows with the ones predicted by theories of comparative advantage.[4]

Labor abundant nations tend to export labor intensive goods. The upper scatterplot of Figure 2 relates the volume of U.S. imports from the nine LICs normalized by U.S. sales in 1996 to

[2]Numerous central bank governors have recognized that the links between globalization and inflation go beyond influencing relative price differences in the short-run. Mishkin (2007), Carney (2008), Trichet (2008) and others highlight the role of productivity, markups, and price flexibility.

[3]Similarly, the estimated effect of LICs imports on U.S. productivity is biased towards zero in an OLS regression. This bias arises because positive sectoral productivity shocks in the United States tend to increase domestic production and decrease imports.

[4]The only study similar in spirit to our instrumentation strategy is Bernard et al. (2006), who construct a measure of industry-exposure to low wage countries. Rather than using the level of LIC imports to measure this exposure, we instrument for the trade flows directly with labor intensity.

the labor intensity of each sector. Clearly, imports are heavily concentrated in labor intensive industries. The lower scatter plot of Figure 2 relates the change in the import volume (again normalized) of U.S imports to labor intensity in 2006. Also in 1996, imports from LICs are concentrated in labor intensive industries.

More important is the growth of LIC market share from 1996 to 2006: it is heavily concentrated in labor intensive sectors. We next document that one can predict the increase of LIC imports by labor intensity.

2 LIC Trade and Factor Intensity

In this section, we document that factor intensity can well explain marginal trade flows. When labor abundant LICs grow, their exports increase much more in labor intensive sectors than in capital intensive sectors. In contrast, when a skill abundant nation such as Japan grows, its exports increase in skill intensive sectors, while this is not the case in labor intensive ones.

Data Description

We use annual trade data from the USTIC, covering the 1997-2006 period. The classification of the import data is 6-digit NAICS and the selected trade type is General Customs value.[5] There are 325 different sectors. U.S. data on wages, producer prices, and productivity (4 to 6 digit) are from the BLS.[6] Information to construct sectoral markups were taken from the Annual Survey of Manufactures, see the Appendix for the respective definition of variables.

The measure of import penetration is constructed in the following way. We divide the value of imports from the country in question (or from the nine LICs together) by the value of U.S. domestic shipments plus world imports. To make sure that our results are not driven by the endogenous response of U.S. sales to U.S. demand, the value of domestic shipments plus world imports is averaged over the 10 years in our sample.[7] Our measure of import penetration takes the value of 0.01 in a sector where imports from the country in question amount to 1% of average

[5] The General Customs value is appraised by the U.S. Customs Service and is the price paid or payable for merchandize when sold for exportation, excluding U.S. import duties, freight, insurance, and other changes incurred.

[6] The BLS publishes only 4-digit data on its website. Additional data were obtained through private correspondence.

[7] Due to this averaging, LIC import share can exceed 100% towards the end of the sampling period.

U.S. sales in the respective sector.

When evaluating changes of import penetration, we evaluate the absolute change, i.e. import penetration at time t minus import penetration at t-1. This strategy is expedient since the response of U.S. prices should be in relation to the increase of imports normalized by U.S. demand. Further, evaluating the absolute growth rather than the relative (percentage) growth of imports does not drop any zero-trade observations.

To measure an industry's labor intensity, we use information from the Annual Survey of Manufactures. Labor share is defined as the 1997 to 2006 average of the U.S. labor expenditure share for each of the 325 sectors. The labor expenditure share equals expenditures for labor divided by the total expenditure for labor and of capital.

The selection criteria for our nine LICs is outlined in the Appendix along with data sources for LIC manufacturing output.

Predicting Trade Flows by Factor Intensity

Table 1 documents the empirical motivation for our instrument. In each regression, the dependent variable is U.S. import share for a selected country. We first present the results of our instrument for the three largest individual LICs in our sample (China, Mexico, India), and then for Vietnam. We next compare the performance of our instrument (labor intensity times growth of manufacturing output) for the two largest developed exporters to the United States (Japan and Canada).

Columns 1 to 3 serve to highlight our empirical strategy. In these three models, the dependent variable is the percentage point change in imports from China divided by the size of the respective sector in the United States. The size of a sector is defined as the value of domestic shipments plus the values of imports from all countries.

We first estimate a random-effects panel model in Column 1. The change in the import share of Chinese is regressed on the variable of interest, the cross product between the sectoral labor share and aggregate growth of industrial production in China (g_{china} times $\overline{ls}_j$). We also include the two interacted components separately. All three regressors are significant at the 1% level.

Column 1 documents that when the industrial output in China grows, exports to the U.S. increase in labor intensive sectors and decrease in capital intensive sectors. $g_{lic}\overline{ls}_j$ is estimated at

+0.646 and is highly significant, i.e. when the China's industrial capacity grows, exports to the United States increase in labor intensive sectors much more than in capital intensive sectors. In contrast, the main effect of industrial growth is estimated to be negative at -0.427. That is, if the annual growth of Chinese industrial output is 1%, the value of exports in an industry using only capital ($\overline{ls}_j = 0$) decrease by -0.427*0.01, or 0.43 percentage points.

For the same 1% change in Chinese output, exports of an industry using only labor ($\overline{ls}_j = 1$) increase by $(0.646 - 0.427) * 0.01 = 0.0021$. The average labor intensity in our sample is 0.85, so that the average sector will capture an import share of $(0.646 * 0.85 - 0.427) * 0.01 =$ 0.12 percentage points when China's aggregate manufacturing output grows by 1%.

Column 2 presents the same regression as Column 1 adding fixed-effects. Because the labor share is averaged over time and does not vary within a sector, it is dropped from the estimation. The results are nearly identical to those of Column 1. Next, in Column 3, we also add time dummies to the estimation. Because the growth of industrial production in China is one aggregate variable, this regressor is dropped from the estimation when time dummies are introduced.

Column 3 documents that the results in Column 1 are not driven by aggregate trends (filtered out by the time dummies) or differences in sector specific trends (filtered out by the fixed effects). The interaction coefficient for the growth of Chinese output times the labor intensity captures the different responses that imports from sectors with different labor intensities display when China's industrial output increases.

Columns 4 to 6 repeat the same exercise with yearly and sectoral dummies for Mexico, India, and Vietnam. The coefficients for growth interacted with labor intensity are positive and significant. The coefficients are smaller reflecting the fact that these economies are smaller than the Chinese economy.

We next turn to two falsification exercises that are particularly important in the context of the identification restriction made in the next section. The fact that imports grew especially in labor intensive sectors could also be a result of U.S. demand shocks biased towards labor intensive goods. As a falsification exercise, we next repeat the analysis for Canada and Japan in Columns 7 and 8. We find that labor share times manufacturing growth in the two countries is not significantly correlated with changes in import share.

As a further counterfactual, we instrument for Japanese trade with Japanese growth interacted with skill intensity. The measure of skill intensity is constructed by averaging the U.S. share of non-production workers of total employees averaged over 1997 to 2006. While this measure can predict changes of imports from Japan (see Column 9), it fails to predict imports from China (see Column 10).

Summarizing, Table 1 documents that there is a systematic relation between the changes in U.S. imports that can only be rationalized by comparative advantage based explanations of trade. When labor abundant LICs grow, their exports increase much more in labor intensive sectors than in capital intensive sectors. When a skill abundant nation such as Japan grows, its exports increase in skill intensive sector, yet not in labor intensive ones.

Marginal trade flows are systematically related to supply conditions (output growth and factor abundance) in the exporting countries. We next construct the comparative advantage implied projection of U.S. imports.

The construction of the instrument

Our instrumentation strategy is based on the simple observation that when LIC manufacturing output grows, LIC exports to the United States increase in labor intensive sectors relative to capital intensive sectors.

Our instrument is constructed in the following way. We first generate one weight for each LIC country i by averaging (imports from country i /(U.S. domestic shipments + total imports)) over the 325 sectors and the 10 years. We then construct the weighted growth of manufacturing output in the nine LICs by summing over the growth rate times the country weight. Finally, we multiply the weighted growth rate by the U.S. labor share of sector j.

3 Empirical Framework

It is evident that trade is endogenous to local demand conditions. In this section we lay out our strategy to instrument for trade flows with the ones induced by the growth of aggregate productive capacity in low income countries interacted with labor intensity. The exhibition in this section is conducted for prices, but the analysis applies equally to productivity.

We begin by laying out the true relation between trade and prices. Denote U.S. prices at time t for sector j by $p_{us,j,t}$, and sectoral U.S. imports from LICs normalized by the U.S. sector size by $m_{lic,j,t}$. Denote the industry-specific trend of U.S. prices in sector j by $\alpha_{p,j}$, the common shock to U.S. prices at time t by $\epsilon_{p,t}$, and sector specific price shocks by $\epsilon_{p,j,t}$. Finally, let Δ denote the absolute change of a variable.

In the United States, the true relation between price changes and the changes of import volume is given by

$$\Delta p_{us,j,t} = \alpha_{p,j} + \beta \Delta m_{lic,j,t} + \epsilon_{p,t} + \epsilon_{p,j,t} \tag{1}$$

In Equation (1), the coefficient of interest is β, measuring the true impact of an increase in imports from low income countries on sectoral prices. A prior shared by most researchers is that LIC imports lower U.S. prices, i.e. $\beta < 0$.

Imports, however, also respond to U.S. demand conditions. Apart from the unobserved export supply shocks in low income countries (denoted by $\Delta s_{m,j,t}$), U.S. prices also influence how much foreign firms export. The relation between the change in LIC imports, U.S. prices, and export supply shocks in LICs, $\Delta s_{m,j,t}$, is given by

$$\Delta m_{lic,j,t} = \alpha_{m,j} + \delta \Delta p_{us,j,t} + \theta \Delta s_{m,j,t} + \epsilon_{m,t} + \epsilon_{m,j,t} \tag{2}$$

where $\alpha_{m,j}$ is an industry-specific trend of LIC imports, $\epsilon_{m,t}$ is a common shock to exports to the U.S., and $\epsilon_{m,j,t}$ is a sector-specific shock.

When prices in the United States rise, imports from LICs most likely increase. Therefore, an OLS estimation of β in Equation (1) is biased. When $\delta > 0$ and $\beta < 0$, the true effect of LIC imports is either underestimated or is estimated with the wrong sign. We thus instead focus on finding and exogenous driver of export supply shocks in LICs $\Delta s_{m,j,t}$.

Our instrumentation approach is motivated by the Heckscher-Ohlin theory predicting that countries should specialize in industries that intensively use relatively abundant factors. The Rybczynski theorem extends this prediction in a dynamic context. The modern extensions of the Heckscher-Ohlin theory by Trefler (1993), Davis and Weinstein (2001), Romalis (2004), Bernard et al. (2007), and Chor (2008) account for factor augmenting technology, transportation costs, and the Ricardian motive for trade. These theories predict that dynamically, countries should export more when their output capacity increases.

Denoting the growth of low income countries by g_{lic} and a sector's time-invariant labor intensity by $\overline{ls}_j$, export supply shocks in LICs are determined by

$$\Delta s_{m,j,t} = \alpha_{s,j} + \lambda_1 g_{lic,t} + \lambda_2 g_{lic,t}\overline{ls}_j + \epsilon_{s,t} + \epsilon_{s,j,t} \tag{3}$$

where $\epsilon_{s,t}$ and $\epsilon_{s,j,t}$ are aggregate and sector-specific shocks.

Since aggregate growth in LICs may be correlated with aggregate demand in the United States, we do not use Equation (3) as an instrument for trade. Rather, we evaluate the difference of imports between two sectors j and k that differ in their time labor intensities $\overline{ls}_j$ and $\overline{ls}_k$, yielding

$$\Delta m_{lic,j,t} - \Delta m_{lic,i,t} = \frac{\theta\lambda_2}{1-\delta\beta} g_{lic,t}\left(ls_j - ls_i\right) + \epsilon^*_{m,j,t} \tag{4}$$

The reduced-form relation between labor intensity differentials and price differentials is derived by substituting Equation (4) into a similar difference-in-difference version of Equation (2). The reduced from difference-in-difference specification relating LIC growth changes, skill intensity to relative changes in prices is

$$\Delta p_{us,j,t} - \Delta p_{us,k,t} = \alpha^*_{pk,j} + \beta\frac{\theta\lambda_2}{1-\delta\beta}\left(\overline{ls}_j - \overline{ls}_k\right) g_{lic,t} + \epsilon^*_{pk,j,t} \tag{5}$$

where

$$\begin{aligned}
\epsilon^*_{pk,j,t} &= \frac{1}{1-\delta\beta}\left(\left(\epsilon_{p,j,t} - \epsilon_{p,k,t}\right) + \beta\left(\epsilon_{m,j,t} - \epsilon_{m,k,t}\right)\beta\theta\left(\epsilon_{s,j,t} - \epsilon_{s,i,t}\right)\right) \\
\alpha^*_{pk,j} &= \frac{1}{1-\delta\beta}\left(\left(\alpha_{p,j} - \alpha_{p,i}\right) + \beta\left(\alpha_{m,j} - \alpha_{m,k}\right) + \theta\beta\left(\alpha_{s,j} - \alpha_{s,i}\right)\right)
\end{aligned}$$

Our methodology can establish the true effect of LIC imports if the following condition holds.

Assumption 1. (Identification Restriction)

$$\epsilon^*_{p(k,j,t)}\left(\overline{ls}_j - \overline{ls}_k\right) \perp g_{lic,t} \tag{6}$$

It is important to note that the orthogonality assumption (6) does not impose that aggregate growth in low income countries is orthogonal to U.S. demand shocks (that are cancelled out due to the difference-in-difference formulation).

Since $\overline{ls}_j - \overline{ls}_i$ is constant over time, our orthogonality assumption (6) is simple: we assume that growth in low income countries was not the result of sector specific U.S. demand shocks that are concentrated in labor intensive sectors.

We have already tested the orthogonality assumption (6) in the previous section, where we demonstrate that marginal trade flows from Japan and Canada cannot be explained by labor intensity (but by skill intensity). Hence, it cannot be the case that demand in the U.S. was systematically biased towards labor intensive goods.[8]

Given the difference-in-difference specification with year dummies to filter out aggregate effects and fixed effects to filter out sector-specific trends, the variation that we utilize below is thus the following. In years that LICs grow more than average, imports grow more in labor intensive sectors than in capital intensive sectors. This different reaction of imports to growth is utilized to establish the effect of trade.

4 Results in a Difference-in-Difference Setup

This section presents OLS and two-step least square estimates for the difference-in-difference form of Equation (4). The empirical analysis uses the following U.S. sectoral variables as the dependent variable: producer prices, productivity, and markups. Section 5 offers a test of robustness of our instrumentation strategy by examining separately the influence of Chinese exports on U.S. producer prices.

[8] Technically, our identification fails only if all of the following three conditions hold. In the United States, there is a systematic shift of demand towards labor intensive goods (for constant prices of these goods). The demand shift induces imports from low income countries. Aggregate growth in low income countries is caused by the increase in U.S. demand.

U.S. Producer Prices

We begin our discussion by first presenting OLS estimates of U.S. producer prices on LIC import share. This is done to highlight the bias in OLS regressions: they suggest that growing LIC imports are associated with increasing U.S. prices.

In the OLS regressions of Table 2, the dependent variable is the percentage change of the U.S. producer price index for each 6-digit sector. All estimations of Table 2 present results using fixed-effects panel regressions. Column 1 does not include time dummies. In this specification, U.S. prices rise by 0.4 % to a 1% above trend rise in LIC import share. When we introduce time dummies in Column 2, the coefficient is still significant, but falls to 0.1. Also in the robustness checks in Columns 3 to 8, this coefficient is always estimated positive and is significant in three out of five cases.

The five robustness tests are the following. In Column 3, we add the lagged LIC import share to the estimation. High past imports imply lower prices today, but again increasing LIC imports are associated with higher U.S. prices. Next, we add the lagged change in producer prices to the estimation in Column 4. Prices display some degree of mean reversion, but this does not influence the effect of LIC imports.

In Column 5, we control for a sector's openness, which we define as all imports divided by U.S. domestic shipments plus all imports. We use a lagged measure of openness because also total openness could be endogenous to changes in U.S. producer prices. A sector's openness has no effect on the change in producer prices, but in this specification the OLS estimate of the change in LIC imports on changes in U.S. producer prices is not significant. In Column 6, we include the three controls of Columns 3 to 5 together. In Column 7 we add the lagged change in the LIC import share to the estimation, and in Column 8 we include U.S. sectoral productivity growth to the estimation.

Table 3 presents the two stage least squares results. We begin with the first stage results for the instrument displayed in the upper Panel A. We repeat the eight specifications presented in Table 2. In all models, the instrument $g_{lic} \cdot \overline{ls}_j$, is significant at the 1% level.

The second-stage IV regressions are recorded in the upper half of Table 3 (Panel B). All specifications show that imports from LICs generate an economically large and statistically significant downward pressure on U.S. prices. For example, in Column 2, the point estimate is that prices fall by 5.8 % when LICs capture 1% market share.

How large is the total effect of LIC trade on US prices? We explain the magnitude of the LIC effect for the most basic specification in Column 1. Assume that industry j has a labor share of 0.8 while industry k has a labor share of 0.3. If the manufacturing output of the nine LICs grows by an additional 1%, sector j's exports to the U.S. are predicted to increase by $(0.8 * 1.006 - 0.614) * 0.01 = 0.19\%$ of United States industry size. In contrast, imports in sector k are predicted to decrease by 0.31%. This difference in import share of 0.50% implies that U.S. producer prices in sector j decrease by around 2.8% compared to prices in sector k.

U.S. Productivity

For the results with U.S. productivity as the dependent variable, the OLS and IV regressions again yield marked differences in the point estimates.[9] The OLS regressions, which are presented in the top panel of Table 4, show that LIC import share is positively correlated with productivity, a result consistent with the theoretical predictions by Melitz (2003) and Bernard et al. (2007). The point estimates lie between 0.3 and 0.4. These estimates are highly significant.

The two-stage least square regressions in Panel B document that the effect of LIC exports to the United States is indeed much more profound than the OLS estimates suggest. A 1% increase in comparative advantage-driven trade results in an increase in U.S. productivity over 2 percentage points. Our results reveal a much stronger trade impact on productivity than the studies by Chen et al. (2006) and WEO (2006). It should be noted that for the specifications with import penetration the point estimates diverge considerably from the other estimates and are not significant, see Columns 6 and 7.

U.S. Markups

Table 5 presents the relation between LIC imports and markups for the OLS (Panel A) and two stage least square estimations (Panel B). The OLS estimates document that LIC import share is positively correlated with U.S. markups. Again, we argue that this result is due to the endogeneity of LIC trade flows: following an increase in U.S. prices and markups, LIC imports increase.

[9] The first stage is identical to that of Panel A in Table 3, and is thus not reported.

The instrumental variable estimates, presented in the lower Panel B of Table 5, document that the correlation between LIC imports and U.S. markups is negative: an increase in LIC trade leads to lower markups. The point estimates are in the order of magnitude of –2% for a 1% increase in LIC market share, however they are insignificant.

Although the two-stage least square estimates for markups are not significant, they are in the right order of magnitude: a 1% increase in LIC - import share leads to a 5.8% fall in prices. This is nearly fully accounted by a 2.1% productivity gain and a 2.3% drop in markups.

5 The China Effect

In this section, we show that our instrumentation strategy can be used in a bilateral setting to answer the question whether Chinese exports lower U.S. producer prices.[10] This question was first examined empirically by Kamin et al. (2006) by regressing Chinese import shares (in four-digit SIC sectors) on U.S. producer prices for the years 1997 to 2001. Their OLS estimates for Chinese import share yielded an insignificant point estimate of -0.033 for 374 manufacturing sectors. With this evidence, the authors conclude that Chinese exports have no influence on U.S. producer prices.

To highlight the strength of our instrument, we redo the estimates for LICs in Tables 2 and 3 but now separately for China. Table 6 presents OLS estimates of Chinese import share on U.S. producer prices. The results – as in the previous section – show that the coefficient for the change in import share is sensitive to time trends. Column 1 shows a positive and significant coefficient of 0.31 in the panel regressions without annual dummies. The coefficient on import share becomes insignificant once yearly dummies are added. These de-trended regressions, which are recorded in Columns 2 to 8 for the same specifications as in Table 3, are consistent with the results by Kamin et al. (2006).

Next, Table 7 presents the IV estimates (Panel B) and the accompanying first-stage regressions for the instrument equation (Panel A). The simplest IV regression in column 2 finds that

[10] The study by Chen et al. (2006) relies on instruments (i.e., distance, volume, and exchange rates) that work only in a multilateral setting and thus cannot shed light on the question posed by Kamin et al. (2006).

instrumenting for Chinese import share yields a significant estimate of -5.8. This result appears to be robust for various specifications, except for the inclusion of import penetration. In this specification, the coefficient jumps to -13.7 (see Columns 5 and 6). This latter result is explained by the fact that our instrument of labor share is positively correlated with import penetration.

The IV results for Chinese imports are similar to those presented in Table 3 for LIC imports. The result with the IV regressions on the one hand is not surprising since China represents a large share of the LIC export volume to the United States.

6 The Aggregate Effect of LIC Imports

Since we rely on a difference-in-difference specification that partials out sector specific trends as well as yearly averages, extrapolating our findings to the aggregate effect of LICs on U.S. inflation is not straightforward. We thus engage in two simple back of the envelope calculations to establish the aggregate effect of LIC imports on U.S. inflation.

The simplest calculation in the following. In our sample, average LIC import share grew from 5.3% in 1997 to 14.3% in 2006. Hence, if all of the increase in imports was driven by comparative advantage, annual producer price inflation of manufactured goods is predicted to be around $5.8 * (14.3\% - 5.3\%)/10 = 5.2\%$ lower because of the presence of LICs imports. Similarly, we predict that annual productivity growth in the sample of this study was about two percentage points higher due to the presence of LIC imports

Not all of the increase in LIC imports was necessarily induced by comparative advantage, however. Increases in trade flows might also be the result of the aggregate increase in U.S. demand for imports. This is important since we have used only the comparative advantage-driven component of trade. Trade motivated by other motives might well have a smaller impact on the U.S. (see Bernard et al. a. (2007)). We hence isolate the component of trade that is motivated by comparative advantage.

To identify the component of trade motivated by comparative advantage, we regress the change of LIC import share from 1997 to 2006 on average labor intensity. The regression is estimates is the following.

$$\Delta m_{lic,i,1997-2006} = \underset{(0.046)}{-.248} + \underset{(0.054)}{.394} * ls_i + \epsilon_i$$

Hence, for the average sector with a labor intensity of 0.85, we estimate that from 1997 to 2006, the comparative advantage driven-component of trade lead to an increase of market share of 8.6 percentage points, resulting in a total effect of $0.086 * 5.8/10$, or 5% lower annual producer price inflation of manufactured goods in the period in question, of which roughly half is due to productivity and reduction in markups.

We find that the aggregate effect of LIC trade on producer prices and manufacture's productivity has been very large. While the ultimate effect on CPI inflation is probably a substantially smaller, we surely conclude that it is cannot be neglected.

7 Conclusion

This paper investigates how imports from low income countries (LICs) influence prices, productivity and markups in the United States. The novel contribution is to instrument for trade flows that are endogenous to U.S. demand with the marginal trade flows implied by comparative advantage.

Our instrument relies on the observation that when LICs grow, their exports increase much more in labor intensive sectors than in capital intensive ones. We hence instrument for trade flows using the interaction between growth of LIC manufacturing output and sectoral labor share. To filter out aggregate correlations and sector specific trends, we use a difference-in-difference specification that exploits only how sectoral differences in trade flows affect sectoral differences in price changes above trend. Although aggregate growth may be endogenous to global demand, the difference in how various sectors are affected by growth can be exploited to identify the causal effects of trade.

We document that trade with LICs had a strong impact on prices and productivity, but no effect on wages. We also document the bias of standard OLS regressions between these variables. In our panel covering 325 6-Digit NAICS industries from 1997 to 2006, an OLS estimation suggests that increases in U.S. imports from nine LICs are associated with increasing producer prices and a mild productivity gain.

In stark contrast, our two-stage least square specification predicts that LIC exports are associated with strong downward pressure on prices and strong productivity growth. For example, when LIC exports capture 1% of U.S. market share, producer prices decrease by more than 5%, with about half of this change due to productivity growth.

The empirical findings based on our instrumentation strategy uncover much stronger dynamics than is commonly assumed. The two-stage least square estimates for producer prices reverse the “China does not matter" verdict by Kamin et al. (2006). Our estimates for prices show that growth in LIC manufacturing output has contributed strongly to price reductions between sectors. A back-of-the-envelope calculation suggests that following a 1% expansion in LIC manufacturing production above trend, two U.S. sectors with a labor share of 0.4 and 0.7 respectively will observe their prices diverge by 1.7% and their productivity by 0.6%. Since we rely on a difference-in-difference specification that partials out sector specific trends as well as yearly averages, extrapolating our findings to the aggregate effect of LICs on U.S. inflation is not straightforward. A simple back of the envelope calculation, however, predicts that in the period from 1997 to 2006, LIC imports have reduced the average yearly producer price inflation rate of manufactured goods by about 4-5 percentage points. While manufacturing prices only make up a fraction of PPI inflation, and also producer price inflation is passed through imperfectly to consumer inflation, the aggregate effect of imports from the newly developing world can surely not be neglected.

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8 Appendix Selection Criteria for LICSs and Data Sources

The sample criterion for is the following. We define a nation to be "low income" if it's non-PPP adjusted GDP per capita in 2005 is less than 20% of U.S. income per capita. There are 133 LICs for which we have both trade and GDP (per capita) information (source: World Bank Development Indicators), but most of these countries account for only a very small fraction of U.S. imports. Furthermore, most countries do not publish reliable information for their manufacturing output. We thus drop all countries that account for less than 0.4% of U.S. imports in 2005. There are 17 remaining economies that have less than 20% of U.S. GDP per capita and that account for more than 0.4% of U.S. world imports. We next exclude all countries where raw materials account for more than 30% of imports.[11] The latter criterion excludes Angola, Algeria, Chile, Colombia, Iraq, Nigeria, the Russian Federation, and Venezuela.

In total, we end up with nine countries that account for 87% of U.S. non-raw material imports from LICs. They are China, Brazil, India, Indonesia, Malaysia, Mexico, the Philippines, Thailand, and Vietnam. In 2005, these nine countries accounted for 37% of non-raw material U.S. imports and for 32% of all U.S. imports.

How would altering the criterion affect our sample? Changing the cut-off of a "low income" country to 10% of U.S. GDP per capita excludes Brazil, Mexico, and Malaysia. Altering the level at which a country is dropped from our data set because it exports mostly raw materials has no big effects on the composition of our sample. We would include Chile if the cut off is higher than 35%, and we next would include in addition Colombia if the cut off is above 59%. On the other side, of the included countries, Mexico's has the highest raw material import share of 16%. Last, if one also includes countries with less than 0.4% of total U.S. imports, this adds a large number of countries, yet only very little trade volume. For example, lowering the cut off to 0.3% would add only Turkey, and lowering it to 0.2% would in addition add the Dominican Republic, Argentina, Honduras, Costa Rica, and Pakistan. These additional countries in total account for only 1.5% of U.S. imports and 3.8% of non-raw material imports from LICs.

[11] Raw material imports are defined as the sum of imports in sectors (Harmonized System) 27 (mineral fuels), 7106, 7108, 7110, 74, 7502, 7601, 7801, 7901, and 8001 (different unwrought metals)

Data Sources for Output Growth

Industrial production

China: IMF International Financial Statistics

Manufacturing production:

Mexico: IMF International Financial Statistics

Philippines: IMF International Financial Statistics

India: Datastream Malaysia: Datastream

Brazil: OECD Main Economic Indicators

Indonesia: OECD Main Economic Indicators

Canada: OECD Main Economic Indicators

Germany: OECD Main Economic Indicators

Japan: OECD Main Economic Indicators

Thailand: Bank of Thailand

Vietnam: General Statistics Office of Vietnam

Definition for Markups

Markup = (Value Added - Total Compensation Paid to Employers)/ Value of Shipments

where

Value Added = Value of Shipments - Cost of Materials, Fuels, Electricity

thus

Markup = (Value of Shipments - Variable Costs)/ Value of Shipments

where

Variable Costs = Cost of Materials, Supplies, Fuels, Electricity + Total Compensation Paid to Employers

Skill intensity = (number of employees - average number of production workers)/number of employees

Source: Annual Survey of Manufactures

Value Added is compiled by the BLS and also adjusts for changes in inventories, and the income from merchandize operations.

Data Sources for Figures 1 to 4

Figure 1: United States International Trade Commission

Figure 2: Trade data are from the United States International Trade Commission. Labor share is from the U.S. Annual Survey of Manufacturers and is defined as total compensation of employees divided by total compensation of employees and total capital expenditures.

Figure 3: Real capital stock is from B. Bosworth used in Bosworth and Collins (2007). Effective labor supply: total number of persons employed in China (Asian Development Bank) times real manufacturing wage growth in China (nominal wage growth from Laborstat database ILO and GDP deflator from the World Bank Development Indicators).

Figure 4: Chinese data from Bai et al. (2006), Mexico and India: United Nations, Statistics Division, " National Accounts Statistics: Main Aggregates and Detailed Tables, 2005, United Nations, New York, 2007. Defined as Compensation of employees divided by gross value added.

Table 1 - Growth of Manufacturing Output, Factor Intensity, and Imports (Panel Estimations)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
US Imports originating from	*China*	*China*	*China*	*Mexico*	*India*	*Vietnam*	*Canada*	*Japan*	*Japan*	*China*
Panel Estimation with	*RE, w/o year dummies*	*FE, w/o year dummies*	*FE, with year dummies*	*FE, with year dummies*	*FE, with year dummies*	*FE, with year dummies*	*FE, with year dummies*	*FE, with year dummies*	*FE, with year dummies*	*FE, with year dummies*
Sample	*325 6-Digit NAICS Manufacturing Industries from 97-06*									
Dependent Variable	***Dependent variable is the year to year absolute change of (Country Imports / (US Industry Size+World Imports))***									
Labor Share	-0.048 [0.016]**									
Growth Industrial Production in China	-0.427 [0.089]**	-0.427 [0.089]**								
Growth Ind. Prod. China * Labor Share	0.646 [0.104]**	0.646 [0.104]**	0.646 [0.103]**							
Growth Manufact. Mexico * Labor Share				0.108 [0.044]*						
Growth Manufact. Mexico * Labor Share					0.059 [0.021]**					
Growth Manufact. Vietnam * Labor Share						0.05 [0.013]**				
Growth Manufact. Canada * Labor Share							0.039 [0.053]			
Growth Manufact. Japan * Labor Share								0.076 [0.051]		
Growth Manufact. Japan * Skill Intensity									0.209 [0.037]**	
Growth Ind. Prod. China * Skill Intensity										0.042 [0.075]
Fixed Effects	n	y	y	y	y	y	y	y	y	y
Year Dummies	n	n	y	y	y	y	y	y	y	y
Observations	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925
Sectors	325	325	325	325	325	325	325	325	325	325
R-Squared (within)		0.088	0.106	0.032	0.024	0.027	0.024	0.045	0.056	0.092

Notes: Table 1 presents the relation between the growth of manufacturing output in several nations, factor intensity and growth of US imports. The countries covered are China ((1), (2), (3), and (10)), Mexico in (4), India in (5), Vietnam in (6), Canada in (7), and Japan in (8) and (9) The dependent variable is the year to year in the level of Import from the respective country divided by the US industry size. US Industry Size is defined as the 1997-2006 average value of US shipments plus total imports in the respective industry. An industry is measured at the 6 Digit NAICS level (only manufacturing industries). All specifications except (1) and (2) include year dummies, and all specifications except (1) include fixed effects by industry; * significant at 5%; ** significant at 1%

Table 2 - Low Income Country Imports and US Prices: OLS Results (Fixed Effects Panel Regressions)

	(1) w/o year *dummies*	(2) with year *dummies*	(3) lagged *importshare*	(4) lagged *price change*	(5) lagged import *penetration*	(6) all of *(3) - (5)*	(7) lagged dif. of imports	(8) productivtiy growth US
				Sample: 6 Digit NAICS Manufacturing Industries from 97-06				
			Dependent Variable is the annual Ln-change of the 6 Digit NAICS US Producer Price					
? Imports LIC (in % of US Shippments)	0.402 [0.063]**	0.131 [0.064]*	0.152 [0.064]*	0.21 [0.068]**	0.092 [0.073]	0.182 [0.078]*	0.208 [0.069]**	0.068 [0.071]
Lag 1 of Imports LIC (in % of US Shippments)			-0.111 [0.030]**			-0.12 [0.046]**		
Lag 1 of ? US Producer Prices (6 Digit NAICS)				-0.087 [0.021]**		-0.127 [0.024]**		
Lag 1 of Import Penetration (Ttl. Imports in % of US Industry)					-0.001 [0.002]	0 [0.003]		
Lag 1 ? Imports LIC (in % of US Industry Size)							-0.057 [0.067]	
US Productivity Growth								-0.008 [0.016]
Year Dummies	n	y	y	y	y	y	y	y
Observations	2702	2702	2702	2375	2191	1864	2413	2312
Sectors	325	325	325	325	325	325	325	325
R-Squared (within)	0.02	0.09	0.09	0.09	0.08	0.1	0.08	0.08

Notes: Table 2 presents the OLS relation between the growth of US imports from 9 low income countries (LICs) and US producer prices. The dependent variable is the annual change in the logarithm of US producer prices at the 6 Digit NAICS level (Only Manufacturing Industries). "? Imports China" is defined as the annual absolute change in (LIC Imports/US Industry Size). US Industry Size is defined as the 1997-2006 average value of US shipments in the respective industry. Also "Imports LIC" (in (3)) and "Import Penetration" (in (5)) are divided by the US industry size. All specifications include fixed effects and all except (1) include year dummies. Therefore, in (2) to (8), the coefficient of ? Imports China thus measures the effect that an increase of LIC imports above the group and year effects has on the producer prices. The variable "productivity" in (8) is the 4, 5, 0r 6 digit NAICS productivity growth from the BLS; * significant at 5%; ** significant at 1%

Table 3 - LIC Imports and US Prices: IV Results (Fixed Effects Panel Regressions)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	w/o year	with year	lagged	lagged	lagged import	all of	lagged dif.	productivtiy
	dummies	*dummies*	*importshare*	*price change*	*penetration*	*(3) - (5)*	of imports	growth US
	Sample: 6 Digit NAICS Manufacturing Industries from 97-06							
	Panel B: Dependent Variable is the annual Ln-change of the 6 Digit NAICS US Producer Price							
Instrumented ? Imports LIC	-5.806	-5.788	-6.261	-4.494	-10.874	-7.97	-4.518	-6.64
(in % of US Industry Size)	[1.299]**	[1.270]**	[1.524]**	[1.109]**	[3.988]**	[2.989]**	[1.181]**	[1.551]**
?% LIC Manfct.	2.074							
Output (weighted)	[0.337]**							
Lag 1 of Imports China			0.157			0.009		
(in % of US Industry Size)			[0.094]			[0.138]		
Lag 1 of ? US Producer Prices				-0.061		-0.083		
(6 Digit NAICS)				[0.039]		[0.070]		
Lag 1 of Import Penetration					0.024	0.02		
(Ttl. Imports in % of US Industry)					[0.012]	[0.010]		
Lag 1 ? Imports China							0.297	
(in % of US Industry Size)							[0.150]*	
								0.115
								[0.047]*
	Panel A: dependent variable is the annual change in Imports LIC / US industry Size							
Labor Share * ?% LIC Manfct.	1.006	1.008	0.903	1.064	0.6	0.66	0.992	0.97
Output (weighted)	[0.193]**	[0.190]**	[0.192]**	[0.209]**	[0.209]**	[0.226]**	[0.205]**	[0.202]**
?% LIC Manfct.	-0.614							
Output (weighted)	[0.165]**							
Lag 1 of Imports LIC			0.035			0.013		
(in % of US Industry Size)			[0.010]**			[0.015]		
Lag 1 of ? US Producer Prices				0.009		0.007		
(6 Digit NAICS)				[0.007]		[0.008]		
Lag 1 of Import Penetration					0.002	0.003		
(Ttl. Imports in % of US Industry)					[0.001]**	[0.001]**		
Lag 1 ? Imports LIC							0.068	
(in % of US Industry Size)							[0.021]**	
US Productivity Growth								0.017
								[0.005]**
Year dummies (both stages)	n	y	y	y	y	y	y	y
Observations	2702	2702	2702	2375	2191	1864	2413	2312
Sectors	325	325	325	325	325	325	325	325
R-Squared (first stage within)	0.1	0.12	0.13	0.14	0.09	0.1	0.14	0.13

Notes: The upper Panel B of Table 3 presents the relation between instrumented changes in US imports from 9 LICs and US producer prices. The dependent variable is the annual change in the logarithm of US producer prices at the 6 Digit NAICS level (Only Manufacturing Industries). "? Imports China" is defined as the annual absolute change in (LIC Imports/US Industry Size). US Industry Size is defined as the 1997-2006 average value of US shipments in the respective industry. Also "Imports LIC" (in (3)) and "Import Penetration" (in (5)) are divided by the US industry size. In (1), "?% LIC Manfct." is a weighted average of the growth of manufacturing or industrial output (for China) in the 9 LICs. In the lower Panel A the first stage relation is presented for the dependent variable ? Imports China. The instrument employed is the labor intensity times ?% LIC Manfct." For interpretation of first and second stage coefficients see main text. The variable "productivity" in (8) is the 4, 5, 0r 6 digit NAICS productivity growth from the BLS; * significant at 5%; ** significant at 1%

Table 4 - LIC Trade and Productivity: Comparing OLS and IV Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	FE, w/o year *dummies*	FE, with year *dummies*	lagged *importshare*	lagged *prod. growth*	lagged import *penetration*	all of *(3) - (5)*	lagged dif. of imports
			Sample: 6 Digit NAICS Manufacturing Industries from 97-06				
Panel A OLS Results - The dependent variable is year to year US prodcutivty Growth (BLS)							
? Imports LIC	0.365	0.362	0.368	0.371	0.341	0.373	0.47
(in % of US Shippments)	[0.099]**	[0.099]**	[0.100]**	[0.099]**	[0.118]**	[0.117]**	[0.115]**
?% LIC Manfct.	0.227						
Output (weighted)	[0.081]**						
Lag 1 of Imports LIC			-0.035			-0.049	
(in % of US Shippments)			[0.060]			[0.084]	
Lag 1 of Productivty Growth				-0.14		-0.13	
				[0.022]**		[0.026]**	
Lag 1 of Import Penetration					-0.014	-0.013	
(Ttl. Imports in % of US Industry)					[0.003]**	[0.004]**	
Lag 1 ? Imports LIC							-0.133
(in % of US Industry Size)							[0.117]
Lag 1 of ? US Producer Prices							
R-Squared (within)	0.01	0.04	0.04	0.06	0.05	0.06	0.05
Panel B Two Stage Least Square Results - The dependent variable is year to year US prodcutivty Growth (BLS)							
Instrumented ? Imports LIC	2.042	2.052	2.399	1.92	4.039	3.907	1.56
(in % of US Shippments)	[1.015]*	[1.003]*	[1.176]*	[0.949]*	[2.147]	[2.006]	[1.104]
?% LIC Manfct.	-0.172						
Output (weighted)	[0.255]						
Lag 1 of Imports LIC			-0.157			0.029	
(in % of US Shippments)			[0.096]			[0.114]	
Lag 1 of Productivty Growth				-0.141		-0.177	
				[0.024]**		[0.043]**	
Lag 1 of Import Penetration					-0.023	-0.023	
(Ttl. Imports in % of US Industry)					[0.007]**	[0.007]**	
Lag 1 ? Imports LIC							-0.214
(in % of US Industry Size)							[0.145]
Lag 1 of ? US Producer Prices							
Year Dummies	n	y	y	y	y	y	y
Observations	0.01	0.04	0.04	0.06	0.05	0.06	0.05
Sectors	325	325	325	325	325	325	325

Notes: The upper Panel A of Table 4 presents the OLS relation between US productivity growth and imports from 9 LICs. The lower Panel B presents the two stage least square results for the same two variables. In both panels, the dependent variable is the annual 4, 5, 0r 6 digit NAICS productivity growth obtained from the BLS (manufacturing industries). "? Imports LIC" is defined as the annual absolute change in (LIC Imports/US Industry Size). US Industry Size is defined as the 1997-2006 average value of US shipments in the respective industry. Also "Imports LIC" (in (3)) and "Import Penetration" (in (5)) are divided by the US industry size. In (1), "?% LIC Manfct." is a weighted average of the growth of manufacturing or industrial output (for China) in the 9 LICs. For the first stage relation between LICs imports and growth in LICs see Panel A of Table 3; * significant at 5%; ** significant at 1%

Table 5 - LIC Trade and Markups: Comparing OLS and IV Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	FE, w/o year *dummies*	FE, with year *dummies*	lagged *importshare*	lagged *prod. growth*	lagged import *penetration*	all of *(3) - (5)*	lagged dif. of imports	productivity growth
	Sample: 6 Digit NAICS Manufacturing Industries from 97-06							
Panel A OLS Results - The dependent variable is the change of Ln(Markup)								
? Imports LIC	0.842	0.694	0.694	0.796	0.69	0.812	0.811	0.595
(in % of US Industry Size)	[0.240]**	[0.246]**	[0.246]**	[0.292]**	[0.246]**	[0.294]**	[0.305]**	[0.243]*
Lag 1 of Imports China			0			-0.356		
(in % of US Industry Size)			[0.171]			[0.214]		
Lag 1 of ? US Producer Prices				-0.29		-0.287		
(6 Digit NAICS)				[0.029]**		[0.029]**		
Lag 1 of Import Penetration					0.007	0.039		
(Ttl. Imports in % of US Industry)					[0.013]	[0.017]*		
Lag 1 ? Imports China							0.348	
(in % of US Industry Size)							[0.295]	
US Productivity Growth								0.393
								[0.054]**
R-Squared (within)	0.01	0.04	0.04	0.12	0.04	0.13	0.05	0.07
Panel B Two Stage Least Square Results -The dependent variable is the change of Ln(Markup)								
Instrumented ? Imports LIC	-2.342	-2.123	-2.06	-1.396	-2.045	-0.549	-2.683	-4.112
(in % of US Industry Size)	[3.920]	[3.623]	[3.525]	[3.655]	[3.579]	[3.718]	[3.946]	[4.028]
?% LIC Manfct.	0.895							
Output (weighted)	[0.761]							
Lag 1 of Imports China			-0.039			-0.263		
(in % of US Industry Size)			[0.184]			[0.332]		
Lag 1 of ? US Producer Prices				-0.294		-0.289		
(6 Digit NAICS)				[0.030]**		[0.030]**		
Lag 1 of Import Penetration					0.011	0.041		
(Ttl. Imports in % of US Industry)					[0.014]	[0.017]*		
Lag 1 ? Imports China							0.595	
(in % of US Industry Size)							[0.417]	
US Productivity Growth								0.451
								[0.078]**
Year Dummies	n	y	y	y	y	y	y	y
Observations	1867	1867	1867	1540	1867	1540	1579	1867
Sectors	325	325	325	325	325	325	325	325

Notes: The upper Panel A of Table 5 presents the OLS relation between US markups and imports from 9 LICs. The lower Panel B presents the two stage least square results for the same two variables. In both panels, the dependent variable is the annual change in Ln(Markup), where Markup equals (Value Added– Total Employment Compensation)/Value of Shippings). Value Added equals the value of shipping minus the cost of materials, supplies, containers, fuel, purchased electricity, and contract work. Value added is also adjusted for changes in inventory and merchandise operations. All data is obtained from the BLS. "? Imports LIC" is defined as the annual absolute change in (LIC Imports/US Industry Size). US Industry Size is defined as the 1997-2006 average value of US shipments in the respective industry. Also "Imports LIC" (in (3)) and "Import Penetration" (in (5)) are divided by the US industry size. In (1), "?% LIC Manfct." is a weighted average of the growth of manufacturing or industrial output (for China) in the 9 LICs. For the first stage relation between LICs imports and growth in LICs see Panel A of Table 3; * significant at 5%; ** significant at 1%

Table 6 - Chinese Imports and US Prices: OLS Results (Fixed Effects Panel Regressions)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	w/o year *dummies*	with year *dummies*	lagged *importshare*	lagged *price change*	lagged import *penetration*	all of *(3) - (5)*	lagged dif. of imports	productivtiy growth US
	Sample: 6 Digit NAICS Manufacturing Industries from 97-06							
	Dependent Variable is the annual Ln-change of the 6 Digit NAICS US Producer Price							
? Imports China (in % of US Shippments)	0.31 [0.084]**	-0.051 [0.084]	0 [0.086]	-0.009 [0.090]	-0.076 [0.101]	-0.011 [0.110]	0.032 [0.092]	-0.103 [0.091]
Lag 1 of Imports China (in % of US Shippments)			-0.102 [0.035]**			-0.124 [0.056]*		
Lag 1 of ? US Producer Prices (6 Digit NAICS)				-0.086 [0.021]**		-0.126 [0.024]**		
Lag 1 of Import Penetration (Ttl. Imports in % of US Industry)					-0.001 [0.002]	0 [0.003]		
Lag 1 ? Imports China (in % of US Industry Size)							-0.165 [0.087]	
US Productivity Growth								-0.006 [0.016]
Year Dummies	n	y	y	y	y	y	y	y
Observations	2702	2702	2702	2375	2191	1864	2413	2312
Sectors	325	325	325	325	325	325	325	325
R-Squared (within)	0.01	0.09	0.09	0.09	0.08	0.09	0.08	0.08

Notes: Table 6 presents the relation between the growth of US imports from China and US producer prices in fixed effects panel OLS regressions. The dependent variable is the annual change in the logarithm of US producer prices at the 6 Digit NAICS level (Only Manufactoring Industries) . "? Imports China" is defined as the annual absolute change in (Chinese Imports/US Industry Size). US Industry Size is defined as the 1997-2006 average value of US shipments in the respective industry. Also "Imports China" (in (3)) and "Import Penetration" (in (5)) are divided by the US industry size. All specifications except (1) include year dummies, so that trends in inflation, Chinese trade, aggregate wages, or aggregate productivity are not reflected in the coefficients. The variable "productivity" in (8) is the 4, 5, 0r 6 digit NAICS productivity growth from the BLS; * significant at 5%; ** significant at 1%

Table 7 - Chinese Imports and US Prices: IV Results (Fixed Effects Panel Regressions)

	(1) w/o year *dummies*	(2) with year *dummies*	(3) lagged *importshare*	(4) lagged *price change*	(5) lagged import *penetration*	(6) all of *(3) - (5)*	(7) lagged dif. of imports	(8) productivtiy growth US
	Sample: 6 Digit NAICS Manufacturing Industries (Codes 300000-3999999) from 97-06							
	Panel B: dependent variable is the annual Ln-change of the 6 Digit NAICS US Producer Price							
? Imports China (in % of US Industry Size)	-5.765 [1.106]**	-5.762 [1.085]**	-7.402 [1.723]**	-4.795 [1.058]**	-13.748 [5.130]**	-13.596 [6.703]*	-4.832 [1.199]**	-6.252 [1.216]**
?% Chinese Industrial Production (aggregate)	1.265 [0.162]**							
Lag 1 of Imports China (in % of US Industry Size)			0.509 [0.158]**			0.625 [0.414]		
Lag 1 of ? US Producer Prices (6 Digit NAICS)				-0.101 [0.033]**		-0.115 [0.080]		
Lag 1 of Import Penetration (Ttl. Imports in % of US Industry)					0.016 [0.010]	0.015 [0.011]		
Lag 1 ? Imports China (in % of US Industry Size)							0.721 [0.255]**	
US Productivity Growth								0.043 [0.030]
	Panel A: dependent variable is the annual change in Imports China / US industry Size							
Labor Share * Growth Chinese Industrial Output	0.646 [0.104]**	0.646 [0.103]**	0.482 [0.103]**	0.739 [0.122]**	0.36 [0.127]**	0.298 [0.137]*	0.587 [0.110]**	0.717 [0.121]**
?% Chinese Industrial Production (aggregate)	-0.427 [0.089]**							
Lag 1 of Imports China (in % of US Industry Size)			0.074 [0.008]**			0.053 [0.013]**		
Lag 1 of ? US Producer Prices (6 Digit NAICS)				0.003 [0.005]		0.002 [0.006]		
Lag 1 of Import Penetration (Ttl. Imports in % of US Industry)					0.001 [0.001]*	0.001 [0.001]		
Lag 1 ? Imports China (in % of US Industry Size)							0.155 [0.020]**	
US Productivity Growth								0.008 [0.004]*
Year dummies (both stages)	n	y	y	y	y	y	y	y
Observations	2925	2925	2925	2381	2195	1868	2600	2350
Sectors	325	325	325	325	325	325	325	325
R-Squared (first stage within)	0.09	0.11	0.13	0.12	0.06	0.08	0.13	0.11

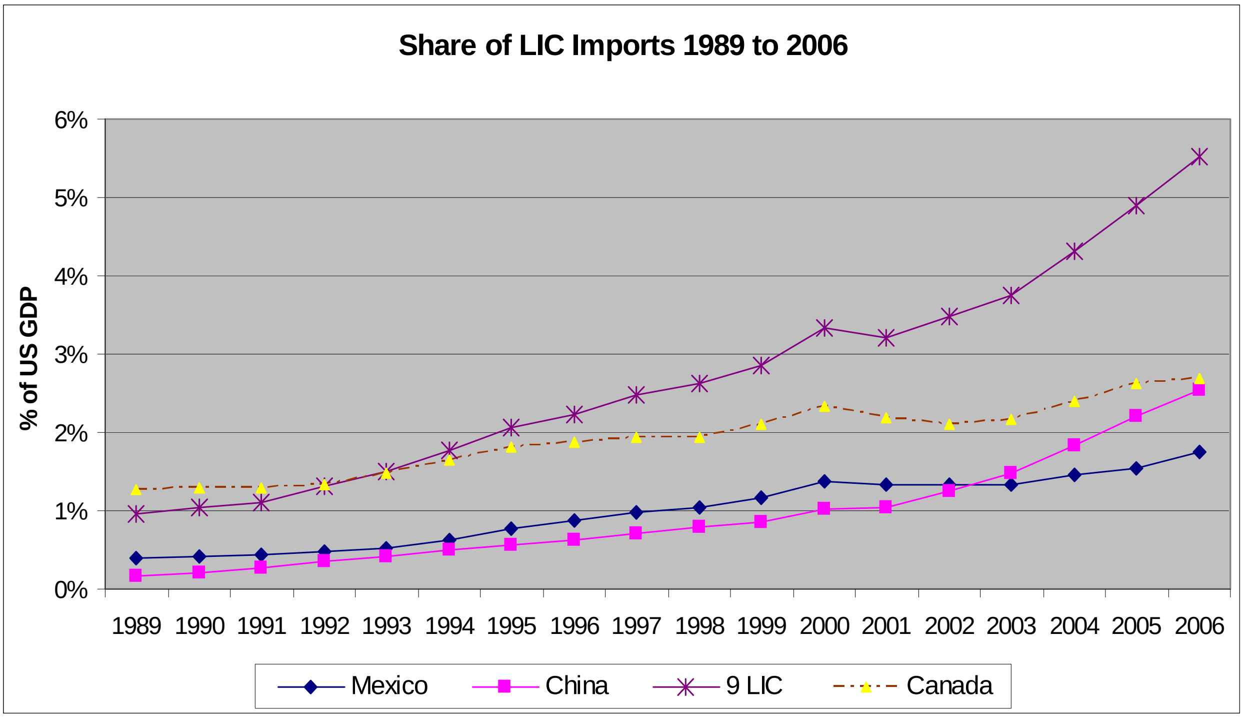
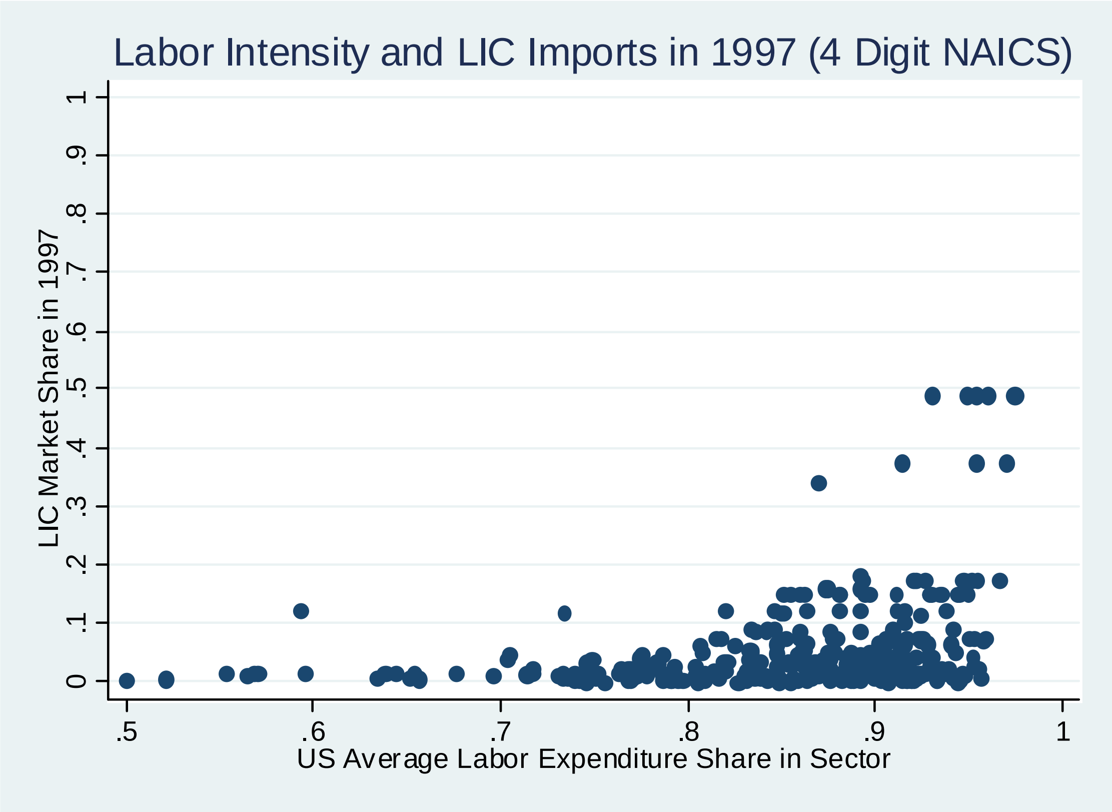

Share of LIC Imports 1989 to 2006
% of US GDP
6%
5%
4%
3%
2%
1%
0%
1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006
Mexico
China
9 LIC
Canada

Figure 1


Labor Intensity and LIC Imports in 1997 (4 Digit NAICS)
LIC Market Share in 1997
0
.1
.2
.3
.4
.5
.6
.7
.8
.9
1
.5
.6
.7
.8
.9
1
US Average Labor Expenditure Share in Sector

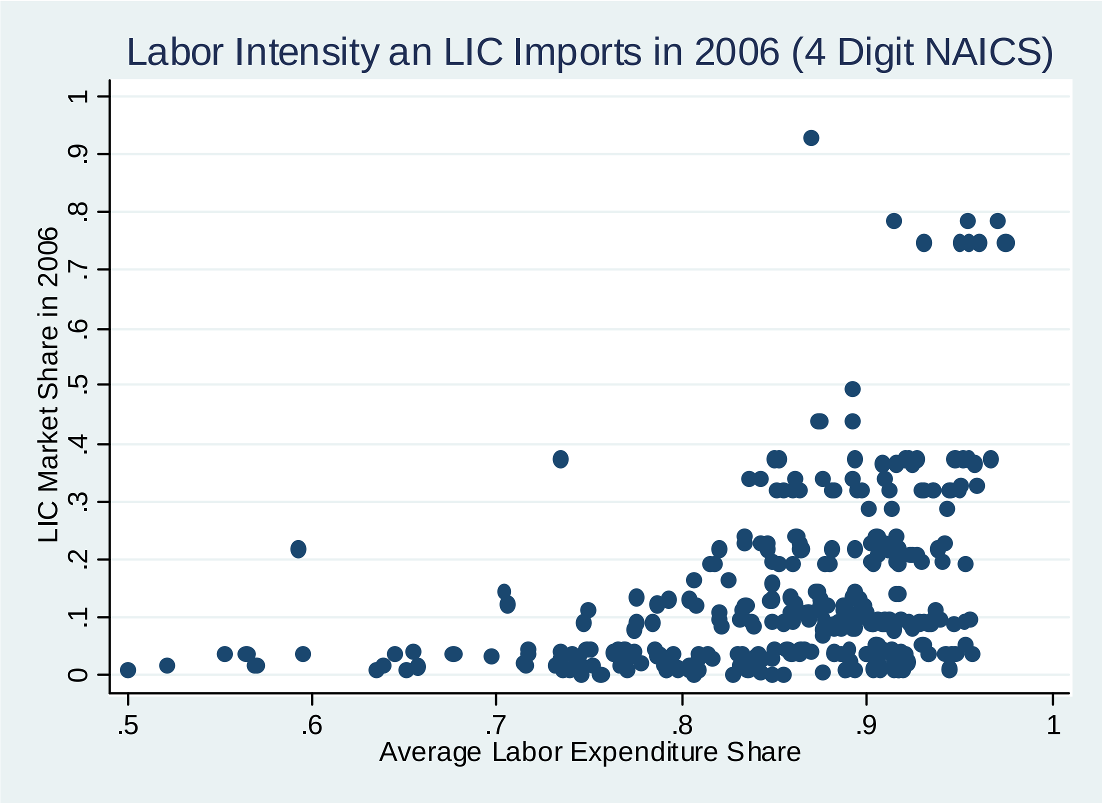

Labor Intensity an LIC Imports in 2006 (4 Digit NAICS)
LIC Market Share in 2006
0
.1
.2
.3
.4
.5
.6
.7
.8
.9
1
.5
.6
.7
.8
.9
1
Average Labor Expenditure Share

Figure 2