Low-Wage Import Competition, Inflationary Pressure, and Industry Dynamics in Europe*

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Abstract

What is the impact of import competition from low-wage countries (LWCs) on inflationary pressure in Europe? This paper examines whether labor-intensive exports from emerging Europe, Asia, and other global regions have a uniform impact on producer prices in Germany, France, Italy, Sweden, and the United Kingdom. In a panel covering 110 (4-digit) NACE industries from 1995 to 2008, instrumental variable estimations predict that LWC import competition is associated with strong price effects. More specifically, when LWC exporters capture 1% of European market share, producer prices decrease by about 3%. In contrast, no effect is present for import competition from low-wage countries in Central and Eastern Europe. Decomposing the mechanisms that underlie the LWC price effect on European industry, we show that import competition has a pronounced effect on average productivity with only a muted effect on wages or margins. Owing to the exit of firms and the increase in productivity, LWC import competition is shown to have substantially reduced employment in the European manufacturing sector.

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1. Introduction

Trade's impact with low-wage countries (LWCs) – and in particular with China – on industry structure and prices in developed economies is a contentious issue.[1] Numerous researchers have attempted to determine whether imports from China held down European prices.[2] A common finding is that trade with LWCs had only a mild effect at best on European prices. The objective of this paper is to demonstrate that the impact of LWC exports on European producer prices is much more pronounced and complex than is commonly assumed.

We argue that the existing literature fails to establish the causal effect

[1]See Mishkin (2007), Carney (2008), De Gregorio (2008), and Trichet (2008) for diverging views as to how central bank governors define the links between globalization and inflation.

[2]Micro studies using 2- and 4-digit PPI and CPI data include Bugamelli et al. (2010) for Italy (small price effect), Glatzer et al. (2006) for Austria (no price effect), WEO (2006) for Europe (no price effect), and Wheeler (2008) for the UK (no price effect). Borio and Filardo, (2007) and Pain et al. (2006) use conventional specifications of Phillips curves to determine the role of foreign output gaps on (aggregate) domestic inflation. A separate set of empirical studies including Auer and Fischer (2010), Ball (2006), Gamber and Hung (2001), Ihrig et al. (2007), Kamin et al. (2006), and Tootell (1998) focus exclusively on the U.S. case.

of trade since trade flows are endogenous to local demand conditions. For example, when an industrial sector in Europe experiences a positive demand shock, prices increase, thereby inducing an increase in LWC imports. The presence of this endogeneity biases the estimated relative price effect from trade towards a less negative or even positive correlaton between import growth and European price changes.

The paper's first contribution is to extend the IV strategy of Auer and Fischer (2010) for the case of both heterogeneous exporter markets (i.e. emerging Europe versus China) and heterogeneous import markets (i.e., Germany, France, Italy, Sweden, and the United Kingdom). As in Auer and Fischer (2010), the IV strategy is based on the observation that when LWC manufacturing output grows, LWC exports to Europe increase in labor intensive sectors relative to capital intensive sectors. Imports from LWCs are heavily concentrated in labor intensive industries. Regression analysis shows that this specialization also holds at the margin: for example, when China's manufacturing output rises, Chinese exports increase much more in labor-intensive sectors than in capital intensive sectors.

Because the aggregate growth of productive capacity in LWCs may be endogenous to European demand, a difference-in-difference specification is

used to identify the causal effect of LWC imports on prices. Fixed effects are also introduced to filter out sector specific trends in prices. The variation that is exploited relates the difference in how imports change in sectors with different labor intensities to differences in sectoral price changes. In addition to this identification strategy, we also determine how the latter supply-driven increase in imports affects various import markets differentially given their varying degree of openness to China and the other LWCs covered in this study.

Beyond the empirical finding that LWC trade has a profound relative price impact on European producer prices, we show that this result is largely driven by Chinese exports. More specifically, when Chinese exporters capture 1% of European market share, producer prices decrease about 2%. In contrast, no effect is present for import competition from low-wage countries in Central and Eastern European (CEE).

The paper's second contribution is to decompose the channels of the LWC price effect, thereby highlighting how LWC import competition has shaped the evolution of European industry during the last decade. Such import competition is shown to have had only a small effect on the relative wages of production workers, no effect on firm's margins, but a large effect on average

firm productivity. Additional evidence shows that the productivity effect is driven by the exit of unproductive firms, which is consistent with Melitz (2003).

LWC import competition is also shown to have significantly reduced employment in the manufacturing sector. Our estimates suggest that between 1995 and 2007, the increase in LWC import competition may have reduced employment in the manufacturing sector in Germany, Italy, France, Sweden, and the UK in the order of 10% (or by about 1.3 million workers in the sectors covered in our study).

The paper proceeds as follows: section 2 first discusses the empirical framework and the data in the context of LWC exports. Next, section 3 presents OLS and IV estimates of LWC's impact on European producer prices. Thereafter, Section 4 disentangles the main empirical result of section 3 by considering different regional constellations of LWC import competition. These include examining the role of China separately or alternatively the influence of CEE countries with an abundance of low-skilled labor. Section 5 decomposes the LWC price effect into the contributions of wages, markups, and productivity. Section 6 offers concluding remarks on the global nature of labor-intensive goods and their implications for European prices.

2. Empirical framework and data

The discussion of the empirical framework is presented in three subsections. The regression model and the IV strategy are discussed in subsection 2.1. Instrument construction and preliminary first-stage regressions are presented in subsection 2.2. Data description and sources are offered in subsection 2.3.

2.1 Empirical setup

The true relation between European price changes and LWC import changes is given by

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

where $p_{e,j,t}$ denotes European prices at time t for sector j and $m_{lwc,j,t}$ denotes European imports in sector j from LWCs. The industry-specific trend of European prices in sector j is captured by $\alpha_{p,j}$, the common shock to European prices at time t by $\epsilon_{p,t}$, and sector specific price shocks by $\epsilon_{p,j,t}$. The absolute change in a variable is denoted by Δ.

In equation 1, the coefficient of interest, β, measures the true impact of an increase in trade with LWCs on European sectoral prices. A prior shared by most researchers is that LWC imports lead to lower European prices, i.e., $\beta < 0$.

It is evident that trade is endogenous to local demand conditions in equation 1. OLS estimation of β in equation 1 is therefore biased. Apart from the unobserved export supply shocks in LWCs (denoted by $\Delta s_{lwc,j,t}$ below), European prices also influence how much foreign firms export. The relation between the change in LWC imports, European prices, and supply and demand conditions in LWCs is given by

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

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

To solve the endogeneity problem, we observe in the next subsection that LWC exports to Europe are primarily in labor-intensive sectors and that the increase in exports is larger when aggregate LWC growth is high. We denote the LWC growth of manufacturing output by g_{lwc} and a sector's (average) labor intensity by $\overline{ls}_j$. For most specifications presented below, we postulate that supply pressure in LWCs follows

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

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

Because aggregate growth in LWCs may still be correlated with aggregate

demand in Europe, we do not use $\Delta s_{m,j,t}$ as an instrument for trade. Rather, we evaluate the difference of imports between two sectors j and k that differ in their labor intensities $\overline{ls}_j$ and $\overline{ls}_k$, yielding

$$\Delta m_{lwc,j,t} - \Delta m_{lwc,k,t} = \frac{\theta\lambda_2}{1-\delta\beta}\left(\overline{ls}_j - \overline{ls}_k\right) g_{lwc,t} + \epsilon^*_{m,j,t}. \tag{4}$$

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 form difference-in-difference specification relating LWC growth changes times labor intensity to relative changes in prices thus becomes

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

where

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

In subsection 4.3, where we analyze the impact of import competition from CEE countries on European prices, we refine our instrumentation strategy to incorporate the fact that the CEE exporters may be more or less important in certain European markets in certain types of goods. For example,

owing to the geographic proximity, these countries could be more important in Germany than in France for goods with high transportation costs. We thus weigh the instrument proposed in equation 3 by the lagged import share of the CEE exporters in each European importer (denoted by $m_{lwc,j,i,t-1}$ where i is the importing nation), yielding

$$\Delta\widetilde{s_{m,j,t}} = \left(\alpha_{s,j} + \lambda_1 g_{lwc,t} + \lambda_2 g_{lwc,t}\overline{ls}_j + \epsilon_{s,t} + \epsilon_{s,j,t}\right) m_{lwc,j,t-1}. \qquad (6)$$

For both measures of LWC supply pressure in equations 3 and 6, the methodology can establish the true effect of LWC imports if the following condition holds.

Assumption 1. (Identification Restriction)

$$(\epsilon_{p,j,t} - \epsilon_{p,k,t}) \quad \perp \quad g_{lwc,t}(\overline{ls}_j - \overline{ls}_k).$$

Assumption 1 requires that aggregate growth in LWCs is not the result of sector specific European demand shocks, which are systematically biased towards high or low labor-intensive sectors. Assumption 1 says that aggregate growth in LWCs has no direct effect on the *difference* in price changes between European sectors j and k other than its true impact on imports from LWCs. The orthogonality assumption does not impose that aggregate growth in LWCs is orthogonal to European demand shocks that are canceled out due

to the difference-in-difference formulation.

Because $\overline{ls}_j - \overline{ls}_k$ is a constant over time, the orthogonality assumption assumes that growth in LWCs is not the result of sector specific European demand shocks that are concentrated in labor intensive sectors. The orthogonality assumption fails only if all of the following three conditions hold. In Europe, there is a systematic shift of demand towards labor intensive goods (for constant prices of these goods). The demand shift induces imports from LWCs. Aggregate growth in LWCs is caused by an increase in European demand.[3]

2.2 The construction of the instrument

The IV strategy is based on the simple observation that when LWC manufacturing output grows, their exports to Europe increase in labor intensive sectors relative to capital intensive sectors.[4] Figure 1 plots average labor in-

[3]Auer and Fischer (2010) use information on U.S. consumption growth, U.S. non-LWC import demand, and U.S. production to test the orthogonality assumption, finding no evidence for this to be the case. Furthermore, even if Assumption 1 were partly violated, our results still provide a valid lower bound on the impact that imports of LWCs have on European prices: any bias that is left would tend to an underestimation of the effect of LWC imports.

[4]The strategy is motivated by Heckscher-Ohlin theory and its modern extensions by Trefler (1993), Davis and Weinstein (2001), and Romalis (2004). The classical theory of

tensity for European industry weighted by Chinese import share, LWCs, and World from 1995 to 2008. The six LWC countries are China, India, Malaysia, Mexico, the Philippines, and Thailand. These countries are defined to be low wage, because they have a high level of manufacturing exports and a GDP per capita of less than 25% of the European average.[5] Europe is Germany, France, Italy, Sweden, and the United Kingdom. The graph highlights two stylized facts that are crucial for the IV strategy. First, average labor intensity irrespective of origin is stable over the 14-year period. LWC exports to Europe are 20% more labor intensive than exports from the rest of the world.

To analyze how import competition from China and other LWCs has changed over time, Figure 2 shows two scatter plots relating low-wage import competition to labor intensity for two points in time. The upper scatter plot relates the volume of European imports from the six LWCs normalized by European sales in 1996 to the sector's labor intensity. In 1996, imports were concentrated in labor-intensive industries. The lower scatter plot documents

trade predicts that countries should specialize in industries that intensively use relatively abundant factors.

[5]Using the same definition, Auer and Fischer (2010) define the following countries to be low wage for U.S. imports: China, Brazil, Indonesia, India, Malaysia, Mexico, the Philippines, Thailand, and Vietnam. See the Appendix as to how the LWCs are selected.

that this relationship is even more pronounced in 2008. In terms of their changes, the two scatter plots of Figure 2 also imply that the increase in import competition was concentrated in labor-intensive sectors.

Based on the documented observations from Figures 1 and 2, the instrument is constructed the following way. We first generate one weight for each LWC country i by averaging (imports from country i /(European domestic shipments + total imports)) over (a maximum of) 110 sectors and over the full sample. We then construct the weighted growth of manufacturing output in the six LWCs by summing over the growth rate multiplied by the country weight. Finally, we multiply the weighted growth rate by the European labor intensity of sector j.

Table 1 documents the empirical motivation for the instrument. In each regression, the dependent variable is European import share for a selected country. Columns 1 to 3 serve to highlight our empirical strategy. In these specifications, the dependent variable is the percentage point change in imports from China divided by the size of the respective sector in Europe. 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 import

share of goods imported from China is regressed on the cross product between the sector's labor share and aggregate growth of industrial production in China ($g_{china}\overline{ls}_j$). We also include the two interacted components separately. Column 1 documents that when industrial output in China expands, exports to Europe grow stronger in labor intensive sectors and grow less rapidly in capital intensive sectors. The estimated coefficient for $g_{China}\overline{ls}_j$ is $+0.006$ and is highly significant. In other words, when China's industrial capacity grows, exports to Europe increase more in labor intensive sectors than in capital intensive sectors. Furthermore, the main effect of industrial growth is estimated to be 0.012. That is, if the annual growth of Chinese industrial output is 1%, the value of exports in an industry using only capital ($\overline{ls}_j = 0$) increases by $0.012 * 0.01$, or 0.012 percentage points.

To better understand the coefficients in column 1, consider the following exercise. In the sample covering 110 manufacturing industries, the 25th percentile of labor intensity equals about 2.5, while the 75th percentile is equal to about 7.5. Assuming that the growth rate of Chinese industrial output is 10%, the value of European imports in industry k with labor intensity equal to 2.5 increases by $(0.006 * 2.5 + 0.012) * 0.1 = 0.27$ percentage points. In contrast, European imports in the more labor intensive industry j with labor

intensity equal to 7.5 increase by $(0.006 * 7.5 + 0.012) * 0.1 = 0.57$ percentage points. This implies that import competition from China will grow by around 0.3 percentage points more in sector j than in sector k.

Column 2 presents the same regression as in column 1, using fixed-effects estimation. Because the labor share is averaged over time and does therefore 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 Chinese industrial production is an aggregate variable, this regressor is dropped from the estimation when time dummies are introduced.

Column 3 documents that the previous results are not driven by aggregate trends (filtered with time dummies) or differences in sector specific trends (filtered with fixed effects). Rather, the interaction coefficient for the growth of Chinese output multiplied by the sector's 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 different LWC blocks: LWC-6 (i.e., China, India, Malaysia, Mexico, the Philippines, and Thailand), LWC-4 (LWC-6 minus China and Mexico),

LWC-10 (LWC-6 plus CEE) and low-wage CEE countries (Poland, Romania, Slovakia, and Turkey).[6] The coefficients for the measure of supply driven pressures are positive and significant.

We interpret the information from Table 1 as follows: there is a systematic relation between changes in European imports that can only be rationalized by explanations of comparative advantage. When labor abundant LWCs grow, their exports increase much more in labor intensive sectors than in capital intensive sectors. To further corroborate this view, we demonstrate the importance of labor abundance in the construction of the instrument in columns 8 and 9. In these regressions, we instrument for LWC trade with LWC growth interacted with a measure of skill intensity. The measure for skill intensity is constructed as one minus the share of non research and development workers multiplied by labor intensity.[7] This measure fails to predict imports from China (column 8) and LWC-10 (column 9).

2.3 Data description

[6] Again, the selection criteria for the (low-wage) CEE countries are discussed in the Appendix.

[7] Auer and Fischer (2010) conduct a similar exercise for Chinese exports to the United States, using skill intensity as an interaction term rather than the share of non research and development workers.

We use annual trade data from Eurostat from 1995 to 2008. The classification of import data is 4-digit NACE for a maximum of 110 industrial sectors.[8] Europe is comprised by France, Germany, Sweden, Italy, and the United Kingdom. The selection of these countries is based on data availability at the 4-digit level. European data on wages, producer prices, and productivity at the 4-digit level are also from Eurostat.

The measure of import penetration is constructed in the following manner. Consider for example the LWC-6 measure. We divide the value of total imports from the six LWCs (i.e., China, India, Malaysia Mexico, the Philippines, and Thailand) by the value of domestic shipments plus world imports. To make sure that the results are not driven by the endogenous response of European sales to European price developments, the value of domestic shipments plus world imports is averaged over the full sample. Our measure of import penetration takes the value of 0.01 in a sector where imports from

[8]The Statistical Classification of Economic Activities in the European Community (in French: nomenclature statistique des activities economiques dans la Communiaute europeenne), commonly referred to as NACE, is a European industry standard classification system consisting of a 6-digit code. The first four digits are the same for all European countries, whereas the fifth varies from country to country and further digits are placed by database suppliers.

LWC-6 amount to 1% of average European sales in the respective sector.

When examining changes of import penetration, we evaluate the absolute change in the level of import penetration, i.e., import penetration at time t minus import penetration at *t-1*. This strategy is expedient, because the response of European prices should be in relation to the increase of imports in proportion to European demand but not in proportion to the percentage growth of imports from LWCs. Further, normalizing by sector size in Europe does not drop any zero-trade observations.

To measure an industry's labor intensity, the 1995 to 2008 average of the European labor expenditure share is used for each of the 110 sectors. Labor intensity is defined as the ratio of average labor expenditure divided by the average capital expenditure.

3. LWC imports and European prices

This section presents OLS and two-stage least squares estimates for the difference-in-difference specification of equation 5. All estimates for European and eurozone prices are stacked regressions that include country dummies. We begin our discussion by first presenting OLS estimates of European producer prices on LWC import share. This exercise is done to highlight the

bias in OLS estimation.

Panel C of Table 2 shows OLS regressions that do *not* support the conjecture that growing LWC imports are associated with declining European prices. The dependent variable is the percentage change of the European producer price index for each 4-digit sector. Table 2 presents results using fixed-effects panel regressions. The regression in column 1 includes time dummies. In this specification, European prices fall by -0.06% to a 1% above trend rise in LWC import share. Next, we add LWC output to the specification. Column 2 shows that the coefficient on import share collapses to 0.001 and is insignificant. A further step is to introduce wages and productivity. The coefficient of interest in this regression, shown in column 3, is 0.015 and remains insignificant. Next, column 4 replicates the regression of column 1 for the three eurozone countries (i.e., France, Germany, and Italy). The coefficient on import share now is -0.029 but is still insignificant. As a last check, different dynamic aspects of prices are considered. In column 5, the introduction of lagged producer prices does not alter the insignificance of import share. The same is true when lagged import share is introduced in the specification. Again, column 6 shows that the import share coefficient is negative but insignificantly so.

The IV regressions as opposed to the OLS regressions show that LWC exports generate a large relative price effect. European producer prices fall between 3.2% and 4.8% when LWC growth in manufacturing rises by 1% above trend. The LWC effect on European prices is statistically significant at the 1% level for all specifications.

We begin the discussion of the IV results with the first-stage regressions. These regressions are displayed in Panel A of Table 2. In each specification, the instrument passes several tests of weak identification. The Cragg-Donald statistics, the associated Stock-Yogo statistic, as well as the F-statistic from the first-stage regressions reveal that the criticism of weak instruments is not an issue. The same panel also shows that the variable of interest, labor intensity multiplied by the change in LWC industrial output, is significant at the 1% level.

The second-stage IV regressions show that the relative price effect is stable in different specifications. These are presented in Panel B. Column 1 shows that the relative price effect is -3.5 and highly significant in the baseline regression with time dummies. This point estimate means that a 1% increase in LWC import share is associated with a 3.5% fall in European producer prices. The addition of manufacturing output to the baseline re-

gression shown in column 2 does not change the -3.5 estimate. The next regression in column 3 adds sectoral productivity and wages to the specification. Although these variables may be endogenous to LWC import share, the coefficient on LWC import share jumps to -4.8%. This increase in the estimated coefficient is possibly explained by the restricted sample (7010 observations in column 1 versus 5620 observations in column 3). Next, the eurozone regression presented in column 4 shows a slightly lower price effect at -3.2. The last two specifications in columns 5 and 6 that control for dynamics do not alter the baseline estimate.

When we observe that the market share of LWC imports grows, this could stem from either more goods being imported at constant prices (the channel we want to isolate), or alternatively, the same quantity being imported at higher prices. To make sure that we study the first effect, a first robustness test uses physical import volumes (measured in kilos) in the first-stage regressions instead of import values (measured in euros). Also the measure of physical import volumes is normalized by the size of the market, which is measured in the same physical quantity as is the import volume. Estimates for European prices and their corresponding specifications as in Table 2 are shown in Table 3. In terms of the instrument's strength, the first-stage re-

gressions show higher F-tests than the regressions with import values. The relative price effect remains highly significant but is now estimated to be around -2% for Europe and -1.5% for the eurozone.

4. LWC import competition from Asia and Emerging Europe: Disentangling the Price Effect

In this section, we show that the IV strategy can be used in a bilateral setting to answer the question whether Chinese exports lower European producer prices. As a further step, we focus on how diffuse LWC import competition is in Europe and examine which European regions are influenced the most. As a last step, we focus on the group of low-wage countries located in CEE.

4.1 How large is the China effect for Europe?

The China question for Europe is of interest because the European Commission currently defines China to be the single most important challenge for EU trade policy. China is the EU's biggest source of imports. More importantly, the results for the bilateral setting show that the Chinese-American debate on inflation discussed in Auer and Fischer (2010) extends to the European continent.

To highlight the instrument's strength in a bilateral setting, we re-run

the regressions for LWCs in Tables 2 and 3 but now separately for China. Table 4 presents OLS and IV estimates of Chinese import share on European producer prices. The OLS results show that the coefficient for the change in import value (measured in euros) is negative and significant for different specifications. Column 1 of Panel C shows a significant coefficient of -0.09 in the panel regressions with annual dummies. Column 2 shows the regression that adds Chinese manufacturing. The coefficient on import share now falls to -0.032 and is insignificant. Further, column 3 shows an extended regression that includes productivity and wages. The coefficient of interest falls further to -0.016 and is significant only at the 10% level. Next, column 4 replicates the estimates for column 1 for the major eurozone countries: France, Germany, and Italy. Here, the results are similar to those for column 1 with the five European countries. The last two specifications in columns 5 and 6 consider different dynamics of the specification in column 1. The introduction of lagged producer prices or lagged import share mitigates slightly the estimate for Chinese import share from -0.09 (column 1) to -0.07.

Next, IV estimates show that the price effect is much larger than the OLS estimates suggest. The IV estimates are recorded in Panel B and the accompanying first-stage regressions for the instrument equation are presented in

Panel A. Depending on the specification, the highly significant coefficient on Chinese import share lies between -3.8 and -6.8. These estimates are considerably higher than the LWC-6 estimates in Table 2, which are between -3.2 and -4.8. Our preferred specification of column 1 yields a price effect of -5.1.[9]

To control for valuation effects through the exchange rate on producer prices, we also show estimates for Chinese import volume measured in kilogram. For completeness, OLS and IV estimates are shown in Table 5. Jumping to the IV regressions of Panel B, the estimates show that the "China effect" on European prices lies between -1.9 to -2.7. These highly significant coefficient estimates for Chinese imports have a stronger effect on European prices than do the estimates using LWC-6. The difference is in the order of 0.5 percentage points. This result is not surprising given the fact that half of the total LWC-10 import share stems from China, and that Chinese goods are probably the cheapest of all imports.

4.2 Bilateral estimates for individual European countries

Until now, Europe is treated as a single regional block. Next, we ask whether

[9] Auer and Fischer (2010) show that the same effect for the United States is only 2.5% using data at the 6-digit NAICS level. However, it should be noted that direct comparisons are difficult, because different concordance assumptions are used in the NAICS and NACE classifications.

LWC exports impact producer prices differently across European countries. A priori, we do not expect LWC import competition to be homogeneous across countries or regions. Differences in market size, trade linkages, and general openness to trade expose countries to different levels of LWC import competition.

Table 6 records the regression estimates of LWC import competition on Germany, France, Sweden, Italy, and the United Kingdom. Panel B displays the second-stage relation between changes in import values in columns 1 to 5 and import volumes in columns 6 to 10. Panel A presents the equivalent information from the first-stage regression. The regressions are similar in specification to those presented in column 1 of Tables 2 and 3. The regressors are LWC-6 import share and time dummies.

The regression results show that LWC import competition is wide-spread, yet the size of the impact varies between European countries. There is strong evidence of LWC import competition in Germany, Sweden, and the United Kingdom. The coefficient estimates for import share are significant for all countries except for Italy in the regressions using import values (columns 1 to 5) and are significant for Germany, Sweden, and the United Kingdom in the regressions using import volume. Further, the coefficient estimates for import

values and import volumes show that the LWC penetration effect for prices is strongest for the United Kingdom and Sweden, followed by Germany and France. When LWC exporters capture 1% of British market share, producer prices decrease by -3.8% in the regression using import volumes. In the same regression for Sweden the price effect is -2.6%, whereas for Germany it is only -1.2%.

In contrast, the estimates for Italy suffer in that neither of the first-stage estimates are significant. Further, it should be noted that the low degrees of freedom and data quality may partially explain the poor performance for Italy. This finding is also in accordance with Bugamelli et al. (2010). They find a significant (since they are using micro data at the establishment level) but only small effect of Chinese import competition on Italian prices when using an instrumentation strategy combining elements of Bernard et al. (2006) and Auer and Fischer (2010).

4.3 Central and Eastern Europe's impact on European prices

What is the impact of the increasing integration between our five import markets and CEE on European producer prices? The fall of the Berlin Wall unleashed a large pool of low-wage workers that quickly converged to European standards. Our definition of a low-wage country assumes a high share

of manufactured exports and a nation's average GDP per capita is less than 25% of the average GDP per capita for Italy, Germany, France, Sweden and the United Kingdom. This LWC definition includes Poland, Romania, Slovakia, and Turkey. The results in the previous sections show a strong impact from LWCs primarily from Asia. Does CEE import competition also influence European prices?

The empirical evidence for CEE import competition is limited at best. A first hurdle lies with the low power of the instrument when applied to this group of countries: labor intensity alone cannot explain marginal exports to Europe. Table 7 shows first-stage regressions using import volume for the four low-wage CEE countries plus Russia, the Czech Republic, and Hungary. All estimations include fixed effects by sector and year dummies. Although Russia, the Czech Republic, and Hungary do not fulfill our LWC definition, they are used as controls. The regressions in Panel B thus use the same instrument of Tables 2 to 6 that multiplies European labor intensity by Eastern European manufacturing.[10]

To refine the instrumentation strategy, equation 6 is used instead. The instrument proposed in equation 3 is weighted by the lagged import share

[10]The instrument of Auer and Fischer (2010) is not significant for the CEE countries.

of the CEE exporters in each European importer, i.e., the adjusted instrument corrects for the small market share of low-wage CEE countries. Panel A of Table 7 displays the first-stage relation between changes of import volumes from the individual CEE countries and the CEE countries' sectoral weight multiplied by the change in the CEE countries' manufacturing output.[11] The adjusted instrument is significant for three of the four low-wage CEE countries, while three non low-wage CEE countries that act as controls are insignificant.

The next step in the IV analysis shows only limited evidence of low-wage CEE import competition for European producer prices. The single country effect is smaller than the estimates found in Tables 2 to 6 and is significant only for a single country. Table 8 presents IV regressions only for the three low-wage CEE countries (Romania, Poland, and Turkey) that passed the first-stage hurdle using our adjusted instrument in Panel A of Table 7. The regressions show only a significant result for Romania. When Romanian exporters capture 1% of European market share, producer prices decrease

[11]The changes of import volumes are defined as the year-on-year absolute change in (LWC import volume/European industry size), where the industry size is defined as the 1995-2008 average value of European domestic production plus world imports.

about 1.0%. In contrast, no such effect is present for Poland and Turkey.

Several factors could explain the non import competition result for low-wage CEE countries versus the strong results for LWC-6. A first issue is that our low-wage CEE countries are only borderline low-wage. If we alter our definition from 25% to 20% of European per capita GDP, Poland and Slovakia fall out. As expected, Romania, the only "true" low-wage country is also the only significant effect. A related issue is that the CEE labor market does not match the Chinese labor pool in size. China possesses a vast reservoir of labor that mitigates wage growth in the dynamic coastal regions. Instead, CEE wages and productivity have risen rapidly, converging to European levels. Further, Auer and Fischer (2008) show that Chinese output in low-skilled products is wide ranging. In contrast, CEE manufacturing tends to be sector specific and thus does not have the same breadth as Chinese goods to impact European producer prices.

5. Decomposing the LWC price effect

The evidence in sections 3 and 4 shows that there is a strong price response to a supply-induced increase of LWC import competition. In this section, the analysis considers the channels through which this is achieved. First,

the role of wages and employment is examined. The analysis then considers how import competition reduces firms' markups and increases firms' productivity.[12] The results show that LWC import competition has a profound on European industry through the firm-reshuffling channel of Melitz (2003).

5.1 Import competition's effect on European labor

The regressions with information from the European labor market are presented in Table 9. Columns 1 to 4 focus on the wage effect of increasing import competition. In column 1, the dependent variable is the year-to-year percentage change in the average cost of a production worker per hour.[13] The baseline panel estimation includes year and fixed effects. Although the coefficient for import share is -4.12, it is statistically insignificant. A potential explanation for this insignificance is that wages react slowly to import competition. If so, this means that the yearly panel analysis fails to pick up the long-run trends caused by LWC import competition. The analysis therefore considers next the long-run response of wages (and other dependent

[12]The source is Eurostat's Structural Business Statistics and the sample is from 1995 to 2007.

[13]This cost measure reflects the firm's point of view. It is the same whether labor costs decrease due to a reduction in wages or through a reduction of benefits and social security contributions.

variables) to supply-growth induced LWC import competition.

The dependent variable is now the total percentage change in the average hourly cost of work by a production worker during the entire sample. The independent variable is the (instrumented) change in LWC import competition over the same period. The estimated model is thus

$$\sum_{t\epsilon 95-07} \Delta w_{t,j} = \alpha + \beta \sum_{t\epsilon 95-07} \Delta m_{lwc,j,t} + \varepsilon_j.$$

In the first-stage estimation (not reported), the long run change in LWC import competition $\sum_{t\epsilon 95-07} \Delta m_{lwc,j,t}$ is then instrumented with the cumulated growth of LWC-6 industrial supply interacted with the sector's European labor intensity.

The analysis of column 2 relates the long-run changes in import competition to the long-run change in the average hourly cost of work by a production worker. The regression shows that a change in import competition is associated with a statistically significant but economically only moderate effect on wages. A 1% increase in LWC imports in European market share results in a decrease by 0.572% percent in labor costs.

Two alternative specifications document the robustness of the wage effect. Column 3 evaluates the effect of LWC-10 import competition. The regression shows a slightly smaller but still comparable point estimate of -0.433. Col-

umn 4 instruments for the increase in LWC-6 import share in physical units rather than in euros. Again, the point estimate is statistically significant but small in magnitude (-0.461).

The regressions in columns 2 to 4 show that LWC imports have only a small impact on relative wages in Europe. Because the average total increase in LWC import competition was around four percentage points in the five European markets, this suggests that LWC import competition has reduced European wages by only 2.3% in the 12-year sample.

This moderate finding regarding relative wages has to be interpreted with care, however: it does *not* imply that low-skilled workers do not suffer from import competition. The absence of any industry-specific effect could also be the consequence of workers being flexible across industries and, therefore, differences between sectors being non-responsive to import competition. What could never the less be the case is that LWC imports have a strong employment effect, that decreased the overall (and not the relative) wage in the European manufacturing sector.

Next, Table 9 presents evidence on the question whether LWC import competition decreases the number of employed workers in a sector. Columns 5 to 7 relate the long-run change in the supply growth induced import com-

petition to the long-run percentage change in production workers employed in a sector. Following the specifications in columns 2 to 4, we first instrument for the long-run change in LWC-6 import competition (column 5), the long-run change in LWC-10 import competition (column 6), and for the change of LWC-6 import competition measured in physical quantity (column 7).

For all specifications, there is a substantial employment effect. For example, the point estimate from column 5 says a 1% increase in LWC-6 import competition is associated with a 2.5% reduction in employment. During 1995 to 2007 the average cumulated increase in LWC import competition was around four percentage points. This implies that during the 12-year sample, LWC import competition has reduced employment in the manufacturing sector by around 10%. This result is substantial. It says in relation to the sectors we cover in five European markets that employ roughly 13 million workers in 2007, LWC import competition has reduced the workforce by 1.3 million.

In addition to reducing the number of employed, LWC import competition could also influence the number of hours worked per worker. Column 8 reproduces the specification of column 5 but uses the percentage change in the number of total hours worked in the sector as dependent variable. The

significant coefficient is -2.64, which is similar to the estimate in column 5. This result suggests that the average numbers of hours worked per employed workers is unaffected by import competition. It seems that firms tend to fire workers rather than reduce the number of hours per worker.

The above regressions only include workers with traditional employment contracts and do not consider payments to workers hired through agencies. It is likely that firms facing increased import competition rely on temporary workers hired by outside agencies more often than do firms that do not face import competition. In column 9, the dependent variable is the long-run percentage change in the expenses for "Payment for Agency Work". Indeed, the point estimate of 8.508 suggests that hiring agency workers is a major source of cutting costs for firms facing high import competition.

Nevertheless, it is noteworthy that in the aggregate, the size of the agency workforce is small. In 2007, total payments to agency workers was less than euro 20 billion (in the five European countries), compared to a total wage bill of euro 520 billion for workers employed with traditional contracts. Although LWC import competition may well have caused a boom for worker agencies, it is unlikely to have created employment gains big enough to offset the direct loss of jobs with traditional employment contracts.

5.2 The role of margins and productivity

The regressions in Table 9 highlight the observation that increasing LWC import competition has reduced employment in European manufacturing. These regressions also show that the effect of LWC import competition on relative wages across manufacturing sectors is rather limited. As a next step in decomposing the relative price effect for European industry, the role of margins and productivity is examined.

A good's price can be expressed as the per unit cost of the good multiplied by (1 + markup). Hence, abstracting from aggregation issues, the percentage change of the average sectoral price can be decomposed into the contribution of (always in percent) cost of input changes that includes wages ($\Delta c_{j,t}$), changes in productivity ($\Delta a_{j,t}$), and changes in one plus the markup ($\Delta\left(1+\pi_{j,t}\right)$),

$$\Delta p_{j,t} = \Delta c_{j,t} - \Delta a_{j,t} + \Delta\left(1+\pi_{j,t}\right).$$

This decomposition reflects the three main channels through which LWC import competition can affect prices in the developed world. The classical theory of trade predicts that labor intensive imports will decrease the wage of unskilled workers and thus also the price of labor intensive goods produced in Europe. The literature deriving from Melitz (2003), in contrast, argues

that import competition has important effects on average productivity via the crowding out of unproductive firms. A third potential channel is that markup decrease following increased import competition (see Melitz and Ottaviano (2008)).

As a first step, we examine whether a firm's markups and profits decrease with growing import competition. To test this, average firm margins in a sector are defined as 1 minus the share of variable costs, $vc_{j,t}$, to revenue, $r_{j,t}$:

$$1+\pi_{j,t}=(r_{j,t} - vc_{j,t})/r_{j,t},$$

where variable costs are equal to total labor expenses, payments to agency workers, and the total costs of materials and supplies.

The evidence in columns 1 to 3 of Table 10 shows that margins do not respond to LWC import competition. Following the previous econometric framework in Table 9, we first instrument for the long-run change in LWC-6 import competition (column 1), the long-run change in LWC-10 import competition (column 2), and the change of LWC-6 import competition measured in physical quantity (column 3). The change in import value is insignificant in each of these specifications. The fact that the estimated coefficients are positive signed lends further evidence against the role of margins.

Productivity is the next channel considered. The regressions with productivity are in columns 4 to 6. The dependent variable is the long-run percentage change in the "Apparent Labor Productivity", which is equal to the value added divided by the number of employed. In column 4, where we instrument for the long-run change in LWC-6 import competition, a one percentage point increase in imports is associated with an increase in sectoral productivity of 2.569%. This estimate is in line with the two alternative specifications instrumenting for the long-run change in LWC-10 import competition (column 5) and for the change of LWC-6 import competition measured in physical quantity (column 6).

The analysis for European industry unveils that the effect of LWC import competition on European prices can be explained by a moderate wage and a strong productivity effect. More specifically, in our baseline estimation in column 1 of Table 2, prices decrease by 3.531% following a 1% increase in LWC market share. The results in Tables 9 and 10 suggest that this price decrease is explained by a 0.572% decrease in wages (column 2 of Table 9) and a 2.569% increase in labor productivity (column 4 in Table 10).

What explains the strong productivity response? Starting with Melitz (2003), the trade literature has increasingly focused on within-industry dy-

namics as a source of aggregate productivity growth. If import competition forces unproductive firms to leave the market, average productivity increases. While we do not have data on single firms, our dataset has information on the number of European firms in each sector.

A next step thus tests whether import competition leads to a change in the number of domestic firm exits for a particular sector. In column 7, the dependent variable is the long-run percentage change in the number of European firms active in each sector. This specification instruments for the long-run change in LWCs. The IV estimation shows that a 1% increase in LWC market share decreases the number of active European firms by 2.447%. How does import competition affect the size composition of European industry? The regression in column 8 now defines the dependent variable as the long-run percentage change in employment per firm. This regression shows that average firms size is unaffected by import competition, as is predicted by the Melitz model.[14]

[14]LWC import competition could also result in productivity growth due to the within-firm concentration on "core" products (see Mayer et al. (2010) and Bernard et al. (forthcoming). However, given that we find that the sales per firm remain rather constant, our results indicate that in the studied sample, the product reshuffling channel is not of first order importance for aggregate productivity growth.

The regressions in Tables 9 and 10 show that increasing LWC import competition reduced European aggregate demand of domestically produced goods. This response is reflected in the reduced number of available jobs, in the increased number of exits of unproductive firms, and in the resulting aggregate productivity growth.[15]

6. Conclusions

This paper investigates how imports from LWCs influence European producer prices. The results show that the IV strategy of Auer and Fischer (2010) has far reaching applications beyond the U.S. case. This IV strategy relies on the observation that when LWCs grow, their exports increase much more in labor intensive sectors than in capital intensive sectors. We therefore instrument for trade flows using the interaction between growth of LWC 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

[15]It is also noteworthy that both the qualitative findings and the uncovered magnitudes in Auer and Fischer (2008) are similar for the response of U.S. industry to LWC import competition.

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.

In a panel covering 110 (4-digit) NACE industries from 1995 to 2008, the results show that trade with LWCs has a strong impact on European producer prices and on industrial productivity. More specifically, the findings document that the traditional LWCs such as China generate a larger price impact than the newly integrating EU countries such as Poland and Romania that also satisfy our definition of low-wage country. When exporters from traditional LWCs capture 1% of European market share, producer prices decrease about 2%. In contrast, no such effect is present for import competition from CEE countries.

To understand how import competition influences European industry, the LWC price effect is decomposed between wages, margins and productivity. The regressions show that import competition has a pronounced effect on average productivity with only a muted effect on wages or margins. Owing to the exit of firms and the increase in productivity, LWC import competition is shown to have substantially reduced employment in the European manufacturing sector.

References

Auer, R. and A. M. Fischer, 2010. The effect of low-wage import competition on U.S. inflationary pressure, Journal of Monetary Economics 57(4), 491-503.

Auer, R. and A. M. Fischer, 2008. "The Effect of Trade with Low-Income Countries on U.S. Industry," CEPR Discussion Papers 6819.

Bernard, A. B., J. B. Jensen, and P. K. Schott, 2006. Survival of the best fit: exposure to low-wage countries and the (uneven) growth of U.S. manufacturing plants. Journal of International Economics 68(1), 219-237.

Bernard, A., S. Redding and P. Schott, 2011. Multi-product firms and trade liberalization, Quarterly Journal of Economics, forthcoming.

Borio, C., and A. Filardo, 2007. Globalisation and inflation: new cross-country evidence on the global determinants of domestic inflation, BIS Working Paper 227. Basel: Bank for International Settlements, May.

Bugamelli, M., S. Fabiani, and E. Sette, 2010. The pro-competitive effect of imports from China: an analysis of firm level price data, Temi di discussione 737, Bank of Italy.

Carney, M., 2008. The implications of globalization for the economy and public policy, Remarks by the Governor of the Bank of Canada to the British Columbia Chamber of Commerce and Business Council of British Columbia, Vancouver, British Columbia, 18 February 2008.

Chen, N., J. Imbs, and A. Scott, 2009. The dynamics of trade and competition, Journal of International Economics 77(1), 50-62.

Davis, D. R. and D. E. Weinstein, 2001. An account of global factor trade, American Economic Review 91(5), 1423-1453.

De Gregorio, J., 2008. The tensions of the world economy, Economic Policy Paper 27, Bank of Chile.

Gamber, E. and J. H. Hung, 2001. Has the rise in globalization reduced U.S. inflation in the 1990s, Economic Inquiry 39(1), 58-73.

Glatzer, E., E. Gnan, and M. T. Valderrama, 2006. Globalization, import prices and producers in Austria, monetary policy and the economy, Austrian National Bank, No. 3, 24-43.

Ihrig, J., S. B. Kamin, D. Lindner, and J. Marquez, 2007. Some simple tests of the globalization and inflation hypothesis, International Finance Discussion Papers 891. Washington: Board of Governors of the Federal Reserve System, April.

Kamin, S. B., M. Marazzi, and J. W. Schindler, 2008. The impact of Chinese exports on global import prices, Review of International Economics, 14(2), 179-201.

Mayer, T., M. J. Melitz, G. I. P. Ottaviano, 2010. Market size, competition and the product mix of exporters, Research Series 2010-202, National Bank of Belgium.

Melitz, M. J., 2003. The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity, Econometrica, 71(4), 1695-1725.

Melitz, M. J. and G. I. P. Ottaviano, 2008. Market size, trade an productivity, Review of Economic Studies 75(1), 295-316.

Mishkin, F. S., 2007. Globalization, macroeconomic performance, and monetary policy, Held at the Domestic Prices in an Integrated World Economy Conference, Board of Governors of the Federal Reserve System, Washington, D.C.

Pain, N., I. Koske, and M. Sollie, 2008. Globalisation and inflation in the OECD economies, OECD Working Paper No. 524.

Romalis, J., 2004. Factor proportions and the structure of commodity trade, American Economic Review 94(1), 67-97.

Tootell, G. M. B., 1998. Globalization and U.S. inflation, New England Economic Review, Federal Reserve Bank of Boston, July, 21-33.

Trefler, D., 1993. International factor price differences: Leontief was right, Journal of Political Economy 101(4), 961-987.

Trichet, J. C., 2008. Globalisation, inflation and ECB monetary policy, Speech held at the Barcelona Graduate School of Economics, Barcelona,

14 February 2008.

Wheeler, T., 2008. Has trade with China affected UK inflation?, External MPC Unit Discussion Paper No 22, Bank of England.

World Economic Outlook, 2008. How has globalization affected inflation?, Chapter 3, 97-134.

Appendix: Selection Criteria for LWCs and Data Sources

Selection criteria for low wage countries

We define a country to be low wage if a nation's average GDP per capita (averages from 1995-2008) is less than 25% of the average GDP per capita (in current US dollars) for Italy, Germany, France, Sweden and the United Kingdom (average GDP for the five countries between 1995 to 2008). There are 137 countries with a per capita GDP of less than 25% of average European GDP per capita. However, there are many countries among them that account for only a small fraction of total European imports. We drop all countries whose exports account for less than 5% of European imports. This leaves us with 24 economies.

We next account only for countries in which the share of manufactured exports (in percent of total merchandizing exports) is higher than 70%. The last criterion leaves us with 10 economies, which are China, India, Malaysia, Mexico, Philippines, Poland, Romania, Slovak Republic, Thailand, and Turkey. These countries account for 12.4% of total mean imports of Italy, France, Germany, Sweden and United Kingdom. China contributes most to this share. In 2008, almost 50% of this LWC import share is accounted for by China. Poland with 18% and Turkey with about 9% are the second and third largest contributors. All other countries account for around 5% or less of total LWC imports.

In the analysis, we first focus on the following six countries China, India, Malaysia, Mexico, the Philippines and Thailand, and define them as (traditional) LWC. Separately, we consider the impact of CEE countries: Poland, Romania, the Slovak Republic, and Turkey.

How would altering the sample criterion affect our sample? Changing the cut-off of a low-wage country to 20% of US GDP per capita excludes Mexico, Poland, and the Slovak Republic. Altering the share of manufactured exports in total merchandizing exports to 75% would exclude India with a share of 72.9%. Lowering the threshold to 65% would include Ukraine. By lowering the threshold to 50%, we would include Brazil and South Africa. Finally, by lowering the export threshold value of 5% of European imports to only 1% of European imports, we would include Bangladesh, Pakistan, Sri Lanka and Tunisia.

Data sources

a) Trade data

Data on external (bilateral) trade are from Eurostat. Detailed 8-digit product level data (classified in CN8) are available from 1988 to 2008 for various European countries and country groups.[16] The analysis is restricted to imports from the following partner countries: Canada, Mexico, Brazil,

[16]These countries are France, Netherlands, Germany, Italy, United Kingdom, Ireland, Denmark, Greece, Portugal, Spain, Belgium, Luxembourg, Sweden, Finland, Belg.-

India, Thailand, Vietnam, Indonesia, Malaysia, Philippines, China, Japan, Bulgaria, Moldova, Romania, Russia, Slovakia, Ukraine, Hungary, Poland, Czech Republic, and Belarus. Eurostat's external trade statistics provides information about the import value (measured in 1000 ECUs), and import volume (measured in tons).

To match the external trade data with the other data sources classified at the NACE economic activity level, it is necessary to convert the product-level data to the NACE classification. For this exercise, the ad-hoc conversion tables created by Eurostat Unit G3 "International trade-Production" are used.[17] This concordance table allows a conversion from CN8 to CPA (4-digit statistical classification of products by activity).[18] The correspondences are created from a multiple (CN) to a single (CPA classification) basis. The product-level data by CPA are summed to construct an aggregate measure for the import value and volume by CPA/NACE.

To construct the instrument, sectoral values of world imports and the sectoral domestic production are needed. These are then averaged over the sample period. The sectoral domestic production and aggregate import values are taken from the PRODCOM database of Eurostat. PRODCOM is an 8-digit product-level classification of industrial production data. The first 4 digits correspond to the NACE (Rev. 1.1) classification. For the import and production values, the corresponding NACE-level measure can be obtained by simply aggregating the values over the different products within each NACE class. For the corresponding quantities, the aggregation is not straightforward: As different products within one NACE-class are measured in different units (such as kg, liters, pieces etc.). In a first step all units are converted into kg to match the trade data (which is classified in 1000kg). To convert all units to kg, the mean value per kg within each NACE-class are used to approximate the quantities of those products which are not in kg. In cases where no product per NACE class is classified in kg, they are treated as missing values.

b) Price data

The price data are from Eurostat. The industry producer price index for the domestic market are used. These data are classified as NACE Rev. 2 and range from 1975 to 2008. However, for most of the countries, data is available only from 1990 or even later, especially at the most detailed 4-digit level. Furthermore, 4-digit level is not available for all divisions or groups.

Luxembourg, Austria, Malta, Estonia, Latvia, Lithuania, Poland, Czech Republic, Slovakia, Hungary, Romania, Bulgaria, Slovenia Cyprus, the EU, EU15 and EU25.

[17] See $http://ec.europa.eu/eurostat/ramon/other_documents/index.cfm?TargetUrl=DSP_OTHER_DOC_DTL$

[18] The CPA classification corresponds to the NACE Rev. 1.1 classification.

The NACE Rev. 2 data has to be converted into NACE Rev. 1.1 to match it with the other data. For this, the correspondences provided by Eurostat are used. For those classes without a unique correspondence, the classes are chosen which matched best among the competing classes. For example, the class DK29.13 (Manufacture of taps and valves) in NACE Rev. 1.1 corresponds to both, the class C28.14 (Manufacture of other taps and valves) and C33.12 (Repair of machinery). As C28.14 corresponds better to the target code, C28.14 is used as the source code.

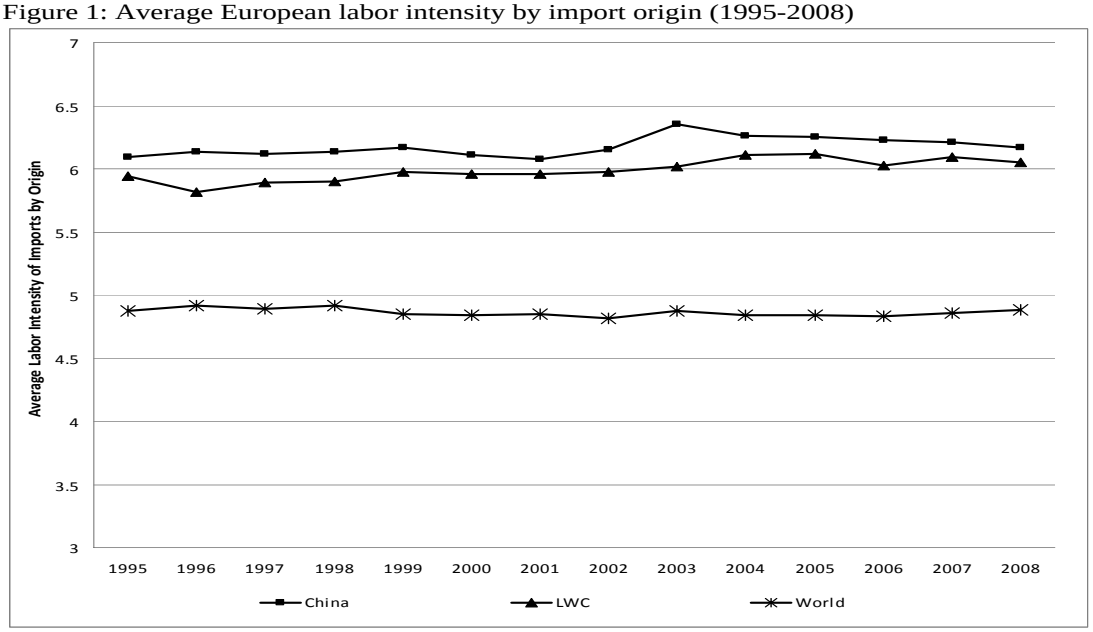
c) Other variables

To construct labor intensity, data from the structural business statistics (sbs), downloadable from Eurostat, are used. The structural business statistics comprise information such as different measures of value added, turnover, the number of employees, number of hours, R&D expenditure, labor productivity, personnel costs, gross investment in tangible goods (such as buildings and structures, land, machinery and equipment), or energy expenditures. These variables are disaggregated at 4-digit NACE Rev. 1.1 for 1995 to 2007 and at 2- or 3-digit level for 1985 to 1995.

Sectoral labor intensity is constructed as the average (over time and countries) of personnel costs divided by the average gross investment in tangibles, which serves as a proxy for capital expenditures.

Finally, data on manufacturing growth in the LWC countries are obtained from Datastream [CN, IN, MY, TH, JP, VN], IFS [PH, MX] or the OECD Main Economic Indicators [CA, BR, ID, CN].

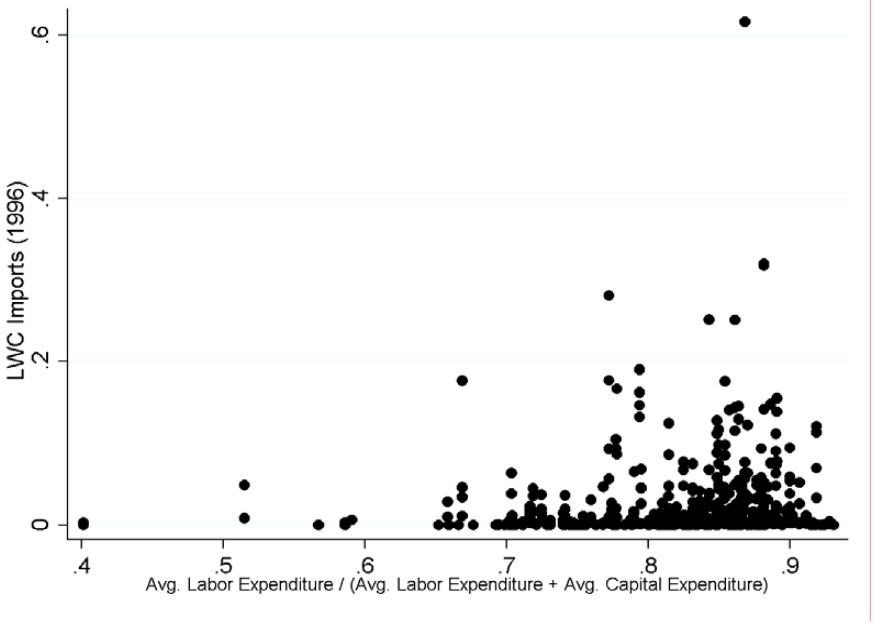
Figure 1: Average European labor intensity by import origin (1995-2008)



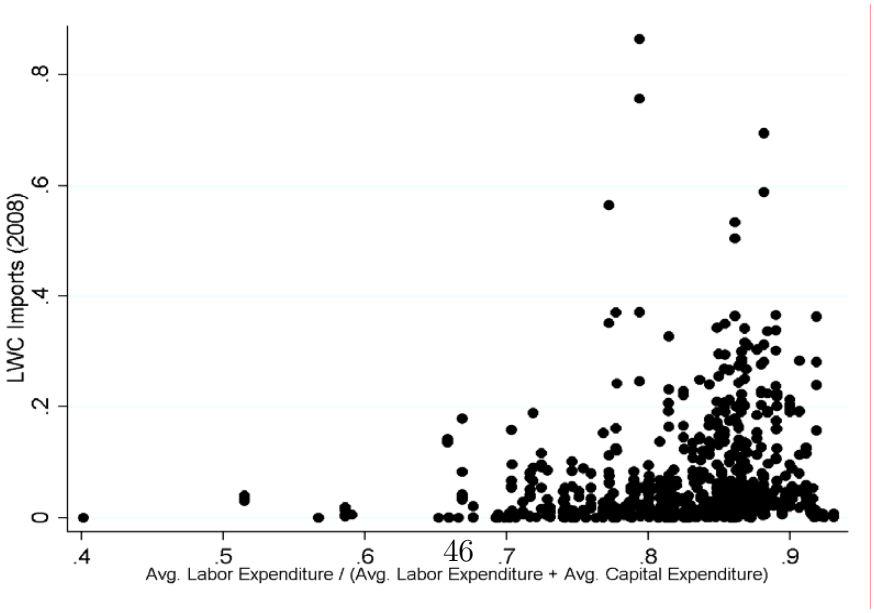
Notes: Europe is France, Germany, Italy, Sweden, and the United Kingdom. LWC imports are from China, India, Malaysia, Mexico, the Philippines, Thailand. Data source are Eurostat (4-digit) 110 NACE industries from 1995- 2008

Figure 2: Labor intensive sectors and LWC import share

LWC import share 1996



LWC import share 2008



Notes: Europe is France, Germany, Italy, Sweden, and the United Kingdom. LWC imports are from China, India, Malaysia, Mexico, the Philippines, Thailand. Data source are Eurostat (4-digit) 110 NACE industry sectors.

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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
European Imports originating from	*China*	*China*	*China*	*LWC-6*	*LWC-4*	*LWC-10*	*Eastern Europe*	*China*	*LWC-10*
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*
Dependent Variable	***Dependent variable is the y/y absolute change of (Import Value in € / (European Industry Size+World Imports))***								
Labor Intensity	0.000								
	[0.000]								
Growth Industrial Production	0.012	0.008							
in China	[0.011]	[0.012]							
Growth Ind. Prod. China *	0.006***	0.007***	0.007***						
Labor Intensity	[0.002]	[0.002]	[0.002]						
Growth Manufact. LWC-6 *				0.001***					
Labor Intensity				[0.000]					
Growth Manufact. LWC-4*					0.000***				
Labor Intensity					[0.000]				
Growth Manufact. LWC-10 *						0.001***			
Labor Intensity						[0.000]			
Growth Manufact. Eastern Europe *							0.000		
Labor Intensity							[0.000]		
Growth Ind.Prod. China *								0.000	
Skill Intensity								[0.002]	
Growth Ind.Prod. LWC-10 *									0.000
Skill Intensity									[0.000]
Fixed Effects	n	y	y	y	y	y	y	y	y
Observations	7932	7932	7932	7548	7583	7482	7601	7923	7472
Groups (Destination - NACE)	744	744	744	742	742	742	742	744	742
R-Squared (within)	0.02	0.02	0.03	0.05	0.02	0.05	0.03	0.03	0.05

Notes: Sample is 4-digit NACE manufacturing industries from 1995 to 2008. Table 1 presents the relation between the growth of manufacturing output in several nations, factor intensity and growth of European imports. The countries covered are China (Columns (1), (2), (3), and (8)), LWC-6 in Column (4) , LWC-4 in Column (5), LWC-10 in Columns (6) and (9) , and the Eastern European countries in Column (7). The dependent variable is the year to year change in the level of Imports from the respective country divided by the European Industry Size is defined as the 1995-2008 average value of domestic production plus total imports in the respective industry. An industry is measured at the 4-digit NACE level (only manufacturing industries). All specifications except (1) and (2) include year dummies, and all specifications except (1) include fixed effects (FE) by industry; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 2 - LWC Import Value (in €) and European[1] Prices: OLS and IV Results (Fixed Effects Panel Estimations)

Specification	(1) *with year dummies*	(2) *incl. LWC Manfct. Growth*	(3) *incl. LWC Manfct. Growth / Productivity & Wages*	(4) *Eurozone countries FR, IT, DE*	(5) *Lagged Prices*	(6) *Lagged Ch. Imports LWC*
Panel C: OLS - Dep. Var. is the y/y Ln-change in Producer Prices						
Ch. Imports LWC	-0.056*	0.001	0.015	-0.029	-0.040	-0.054
(in % of European Industry Size)	[0.023]	[0.030]	[0.026]	[0.032]	[0.025]	[0.026]
Ch. % LWC Manufacturing		0.155***	0.175***			
Output		[0.026]	[0.027]			
Productivity			0.000			
			[0.000]			
Wages			0.000			
			[0.000]			
Lag of Producer Prices					0.104**	
					[0.031]	
Lag of Ch. Imports LWC						-0.067
						[0.063]
Within R-Square	0.09	0.02	0.03	0.09	0.11	0.10
Panel B: IV Second Stage Estimation - Dep. Var. is the y/y Ln-change in Producer Prices						
Ch. Imports LWC	-3.531***	-3.575***	-4.883***	-3.167***	-3.623***	-3.568***
(in % of European Industry Size)	[0.964]	[0.805]	[1.095]	[1.030]	[0.881]	[0.996]
Ch. % LWC Manufacturing		0.342***	0.433***			
Output		[0.069]	[0.092]			
Productivity			0.000***			
			[0.000]			
Wages			-0.000**			
			[0.000]			
Lag of Producer Prices					0.102***	
					[0.029]	
Lag of Ch. Imports LWC						-0.395***
						[0.084]
Panel A: IV First Stage Estimation - Dep. Var. is the y/y change in (LWC Import Value in € / European[1] Industry Size)						
Labor Intensity * Ch. % LWC	0.010**	0.009**	0.008**	0.009*	0.010**	0.010**
Manfct. Output	[0.002]	[0.002]	[0.002]	[0.003]	[0.002]	[0.002]
Ch. % LWC Manufacturing		0.002	0.008			
Output		[0.012]	[0.014]			
Productivity			0.000**			
			[0.000]			
Wages			0.000			
			[0.000]			
Lag of Producer Prices					0.000	
					[0.003]	
Lag of Ch. Imports LWC						-0.093**
						[0.023]
Cragg-Donald Statistic	18.991	17.392	10.704	12.232	17.949	19.440
Max Reject Stock-Yogo Crit Value Level	10%	10%	15%	15%	10%	10%
1st stage F-statistic	16.55	19.09	12.67	9.38	15.32	18.19
Year dummies (both stages)	y	n	n	y	y	y
Observations	7010	7010	5620	4757	6613	6386
Groups (Destination - NACE)	618	618	612	436	618	618
R-Square (first stage within)	0.05	0.02	0.02	0.04	0.05	0.06

Notes: [1] Europe is France, Germany, Italy, United Kingdom, and Sweden. Panel C of Table 2 shows the OLS relation between changes of import values in € from six LWCs and European producer prices. Panel B displays two-stage least squares estimations. The dependent variable is the annual change in the logarithm of the producer price at the four-digit NACE (Rev. 1.1) level (only manufacturing industries). "Ch. Imports LWC" is defined as the y/y absolute change in (LWC import value in €/European industry size). The industry size is defined as the 1995-2008 average value of European domestic production plus world imports. In columns 2 and 3, "Ch. % LWC Manufacturing Output" is the weighted average growth rate of manufacturing output in the six LWCs. Productivity is the wage adjusted labour productivity and wages capture wages and salaries. Column 4 captures only countries in the Eurozone, i.e. France, Germany and Italy. Column 5 includes lagged producer price changes and column 6 incorporates lagged changes of LWC import values. In Panel A the first-stage relation is displayed. The instrument is the sector's labor intensity times "Ch. % LWC Manufacturing Output". All estimations include fixed effects by sector. Clustered standard errors (by country) reported in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3 - LWC Import Volume (in kilograms) and European[1] Prices: OLS and IV Results (Fixed Effects Panel Estimations)

Specification	(1) *with year dummies*	(2) *incl. LWC Manfct. Growth*	(3) *incl. LWC Manfct. Growth / Productivity & Wages*	(4) *Eurozone countries FR, IT, DE*	(5) *Lagged Prices*	(6) *Lagged Ch. Imports LWC*
Panel C: OLS - Dep. Var. is the y/y Ln-change in Producer Prices						
Ch. Imports LWC	-0.078*	-0.097*	-0.083**	-0.079	-0.061	-0.076*
(in % of European Industry Size)	[0.035]	[0.043]	[0.028]	[0.063]	[0.035]	[0.029]
Ch. % LWC Manufacturing		0.206***	0.224***			
Output		[0.028]	[0.029]			
Productivity			0.000			
			[0.000]			
Wages			0.000			
			[0.000]			
Lag of Producer Prices					0.073**	
					[0.025]	
Lag of Ch. Imports LWC						-0.038**
						[0.009]
Within R-Square	0.11	0.02	0.05	0.11	0.13	0.13
Panel B: IV Second Stage Estimation - Dep. Var. is the y/y Ln-change in Producer Prices						
Ch. Imports LWC	-1.992***	-1.922***	-2.326***	-1.513***	-2.191***	-1.987***
(in % of European Industry Size)	[0.638]	[0.534]	[0.746]	[0.561]	[0.633]	[0.662]
Ch. % LWC Manufacturing		0.307***	0.348***			
Output		[0.051]	[0.057]			
Productivity			0.000**			
			[0.000]			
Wages			0.000**			
			[0.000]			
Lag of Producer Prices					0.074***	
					[0.023]	
Lag of Ch. Imports LWC						-0.254***
						[0.073]
Panel A: IV First Stage Estimation - Dep. Var. is the y/y change in (LWC Import Volume in kilograms/ European[1] Industry Size)						
Labor Intensity * Ch. % LWC	0.020***	0.021***	0.021**	0.021*	0.020***	0.022***
Manfct. Output	[0.004]	[0.004]	[0.005]	[0.007]	[0.004]	[0.004]
Ch. % LWC Manufacturing		-0.045*	-0.048*			
Output		[0.017]	[0.018]			
Productivity			0.000			
			[0.000]			
Wages			0.000			
			[0.000]			
Lag of Producer Prices					0.001	
					[0.003]	
Lag of Ch. Imports LWC						-0.114***
						[0.007]
Cragg-Donald Statistic	44.089	44.180	38.093	34.506	40.705	48.839
Max Reject Stock-Yogo Crit Value Level	10%	10%	10%	10%	10%	10%
1st stage F-statistic	26.32	25.12	15.87	9.057	23.06	26.91
Year dummies (both stages)	y	n	n	y	y	y
Observations	4908	4908	3935	3329	4633	4468
Groups (Destination - NACE)	434	434	429	305	434	434
R-Square (first stage within)	0.05	0.03	0.03	0.06	0.05	0.10

Notes: [1] Europe is France, Germany, Italy, United Kingdom, and Sweden. Panel C of Table 3 shows the OLS relation between changes of import volume (in kilograms) from six LWCs and European producer prices. Panel B displays two-stage least squares estimations. The dependent variable is the annual change in the logarithm of the producer price at the four-digit NACE (Rev. 1.1) level (only manufacturing industries). "Ch. Imports LWC" is defined as the y/y absolute change in (LWC import volume in kg/European industry size). The industry size is defined as the 1995-2008 average value of European domestic production plus world imports. In columns 2 and 3, "Ch. % LWC Manufacturing Output" is the weighted average growth rate of manufacturing output in the six LWCs. Productivity is the wage adjusted labour productivity and wages capture wages and salaries. Column 4 captures only countries in the Eurozone, i.e. France, Germany and Italy. Column 5 includes lagged producer price changes and column 6 incorporates lagged changes of LWC import volumes. In Panel A the first-stage relation is displayed. The instrument is the sector's labor intensity times "Ch. % LWC Manufacturing Output". All estimations include fixed effects by sector. Clustered standard errors (by country) reported in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4 - China Import Value (in €) and European[1] Prices: OLS and IV Results (Fixed Effects Panel Estimations)

Specification	(1) *with year dummies*	(2) *incl. China Ind. Growth*	(3) *incl. China Ind. Growth / Productivity & Wages*	(4) *Eurozone countries FR, IT, DE*	(5) *Lagged Prices*	(6) *Lagged Ch. Imports LWC*
Panel C: OLS - Dep. Var. is the y/y Ln-change in Producer Prices						
Ch. Imports China	-0.092***	-0.032*	-0.016**	-0.085***	-0.073***	-0.078***
(in % of European Industry Size)	[0.019]	[0.016]	[0.007]	[0.026]	[0.014]	[0.015]
Ch. % China Manufacturing		0.184***	0.209***			
Output		[0.032]	[0.038]			
Productivity			0.000			
			[0.000]			
Wages			0.000			
			[0.000]			
Lag of Producer Prices					0.104**	
					[0.031]	
Lag of Ch. Imports China						-0.062
						[0.078]
Within R-Square	0.09	0.02	0.04	0.09	0.11	0.10
Panel B: IV Second Stage Estimation - Dep. Var. is the y/y Ln-change in Producer Prices						
Ch. Imports China	-5.101***	-4.840***	-6.728***	-3.864***	-5.039***	-5.304***
(in % of European Industry Size)	[1.487]	[1.355]	[2.283]	[0.869]	[1.328]	[1.635]
Ch. % China Manufacturing		0.401***	0.512***			
Output		[0.098]	[0.155]			
Productivity			0.000***			
			[0.000]			
Wages			-0.000**			
			[0.000]			
Lag of Producer Prices					0.104***	
					[0.026]	
Lag of Ch. Imports China						-0.237
						[0.210]
Panel A: IV First Stage Estimation - Dep. Var. is the y/y change in (China Import Value in € / European[1] industry Size)						
Labor Intensity * Ch. % China	0.007***	0.007***	0.006***	0.007***	0.007***	0.008***
Manfct. Output	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
Ch. % China Manufacturing		0.006	0.011			
Output		[0.011]	[0.013]			
Productivity			0.000*			
			[0.000]			
Wages			-0.000*			
			[0.000]			
Lag of Producer Prices					0.001	
					[0.002]	
Lag of Ch. Imports China						-0.034
						[0.041]
Cragg-Donald Statistic	12.146	12.428	7.767	10.488	11.555	12.534
Max Reject Stock-Yogo Crit Value Level	15%	15%	20%	15%	15%	15%
1st stage F-statistic	16.22	18.45	10.61	14.2	16.16	15.63
Year dummies (both stages)	y	n	n	y	y	y
Observations	7273	7273	5803	4943	6613	6678
Groups (Destination - NACE)	618	618	611	436	618	618
R-Square (first stage within)	0.03	0.01	0.02	0.04	0.03	0.04

Notes: [1] Europe is France, Germany, Italy, United Kingdom, and Sweden. Panel C of Table 4 shows the OLS relation between changes of import values in € from China and European producer prices. Panel B displays two-stage least squares estimations. The dependent variable is the annual change in the logarithm of the producer price at the four-digit NACE (Rev. 1.1) level (only manufacturing industries). "Ch. Imports China" is defined as the y/y absolute change in (China import value in €/European industry size). The industry size is defined as the 1995-2008 average value of European domestic production plus world imports. In columns 2 and 3, "Ch. % China Manufacturing Output" is the growth rate of manufacturing output in China. Productivity is the wage adjusted labour productivity and wages capture wages and salaries. Column 4 captures only countries in the Eurozone, i.e. France, Germany and Italy. Column 5 includes lagged producer price changes and column 6 incorporates lagged changes of Chinese import values. In Panel A the first-stage relation is displayed. The instrument is the sector's labor intensity times "Ch. % China Manufacturing Output". All estimations include fixed effects by sector. Clustered standard errors (by country) reported in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5 - China Import Volume (in kilograms) and European Prices: OLS and IV Results (Fixed Effects Panel Estimations)

Specification	(1) *with year dummies*	(2) *incl. China Ind. Growth*	(3) *incl. China Ind. Growth / Productivity & Wages*	(4) *Eurozone countries FR, IT, DE*	(5) *Lagged Prices*	(6) *Lagged Ch. Imports LWC*
Panel C: OLS - Dep. Var. is the y/y Ln-change in Producer Prices						
Ch. Imports China	-0.110***	-0.129***	-0.125***	-0.108	-0.083**	-0.103***
(in % of European Industry Size)	[0.039]	[0.042]	[0.023]	[0.071]	[0.037]	[0.032]
Ch. % China Manufacturing		0.241***	0.264***			
Output		[0.034]	[0.038]			
Productivity			0.000			
			[0.000]			
Wages			0.000			
			[0.000]			
Lag of Producer Prices					0.073***	
					[0.025]	
Lag of Ch. Imports China						-0.050
						[0.024]
Within R-Square	0.11	0.03	0.05	0.11	0.13	0.12
Panel B: IV Second Stage Estimation - Dep. Var. is the y/y Ln-change in Producer Prices						
Ch. Imports China	-2.291***	-2.200***	-2.673***	-1.913***	-2.374***	-2.410***
(in % of European Industry Size)	[0.493]	[0.431]	[0.639]	[0.497]	[0.433]	[0.566]
Ch. % China Manufacturing		0.353***	0.400***			
Output		[0.055]	[0.064]			
Productivity			0.000**			
			[0.000]			
Wages			0.000			
			[0.000]			
Lag of Producer Prices					0.070***	
					[0.019]	
Lag of Ch. Imports China						-0.273***
						[0.048]
Panel A: IV First Stage Estimation - Dep. Var. is the y/y change in (China Import Volume in kilograms / European[1] industry Size)						
Labor Intensity * Ch. % China	0.020***	0.020***	0.020***	0.018***	0.020***	0.021***
Manfct. Output	[0.003]	[0.003]	[0.004]	[0.005]	[0.003]	[0.003]
Ch. % China Manufacturing		-0.041**	-0.044**			
Output		[0.013]	[0.012]			
Productivity			0.000			
			[0.000]			
Wages			0.000			
			[0.000]			
Lag of Producer Prices					0.000	
					[0.002]	
Lag of Ch. Imports China						-0.097***
						[0.006]
Cragg-Donald Statistic	49.408	48.065	42.4	33.238	46.957	52.855
Max Reject Stock-Yogo Crit Value Level	10%	10%	10%	10%	10%	10%
1st stage F-statistic	44.63	43.67	30.41	15.62	53.38	49.96
Year dummies (both stages)	y	n	n	y	y	y
Observations	5104	5104	4072	3465	4637	4682
Groups (Destination - NACE)	434	434	429	305	434	434
R-Square (first stage within)	0.05	0.03	0.03	0.06	0.05	0.08

Notes: Europe is France, Germany, Italy, United Kingdom, and Sweden. Panel C of Table 5 shows the OLS relation between changes of import volume (in kilograms) from China and European producer prices. Panel B displays two-stage least squares estimations. The dependent variable is the annual change in the logarithm of the producer price at the four-digit NACE (Rev. 1.1) level (only manufacturing industries). "Ch. Imports China" is defined as the y/y absolute change in (China import volume in kg/European industry size). The industry size is defined as the 1995-2008 average value of European domestic production plus world imports. In columns 2 and 3, "Ch. % China Manufacturing Output" is the growth rate of manufacturing output in China. Productivity is the wage adjusted labour productivity and wages capture wages and salaries. Column 4 captures only countries in the Eurozone, i.e. France, Germany and Italy. Column 5 includes lagged producer price changes and column 6 incorporates lagged changes of Chinese import volumes. In Panel A the first-stage relation is displayed. The instrument is the sector's labor intensity times "Ch. % China Manufacturing Output". All estimations include fixed effects by sector. Clustered standard errors (by country) reported in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6 - LWC Imports and Individual Country Prices: IV Results (Fixed Effects Panel Estimations)

	(1) *Germany*	(2) *France*	(3) *Sweden*	(4) *Italy*	(5) *UK*	(6) *Germany*	(7) *France*	(8) *Sweden*	(9) *Italy*	(10) *UK*
Panel B: IV Second Stage Estimation - Dep. Var. is the y/y Ln-change in Producer Prices										
Ch. Imports LWC	-2.306**	-2.669*	-3.285**	43.735	-7.805*	-1.155*	-0.889	-2.595*	-12.714	-3.794**
(in % of Country *i*'s Industry Size)	[1.041]	[1.519]	[1.673]	[271.854]	[4.706]	[0.663]	[0.589]	[1.380]	[23.884]	[1.487]
Panel A: IV First Stage Estimation - Dep. Var. is the y/y change in										
	LWC Import Volume in € / Country i's Industry Size					**LWC Import Volume in kilograms / Country i's Industry Size**				
Labor Intensity * Ch. % LWC	0.011***	0.009***	0.022**	-0.001	0.006	0.022**	0.035***	0.028*	0.003	0.017**
Manfct. Output	[0.004]	[0.003]	[0.009]	[0.003]	[0.004]	[0.009]	[0.010]	[0.015]	[0.004]	[0.007]
Cragg-Donald Statistic	6.262	9.511	9.463	0.018	1.126	16.856	33.840	26.698	0.125	3.810
Max Reject Stock-Yogo Crit Value Level	25%	15%	15%	> 25%	> 25%	10%	10%	10%	> 25%	> 25%
1st stage F-statistic	11.63	9.323	7.429	0.026	2.929	11.05	9.933	11.69	0.282	8.697
Year dummies (both stages)	y	y	y	y	y	y	y	y	y	y
Observations	2264	1702	769	791	1484	1565	1195	605	569	974
Groups (Destination - NACE)	184	144	63	108	119	128	100	50	77	79
R-Square (first stage within)	0.04	0.08	0.10	0.07	0.06	0.06	0.10	0.12	0.07	0.06

Notes: Panel B of Table 6 displays the second-stage relation between changes of LWC-6 import values (columns 1-5) and LWC-6 import volumes (columns 6-10) and the destination country *i*'s producer prices. Destination countries are Germany (columns 1 and 6), France (cloumns 2 and 7), Sweden (columns 3 and 8), Italy (columns 4 and 9), and United Kindom (columns 5 and 10). The dependent variable is the annual change in the logarithm of the producer price at the four-digit NACE (Rev. 1.1) level (only manufacturing industries). "Ch. Imports LWC" is defined as the y/y absolute change in (LWC imports/country *i*'s industry size). The industry size is defined as the 1995-2008 average value of country i's domestic production plus world imports. In the lower Panel A the first-stage relation is displayed. The instrument is the sector's labor intensity times "Ch. % LWC Manufacturing Output". All estimations include fixed effects by sector and year dummies. Clustered standard errors (by country) reported in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7 - Growth of Manufacturing Output, Labor Intensity, and Imports in Eastern Europe (Panel Estimations)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
European Imports originating from	*Russia*	*Czech Republic*	*Hungary*	*Poland*	*Romania*	*Slovakia*	*Turkey*
Panel Estimation with	*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*
Panel B: First Stage Estimation - Dep. Var. is the y/y change in (Country i's Import Volume in kilograms/ European[1] Industry Size)							
Labor Intensity * Ch. % Russia's	-0.000						
Manfct. Output	[0.001]						
Labor Intensity * Ch. % Czech Republic's		-0.007					
Manfct. Output		[0.005]					
Labor Intensity * Ch. % Hungary's			0.001				
Manfct. Output			[0.001]				
Labor Intensity * Ch. % Poland's				0.003			
Manfct. Output				[0.003]			
Labor Intensity * Ch. % Romania's					0.001		
Manfct. Output					[0.000]		
Labor Intensity * Ch. % Slovakia's						0.000	
Manfct. Output						[0.001]	
Labor Intensity * Ch. % Turkish							0.001
Manfct. Output							[0.001]
R-Square (within)	0.003	0.012	0.003	0.007	0.007	0.006	0.007
Panel A: First Stage Estimation - Dep. Var. is the y/y change in (Country i's Import Volume in kilograms/ European[1] Industry Size)							
Russia's Sector Weight * Ch. % Russia's	0.460						
Manfct. Output	[0.591]						
Czech's Sector Weight* Ch. % Czech		-0.375					
Republic's Manfct. Output		[0.876]					
Hungary's Sector Weight* Ch. % Hungary's			0.660				
Manfct. Output			[0.441]				
Poland's Sector Weight * Ch. % Poland's				1.594***			
Manfct. Output				[0.087]			
Romania's Sector Weight* Ch. % Romania's					0.602***		
Manfct. Output					[0.104]		
Slovakia's Sector Weight* Ch. % Slovakia's						0.170	
Manfct. Output						[0.321]	
Turkey's Sector Weight* Ch. % Turkey's							0.844***
Manfct. Output							[0.167]
Fixed Effects	y	y	y	y	y	y	y
Year Dummies	y	y	y	y	y	y	y
Observations	5085	5141	5136	5156	5057	5061	5134
Groups (Destination - NACE)	434	434	434	434	434	434	434
R-Square (within)	0.006	0.012	0.004	0.109	0.017	0.006	0.042

Notes: [1] Europe is France, Germany, Italy, United Kingdom, and Sweden. Panel B of Table 7 shows the first stage relation between changes of import volumes from the seven CEE countries and labor intensity times "Ch. % CEE countries' Manufacturing Output". Panel A of Table 7 displays the first stage relation between changes of import volumes from the seven CEE countries and the CEE countries's sectoral weight times "Ch. % CEE countries's Manufacturing Output". The changes of import volumes are defined as the y/y absolute change in (LWC import volume/European industry size). The industry size is defined as the 1995-2008 average value of European domestic production plus world imports. All estimations include fixed effects by sector and year dummies. Clustered standard errors (by country) reported in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 8 - Low-Wage CEE Country Imports and European Producer Prices

European Imports originating from	*Poland*	*Romania*	*Turkey*
Panel Estimation with	*FE, with year dummies*	*FE, with year dummies*	*FE, with year dummies*
IV 2nd Stage Results - Dep. Var. is the y/y Ln-change in Producer Prices			
Ch. Imports Poland	0.028		
(in % of European Industry Size)	[0.045]		
Ch. Imports Romania		-1.006***	
(in % of European Industry Size)		[0.385]	
Ch. Imports Turkey			-0.730
(in % of European Industry Size)			[0.640]
Fixed Effects	y	y	y
Year Dummies	y	y	y
Observations	5156	5057	5134
R-squared (first stage within)	0.11	0.02	0.04
Groups (Destination - NACE)	434	434	434
1st stage F-statistic	335.3	33.27	25.56

Notes: Table 8 presents the relation between European producer price changes and changes in the import volumes from select low-wage CEE countries. The countries covered are Poland, Romania, Turkey. The dependent variable is the annual change in the logarithm of the producer price at the four-digit NACE (Rev. 1.1) level (only manufacturing industries). "Ch. Imports country *i*" is defined as the y/y absolute change in country *i*'s import volume in kg/European industry size. The industry size is defined as the 1995-2008 average value of European domestic production plus world imports. The instrument used in the first stage is the sector weight times "Ch. % Cee country *i*'s Manufacturing Output". All specifications include year dummies and fixed effects by industry. Clustered standard errors (by country) reported in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 9 - LWC Imports and the European Labor Market

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent Var.	*Wages*	*Wages, Long Run*	*Wages, Long Run*	*Wages, Long Run*	*No. of Emp workers*	*No. of Emp workers*	*No. of Emp workers*	*Employment (Hours)*	*Agency Workers*
Specification	*Panel Specification*	*Change (2SLS)*	*Change (2SLS)*	*Change (2SLS)*	*Cross Sectional IV*	*Cross Sectional IV*	*Cross Sectional IV*	*Cross Sectional IV*	*Cross Sectional IV*
	FE & year dummies	*LWC-6 Imports*	*LWC-10 Imports*	*LWC-6 Import Quant.*	*LWC-6 Imports*	*LWC-10 Imports*	*LWC-6 Import Quant.*	*LWC-6 Imports*	*LWC-6 Imports*
LWC Imports and the European Labor Market (various Dep. Var.)									
y/y Ch. Import Value LWC 6	-4.12								
(in % of European Industry Size)	[5.358]								
95-07 Ch. Import Value LWC 6		-0.572***			-2.509***			-2.642***	8.508***
(in % of European Industry Size)		[0.212]			[0.888]			[0.705]	[2.921]
95-07 Ch. Import Value LWC 10			-0.433**			-2.123***			
(in % of European Industry Size)			[0.170]			[0.706]			
95-07 Ch. Import Quantity LWC 6				-0.461**			-2.024**		
(in % of European Prod. in Quantity)				[0.202]			[0.939]		
First Stage Summary Information									
P-Value Associated with Anderson canon. cor. LR statistic:									
	<0.001	<0.001	<0.001	0.0016	<0.001	<0.001	0.0016	<0.001	<0.001
Groups (1) / Observations ((2)-(9))	754	612	612	612	612	612	612	748	748

Notes: Europe is France, Germany, Italy, United Kingdom, and Sweden. Table 9 displays the second-stage relation between changes of import values (in € in columns (1)-(3), (5), (6), (8), and (9) and in physical quantity in ((4) and (7)) from 10 (columns ((3) and (6)) or 6 (all other columns) LWC countries and selected measures of the European labor market. In the panel estimation of column (1), the dependent variable is the y/y percentage change in the sector's average wage. In the cross sectional estimation of (2) to (4), the dependent variable is the 95-07 percentage change of the sector's average wage. In (5) to (7), the dependent variable is the 95-07 percentage change of the sector's number of employed workers. In (8), the dependent variable is the 95-07 percentage change in the total number of hours worked in the sector. In (9), the dependent variable is the 95-07 percentage change in payments for agency workers. Standard errors reported in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 10 - LWC Imports, Margins, and Productivity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Var.	*Margins, Long Run*	*Margins, Long Run*	*Margins, Long Run*	*Productivity, Long Run*	*Productivity, Long Run*	*Productivity, Long Run*	*No. of Firms*	*Employment Per Firm*
Specification	*Change (2SLS)*	*Change (2SLS)*	*Change (2SLS)*	*Change (2SLS)*	*Cross Sectional IV*	*Cross Sectional IV*	*Cross Sectional IV*	*Cross Sectional IV*
	LWC-6 Imports	*LWC-10 Imports*	*LWC-6 Import Quant.*	*LWC-6 Import Quant.*	*LWC-6 Imports*	*LWC-10 Imports*	*LWC-6 Import Quant.*	*LWC-6 Imports*
LWC Imports and the European Labor Market (various Dep. Var.)								
95-07 Ch. Import Value LWC 6	0.07			2.569***			-2.447***	-0.897
(in % of European Industry Size)	[0.145]			[0.820]			[0.799]	[0.730]
95-07 Ch. Import Value LWC 10		0.059			2.174***			
(in % of European Industry Size)		[0.116]			[0.657]			
95-07 Ch. Import Quantity LWC 6			0.057			2.072**		
(in % of European Prod. in Quantity)			[0.118]			[0.891]		
First Stage Summary Information								
P-Value Associated with Anderson canon. cor. LR statistic:								
	<0.001	<0.001	0.0016	<0.001	<0.001	0.0016	<0.001	<0.001
No. Of Observations	612	612	612	612	612	612	748	748

Notes: Europe is France, Germany, Italy, United Kingdom, and Sweden. Table 10 displays the second-stage relation between changes of import values (in € in colums (1),(2), (4), (5), (7),(8)) and in physical quantity in ((3) and (6)) from 10 (columns ((2) and (4)) or 6 (all other columns) LWC countries and selected measures of the European industry. In (1) to (3), the dependent variable is the 95-07 percentage change of the sector's average margin. The margin is defined as one minus the ratio of variables costs overrvenue. In (4) to (6), the dependent variable is the 95-07 percentage change in the sector's "Average Apparent Productivity". In (7), the dependent variable is the 95-07 percentage change in the number of firms active in the sector. In (8), the dependent variable is the 95-07 percentage change in the average number of employees per firm. Standard errors reported in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.