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Heterogeneous Labor Market Adjustments to Offshoring in European Regions*

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Abstract

Offshoring is often found to be associated with an increase of wage inequality between low- and high-skilled employees. This is interpreted as a relative decline of low-skilled labor demand induced by offshoring of low-skilled tasks. However, the effect of offshoring on labor demand is ambiguous, since workers may benefit from productivity effects of offshoring. Moreover, whether offshoring affects wages or (un-)employment depends on the flexibility of the labor market. Inflexible wages in European labor markets could induce adjustments along the employment margin. We investigate the effects of offshoring to Eastern Europe and China on Western European regional labor markets. We define offshoring as trade in intermediates and control for trade in final goods because Autor et al. (2013) and Dauth et al. (2014) have shown that US- resp. German regional labor markets respond to trade in final goods with China resp. Eastern Europe. Similarly to these authors, we find that import competition from China and Eastern Europe in terms of final goods reduced manufacturing employment in Western European regional labor markets. To the contrary, net-offshoring to China and Eastern Europe actually lead to positive effects on manufacturing employment, but also negatively affected manufacturing wages. We discuss potential mechanisms.

Keywords: offshoring, unemployment, wages, regions, Europe

JEL: F66, J23, R23

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1 Introduction

Until the 1980s, globalization was mainly driven by trade in final goods and hence took place at the level of sectors or firms. Due to the large wage-gap between western European and eastern European (Asian) countries on the one hand and the decline transportation and communication costs on the other hand, it became more and more profitable to internationally relocate the provision of tasks in the production process. The share of tasks for which it is now profitable to disentangle them from the production process and to fulfill them elsewhere in the world has increased (Baldwin, 2006; Baldwin and Evenett, 2014; Feenstra and Hanson, 2003). Hence, there has been a strong increase in offshoring which Baldwin (2006) calls the “second unbundling”.

The growing importance of offshoring is illustrated by the remarkable increase in the intermediate goods imports in Figure 1. Namely, intermediate imports of manufacturing products from China to Western Europe (EU 15) increased by a factor of 13 between 1995 and 2011. Also, intermediate manufacturing imports from Eastern Europe increased by almost factor 5 in the same time period. This process likely affects labor markets as it reshapes the structure of demand for labor in EU countries, which has motivated many researchers to study the effects of offshoring on labor markets.

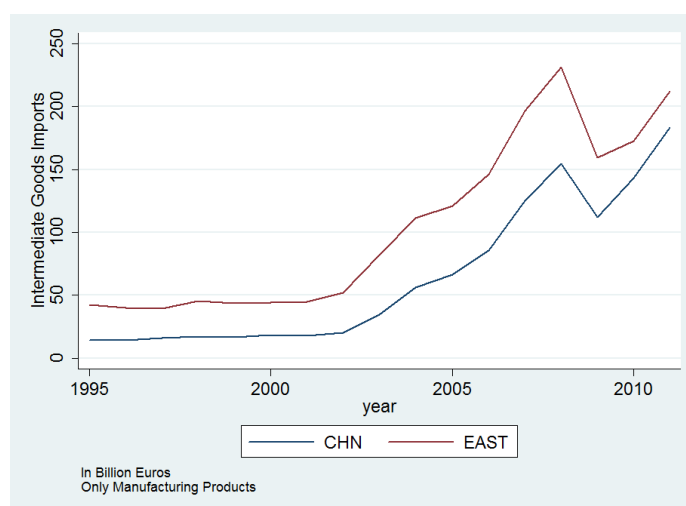


Figure 1: Intermediate Imports of the EU 15 from China and Eastern Europe

A main focus of the literature thus far has been on wage inequality. If mostly low-skilled jobs are offshored, this should lead to an increase of the high-to-low-skilled wage gap, as discussed by Feenstra and Hanson (1996, 1999). This phenomenon has been studied in many western economies (Crinò, 2008; Pflüger et al., 2013; Becker et al., 2013).¹ However, offshoring also generates a productivity effect, as lower costs for imported intermediates rise productivity (Amiti and Konings, 2007; Goldberg et al., 2010; Kasahara and Rodrigue, 2008). Firms become more productive through offshoring, which may lead to

¹Hummels et al. (2014) provide recent results based on the universe of Danish firms, linked to the Danish population of employees.

higher employment if the higher productivity leads to an expansion of economic activity. Consumption may be adjusted in response to real income changes, for instance, affecting economic activity in the related sectors. Grossman and Rossi-Hansberg (2008) hence argue that low skilled workers may benefit from offshoring through wage premia for offshorable jobs which are not offshored in equilibrium.

In conclusion, the theory does not provide unambiguous signs for the effects of offshoring on labor market outcomes, such as wages, employment and unemployment. The main aim of this paper therefore is to study the labor market effects of offshoring. We provide three main contributions to the literature.

Firstly, while a large part of the literature thus far has focused on relative wage effects and has typically provided micro-² or sector-level³ evidence, in this paper we apply a reduced-form regional-level approach. By viewing regions as small economies which are differently exposed to offshoring, we can study the macroeconomic implications of offshoring on labor markets, comparable to the studies of Autor et al. (2013) and Dauth et al. (2014) for the effects of trade on regional labor markets. Autor et al. (2013) and Dauth et al. (2014) analyze the effects of trade in final goods⁴ and show that import competition from China resp. Eastern Europe negatively affected manufacturing employment in the US resp. in Germany – while Dauth et al. (2014) further find that exporting to Eastern Europe positively affected manufacturing employment in Germany. In contrast to these authors, we are interested in offshoring, which is measured based on trade in intermediate goods. Offshoring has opposing effects on labor markets and the net effect is a priori ambiguous. Trade in intermediate goods is quantitatively even more important than trade in final goods (see figure 2). Moreover, while the EU 15 has a huge deficit in final goods trade with China and (to a lesser extent) with Eastern Europe, on average the balances of the EU 15 intermediates trade with China and Eastern Europe are rather balanced (see figure 2). Nevertheless, there are huge disparities between European countries. We show that the intermediates trade balances indeed matter for aggregate regional labor market outcomes.

Secondly, we not only focus on wages but further take into account adjustments along the employment margin. While a large fraction of the literature focuses on wage differences, the main public concern is jobs lost due to production relocation. Theories by Egger et al. (2013) and Keuschnigg and Ribi (2009) therefore consider rent sharing or search frictions in offshoring models to study the implications of offshoring on (un-)employment. Besides the evidence on the effects of offshoring on wage inequality, the empirical literature further finds that offshoring has led to an increase of employment volatility, whereas the effects of service offshoring on overall employment are negative but small (Crinò, 2008;

²Harrison et al. (2011) provide a survey of empirical studies on offshoring which use firm-level or linked employer-employee-data.

³The main contributions for the effects of offshoring at the sector level are Feenstra and Hanson (1997, 1999). Feenstra and Hanson (2003) further provide a survey of the early, sector-based, literature, which has a strong focus on the wage gap between high- and low-skilled workers. Other studies focus on the effects of offshoring on sector-level employment, such as Cadarso et al. (2008), Hijzen and Swaim (2007) or Falk and Wolfmayr (2005).

⁴Autor et al. (2013) and Dauth et al. (2014) use data on total trade and do not distinguish in their main analysis between final and intermediate goods. However, their discussion focuses on trade in final goods and they provide evidence that their results further hold when focusing only on final goods.

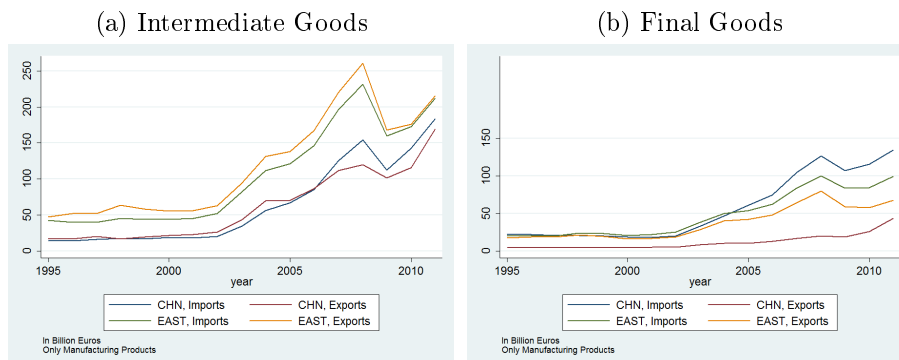


Figure 2: Trade of the EU 15 with China and Eastern Europe

Pflüger et al., 2013). In Europe, where labor markets are less flexible than in the US, one might expect that not only wages, but also (un-)employment adjusts to the rise of offshoring (Crinò, 2008). We show that offshoring in terms of intermediate manufacturing imports negatively affects manufacturing wages, but actually positively affects manufacturing employment, and we discuss potential explanations.

Thirdly, we expect that the effect of offshoring on labor demand is more favorable in regional economies which have a more favorable position in the value chain as they likely have already offshored their low-skilled labor inputs in the past and now potentially profit more strongly from productivity effects (*work in progress*).

The rest of the paper is organized as follows: In section 2, we present the data and econometric approach of our paper. The preliminary results are discussed in section 3. Section 4 provides a preliminary conclusion and an outlook.

2 Data and Empirical Strategy

2.1 Offshoring Intensity

Consistently measuring offshoring across European countries and regions is a challenge. However, with the release of the World Input Output Database (WIOD), this task has become feasible, indirectly at least.⁵ The data base provides a clear picture of the trade-based input-output linkages between industries and countries and hence directly allows for a study of industry-level trade in intermediate (and final) goods, which we use to approximate offshoring. In particular, we take the value of all intermediate goods imported by a specific industry to create a measure that resembles the classic approach by Feenstra and Hanson (1996, 1999).⁶ We focus on material offshoring and thus only consider goods that have been produced by manufacturing sectors.⁷ We furthermore make use of the country-by-country setup of the data and focus on imported

⁵The WIOD is freely available at www.wiod.org. Timmer et al. (2012) describe the methods and detailed sources of the data base.

⁶See appendix for more info on the offshoring index.

⁷We take into account all using sectors (intermediate goods) and consumption (final goods).

intermediates that originate either from China or Eastern Europe in order to capture the most prominently discussed offshoring destinations.⁸ Having industry level offshoring data is only the first step towards a regional measure.

We apply employment shares of the WIOD industries within European regions to map industry level offshoring indicators into NUTS-2 regions.⁹ That is, we take the value of our industry level offshoring measure and calculate the regional measure as the average of industry level offshoring numbers weighted by the employment shares of the regions in national industry employment. This regional mapping approach resembles the concept introduced by Autor et al. (2013) for import competition in U.S. commuting zones. In more technical terms, we use the following equation:

$$\Delta(OFF)_r^{EU \leftarrow c} = \sum_{i=1}^I \frac{E_{ir,2000}}{E_{i,2000}} \times \frac{\Delta(Int)_i^{EU \leftarrow c}}{E_{r,2000}} \quad (1)$$

In the above equation, r describes NUTS-2 level regions of the EU15 countries and i represents industries. We use the employment shares of 2000 and investigate changes in offshoring (intermediate imports, Int) used by sector i and our outcome variables between 2000 and 2008. When looking at specific offshoring destinations, c is a mnemonic for either China or Eastern Europe. An important aspect to note with respect to identification is that the time variation entirely stems from the imported intermediates. As in Autor et al. (2013), the employment shares used to scale imports as well are all fixed. This leaves all variation across regions to arise from different beginning-of-period employment structures. Regions with initially high shares of subsequently strongly globalizing industries will be characterized by higher numbers of our regional offshoring measure.

Similarly, we regionalize intermediate exports using the following equation:

$$\Delta(OFF)_r^{EU \rightarrow c} = \sum_{i=1}^I \frac{E_{ir,2000}}{E_{i,2000}} \times \frac{\Delta(Int)_i^{EU \rightarrow c}}{E_{r,2000}} \quad (2)$$

where i now refers to the supplying industry and where we focus on intermediate exports of EU15 countries to Eastern Europe or China. These industry-level trade figures are regionalized using the employment shares of the industry-region-cells in the national employment of the producing industries.

We then calculate net offshoring to Eastern Europe and China as follows:

$$\Delta(netOFF)_r^{EU \leftrightarrow c} = \Delta(OFF)_r^{EU \leftarrow c} - \Delta(OFF)_r^{EU \rightarrow c} \quad (3)$$

As trade in intermediate goods and in final goods increased simultaneously, we further control for this increase when identifying the effect of offshoring. Hence, we analogously regionalize trade in final goods and calculate net trade as follows:

⁸Eastern Europe in our case includes the following countries: Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Romania, Slovakia, and Slovenia.

⁹See appendix for more info on the region-sector employment data.

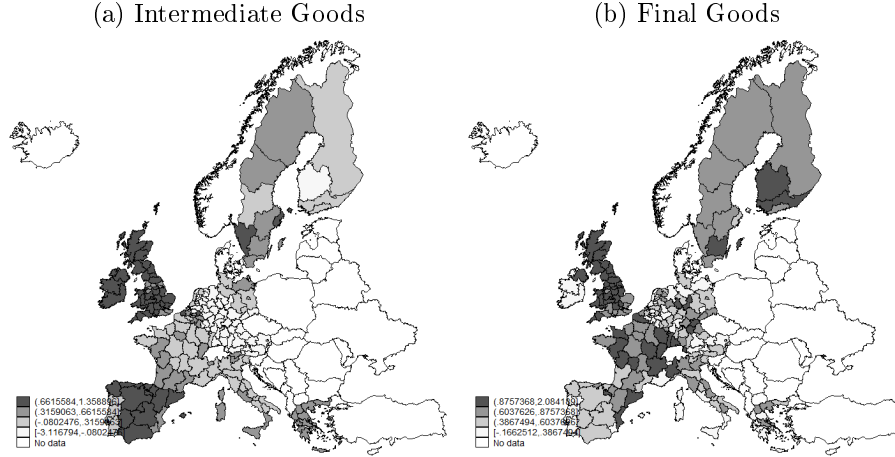


Figure 3: Change in Net Imports from China and Eastern Europe (2000-2008, 1,000 Euros/Employee)

$$\Delta(Trade)_r^{EU \rightarrow c} = \sum_{i=1}^I \frac{E_{ir,2000}}{E_{i,2000}} \times \frac{\Delta(Trade)_i^{EU \rightarrow c}}{E_{r,2000}} \quad (4)$$

$$\Delta(Trade)_r^{EU \leftarrow c} = \sum_{i=1}^I \frac{E_{ir,2000}}{E_{i,2000}} \times \frac{\Delta(Trade)_i^{EU \leftarrow c}}{E_{r,2000}} \quad (5)$$

$$\Delta(NetTrade)_r^{EU \leftrightarrow c} = \Delta(Trade)_r^{EU \leftarrow c} - \Delta(Trade)_r^{EU \rightarrow c} \quad (6)$$

where i refers to the producing industry¹⁰, and where $\Delta(Trade)_i^{EU \rightarrow c}$ refers to the change in the final goods exports of the EU15 to Eastern Europe or China between 2000 and 2008 – $\Delta(Trade)_i^{EU \leftarrow c}$ refers to the reverse trade direction, accordingly.

On average, offshoring (intermediate imports) in the EU15 from Eastern Europe and China rose by 1,862 Euro per employee, while intermediate exports to those countries rose by a comparable amount (1,705 Euro per employee). Hence, net offshoring on average rose by only 157 Euro per employee, but this differs strongly between regions, as indicated by figure 3. To the contrary, final goods imports from China and Eastern Europe rose strongly between 2000 and 2008 (by 1,073 Euro per employee), while exports rose only modestly (444 Euro per employee), so that net imports rose by 629 Euros per employee. This also differs strongly between regions (see figure 3). Moreover, the figure indicates that the change in net trade of intermediates and of final goods are differently distributed across the regions – in fact the correlation between the two variables is only 0.126.

¹⁰ Again, we focus only on products produced by manufacturing.

2.2 Econometric Approach

While the above measure pictures how different European regions were exposed to offshoring over the 2000 to 2008 period, it is likely insufficient to reliably identify any causal impact on regional labor markets. As with many trade related variables, the possibility that unobserved technology shocks affect both offshoring and labor market figures is a serious threat to identification. As a remedy, Autor et al. (2013) have suggested an instrumental variable strategy for regional trade exposure that easily lends itself to our application as well.¹¹ The main idea is that the rise of China and Eastern Europe into the ranks of major trading partners for advanced economies constitute a supply shock that affects more than just the EU15 countries sampled in our analysis. In other words, there is an exogenous component in the rise of offshoring from an EU perspective that is identified through the correlation of European offshoring with offshoring in other parts of the world. As stressed in Dauth et al. (2014), selecting the countries for constructing the instrumental variable requires some caution. For the identification assumptions not to be violated, we need countries with a similar exposure to the exogenous supply shock represented by what Dauth et al. (2014) call the “Rise of the East”. Yet, these countries market’s must not be tied too closely to European ones in order to avoid picking up any links other than the observed correlation in offshoring to the East. Furthermore, unobserved supply and demand shocks should be of limited importance such that the correlation in the offshoring numbers is not blurred by them. And finally, the countries need to be similarly exposed to the offshoring shock for the explanatory power of the instrument to reach satisfactory levels. With these considerations in mind, we chose Australia, Canada, Japan, Korea, and New Zealand as our instrument group. As an alternative IV, we rely on Brazil, India, Indonesia, Mexico and Taiwan – this only leads to marginal differences. Our IV is defined as follows:

$$\Delta(OFF)_r^{IV\leftarrow c} = \sum_{i=1}^I \frac{E_{ir,2000}}{E_{i,2000}} \times \frac{\Delta(Int)_i^{IV\leftarrow c}}{E_{r,2000}} \quad (7)$$

We calculate analogous IVs for the other offshoring direction, net offshoring and the trade in final goods indicators. Based on these considerations, we then estimate the effect of net offshoring on changes in labor market outcomes y_r between 2000 and 2008 in an instrumental variable approach:

$$y_r = \beta_0 + \beta_1 \Delta(netOFF)_r^{EU\leftrightarrow c} + \beta_2 \Delta(NetTrade)_r^{EU\leftrightarrow c} + \beta_n + \beta_x X_r + \epsilon_r \quad (8)$$

where β_n are dummy variables for the country(-group) to which region r belongs.¹² We apply our instrumental variable $\Delta(OFF)_r^{IV,c}$.

¹¹The approach has enjoyed growing popularity in the literature and also features in Dauth et al. (2014) and Hogeře and Wrona (2015) for instance.

¹²The countries and country-groups (indicated by brackets) in our sample are: Austria, (Belgium, Netherlands, Luxemburg), Germany, Greece, (Spain, Portugal), (Finland, Sweden), France, (United Kingdom, Ireland) and Italy. We exclude Denmark, since most of our indicators are unavailable due to the territorial reforms in Denmark.

2.3 Dependent and Control Variables

We interpret offshoring as a labor demand shock to the regional labor markets and are interested in the adjustments of regional labor markets to these shocks in terms of manufacturing employment, non-manufacturing employment, manufacturing wages, active population, high-/low-skilled unemployment and high-/low-skilled wages. In particular, we focus on the following dependent variables:

- Change in manufacturing employment $\Delta E_r^{manu} \equiv \frac{E_{r,2008}^{manu}}{L_{r,2008}} - \frac{E_{r,2000}^{manu}}{L_{r,2000}}$
- Change in non-manufacturing employment $\Delta E_r^{non-manu} \equiv \frac{E_{r,2008}^{non-manu}}{L_{r,2008}} - \frac{E_{r,2000}^{non-manu}}{L_{r,2000}}$
- Change in active population $\Delta L_r \equiv \log L_{r,2008} - \log L_{r,2000}$
- Change in low-skilled unemployment $\Delta U_r^{ls} \equiv \log U_{r,2008}^{ls} - \log U_{r,2000}^{ls}$ (high-skilled accordingly)
- Growth of low-skilled wages $\Delta w_r^{ls} \equiv \log w_{r,2008}^{ls} - \log w_{r,2000}^{ls}$ (high-skilled & manufacturing accordingly)

where E is employment, L is active population, w are wages (compensation per employee), U is the number of unemployed, ls is low-skilled, hs is high-skilled, $manu$ is manufacturing, $non - manu$ is non-manufacturing.

As further control variables, we include:

- Share of female employees in 2000
- Share of high-skilled in labor force in 2000
- Share of manufacturing in employment in 2000
- Population density in 2000
- Dummy variable for Eastern German regions

3 Preliminary Results

3.1 Baseline Results

We are mainly interested in the effects of offshoring on manufacturing employment. While we expect a negative effect of net import exposure ($\Delta(NetTrade)_r$) on manufacturing employment – import competition from China and Eastern Europe likely crowds out domestic manufacturing employment – the effects of net offshoring ($\Delta(NetOff)_r$) are unclear due to opposing effects. On the one hand, net offshoring might crowd out domestic workers, but on the other hand, net offshoring might increase productivity, leading to higher competitiveness and hence higher employment.

In a simple OLS model with country-group dummies but without additional controls (first column of table 1), net offshoring is positively associated with manufacturing employment, while net import exposure is negatively associated

with manufacturing employment. Hence, it seems that the positive employment effects of offshoring dominate the negative effects, while we find the expected negative sign for net import exposure. Nevertheless, these results might be biased due to the endogeneity of the two variables. We therefore estimate an IV model using net offshoring and trade of other countries with China and Eastern Europe ($\Delta(NetOff)_r^{EU \leftrightarrow CHN \& EAST}$, $\Delta(NetTrade)_r^{EU \leftrightarrow CHN \& EAST}$) as instrumental variables in column 2 of the table. However, as the F-test reveals, these two instrumental variables are too weak. We therefore use the intermediate and final goods im- and exports separately, such that we have four instrumental variables and re-estimate the model in column 3. Now the F-value is much larger and we can confirm the positive effect of net offshoring and the negative effect of net trade on manufacturing employment. While Autor et al. (2013) show that manufacturing employment in US regions is negatively affected by import exposure from China, we show that also in the EU 15, regional employment is negatively affected by net import exposure from China. Note that trade with China and Eastern Europe positively affects employment in EU 15 regions if those regions had a stronger growth of their exports to China and Eastern Europe, than of their imports from these locations.

In column 4 of table 1, we additionally include several control variables (see above). In the OLS model, the coefficients of net offshoring and net import exposure get closer to zero when taking into account the further control variables. Only if we apply our IV strategy (column 5), we can confirm the positive effect of net offshoring on manufacturing employment, while the effect of net import exposure remains small. In the last column of table 1, we choose our alternative set of countries for constructing the IVs. The effect of net offshoring remains very similar and significant. Hence, the results seem to be stable w.r.t. adjusting the set of IV countries.

	OLS ΔE_r^{manu}	IV ΔE_r^{manu}	IV ΔE_r^{manu}	OLS ΔE_r^{manu}	IV ΔE_r^{manu}	IV ΔE_r^{manu}
$\Delta(NetOff)_r$	0.0192*** (0.0037)	0.0232 (0.0599)	0.0213** (0.0094)	0.0066 (0.0044)	0.0178** (0.0082)	0.0227** (0.0093)
$\Delta(NetTrade)_r$	-0.0228*** (0.0057)	-0.1467 (1.1506)	-0.0362*** (0.0122)	-0.0097* (0.0055)	-0.0152 (0.0186)	-0.0062 (0.0118)
controls	no	no	no	yes	yes	yes
country dummies	yes	yes	yes	yes	yes	yes
Observations	209	209	209	209	209	209
R-squared	0.4347	-2.7243	0.2043	0.5437	0.3599	0.3365
F-stat weak IV		0.0102	11.10		2.033	6.805
IVs		net	im-/export		im-/export	im-/export
IV countries		A	A		A	B
	Robust standard errors in parentheses					
	*** p<0.01, ** p<0.05, * p<0.1					

Table 1: Main Results

So far, the results refer to the aggregate trade with China and Eastern Europe. In table 2 we further disaggregate the results. First (column 1), we distinguish between intermediate imports ($\Delta(Off)_r^{EU \leftarrow CHN \& EAST}$) and intermediate exports ($\Delta(Off)_r^{EU \rightarrow CHN \& EAST}$). Both effects are close to zero and it turns out that we cannot distinguish between the two. This is due to the high correlation (0.948) between the two indicators. Next, we restrict the model to either trade with China only (column 2) or with Eastern Europe only (column 3). In both cases, we confirm the positive effects of net offshoring on manufac-

turing employment, while the standard errors are smaller for trade with China. The effects of net import exposure are negative, but only significant in the case of trade with China. This could be due to the fact that the trade balance (for final goods) with Eastern Europe is less negative than the trade balance with China and that there is not enough variation to identify potential effects of trade with final goods with Eastern Europe.

	IV ΔE_r^{manu}	IV ΔE_r^{manu}	IV ΔE_r^{manu}
$\Delta(Off)_r^{EU \leftarrow CHN \& EAST}$	-0.0015 (0.0180)		
$\Delta(Off)_r^{EU \rightarrow CHN \& EAST}$	-0.0101 (0.0117)		
$\Delta(NetTrade)_r$	-0.0317 (0.0265)		
$\Delta(NetOff)_r^{EU \leftrightarrow CHN}$		0.0340*** (0.0118)	
$\Delta(NetTrade)_r^{EU \leftrightarrow CHN}$		-0.0404** (0.0203)	
$\Delta(NetOff)_r^{EU \leftrightarrow EAST}$			0.0316* (0.0183)
$\Delta(NetTrade)_r^{EU \leftrightarrow EAST}$			-0.0687 (0.0474)
controls	yes	yes	yes
country dummies	yes	yes	yes
Observations	209	209	209
R-squared	0.3264	0.3228	0.2684
F-stat weak IV	2.271	3.312	1.160
IVs	im-/exports	im-/exports	im-/exports
IV countries	A	A	A
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Table 2: Trade with China vs. Eastern Europe

3.2 Further Labor Market Adjustments

Our results so far show positive effects of net offshoring and negative effects of net import exposure on manufacturing employment. We now turn to further potential adjustment mechanisms of local labor markets to the offshoring and trade shocks with China and Eastern Europe. Firstly, we are interested in potential labor supply adjustments (potentially mostly through migration) and hence focus on the active population in the regions, see table 3. In column 1, we calculate the effect for net trade with China and Eastern Europe combined. We do not find any significant effects on the active population. However, net offshoring to China seems to reduce active population in net intermediates-importing regions in the EU 15. However, net offshoring to Eastern Europe (column 3) does not affect the active population in the EU 15 regions.

Next, we estimate the effects of net offshoring on further local labor market indicators, namely non-manufacturing employment ($\Delta E_r^{non-manu}$), aggregate unemployment (ΔU_r), low-skilled unemployment (ΔU_r^{ls}), manufacturing wages (Δw_r^{manu}), low-skilled wages (Δw_r^{ls}) and high-skilled wages (Δw_r^{hs}). Apart from manufacturing employment, only manufacturing wages seem to be affected by net offshoring to China and Eastern Europe. As we observe both a positive effect on manufacturing employment and a negative effect on manufacturing wages from net offshoring to China and Eastern Europe, this offshoring cannot

	IV ΔL_r	IV ΔL_r	IV ΔL_r
$\Delta(NetOff)_r$	-0.0264 (0.0363)		
$\Delta(NetTrade)_r$	-0.0348 (0.0876)		
$\Delta(NetOff)_r^{EU \leftrightarrow CHN}$		-0.0738** (0.0337)	
$\Delta(NetTrade)_r^{EU \leftrightarrow CHN}$		0.0525 (0.0756)	
$\Delta(NetOff)_r^{EU \leftrightarrow EAST}$			0.0373 (0.0595)
$\Delta(NetTrade)_r^{EU \leftrightarrow EAST}$			-0.0275 (0.2100)
controls	yes	yes	yes
country dummies	yes	yes	yes
Observations	209	209	209
R-squared	0.0441	-0.0121	0.0984
F-stat weak IV	2.033	3.312	1.160
IVs	im-/exports	im-/exports	im-/exports
IV countries	A	A	A
	Robust standard errors in parentheses		
	*** p<0.01, ** p<0.05, * p<0.1		

Table 3: Effects on Active Population

reflect only a aggregate labor demand shock. Instead, there are either simultaneous labor supply adjustments, or offshoring further affects the structure of employment in the regions. At the aggregated regional level (including all sectors), we do not find any effects on skill-specific unemployment or wages. Another potential explanation could be that trade unions were willing to accept lower wages in offshoring-competing regions to avoid potential job losses and that the wage moderation was large enough to overcompensate potential job losses.

	IV ΔE_r^{manu}	IV $\Delta E_r^{non-manu}$	IV ΔU_r	IV ΔU_r^{ls}	IV Δw_r^{manu}	IV Δw_r^{ls}	IV Δw_r^{hs}
$\Delta(NetOff)_r$	0.0178** (0.0082)	0.0153 (0.0149)	-0.3359 (0.2210)	-0.2644 (0.2633)	-0.2623** (0.1028)	0.1504 (0.1408)	-0.0240 (0.0661)
$\Delta(NetTrade)_r$	-0.0152 (0.0186)	0.0216 (0.0618)	-1.0113* (0.5978)	-1.1002 (0.7577)	0.1025 (0.2860)	0.4213 (0.3523)	0.0180 (0.1767)
controls	yes	yes	yes	yes	yes	yes	yes
country dummies	yes	yes	yes	yes	yes	yes	yes
Observations	209	209	196	196	208	209	209
R-squared	0.3599	0.0232	-0.1580	-0.2525	0.1396	-0.2696	0.1823
F-stat weak IV	2.033	2.033	1.582	1.582	2.060	2.033	2.033
	Robust standard errors in parentheses						
	*** p<0.01, ** p<0.05, * p<0.1						

Table 4: Further Effects

3.3 Heterogeneous Effects Across Regions

Work in Progress: We are further interested in how regions differently react to offshoring to China and Eastern Europe. In particular, we aim at evaluating potential underlying mechanisms by analyzing the reallocation of intra-EU15 intermediates trade relationship in response to intermediates import competition from China and Eastern Europe.

4 Preliminary Conclusions

In this paper, we study the effects of offshoring to China and Eastern Europe on regional labor markets in Western Europe. In line with results for the US from Autor et al. (2013) and for Germany from Dauth et al. (2014), we find that net imports from China and Eastern Europe negatively affect manufacturing employment in import-competing Western European (EU 15) regions. In contrast to these authors, we are mainly interested in the effects of offshoring (trade in intermediates) on local labor market outcomes. The effects of offshoring on local labor demand are ambiguous as offshoring on the one hand might crowd out domestic employment but on the other hand might increase productivity, competitiveness and hence employment of net-offshoring regions. Our results point to positive effects of net-offshoring on manufacturing employment in the EU 15 regions. This indicates that the positive effects of offshoring dominate. However, net-offshoring also leads to lower manufacturing wages in net-offshoring regions. The reasons behind this remain unclear, as we cannot find any further effects of offshoring on other regional labor market outcomes. In particular, we don't find any effects on low- or high-skilled wages or unemployment. However, labor supply seems to negatively respond to net-offshoring to China (but not to Eastern Europe). A potential explanation for the simultaneous positive effects on employment and negative effects on wages (and labor supply) thus might be that intermediate imports-competing regions have reacted by lower wage growth in manufacturing sectors to net offshoring and that this effect was large enough to overcompensate potential crowding out effects on employment while it might have been associated with outmigration from those regions.

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Appendix

Wide versus Narrow Concept of Offshoring

Our offshoring-measure most closely resembles the “wide” approach which counts all intermediate imports, while the “narrow” one only records those imports of intermediates that originate in the same industry abroad that they are used in at home. A further difference is using employment as the denominator. This has the advantage to control for some of the variation arising from domestic outsourcing. The latter would increase total non-energy inputs (the denominator used in Feenstra and Hanson (1996)), affecting the original offshoring measure. However, since this is not the case for employment, which might even fall with domestic outsourcing, this effect is counterbalanced in our case – see also Geishecker and Görg (2008).

Preparation of Region-Sector Employment Shares

We depict the sectoral employment shares at the level of EU NUTS-2 regions from the aggregated results of the European Union Labor Force Survey (EU-LFS), as available from Eurostat (epp.eurostat.ec.europa.eu). This data is only available at the level of 6 aggregated sectors. We therefore further apply the results from the Structural Business Survey (SBS), as available at Eurostat, to sectorally disaggregate the results of the EU-LFS. The two data sets are based on different data collection approaches and the SBS does not cover all sectors. We therefore proportionally fit the SBS employment levels to the EU-LFS employment levels. Further, we use an iterative proportional fitting (IPF) algorithm to harmonize our data with the aggregate sectoral employment at the national level and the aggregate regional employment. Through this process, we receive the employment shares for the NUTS-2 regions at the level of 31 NACE Rev. 1.1 sectors.