

Can international trade explain the decline in collective bargaining in Germany?

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Abstract

We investigate to what extent the rise of China and the transformation of Eastern Europe from the mid-1990s onwards have let German firms to opt out of their collective bargaining agreements. This is important, since the decline in collective bargaining coverage has been identified as a major source of rising wage inequality in Germany. We link detailed establishment level data to trade flows and make use of cross-industry variation. We apply the instrumental variable strategy of Autor et al. (2013) and use trade flows of other high-income countries as instruments for German import and export exposure. Our first preliminary OLS results suggest that increased import exposure increases the probability for firms to leave sectoral bargaining agreements.

Keywords: International Trade, Import Competition, Export Opportunities, Collective Bargaining

JEL classification: F 16, J 51

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1 Introduction

How does globalization affect labour market outcomes? This is a very old and fundamental question in economic research and many scholars have analyzed the effect of globalization on wages and employment in different settings. With this paper, we want to contribute to this strand of research by looking at the particular case of Germany. Moreover, we focus on an indirect channel through which globalization might affect labour market outcomes: We investigate to what extent the increase in international trade affects the willingness of German firms to leave collective bargaining agreements and to what extent it thereby impacts the wage setting process.

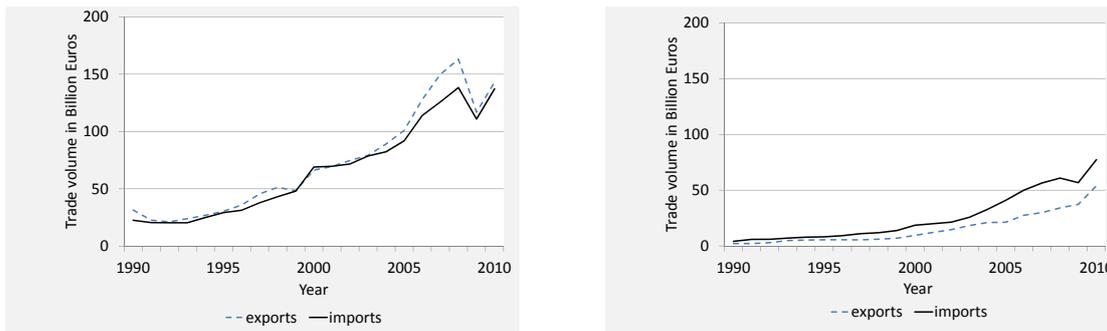
Our analysis is motivated by two major empirical observations. One is related to the fact that since the mid-1990s wage inequality has increased considerably in Germany (Dustmann et al. (2009), Card et al. (2013)). From 1996 to 2010 wage dispersion - measured as the standard deviation of real log wages - has increased by about twelve log-percentage points. Compared to other developed economies, this is a large increase. The United States for example, typically considered as a country with a high dynamic in wage inequality, show a similar increase - however over a longer time horizon of 25 years (Heathcote et al. (2010)).¹ Moreover, Baumgarten et al. (2014) have shown, that a major part of this rise in German wage inequality - about 43 percent - can be linked to the decline in collective bargaining coverage of German firms. After 1996, there was indeed a dramatic decline in union coverage in Germany. While in 1996 a large majority of German firms, about 60 percent, were covered by collective agreements, this share declined to only 35 percent in 2010.

Our second empirical observation is related to two major trade shocks that affected the German economy also from the mid 1990s onwards. One is the transformation of the former socialist countries in Eastern Europe, which was related to a substantial rise in trade between Germany and these countries (see Figure 1a).² In the period from 1990 to 2008 German exports grew from a level of about 30 billion Euros to about 160 billion Euros, which corresponds to a growth rate of more than 400 percent. Over the same period of time, German imports rose by 500 percent, from about 20 billion Euros to 140 billion Euros. The second trade shock that affected Germany around that time was the rise of China. Starting from a very low level of German import volumes at the beginning of the 1990s (about four billion Euros), it has risen to more than 60 billion Euros in 2008 (Figure 1b), which corresponds to a growth rate of 1400 percent and which is far higher than for any other trading partner. Similar patterns can be observed for German export volumes to China. While at the beginning of the 1990s German exports to China amounted only to about two billion Euros, they reached a level of more than 30 billion Euros in 2008. These numbers show that these two major events increased the trade exposure for the German economy considerably.

In this paper, we investigate the link between these trade shocks and the decline in German collective bargaining coverage. To what extent has the transformation of Eastern

¹For cross-country comparisons of increases in wage inequality see Krueger et al. (2010).

²We consider Eastern Europe to be set up from the following countries: Bulgaria, Czech Republik, Hungary, Poland, Romania, Slovakia, Slovenia, and the former USSR or its succession states Russian Federation, Belarus, Estonia, Latvia, Lithuania, Moldova, Ukraine, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.



(a) Eastern Europe

(b) China

Figure 1. German trade volumes with Eastern Europe and China, 1990-2010

Europe after the fall of the iron curtain caused German firms to change their willingness of sticking to union agreements? And similarly: Has the rise of China’s productivity caused German firms to opt out of their bargaining agreement? Can international trade explain the willingness of German firms to leave union agreements?

Answering these questions is important for two reasons. First, it is crucial from a policy perspective since it sheds light on the reaction of firms facing increased trade exposure. It is also relevant since the decrease in collective bargaining coverage has been identified as one of the major drivers of rising wage inequality in Germany. Second, it is important for economic theory. Most existing trade models treat labor market institutions as exogenous. If we can establish a link between international trade exposure and the decision of firms to leave collective bargaining agreements, this should encourage economists to build trade models that treat labor market institutions as endogenous.

For this study we make use of cross-industry variation in trade exposure. For every three-digit manufacturing industry we construct a measure of import and export exposure by taking the change in trade flows over the period from 1996 to 2008 from Eastern Europe and China to Germany and vice versa. We thereby get industries that are differently affected by import competition and export opportunities arising from those regions. Industries that are strongly export-oriented may benefit from the rise of new markets and may face less pressure to set wages more flexibly, while industries that are characterized by a high import exposure may be confronted with more competition and may face a higher need for flexibility in the wage setting process. In our analysis we link the import and export exposure measures to the firm decisions of changing their collective bargaining status.

We argue, that the rise of China, facilitated by several market openings and reforms, productivity gains of Chinese producers and market access gains after its WTO accession in 2001, occurred exogenously from the point of view of the German economy. The rise of Eastern Europe shared many of those characteristics. The transformation of the former socialist block triggered substantial productivity gains in those economies, which is in line with the findings by Burda and Severgnini (2009) who analyze TFP growth across European countries. Moreover, we exploit the fact that many Eastern European countries adopted concrete steps of trade integration, since several of them joined the WTO around the year 1995. The large increase in German trade volumes documented in Figure 1 is thus, likely

to results - at least to a large extent - from the strong rise in productivity and accessibility of China and Eastern Europe and less so by developments that are specific to the German economy.

We build on a strand of empirical literature that analyses the impact of trade shocks on labour market outcomes. Our study is close to the work by Autor et al. (2013) who investigate the impact of increased import competition from China on regional local labour market outcomes in the U.S.. Their main finding is that regions that are highly affected by Chinese import competition, have experienced severe negative impacts on their labor markets, such as lower manufacturing employment, rising unemployment, or lower labor force participation. In a second paper, Autor et al. (2014) look at the impact of increased Chinese import competition on individual labour market outcomes. Here they find that import shocks impose substantial labor adjustment costs that are highly unevenly distributed across workers according to their skill levels and conditions of employment in the pre-shock period. Dauth et al. (2014) apply the two previous approaches to the German case and look at local labour market outcomes as well as individual labor market biographies. They do not only consider the rise of China but as well the transformation of the Eastern European countries. In line with the US evidence, Dauth et al. (2014) also find negative employment effects due to increased import exposure at the local labour market level. However, they find that this negative effect is, on average, more than offset by a positive effect of rising export exposure. With respect to individual employment biographies they find that trade had a stabilizing overall effect on employment relationships. We contribute to this literature by looking at the impact of these trade shocks on firm behaviour. Moreover, our work is related to previous literature that deals with collective bargaining in Germany. Dustmann et al. (2014) characterize the decrease of collective wage setting at the industry level as an important source of Germany's gain in competitiveness. They however, do not analyze the determinants of this decline. Other studies, as Hirsch et al. (2014), look at different firm level characteristics that determine firm's wage setting status and Capuano et al. (2014) analyze the correlation between firm's export status and its bargaining regime. Up to our knowledge there is no previous work that tries to explain the decline in collective wage setting in Germany. With our study, we want to fill this gap.

The rest of the paper is organized as follows. Section 2 briefly lays out the German system of collective bargaining. Section 3 describes the empirical approach, the data and gives a descriptive overview. Section 4 reports the results while Section 5 concludes.

2 The German bargaining regime

Different to many other economies, the structure of the German system of industrial relations is not rooted in legislation and is not governed by the political process. Instead it is laid out in contracts and mutual agreements between trade unions, employer associations and work councils. The principle of autonomy of wage bargaining is fixed in the German constitution and implies that negotiations take place without the government directly exerting influence. For the period under study, Germany has had no minimum wage imposed by the political process, rather a system of wage floors which has been negotiated regularly

between trade unions and employer associations. In Germany, contractual agreements are either formed at the industry-level or at the firm level. Moreover, in Germany, the recognition of trade unions is at the level of the firm. This also implies that firms, that once recognized a union, can later decide to opt out of the collective agreement. In such a case the firms still have to pay wages to the incumbent workers that are in line with the collective agreement until a new agreement at the firm level is formed. However, they need not follow new negotiated wage increases and the firm does not need to pay the old collective wages to new hires. Thus over time, by opting out of collective agreements, firms are able to negotiate wages more flexibly and to reduce wage costs.

Since the mid-1990s there has been a steady and dramatic decline in collective bargaining coverage in Germany. While in 1996 about 60 percent of all firms recognized a collective agreement, this share declined to only 35 percent in 2010.³ Figure 2 shows that most of this development can be linked to a decrease in industry-level agreements: From 1996 to 2010 the share of firms with such agreements fell from 49 percent to 33 percent. During the same time, the share of firms with firm-level agreements remained relatively stable. Overall this decentralization of the wage setting process from the industry to the firm level increased the importance of the firm in the wage bargaining process. Dustmann et al. (2014) refer to this process as an "increasing localization of Germany's industrial relations" (p. 168).

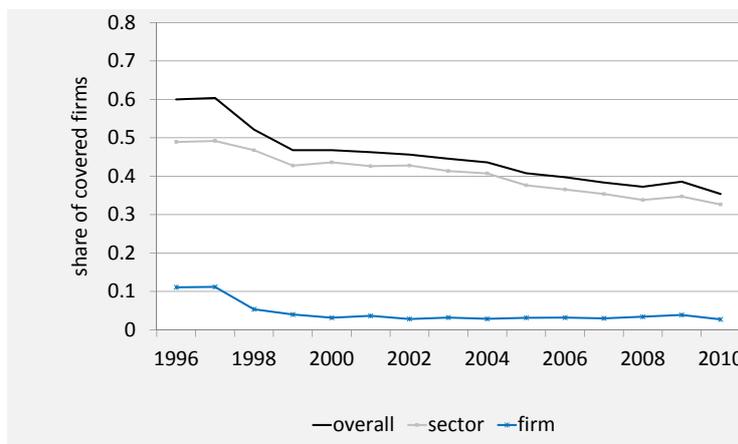


Figure 2. Collective bargaining coverage, 1996-2010

3 Empirical approach

3.1 Trade exposure across industries

We make use of the variation in trade flows at the industry level to construct measures of trade exposure for each three-digit industry of the manufacturing sector. Note, that in the following the notation of *East* encompasses Eastern Europe as well as China. First, consider the import exposure of industry j at time t :

³Data is available from 1995 for West- and 1996 for East-Germany up to 2010 and it stems from the IAB Establishment Panel provided by the Federal Employment Agency. Details on the dataset in the data section.

$$\Delta(IMexposure)_{jt}^{East} = \frac{\Delta IM_{jt}^{D \leftarrow East}}{E_{jt}}, \quad (1)$$

where $\Delta IM_{jt}^{D \leftarrow East}$ corresponds to total change in imports from the East to Germany in industry j between t and $t+1$ and E_{jt} gives total employment in industry j at time t . Our measure of import exposure $\Delta(IMexposure)_{jt}^{East}$ therefore mirrors the per capita change in imports for industry j from t to $t+1$.

We construct a similar measure for the export exposure of industry j at t :

$$\Delta(EXexposure)_{jt}^{East} = \frac{\Delta EX_{jt}^{D \rightarrow East}}{E_{jt}}, \quad (2)$$

where $\Delta EX_{jt}^{D \rightarrow East}$ now corresponds to the total change in German exports to the East in sector j between t and $t+1$. Our measure of export exposure $\Delta(EXexposure)_{jt}^{East}$ therefore captures the per capita increase in exports between t and $t+1$.

In our empirical analysis our aim is to identify the causal effect of the rise of the East on the probability of firms to leave union agreements. We therefore regress the change in collective bargaining status at the firm level between t and $t+1$, ΔY_{it} , on the change of our trade exposure measures at the industry level, while controlling for other start-of-period variables, X'_{it} , where the subscript i indicates the firm. The specification is therefore the following:

$$\Delta Y_{it} = \beta_0 + \beta_1 * \Delta(IMexposure)_{jt}^{East} + \beta_2 * \Delta(EXexposure)_{jt}^{East} + X'_{it} * \beta_3 + \epsilon_{it}. \quad (3)$$

One problem with a simple ordinary least squares (OLS) analysis might be related to the potential endogeneity of our trade exposure measures. As soon as unobservable shocks affect import and export exposure as well as the firm decisions to stay or to leave collective agreements at the same time, our parameter estimates will be biased. To address this concern of endogeneity, we consider an instrumental variable (IV) strategy.

3.2 Identification strategy

Our IV strategy closely follows the approach developed by Autor et al. (2013) and also applied by Dauth et al. (2014). For each three-digit industry we therefore construct the following variable for our import measure

$$\Delta(IMexposureINST)_{jt}^{East} = \frac{\Delta IM_{jt}^{Other \leftarrow East}}{E_{jt}}, \quad (4)$$

where $\Delta IM_{jt}^{Other \leftarrow East}$ now corresponds to changes in total import flows of industry j goods from the East to *other countries* between t and $t+1$. Similar, for our export exposure we construct the following instrument

$$\Delta(EX\text{exposure}INST)_{jt}^{East} = \frac{\Delta EX_{jt}^{Other \leftarrow East}}{E_{jt}}, \quad (5)$$

where $\Delta EX_{jt}^{Other \rightarrow East}$ captures here the changes in exports from *other countries* to the East.

The idea behind these instruments is that the rise of China and Eastern Europe on the one hand induces a supply shock which goes along with import penetration for all trading partners, not just for Germany. Using the import volumes of other countries for the calculation of the import exposure of industry j therefore identifies the exogenous component of rising competitiveness in the East and adjusts the measure from potential shocks that simultaneously affect German imports and firm decisions. On the other hand, the rise of the East induces a demand shock for all countries, since the former socialist countries and China have become more attractive economies and export destinations not only for Germany. Using exports from other countries to the East in the calculation of industry export exposure therefore captures the exogenous rise of export opportunities to the East and purges the impacts of potential unobservable shocks.

Crucial for our analysis is the quality of our instrument, which primarily depends on the following conditions: First, the instrument must be correlated with our causal variable of interest. This means, our instrument should have explanatory power in order to avoid a weak instrument problem. Second, the instrument should be uncorrelated with any other determinant of the endogenous variable. This implies that unobservable supply or demand shocks in the instrument-group countries are not correlated with the unobservable shocks hitting the German economy. And third, in order for the exclusion restriction to hold, there should not be any relation between the instrument and the outcome variable other than through the causal variable of interest. Applied to our case this means that the trade flows of our instrument group with the East should not influence the willingness of German firms to leave union agreements other than through the rise of the East.

Taking these requirements into account it is important which countries to consider in our instrument group. We stick very close to the approach taken by Dauth et al. (2014) and consider the following countries: Australia, Canada, Japan, Norway, New Zealand, Sweden, Singapore and the United Kingdom. Note that these countries all have a similar income level as Germany but none of them is a direct neighbour of the German economy. Moreover, we do not consider members of the European Monetary Union since it is more likely that member countries face common shocks.

3.3 Data

For our analysis we combine three main datasets. The German labor market data stem from two sources that are provided by the Research Data Centre of the German Federal Employment Agency. First, we use the Sample of Integrated Labor Market Biographies (SIAB) to obtain industry level employment information. This data source is a representative sample of all administrative social security records for the years 1975 to 2010 and contains detailed information about the industry (on a three-digit level) a worker belongs

to. Second, we use firm-level information that stems from the IAB Establishment Panel, which is a stratified sample of all establishments which employ at least one worker covered by social security. Strata are defined over regions, industries and size classes, with larger establishments being oversampled. However, appropriate weights are provided that ensure the representativeness of the results. The IAB Establishment Panel started in 1993 with 4265 establishments in West Germany. East German establishments were included from 1996 onwards. The survey covers many different topics. For our analysis at hand information regarding the collective bargaining regime of an establishment is most important. This information is surveyed every year from 1995 onwards and distinguishes between collective agreements at the industry level, at the firm level or no collective bargaining. We use this information to construct our dependent variable, the change in bargaining status at the plant level. The earliest information on collective bargaining is only available from 1995 (1996) for West (East) Germany. We therefore take 1996 as our starting point and use data until 2008.⁴ In order to construct our dependent variable, we need to observe each firm in both periods, t and $t + 1$. Since every year some of the firms are lost from the panel and some firms are newly included, we decide to look at four year windows (1996-2000, 2000-2004, 2004-2008) in order to increase the number of firm observations.

Information on international trade flows stems from the BACI Database which is provided by the CEPII and builds on the UN Comtrade Database. It contains detailed bilateral trade statistics for more than 200 countries and 5.000 products, covering the period from 1995 to 2012. We merge these three datasets by harmonizing industry and product classifications. The correspondance between HS92 product codes and the employment data, which is classified on a NACE rev.1 three-digit industry code, is provided by the UN Statistical division. Trade values that cannot be matched unambiguously into one industry are partitioned into industries according to their national employment share in 1986. Finally, we drop all industries related to agriculture, mining and fuel products, so that our empirical analysis focuses on 101 different manufacturing industries.

3.4 Descriptive overview

In Appendix Tables (2) and (3) we report the sectors with the highest import and export volumes in 2008 with respect to Eastern Europe and China, respectively. It can be seen that Germany tends to export similar products to the two regions, mainly motor vehicles and other machinery. Yet, the imports are rather different: From China, Germany mainly imports office machinery, cloths, and toys. From Eastern Europe, however, the most important import sectors are motor vehicles, parts for motor vehicles, and metals. It can be seen that there is substantially more intra-industry trade with Eastern Europe than with China. The changes in sectoral import and export exposure are our main explanatory variables of interest and Appendix Table (4) reports the mean values and standard deviations across all sectors for the three time periods and the two regions. For China, we see that German industries were exposed to trade mainly during the last period from 2004 to 2008. During these four years the exposure to Chinese imports rose by 17,000 US Dollar as compared

⁴Data is available up to the year 2010. Since there was however the large recession that heavily affected trade flows in 2008, we only consider data up to this year.

to only 1,200 US Dollar in the first period. Export exposure also increased most in the third period, however much less by only 2,500 US Dollar on average over the period from 2004 to 2008. For Eastern Europe, import exposure on average increased far less than the Chinese import exposure. However export exposure increased stronger than the respective Chinese measure and also substantially earlier. Finally, Appendix Table (4) also reports descriptive statistics of our dependent variable. For our baseline specification, we focus on changes with respect to the sector level regime, since we have seen that most of the decline in collective bargaining coverage is due to a decrease in industry level agreements. Moreover, it is plausible that switching from a sector level to a firm level agreement already allows firms to set wages more flexibly. Our dependent variable *status change* therefore can take the values -1 , if a firm opts into a sector level bargaining regime between t and $t + 1$, it can equal zero, if a firm does not change its status, or it can take the value $+1$, which indicates that the firm has opted out of the sectoral bargaining regime. As can be seen from Appendix Table (4), there are between 1002 and 2066 firms that we observe over the three time periods. During the first period, from 1996 to 2000, 47 firms of our sample joint a sectoral agreement, 99 firms opted out of such an agreement and 856 establishments did not change their status. Qualitatively similar numbers are found for the other two periods.

4 Trade exposure and firm behaviour

We now turn to our empirical analysis where we estimate equation 3 first by OLS and then use 4 and 5 as instruments for our main variables 1 and 2.

4.1 Baseline specification

Table 1 shows the regression results, where columns 1 and 2 report the results of our OLS analysis and column 3 gives the result of our IV-regression. Column 1 shows our most parsimonious specification, where we only control for the previous bargaining status of the firm, firm's size and where we include federal state and time dummies. The previous bargaining status enters positively and is highly significant. Moreover, the size of the firm, measured with its log employment, has a negative sign and is highly significant. This mirrors the fact that larger firms are less likely to opt out of sectoral agreements. We cannot, however, identify a significant impact for our trade exposure variables in this specification.

In column 2 we add further variables that control for more firm characteristics. We find that having a work council reduces the likelihood of opting out of an agreement. At the same time, being a single firm (not belonging to a group of firms) enters positively, the same is true for being an exporter. The impact of import exposure enters positively, thus, a higher exposure to import competition increases the probability of opting out of a sectoral agreement.

Column 3 shows the respective specifications implementing the IV-approach. The first stage results reported in the bottom panel indicate that our instruments are strong, with a F-test statistic above conventional threshold levels. Turning to the second stage results, export exposure has a negative (but insignificant) sign, while the impact of import exposure

has a positive one. The point estimate of our import exposure measure lies below the respective OLS estimate, but loses its statistical significance.

What are possible explanations for this finding? The comparison between the OLS and the two-stage least squares (2SLS) coefficients show, that the OLS estimate for import exposure is biased upwards, this would be in line with a positive demand shock. The robustness of this result, however, needs to be further investigated.

5 Conclusion

In this paper we analyze to what extent the increased exposure to import competition and the rise in new export opportunities due to the rise of China and Eastern Europe from the mid-1990s onwards can explain the decline in collective bargaining coverage in Germany. Our simple OLS analysis suggests, that the increase in import exposure indeed increased the probability for firms to opt out of sectoral bargaining agreements. As soon as we control however for potential endogeneity issues by applying an IV-strategy, we cannot identify any significant impact.

Table 1. Trade Exposure and Sectoral Bargaining Agreements

Dependent variable: change in sectoral bargaining status			
	1 (OLS)	2 (OLS)	4 (2SLS)
Δ import exposure	0.00041* (0.00024)	0.00045* (0.00025)	0.0003788 (0.0003167)
Δ export exposure	-0.00021 (0.00048)	-0.00031 (0.00047)	-0.0006867 (0.0013071)
previous status	0.37775*** (0.01729)	0.39090*** (0.01771)	0.3910106*** (0.0178908)
ln empe	-0.01343*** (0.00466)	0.02361* (0.01191)	0.025002* (0.0122881)
ln empe2		-0.00548*** (0.0014602)	-0.0055748*** (0.0014731)
work council	-0.0553955*** (0.017603)	-0.0565375*** (0.0190166)	-0.053427*** (0.0190425)
single	0.0590661*** (0.0146972)	0.0511632*** (0.014452)	0.0520232*** (0.0146397)
share female		0.01891 (0.02813)	0.0235015 (0.0295379)
share foreign		-0.07715 (0.05357)	-0.0827935 (0.0561253)
share highskill		0.04282 (0.02695)	0.0434935 (0.0265199)
technical status (0,1)		-0.00728 (0.01209)	-0.0057782 (-0.0057782)
exporter (0,1)		0.03551** (0.01384)	0.036687** (0.0141829)
federal state dummies	Y	Y	Y
time dummies	Y	Y	Y
N	4634	4454	4368
First stage results, dependent variable: import exposure			
Δ import exposure (other countries)			0.5107982*** (0.0283196)
Δ export exposure (other countries)			-0.0122208 (0.0158254)
F-test			167.2
R-squared			0.7663
First stage results, dependent variable: export exposure			
Δ import exposure (other countries)			0.0451744*** (0.0110936)
Δ export exposure (other countries)			0.2778903*** (0.0209217)
F-test			200.04
R-squared			0.5795

Standard errors are clustered at the industry-level and given in parentheses.
Level of significance: *** 1%, ** 5%, * 10%.

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Appendix

Table 2. Trade volumes with Eastern Europe, top 5 manufacturing industries

Industry		
Imports from Eastern Europe		2008
341	Motor vehicles	12300000
343	Parts and accessories for motor vehicles	11100000
274	Basic precious and non-ferrous metals	7349975
271	Basic iron and steel, ferro-alloys (ECSC)	5786613
361	Furniture	5212880
Exports to Eastern Europe		2008
341	Motor vehicles	22400000
343	Parts and accessories for motor vehicles	15200000
295	Other special purpose machinery	12200000
241	Basic chemicals	8969942
292	Other general purpose machinery	8872885

Table 3. Trade volumes with China, top 5 manufacturing industries

Industry		
Imports from China		2008
300	Office machinery and computers	11500000
182	Other wearing apparel and accessories	7714322
365	Games and toys	4827105
321	Electronic valves and tubes, other electronic comp.	4718183
322	TV, and radio transmitters, apparatus for line telephony	4348643
Exports to China		2008
341	Motor vehicles	5472629
295	Other special purpose machinery	5217881
291	Machinery for production, use of mech. power	4424425
241	Basic chemicals	3307421
292	Other general purpose machinery	2996526

Table 4. Descriptive statistics of the main variables

	1996-2000			2000-2004			2004-2008		
Dependent variable									
	N	-1	+1	N	-1	+1	N	-1	+1
<i>change status (-1,0,+1)</i>	1002	47	99	1845	108	157	2066	98	177
Trade exposure									
	N	mean	sd	N	mean	sd	N	mean	sd
Δ imports per worker									
China	96	1.19	4.28	100	5.38	14.79	101	17.83	61.32
Eastern Europe	99	1.44	3.97	101	4.39	5.78	101	9.39	14.33
Both	99	2.59	6.57	101	9.72	17.77	101	27.22	61.92
Δ exports per worker									
China	98	0.40	1.92	100	1.38	2.92	100	2.48	4.68
Eastern Europe	98	0.25	4.45	100	7.91	8.25	101	17.61	20.30
Both	98	0.65	5.12	100	9.29	9.36	101	20.06	22.06