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Are Wage Cost Differentials Driving Delocalisation?

A comparative analysis between High Income and Low Income Countries using Firm Level Data[1]

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Summary

This paper compares the wage cost and productivity differentials between Belgium and Portugal, being the EU benchmarks for high and low labor costs, with those in the three leading emerging economies of Central and Eastern Europe, Poland, Hungary and the Czech Republic. To this end we use firm level data to construct measures of labor costs and labor productivity.

We find that labor costs are more than 5 times larger in Belgium compared to Central and Eastern Europe. But also compared to Portugal, labor costs in Belgium are 4 times larger, indicating that even within the EU there are huge differences in labor costs. However, at the same time labor productivity varies substantially between these regions and there is a close correlation between high wage costs and high labor productivity.

Third, we compute a competitiveness index (the ratio of wage costs to labor productivity) and find that by the year 2000, Poland is less competitive than the high income country, Belgium. Furthermore, we find that high labor cost relative to productivity sectors in Belgium are also high labor costs relative to productivity sectors in the other low wage regions, suggesting that the incentives to delocate production from high to low wage regions are not that straightforward.

Finally, we estimate firm level labor demand in Belgian manufacturing. We find no evidence that labor costs in Central and Eastern Europe destroy jobs in Belgian firms on average. However, we have some support for the idea that the evolution of labor costs relative to productivity in Portugal has some depressing effect on jobs in Belgian firms, although that such an effect is estimated to be relatively low.

The main conclusion of this paper is that on average there is no evidence that low wage competition from Central and Eastern Europe has a negative effect on jobs in Belgian manufacturing.

I. Introduction

The opening of Central and Eastern Europe confronted the European Union (EU) with a real challenge. The Central and Eastern European economic system had been based on central planning for almost fifty years. The gaps in income and productivity between Eastern and Western Europe were immense. Contrary to the gradual process of economic integration that had taken place in Western Europe after World War II, the collapse of communism came abruptly. The opening of Central and Eastern Europe countries (CEEC) implied not only the start of far-reaching economic adjustments in both Western European countries and the CEEC, but also, with the Copenhagen European Council in June 1993, the beginning of the EU enlargement process.

Most of the policy concerns relate to employment. Eastern Europe represents a large reservoir of low wage labor in the EU's backyard. There is a concern that low wage import competition from those countries may result in job losses in EU member states. Alternatively, EU companies may close factories or parts of them at home and move some of their operations to the CEEC. One of the most obvious channels through which home (EU) jobs may be affected by this increased economic integration is through the employment (re-)allocation decisions of multinational enterprises (MNEs). It is often argued that MNEs are footloose (Caves, 1996; Görg and Strobl, 2002). They operate over different national markets and can reallocate their factors of production across these markets to minimize total costs of production in response to changing local economic conditions, without having to incur major set up costs. While there exist a number of anecdotes confirming this view of relocation, the evidence so far, however, has not been overwhelming. On the basis of company surveys that have been reported in a number of studies the consensus seems to emerge that for most companies the main driving force for investing in Central and Eastern Europe is not the low wage costs, but rather the achievement of first mover advantages and to opportunity to get access to a growing market. These investments usually did *not* imply a relocation of economic activity or job loss at home, rather it implied further growth and job gains in the home firms (e.g. Lankes and Venables, 1996, Abraham and Konings, 1999). This pattern is also confirmed by recent studies that look at the relationship between relocation of employment and wage cost

differentials between EU countries and CEEC. Using company accounts data of multinational enterprises Braconier and Eckholm (2000) for Swedish firms and Konings and Murphy (2003) for European multinationals find that employment relocation from high income EU countries to low income CEEC countries does not take place.

Yet, the popular press and captains of industry seem to believe that the low wage competition from CEEC constitute a real threat for employment in the EU. With the removal of barriers in the light of EU enlargement this threat may become even stronger. Despite these strong statements, however, there is hardly any systematic evidence that compares labor costs across the CEEC countries with those of the EU[2]. Furthermore, economic theory suggests a close link between labor costs and labor productivity. However, little is known about firm level labor productivity in the future accession countries. This paper aims to fill this gap and compares wage costs and labor productivity at the firm level in the three leading CEEC countries, Poland, Hungary and the Czech Republic with those in Belgium and Portugal. Belgium and Portugal are good EU benchmarks as these countries form the bounds of the wage cost differentials with the EU, Belgium being one of the highest in the EU and Portugal one of the lowest. By comparing wage costs and labor productivity across these countries we may get an idea about the *attractiveness* for EU companies to relocate part of their activity to CEEC and this will help us to assess whether we should view the competition from CEEC as a real threat to EU employment. In doing so, we take a micro economic approach and use firm level data in our analysis. We will rank sectors according to their competitiveness and compare them across the different countries. Furthermore, we study how responsive employment in Belgium is to labor cost differentials between the various regions.

The paper is organized as follows. In the next section we discuss the firm level data that we use. In section III we report and compare labor productivity and wage costs in the different countries that we study. Section IV gives some conclusions.

[2] Exceptions include De Loecker and Konings (2003) and Abraham (2001)

II. Data and Measurement Issues

We make use of a unique panel data set of large and medium sized manufacturing firms covering 3 CEE candidate countries (Poland, Hungary and the Czech Republic) and two EU countries, Belgium and Portugal. We opted for Belgium and Portugal as EU benchmark countries because Belgium is one of the EU countries with the highest labour costs, while Portugal has the lowest labour cost in the EU (e.g. Abraham, 2002). We have observations between 1995 and 2000. The data consists of the medium and large sized European (both EU and non-EU) companies that have to report full company accounts to the national statistical offices. This data set is commercialised under the name 'AMADEUS' by Bureau Van Dijck (BvD) and has as its main advantage its comparability of companies across counties, given that the same inclusion criteria across the different countries have been used and that BvD has tried to harmonize the reporting of the company accounts. Furthermore the data is not restricted to just the listed firms as is the case in for example the COMPUSTAT tapes of U.S. firms. A drawback of this data set is that the coverage on a number of variables may vary from country to country depending on the national accounting legislation.

We retrieved data on sales, employment, total wage bill, material costs, value added and the sector the firm was operating in for the years 1995 – 2000. This allows us not only to compare countries but also country-sectors, which is arguably more important. The coverage on these variables varies somewhat between the countries, but on average our data set covers more than 60% of total manufacturing employment in the countries that we study. We measure labor productivity as output per worker, where output is proxied by value added, which we obtain from the profit and loss accounts (the equivalent of the income statements in the U.S.). We also experimented with using sales as a proxy for output, which gave qualitatively the same pattern of results. We also get from the profit and loss accounts the total wage bill of a firm in one year. By dividing the total wage bill by the number of employees we have a measure of labor costs per worker, on an annual basis. The drawback of this measure is that we have no information on the hours worked. However, we have a measure that includes not only the actual pay of workers, but also the social security contributions and employer contributions, which often constitutes a substantial fraction of the total

labor costs. This provides us with a measure that truly captures the costs firms incur by employing labor. We transformed all the local currencies into Euros, which suggests that we are comparing real labor cost and productivity differences, assuming that purchasing power parity approximately holds, which is not unrealistic for emerging economies (e.g. Krugman and Obstfeld, 2000)

The ratio of the wage cost per worker versus labor productivity, which is the same as the total wage bill as a fraction of total output, gives an indication of the relative competitiveness of firms and thus of a country. It tells you the degree to which the value added that is generated by the firm can pay for the wage bill of workers. The advantage of this measure is that it is free of any monetary measurement and can therefore be interpreted in real terms.

Table 1 shows summary statistics on the average employment per firm in our sample, the wage per worker and the labor productivity measure (value added per worker) all expressed in 1000 of Euros.

To minimize measurement error we dropped from our sample the top and bottom one percentiles from the distribution of labor productivity and from the distribution of wages per worker. This guarantees that we exclude from our sample 'unrealistically' high values of labor productivity and wage costs.

From table 1 we can note that that the average employment size in the firms is quite large, but also that the standard deviation is large, indicating substantial heterogeneity between firms. We can note that the average labor costs in CEEC are more than 7 times lower than in Belgium. However, also the average labor productivity is more than 7 times lower in CEEC than in Belgium! This suggests that it is not so obvious that there is a wage cost handicap in Belgium relative to CEEC. But even within the EU there exists a substantial heterogeneity in terms of wage costs as already pointed out by Konings and Murphy (2003). When we compare Portugal with Belgium we can note that the average labor cost is about 4 times lower than in Belgium, but labor productivity on average is three and a half times lower. This suggests that competition from low wage countries may be more important within the European Union compared to CEEC. We will explore some of these dimensions in the next section.

III. Results

In this section we report median values[3] of the labor costs and labor productivity for the country as a whole over time. We then go on at a more disaggregated level and study labor productivity and labor cost differentials at the sector level. We finally report a firm level employment regression where we test for the responsiveness of Belgian labor demand with respect to wage cost differentials across the regions.

Figure 1 shows the evolution of the ratio of labor costs over labor productivity for Belgium, Portugal, Poland and Hungary. We omitted the Czech Republic as the data before the year 2000 for employment values are less reliable. Computing the ratio of labor costs over labor productivity gives an idea about the 'competitiveness', ignoring any other factors of production like the productivity of capital, the infrastructure of a country etc.. If the only criterium to move production to another location would be the labor cost differentials relative to the labor productivity then this ratio reflects the incentive for a firm to move production. The pattern shown in Figure 1 is very revealing. We can note that Belgium has a relatively high labor cost per output and that it remains relatively stable over time. The pattern in Poland reveals that up to 1998 this ratio was below the Belgium one, but since then has increased above the Belgian one. This suggests that some convergence has taken place towards the Belgian levels. Moreover, from a competitiveness point of view it is more expensive to produce in Poland than in Belgium! Comparing Belgium with Portugal on the other hand suggests that Portugal has always been cheaper to produce and by the late 1990s even cheaper than Hungary and Poland. This suggests that the incentives for relocation production activities are stronger in the case of comparing Belgium with Portugal, rather than with the CEEC.

Obviously other factors play a crucial role in the (re)location decision of production. Nevertheless this simple exercise points out that the main threat of low

[3] The reason why we want to focus on medians is that average values are more sensitive to outliers than median values and this may be important in our sample as we have large standard deviations for our variables as can be seen from table 1. Median values have also a nice interpreation, i.e. we divide the sample in two equal parts and rank the firms. The median refers to the middle ranked firm in the sample, so half of the firms will have values below the median, while the other half above the median. This seems to be a sensible way forward when comparing micro data across countries.

wage competition does not necessarily come from the CEEC, but perhaps also from within the EU as suggested by Konings and Murphy (2003). Taking into account that survey evidence suggests that the main reason for investment in CEEC is market expansion, rather than wage costs, it seems that the opening of CEEC may be rather an engine for growth in the high income countries. The fear of delocalisation towards Central and Eastern Europe because of the lower wage costs appears to be ungrounded since the low wage costs are reflecting the lower productivity. Of course these aggregate figures hide substantial heterogeneity within a country. Some sectors create more value added than others for a given employment level. This could be due to the different technologies in different sectors, different institutional settings such as the extend of union bargaining in different sectors and the degree of foreign ownership in different sectors.

We therefore show in table 2 the ratio of labor costs to productivity in the various 2-digit NACE sectors in the year 2000 for the countries in our sample. We rank the sectors from low labor costs to high labor costs relative to productivity in Belgium. We can then compare the ranking of Belgium to other countries. We can first note from table 2 that there exists substantial heterogeneity between sectors. In Belgium the ratio of labor cost to productivity varies from 39% to almost 80%. A similar heterogeneity between sectors can be found in the other countries that we study. Thus, just performing a macro economic analysis of labor cost differentials at the country wide level misses an important aspect of what is going on. This heterogeneity also suggests that the question of delocalisation to low wage countries is not easy to generalize over all sectors. Nevertheless it is possible to see some overall tendencies. From table 2 we can notice that the ranking of sectors across countries is not that different. Low wage-productivity sectors in Belgium are often also low wage-productivity sectors in Portugal and in the CEEC. Take for instance "wearing apparel", a sector that has often been cited in the popular press as prone to low wage competition. We can indeed see that the wage cost relative to productivity in Belgium, with a ratio of 72%, is quite high. However, also in the other countries this sector seems to have a relatively high ratio of 68% in Portugal, 81% in Poland, 63% in Hungary and 75% in the Czech Republic. Given these marginal differences in these ratios between the different regions suggests that the incentives to relocate

production are not at all that big. We come to a similar conclusion if we look at the Textile sector. Its labor cost ratio in Belgium is 65%, which compares to 74% in Portugal, 73% in Poland , 58% in Hungary and 64% in the Czech Republic. Taking into account the good infrastructure and location of Belgium, the incentives to relocate to say Hungary do not seem that big either.

In order to test more rigorously the hypothesis that labor cost differentials between Central and Eastern Europe and the high income countries, like Belgium are not the main cause of job destruction we run a simple regression of employment at the firm level in Belgian manufacturing on the wage per output at the firm level. In additional we also include the wage per output that corresponds to the 2-digit sector level in which the firm is operating in, but then for Portugal, Poland and Hungary respectively[4]. This captures the idea that it is the wage which is relevant for a Belgian firm if it would consider moving to these low wage countries. In table 3 we show the results of fixed effects estimates. Fixed effects capture firm heterogeneity and potential measurement error that is constant over time. In the first column we do not include a control for the capital intensity at the firm level, while in the second column we do. The estimates confirm what was suggested from table 2. The own wage-output elasticity is -0.18 and is statistically significant at the 5% critical level. Thus if a firm's labor cost relative to its labor productivity goes up by say 10%, its demand for labor will be reduced by about 2% on average. More importantly, however, is the cross-price effects. In the first column of table 3 non of the wage-output elasticities of the other regions are statistically significant, suggesting that these wage-output ratios are not important on average for the demand for labor in Belgian firms. In the second column of table 3 we control for the capital stock in the firm. The own wage effect is still negative and statistically significant, as expected. Furthermore, the wage-output ratios in Hungary and Poland are not statistically significant, which indicates that the evolution of labor cost differentials in Hungary and Poland had no effect on the demand for labor in Belgian firms between 1995 and 2000. However, the wage-output effect of Portugal is now estimated at 0.066 and statistically significant. This means that ceteris paribus a decrease of labor costs in Portugal is associated with a decrease of employment in Belgian firms. In other words this positive cross price effect indicates that employment in Belgium may be substituted by employment in Portugal,

although the effect is quite small. Thus, all in all the evidence suggests that employment relocation in response to labor cost differentials is not taking place between Belgium and CEEC and only marginally between Belgium and Portugal. This is also confirmed in the third column where we regres labor demand in Belgian firms on the wage-productivity in Belgium firms relative to the wage-productivity in Portugal, Poland and Hungary. Again we find that the relative wage cost-productivity differential is not statistically significant for Poland and Hungary, but it is for Portugal. A 10% increase in the labor cost-productivity ratio in Belgian firms relative to Portugal is associated with a reduction of labor demand of 0.7%. Thus this effect exists, but it is really small. Delocalisation because of low labor costs in CEEC does not seem to happen on average for the sample of firms that we study.

IV. Conclusion

In this paper we compared the wage cost and productivity differentials between Belgium and Portugal, being the EU benchmarks for high and low labor costs, with those in the three leading emerging economies of Central and Eastern Europe, Poland, Hungary and the Czech Republic. To this end we use firm level data to construct measures of labor costs and labor productivity. We find that labor costs are more than 5 times larger in Belgium compared to Central and Eastern Europe. But also compared to Portugal, labor costs in Belgium are 4 times larger, indicating that even within the EU there are huge differences in labor costs. However, at the same time labor productivity varies substantially between these regions and there is a close correlation between high wage costs and high labor productivity.

We therefore construct the ratio of labor costs to labor productivity as a measure of competitiveness and find that there exists substantial heterogeneity between sectors. We find that there is a close correlation between high labor cost relative to productivity sectors in Belgium and those in other regions, suggesting that the incentives to relocate to low wage regions are rather weak. This is confirmed in a firm level regression analysis. We find that the own labor costs in Belgian firms matter for labor demand, however, labor costs in CEEC do not have a statistically

[4] We omitted the Czech Republic because before 2000 the employment data are not reliable in our data set.

significant effect on the demand for labor in Belgian firms on average. In contrast we find that labor cost differentials between Belgian firms and Portugese firms do have some effect on the demand for labor in Belgian firms, albeit very small. A 10% relative increase in the ratio of labor costs to productivity in Belgian firms relative to Portugese reduces the demand for labor in Belgium firms by only 0.7%.

Our findings indicate that relocation of Belgian firms to CEEC does not take place on average, but there may be some going on within the EU, although the estimated effects are quite small. The results in this paper are in line with earlier work that found on the basis of interviews with managers the main driving force to go to CEEC is not the lower wage costs, but rather the potential for growth and market expansion, which benefits the headquarters at home.

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Figure 1: Evolution Ratio of Wage Cost to Labor Productivity

Table 1: Summary Statistics (means of firm level variables)

	Belgium	Portugal	Poland	Hungary	Czech R.
Employment	239 (579)	113 (236)	475 (1001)	223 (458)	396 (830)
Wage	40.7 (12.1)	10.1 (4.5)	5.0 (2.8)	5.9 (3.8)	5.13 (5.3)
Labor Productivity	72.9 (49.1)	18.6 (11.8)	10.0 (9.4)	12.6 (12.7)	9.3 (9.6)

Note: Standard errors in brackets

Table 2: Labor Cost Relative to Productivity per worker
Ranked from low to high in Belgium

NACE Description	Belgium	Portugal	Poland	Hungary	Czech R.
Group 1:					
Tobacco Products (16)	0.39	0.58	0.37	0.38	0.28
Recycling (37)	0.46	NA	NA	0.60	0.48
Wood and Wood Products (20)	0.57	0.31	0.70	0.78	0.60
Coke, refined petroleum products, nuclear fuel (23)	0.58	0.59	0.45	0.63	0.81
Chemicals (24)	0.58	0.48	0.62	0.55	0.45
Food and Beverages (15)	0.58	0.52	0.53	0.55	0.55
Group 2:					
Office Machinery and Computers (30)	0.62	0.67	0.68	0.43	0.71
Leather Products (19)	0.63	0.57	0.77	0.77	0.78
Furniture (36)	0.64	NA	0.48	0.77	0.65
Textiles (17)	0.65	0.74	0.73	0.58	0.64
Other Non-Metallic Mineral Products (26)	0.67	0.69	0.62	NA	0.57
Basic Metals (27)	0.67	0.64	0.62	NA	0.57
Rubber and Plastic Products (25)	0.67	0.64	0.79	0.50	0.67
Fabricated metal products, except machinery (28)	0.68	0.57	0.68	0.67	0.67
Radio, TV and communication equipment (32)	0.68	0.51	0.63	0.43	0.64
Pulp, Paper and Paper Products (21)	0.68	0.69	0.50	0.57	0.48
Group 3:					
Publishing, Printing (22)	0.71	0.56	0.56	0.68	0.62
Wearing Apparel (18)	0.72	0.68	0.81	0.63	0.75
Motor Vehicles, trailers (34)	0.73	NA	0.80	0.54	0.57
Electrical Machinery n.e.c (31)	0.75	0.96	0.68	0.82	0.64
Machinery (29)	0.75	0.68	0.76	0.52	0.67
Medical Precision, Optical Instruments (33)	0.78	NA	0.45	0.84	0.66
Other transport equipment (35)	0.79	NA	0.76	0.68	0.63

Table 3: Regression Results, Dependent Variable: Log of Employment at the firm level in Belgium (Fixed Effects Estimates)

	(1)	(2)	(3)
Ln(Wage/Productivity) at the firm in Belgium	-0.18* (0.09)	-0.15* (0.08)	-
Ln(Wage/Productivity) at the sector in Poland	0.003 (0.03)	0.02 (0.02)	-
Ln(Wage/Productivity) at the sector in Hungary	-0.02 (0.02)	-0.02 (0.02)	-
Ln(Wage/Productivity) at the sector in Portugal	0.04 (0.03)	0.06 (0.03)	-
Ln(Wage/Productivity) Belgium relative to Ln(Wage/Productivity in Poland	-	-	-0.02 (0.02)
Ln(Wage/Productivity) Belgium relative to Ln(Wage/Productivity in Hungary	-	-	0.02 (0.02)
Ln(Wage/Productivity) Belgium relative to Ln(Wage/Productivity in Portugal	-	-	-0.07* (0.03)
Ln(capital)	-	0.21* (0.006)	0.21* (0.006)
# observations	7361	7356	7356
# firms	1887	1885	1885

Note: Robust standard errors in Brackets, * indicates statistically significant at the 5% level or lower, all specifications include year dummies.