Do Labour Market Institutions Matter?

Micro-level Wage Effects of International Outsourcing in Three European Countries

Geishecker, Ingo; Görg, Holger; Munch, Jakob Roland

Publication date:
2007

Document version
Publisher's PDF, also known as Version of record

EPRU Working Paper Series 2007-03

Economic Policy Research Unit
Department of Economics
University of Copenhagen
Studiestræde 6
DK-1455 Copenhagen K
DENMARK
Tel: (+45) 3532 4411
Fax: (+45) 3532 4444
Web: http://www.econ.ku.dk/epru/

Do Labour Market Institutions Matter?
Micro-level Wage Effects of International Outsourcing in Three European Countries

Ingo Geishecker, Holger Görg
and Jakob Roland Munch

ISSN 0908-7745

Do labour market institutions matter? Micro-level wage effects of international outsourcing in three European countries*

Ingo Geishecker
Georg-August-Universität Göttingen

Holger Görg
GEP, University of Nottingham and CEPR

Jakob Roland Munch†
University of Copenhagen

October, 2007

Abstract

This paper studies the impact of outsourcing on individual wages in three European countries with markedly different labour market institutions: Germany, the UK and Denmark. To do so we use individual level data sets for the three countries and construct comparable measures of outsourcing at the industry level, distinguishing outsourcing by broad region. Estimating the same specification on different data show that there are some interesting differences in the effect of outsourcing across countries. We discuss some possible reasons for these differences based on labour market institutions.

Keywords: International outsourcing, individual wages, labour market institutions

*Financial support from the Economic Policy Research Network and the Leverhulme Trust (Grant No. F114/BF) is gratefully acknowledged. We would like to thank participants at the 2007 Zeuthen Workshop, University of Copenhagen for valuable comments.

†Address: Department of Economics, University of Copenhagen, Studiestræde 6, DK - 1455 Copenhagen K, Tel.: +45 35323019, Fax: +45 35323000, E-mail: Jakob.Roland.Munch@econ.ku.dk.

JEL Classification: F16, J31, C23.

1 Introduction

Over the last years globalisation and its alleged negative effects for the distribution of income, unemployment, poverty and social cohesion has caused immense public anxiety in Europe, particularly against the backdrop of eastern enlargement of the European Union. Indeed, globalisation in the form of intensified international trade and, in particular, international outsourcing of production, has a deep structural impact fostering the specialisation of open economies in industries where they posses a comparative advantage. Other, less competitive industries on the other hand shrink. Following standard trade theory, international specialisation is expected to yield significant efficiency gains improving the welfare of open economies.[1]

However, even if there are overall welfare gains there will inevitably be distributional consequences leading to winners and losers of the globalisation process in the economy. This paper concerns itself with one aspect of globalisation, namely the practice of outsourcing of production around the globe. A key feature of today's globalisation process is the ever increasing international fragmentation of production resulting in outsourcing, that manifests itself in a fast growing share of trade with intermediate goods. What we witness now is a dramatically intensified international division of labour which does not only take place between industries but is prevalent within each manufacturing industry and increasingly within business services.

Trade liberalisation and technological progress have substantially lowered transaction costs which increasingly enables firms to outsource and relocate production to those locations where production costs are lowest. Analogue to conventional trade this outsourcing potentially yields large efficiency gains that materialise in the form of increased competitiveness and thus higher growth and employment (see, e.g., Amiti and Wei, 2006 and Görg, Hanley and Strobl, 2007). However, it is also clear that this process generates winners and losers. Particularly low skilled workers are arguably at risk to suffer higher economic insecurity, income losses, unemployment and social exclusion.

The aim of the paper is, hence, to try and identify winners and losers from international outsourcing in European economies. Specifically, we investigate the impact of outsourcing on wages of individual workers. A further aim of the paper is to establish whether the impact of international outsourcing differs across countries with different types of welfare

[1]Slightly newer trade models, however, have shown that the paradigm of universal welfare gains through international trade is heavily based on the assumptions of perfect competition and flexible factor prices. For example, Krugman (1995) shows that with rigid relative factor prices imports from low wage countries cannot be met by a sufficient specialisation in export oriented activities. As a result, trade with low wage countries can dramatically lower aggregate domestic production and employment.

states and, in particular, labour market institutions. In other words, we try to address the question as to what role labour market institutions may play in shaping the wage effect of international outsourcing on workers.

This makes our paper of particular relevance in the European context and highlights the importance of institutional characteristics of the labour market that affect the wage setting. Welfare states face the challenge of mitigating adverse effects of the globalisation process while at the same time the institutional characteristics of the welfare system directly shape the potential welfare gains and losses from globalisation. In the public but also academic debate one often refers the European Social Model or the European Welfare System partly to contrast the American Social Model. However, institutional characteristics of the welfare system starkly differ within Europe. Somewhat simplifying, one can identify three types of social models within the European Union: the Anglo-Saxon, the Central European and the Scandinavian. All three substantially differ in terms of institutions and legislation particularly with respect to employment protection, unemployment benefits, minimum wages or the role of unions. It is an open question that will be addressed in this paper which social model is best suited to cope with the challenges of globalisation through outsourcing of production.

Empirical evidence so far suggests that low skilled workers are the losers from international outsourcing of production in many countries (see for example Feenstra and Hanson (1996) on the US, Hijzen, Görg and Hine (2004) on the UK and Geishecker (2006) on Germany). However, the existing empirical studies generally use fairly aggregated data which prevents an in-depth analysis of the social impact of this phenomenon. Namely, existing studies do not allow to decompose changes in the composite demand for various skill groups into wage and employment effects. Furthermore, using aggregated data does not allow to differentiate absolute gains and losses from relative ones. However, when designing policies it clearly matters whether the task is for instance to tackle increased income inequality that comes through absolute wage gains for highly educated workers or through absolute wage losses of low skilled workers.

This paper provides a detailed disaggregated estimation of the impact of international outsourcing on individual wages for various population groups. We will identify winners and losers from the globalisation process and assess to what extent education and, thus, skills determine the individually experienced impact of globalisation. Although wages and employment at the aggregated level are central determinants of social cohesion our micro level approach allows us to also look at other important factors. It is now not only possible too look at aggregated wage and employment effects but also to assess the role of globalisation for individual economic security that manifests itself in yearly income

fluctuations.

The analysis is carried out for three countries: the United Kingdom, Germany and Denmark, that exemplary stand for the three different social models in Europe and significantly differ in terms of the institutional setting. Comparing the social impact of relocation across these three countries can provide interesting new insights into the role of institutions and social policies for shaping and mitigating the impact of globalisation.

Section 2 discusses briefly the theoretical background and the expected impact of labour market institutions on the relationship between international outsourcing and wages. Section 3 describes the empirical approach, measurement of outsourcing and micro data for the three countries. Estimation results are reported in Section 4. The final section offers a brief conclusion.

2 International outsourcing, labour market institutions and wages

In theory the consequences of outsourcing for workers of different skill types are not clear cut. For example, Feenstra and Hanson (1996) formulate a model of international outsourcing that is a specific form of a Heckscher-Ohlin type model with only one final good and two countries, North and South. By changing relative unit costs of production, for instance through Hicks-neutral technological progress in the South, production fragments with lower skill intensity are shifted from the North to the South, thereby raising the average skill intensity of production in both countries. As a result, relative demand for skilled labour increases in both the North and the South. By contrast, Arndt (1997, 1999) develops a model of international outsourcing that is also based on a HO framework but makes less restrictive assumptions. In particular, he considers trade between a small price-taking economy and the rest of the world, allowing for two factors of production and two final goods. In this model, if the low skill intensive industry shifts some fragments of production abroad, this results in a productivity improvement in the low skill intensive industry and with given world prices, ultimately in higher relative wages for skilled workers. Hence, depending on the models and assumptions chosen, outsourcing of the low skill intensive part of production can lead to decreases or increases in the wage of (unskilled) labour in the outsourcing economy.[2] Whether workers in practice gain or lose from fragmentation and relocation is, therefore, largely an empirical question.

These theoretical models assume that wages are flexible and that there is no unem-

[2]See also Jones and Kierzkowski (2001) and Kohler (2004) for other related theoretical papers.

ployment. Furthermore, the two sector models assume that labour is mobile between industries. Clearly, these assumptions are generally violated in the real world, at least in the short run. This is where the role of labour market institutions comes into play. Many countries have, in some form or other, collective wage bargaining or coordination of wage bargaining, as well as some form of employment protection and unemployment benefits. This, on the one hand, leads to rigidities in the labour market but is also designed to safeguard workers against adverse shocks in the economy.

Of the three countries considered, Germany has arguably the least flexible labour market institutions. In terms of employment protection, Germany has an elaborate system of legal rules and contracts that stipulate conditions for dismissal, providing fairly secure employment prospects for workers, but making hiring and firing of workers difficult for firms. In fact, as Nickell et al. (2005) show, Germany has one of the highest levels of employment protection among OECD countries. Furthermore, the German labour market is characterised by the importance of unions in wage bargaining. While the actual level of unionisation is only about 30 percent of employees, the percentage of employees who are covererd by wage bargaining is around 90 percent (Nickell, 2005). Collective bargaining generally takes place annually between unions and employer federations and can be at either industry and/or regional level.[3] It is important to note, however, that in collective bargaining only *minimum* wages are determined, while many workers are paid wages above that floor rate.

Compared to Germany, the UK represents the other, more flexible, end of the spectrum in terms of European labour market institutions. The level of employment protection is one of the lowest among OECD countries (with only the US and Canada being more flexible) and it also has substantially lower levels of union density and coverage than most other continental European countries (Nickell et al., 2005). Indeed, wage setting is generally decentralised and is relatively free of regulations, as discussed in some detail by Borland et al. (2002). The UK has adopted a system of a national minimum wage in 1999.

Turning to Denmark, an important characteristic of the labour market is that it is heavily unionised and although a process of decentralisation of wage formation has been ongoing since the late 1980's the wage structure is still relatively compressed even by European standards. Compared to other continental European labour markets the Danish labour market is often described as being very flexible as employment protection is relatively weak, while at the same time replacement rates of UI benefits are high. A third distinguishing characteristic of the Danish labour market is that large sums are spent on

[3]See also Bender et al. (2002) for a good description of labour market institutions in Germany.

active labour market policies. Together these ingredients form what by some has been dubbed the 'flexicurity' model. The idea behind this model is that Danish firms relatively easy may adjust employment according to demand. As compensation for high job turnover workers receive relative generous UI benefits when unemployed, but incentives to search for jobs during unemployment are reinforced by a strict 'activation' regulation.

This labour market model has led to turnover rates and an average tenure which are in line with those of the Anglo-Saxon countries. In 1995 the average tenure in the Danish labour market was the lowest in continental Europe with 7.9 years just exceeding the number for UK (7.8 years) while average tenure in the German labour market was 9.7 years, cf. OECD (1997). Motivated by the fact that unemployment in Denmark is very low, OECD has recently recommended Germany to learn from the Danish 'flexicurity' model in its attempt to combat unemployment, see OECD (2005).

Table 1 summarises some important characteristics for the labour markets in (West) Germany, UK and Denmark, which are taken from Nickell et al. (2005). The wage setting processes are clearly important to our analysis, and they evidently following different mechanisms in the three countries. Wage formation in United Kingdom is very flexible as union density, collective bargaining coverage and union co-ordination are lowest in the UK. In contrast, unions play a much more important role in the German and Danish labour markets – union density is highest in Denmark while the coverage rate is highest in Germany, and wage bargaining in both countries is highly co-ordinated. Thus based on these observations we should expect that wages are most sensitive to changes in international outsourcing at the industry level in the UK.

However, this is not the complete picture since adjustments may go through employment changes instead. Coupled with the average tenures cited above it is clear that employment protection stands out as the most restrictive in Germany. Therefore the German labour market may be seen as the least flexible as wages are relatively rigid and employment is protected. The UK in contrast is the most flexible of the three economies with very little regulation of employment and wages, while Denmark is in between with rigid wage formation and low employment protection.

An immediate prediction concerning the differential impact of outsourcing in the three countries is that wages should be least affected in Denmark, since with rigid wages adjustments are likely to go through employment changes instead. International outsourcing may give rise to wage moderation in bargaining between firms and unions if, for example, it corresponds to improved outside options for employers. This may be especially true for labour markets such as the German where employment is highly protected. Thus even if wages are relatively rigid in Germany they may still adjust if faced with increasing

Table 1: Labour market characteristics, 1994-1999

	Germany (W)	UK	Denmark
Union density (%, 1996-8)	27	35	76
Collective bargaining coverage (%, 1994)	92	40	69
Co-ordination index (1995-9)	2.5	1.0	2.0
Employment protection index (1998)	1.30	0.35	0.70
UI replacement ratio (1999)	0.37	0.17	0.66
Expenditure on ALMP (% of GDP, 1998)	1.26	0.34	1.66

Source: Nickell et al. (2005)

outsourcing pressure. Furthermore, it is important to recall that centralised bargaining only determines the minimum level of wage, while most workers are paid above that level. Hence, wages may adjust by moving towards the minimum. In the UK both wages and employment may adjust so it is not entirely clear which dimension any adjustment may follow. Thus to sum up we expect wages to be relatively insensitive to international outsourcing in Denmark, while they are more likely to adjust in Germany and the UK.

3 Methodology

To assess the impact of outsourcing on individual wages we follow the approach in Geishecker and Görg (2007) and estimate simple Mincer human capital wage equations of the form

$$\log w_{ijt} = \alpha + \beta X_{it} + \gamma Y_{jt} + \lambda OUT_{jt} + \mu_t + \alpha_i + \iota_j + \epsilon_{ijt}, \tag{1}$$

where w_{ijt} is the hourly wage of worker i in industry j at time t. X_{it} is a vector of standard demographic and human capital variables which includes age, age squared, dummies for the presence of children and being married, job tenure, tenure squared, an indicator variable for high education, dummies for occupation using the nine main categories of the ISCO code, dummies for firm size and regional dummies. Year effects, μ_t, and individual specific fixed effects, α_i, are also controlled for. In addition we include

industry dummies ι_j, and to control for time varying industry characteristics we also enter industry output, Y_{jt}, in the model. The main explanatory variable of interest, of course, is the outsourcing variable, OUT_{jt}, which we describe in more detail below.

All the regressions are weighted using the standard sampling weights from the respective datasets to adjust for different individual sampling probabilities. Finally a methodological point should be mentioned. In the wage equation (1) we estimate the effect of an aggregate variable (i.e. outsourcing at the industry level) on wages of individual workers, so the standard errors of the estimated coefficients may be biased downwards as indicated in Moulton (1990). Accordingly, we adjust standard errors allowing for contemporaneous correlation as has become standard in the literature.

3.1 Measurement of international outsourcing

Anecdotal evidence on firms shifting production stages abroad by subcontracting legally independent suppliers or establishing foreign production sites is manifold. However, systematically measuring the process of international outsourcing presents a challenge.

Most authors rely on trade statistics, exploiting the close relation between international outsourcing and trade in intermediate goods. Authors such as Yeats (2001) seek to measure international outsourcing or, as he calls it, *production sharing*, by directly quantifying trade in intermediate goods, assessing the intermediate character of the traded goods on the basis of disaggregated goods classifications. However, such calculations most likely are upward-biased, as imported parts and components (of machinery and transport equipment) are assumed to be intermediate goods imports of the respective broader industry that produces such parts and components itself (machinery and transport equipment industry). This abstracts from the possibility that parts and components from one industry can be also used by other manufacturing and service industries or by final consumers. Having said that, at the country level, differentiating trade in intermediate goods arguably is a valid way to derive a broad picture of the overall outsourcing intensity. However, in order to generate industry-level outsourcing measures, one needs to find ways to appropriately allocate imports of parts and components to those industries that actually use them.

Authors such as Feenstra and Hanson (1999) or Campa and Goldberg (1997) quantify international outsourcing by combining input coefficients that can be found in input-output tables and trade data. The estimated value of imported intermediate inputs of an industry thereby largely depends on whether one applies a narrow or wide definition of international outsourcing.

Campa and Goldberg (1997) assume that the total sum of imported intermediate goods in each industry as a share of the respective industry's production value represents a reasonable indicator for international outsourcing. However, according to Feenstra and Hanson (1999) the above "definition" might be too broad if one understands international outsourcing to be the result of a make-or-buy decision. Following this approach, it is not the total sum of imported intermediate inputs but only the part that could be produced within the respective domestic industry that actually constitutes international outsourcing. However, depending on the aggregational level, the range of products that an industry can produce varies. Accordingly, the more highly aggregated the industries are, the broader the definition of international outsourcing becomes.

For the present analysis we loosely follow the concept proposed in Feenstra and Hanson (1999) and measure narrow international outsourcing as the shift of a two-digit industry's *core activities* abroad, represented by the value of the industry's imported intermediate inputs from the same industry abroad as a share of the domestic industry's production value. The challenge is now to measure the respective industry's imports of intermediate goods. A simple procedure would be to assume that all imports from a certain foreign industry i^* are directed towards the respective domestic industry i and nowhere else. Essentially, this would amount to the construction of industry-level import penetration ratios, which are however rather poor measures of industries' outsourcing activities. Instead, input-output data that are available from national Statistic Offices are utilised in order to allocate imports according to their usage as input factors across industries. The use of input-output tables renders obsolete the differentiation of intermediate goods on the basis of disaggregated goods classifications. Imports are always counted as intermediate goods imports if they are used in manufacturing.

Formally, outsourcing is constructed as:

$$OUTS_{it} = \frac{IMP_{i^*t} \times \Omega_{ii^*t}}{Y_{it}} \tag{2}$$

with IMP_{i^*t} denoting imported intermediate inputs from industry i^* and Y_{it} the production value of industry i at time t. Ω_{ii^*t} denotes the share of imports from a foreign industry i^* that is consumed by the respective domestic industry i in t with $\sum_{i=1}^{I} \Omega_{ii^*t} \times IMP_{i^*t}$ =total imports from industry i^* which are not only used in manufacturing but also in agriculture, services, private and public consumption, investment and exports in t.

Following Equation 2 we construct industry-level outsourcing measures for each coun-

try. In doing so we are, however, constrained by different availability of input-output tables for the different countries. While for Denmark use tables for imported inputs are available from 1990 to 2002, for Germany comparable tables are only available for 1991 until 2000. For the UK data availability is even more limited as input-output data differentiated between imports and domestic production is only available for 1995.[4] Accordingly we use available yearly input-output tables from UK National Statistics which, however, do not differentiate between imports and domestic supplies. Table 2 summarises these constraints. In order to estimate our empirical model for a common period with as many years as possible we select the years 1991 until 2000 as joint sample period and for the UK use 1992 values of Ω for the missing year 1991.

Table 2: Availability of Input-Output Data

Country	separate I-O Tables for imports	
United Kingdom	not available	instead aggregated yearly tables 1992-2004
Denmark	available	1990-2002
Germany	available	1991-2000

Figure 1 depicts international outsourcing as weighted averages over all manufacturing industries in the UK, Denmark and Germany and Table 3 presents the respective levels and growth rates for comparison. Generally speaking, the level of international outsourcing is roughly comparable across the three countries ranging from 5.5 percent in the UK in 2000 to 7.4 percent in Germany for the same year. In terms of total growth of international outsourcing, which is of course more meaningful than the sheer level, the UK stands out. Here outsourcing grew by about 43% over the years 1991 to 2000. In comparison growth rates in Germany and Denmark are somewhat lower, but with 40% and 29% still substantial.

By differentiating imports by their origin while assuming $Omega_{ii^*t}$ to be constant across countries we can in a next step construct outsourcing measures for different geographic regions. Against the backdrop of dramatic political and economic change we are particularly interested in outsourcing towards Central and Eastern European Countries

[4]Input-output data for the UK in this respect are similar to that for the U.S. which also do differentiate between imports and domestic production.

(CEECs). Equation 2 now becomes:

$$OUTS_{it} = \frac{\sum_{c=1}^{C} IMP_{i^*ct} * \Omega_{tii^*}}{Y_{it}} \quad (3)$$

with Imp_{i*ct} denoting imported inputs from industry i^* in the country of origin c and Y_{it} the production value of industry i at time t.

The respective figures are reported in Figures 2 and 3 and Table 3. As becomes apparent, the intensity of outsourcing towards CEECs significantly differs between the three countries with Germany's outsourcing intensity towards CEECs being more than four times higher than that of Denmark and the UK. In terms of growth rates, however, the UK is leading with a total growth rate of 692% followed by Germany with total growth of 603%. Clearly, such figures are impressive; one has, however, to bear in mind, that outsourcing almost started from zero in 1991.

[**Insert Figures 1 to 3 and Table 3 around here**]

3.2 Individual Level Data

We measure wages and worker characteristics using individual level data for the three countries. The nature of data sets we use differ to some extent as data for the UK and Germany are based on surveys while data for Denmark comes from administrative registers. However, in all cases we look at individual panel data for the period 1991-2000, and we restrict the samples to include only 18-65 year old male manufacturing workers. Special attention has been paid to construction of the explanatory variables in a consistent way across countries. For example, the education variable 'High education' is defined as the two highest categories in the International Standard Classification of Education (ISCED).[5]

For Germany the analysis is based on individual level data from the German Socio Economic Panel (GSOEP). Specifically, the analysis is based on data from Sample A, B, C, D and E (see Haisken-DeNew and Frick, 2003 for a detailed description of the panel). We exclude respondents who report to work in East Germany as wages in the East are to a large extent shaped by the dramatic structural change of the economy that has been taking place since the fall of the wall and that dominates the impact of other changing structural factors such as outsourcing. Wages are defined as average hourly gross labour earnings including bonuses, premiums and other extra payments over the year preceding

[5]This corresponds to the individual having a tertiary education.

the respective interview month.

For the UK data comes from the Britsh Household Panel Survey (BHPS), a household survey that follows the same representative sample of individuals over time. Again, as for Germany wages are defined as average hourly gross labour earnings including bonuses, premiums and other extra payments over the year preceding the respective interview month.

For Denmark the analysis relies on a large data set which is extracted from the Integrated Database for Labour Market Research (IDA) and the Income Registers in Statistics Denmark. There is information about individual characteristics for a 10 % sample of workers in Danish manufacturing industries, and since the data is based on administrative registers its reliability is highly regarded. The hourly wage rate is calculated as total labour income divided by the total number of hours worked in any given year.

4 Estimation results

In this section we present the results from estimating equation (1) for all three countries. Columns 1 to 3 in Table 4 report the baseline results for Germany, the UK and Denmark, respectively. Focussing on the coefficient on international outsourcing we find that there is a negative and statistically significant effect on wages only for Germany. For the other two countries we fail to find any statistically significant coefficient. While this regression controls for the skill level of the worker, it does not allow the effect of outsourcing to differ according to skills. However, from theory we may expect different effects: if countries outsource mainly low skill production activities then the demand for low skilled workers falls, bringing with it a reduction in the wage for these types of workers.

In order to allow for differential effects we interact the outsourcing variable with dummy variables for high and low skilled workers, respectively. These results are reported in Columns 4 to 6 in Table 4. Surprisingly we still find no effects of outsourcing on wages in the UK and Denmark. However, we do find that the negative effect found in the previous estimation for Germany only accrues to low skilled workers. There is no statistically significant effect of outsourcing on high skilled workers in Germany. Hence, this suggests that in Germany wages for low skilled workers adjust downward in response to increased international outsourcing.[6]

[6]The result of a negative effect for low skilled workers is in line with Geishecker and Görg (2007). However, Geishecker and Görg also find a positive effect of outsourcing for high skilled workers. This is likely to be due to their using more control variables in the empirical model. This was not possible in our case in order to ensure that we estimate the same model for all three countries.

[**Insert Table 4 around here**]

In the estimations thus far we treat outsourcing as one homogeneous activity. Clearly, this is not the case. In order to allow for some heterogeneity in the activities that are outsourced we distinguish outsourcing to Central and Eastern European Countries from outsourcing to other countries. The former is likely to include outsourcing of many low skilled manufacturing activities. The latter group of countries contains outsourcing mainly to other developed countries and, therefore, the type of outsourcing should be considered different. Table 5 presents regression results where we split up the outsourcing variable by broad region, and also allow for differential effects according to skill levels.

Results for Germany (Column 1) show that there is a negative weakly significant effect of outsourcing to CEECs on high skilled wages, while the effect is insignificant for low skilled workers. While this result may be somewhat surprising it is in line with Marin (2004) who argues and provides evidence that German firms outsource mainly high skill activities to Eastern Europe taking advantage of the availability of abundant skilled labour. By contrast we find that outsourcing to non-CEECs countries has a negative impact on wages of low skilled workers only.

In comparison, we find a similar picture for the UK. Outsourcing to CEECs has negative effects on wages for both skilled and unskilled workers, however the effect is only statistically significant for high skilled workers. By contrast, high skilled workers benefit in terms of wages from outsourcing to non-CEEC countries. This is in line with the hypothesis that outsourcing to those countries leads to a restructuring of production towards more skill intensive activities, hence raising the price for skilled labour.

Finally, for Denmark we only find a negative effect of outsourcing to CEECs on low skilled workers. Other types of outsourcing do not appear to have any statistically significant effect on either skilled or unskilled workers.

Our results seem to confirm the prediction that wages should be least sensitive to outsourcing in Denmark, since wages are set in negotiations between unions and firms, while employment protection is low so that any adjustments are more likely to go through job separations. In contrast we argued that wages in Germany and the UK could be more responsive to outsourcing, and this is indeed what we find. For Germany both wages and employment are regulated but something has to give and wages may fall as a result of better outside options for firms.[7] In the UK both wages and employment may be more flexible and some of the adjustment appears to go through wages.[8]

[7]In terms of job separations the work of Geishecker (2007) indicates a significant impact of outsourcing which is, however, uniform across all skill groups.

[8]For the Danish case it should be noted that the the conclusion that wages do not adjust is in fact

5 Conclusion

This paper studies the impact of international outsourcing on individual wages in Germany, the UK and Denmark. To do so we use individual level data sets for the three countries and construct comparable measures of outsourcing at the industry level, distinguishing outsourcing to Central and Eastern Europe from other countries. Estimating the same specification for the three countries show that there are some interesting differences in the effect of outsourcing across countries: There is little effect of international outsourcing on wages in Denmark. In the UK wages for both high and low skilled workers are reduced by outsourcing to CEECs, while skilled workers benefit in terms of wages from outsourcing to (more advanced) non-CEECs. For Germany the picture is more complex, with high skilled workers being negatively affected from outsourcing to CEECs, while low skilled workers face reductions in wages due to outsourcing to non-CEECs.

These results may to some extent reflect the cushioning effects of the different types of labour market institutions. In Denmark, wages are quite rigid while there is little employment protection, hence, adjustments should be expected to go mainly through labour quantity rather than price. Hence, our result is in line with this. In contrast we argue in the paper that wages in Germany and the UK may be more responsive to outsourcing - albeit due to different reasons - and this is what we find.

References

[1] Amiti, M. and S.J. Wei (2006) "Service offshoring and productivity: Evidence from the United States", NBER Working Paper 11926.

[2] Arndt, S. W. (1997) "Globalization and the Open Economy" North American Journal of Economics and Finance, Vol. 8 (1), pp. 71-79

[3] Arndt, S. W. (1999) "Globalization and economic development" The Journal of International Trade and Economic Development, Vol. 8 (3), pp. 309-318

[4] Bender, S., C. Dustmann, D. Margolis, C. Meghir (2002) "Worker displacement in France and Germany", in P.J. Kuhn, ed., Losing Work, Moving on: International

consistent with the results of Munch (2005), who shows that outsourcing indeed has a significant positive impact on job separation rates in the Danish labour market. It is found that outsourcing may account for as much as 10 percent of all job separations in the manufacturing sector.

Perspectives on Worker Displacement, W.E. Upjohn Institute for Employment Research.

[5] Borland, J., P. Gregg, G. Knight and J. Wadsworth (2002) "The get knocked down. Do they get up again?", in P.J. Kuhn, ed., Losing Work, Moving on: International Perspectives on Worker Displacement, W.E. Upjohn Institute for Employment Research.

[6] Feenstra, R.C. and G.H. Hanson (1996), "Globalization, Outsourcing, and Wage Inequality", American Economic Review, Vol. 86, Iss. 2, pp. 240-245.

[7] Feenstra, R.C. and G.H. Hanson (1999), "The Impact of Outsourcing and High-Technology Capital on Wages: Estimates for the United States, 1979-1990", Quarterly Journal of Economics, Vol. 114, Iss. 3, pp. 907-941.

[8] Geishecker, I. (2006), "Does outsourcing to Central and Eastern Europe really threaten manual workers' jobs in Germany?", The World Economy, Vol. 29, pp. 559-583.

[9] Geishecker, I. (2007), "The Impact of International Outsourcing on Individual Employment Security: A Micro-Level Analysis", Labour Economics, forthcoming.

[10] Geishecker, I. and H. Görg (2007), "Winners and losers: A micro-level analysis of international outsourcing and wages", Canadian Journal of Economics, forthcoming.

[11] Görg, H., A. Hanley and E. Strobl (2007), "Productivity effects of international outsourcing: Evidence from plant level data", Canadian Journal of Economics, forthcoming.

[12] Hijzen, A., Görg, H. and Robert C. Hine (2005), "International outsourcing and the skill structure of labour demand in the United Kingdom" Economic Journal, Vol. 115, No. 506, 2005, pp. 861-879.

[13] Jones, R.W. and H. Kierzkowski (2001), "A Framework for Fragmentation", in S.W. Arndt, and H. Kierzkowski, Fragmentation: New Production Patterns in the World Economy, Oxford University Press.

[14] Krugman, P. (1995), "Growing World Trade: Causes and Consequences", Brookings Papers on Economic Activity, 1,

[15] Kohler, W. (2004), "International outsourcing and factor prices with multistage production", Economic Journal, Vol. 114, pp. C166-C185.

[16] Marin, D. (2004), "A Nation of Poets and Thinkers: Less so with Eastern Enlargement? Austria and Germany", CEPR Discussion Paper 4358

[17] Moulton, B. (1990), "An illustration of the pittfall in estimating the effects of aggregate variables in micro units", Review of Economics and Statistics, Vol. 72, 334-338.

[18] Munch, J. R. (2005), "International outsourcing and individual job separations", Discussion paper 05-11, Department of Economics, University of Copenhagen.

[19] Nickell, S., L. Nunziata and W. Ochel (2005), "Unemployment in the OECD since the 1960s. What do we know?", Economic Journal, Vol. 115, pp. 1-27.

[20] OECD (1997), "OECD Employment outlook 1997", Paris, OECD.

[21] OECD (2004), "OECD Employment outlook 2004", Paris, OECD.

[22] OECD (2005), "OECD Employment outlook 2005", Paris, OECD.

[23] Venables, A. J. (1999), "Fragmentation and Multinational Production", European Economic Review, Vol. 43 (4-6), 935-945.

Tables and figures

Figure 1: Outsourcing Intensity in %, Whole World

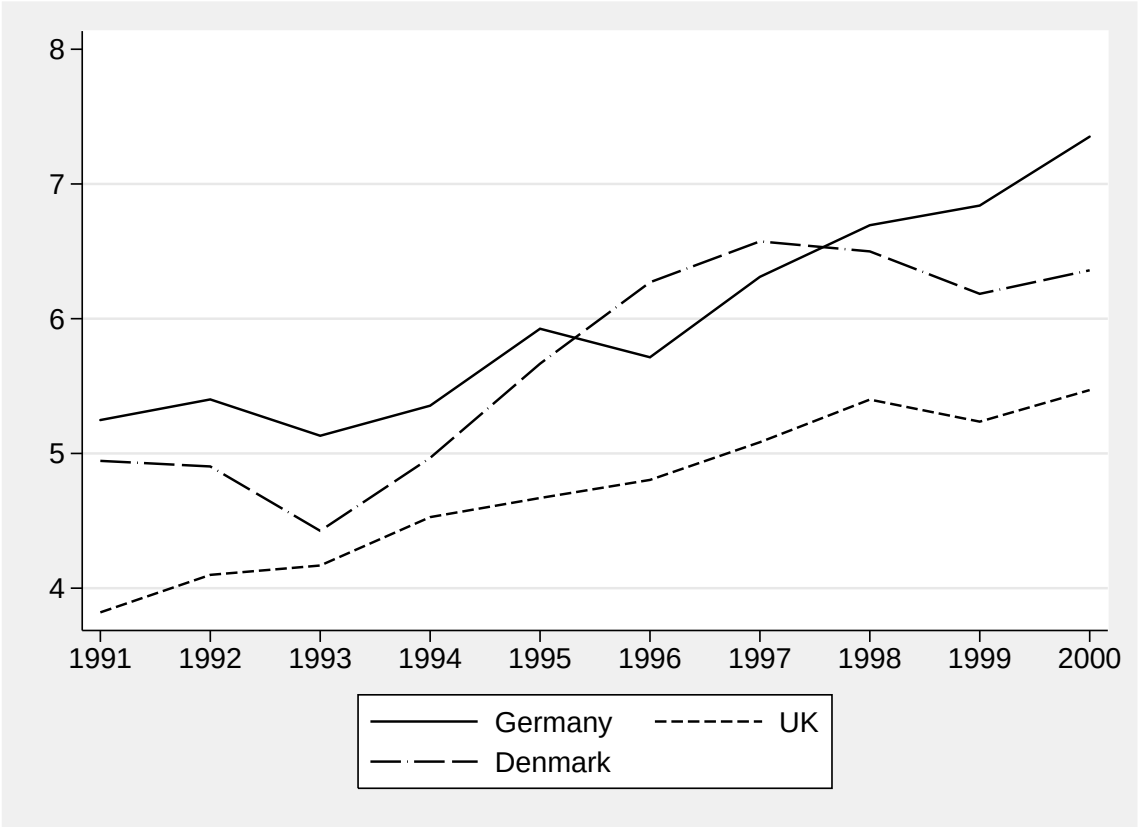

Figure 2: Outsourcing Intensity in %, CEECs

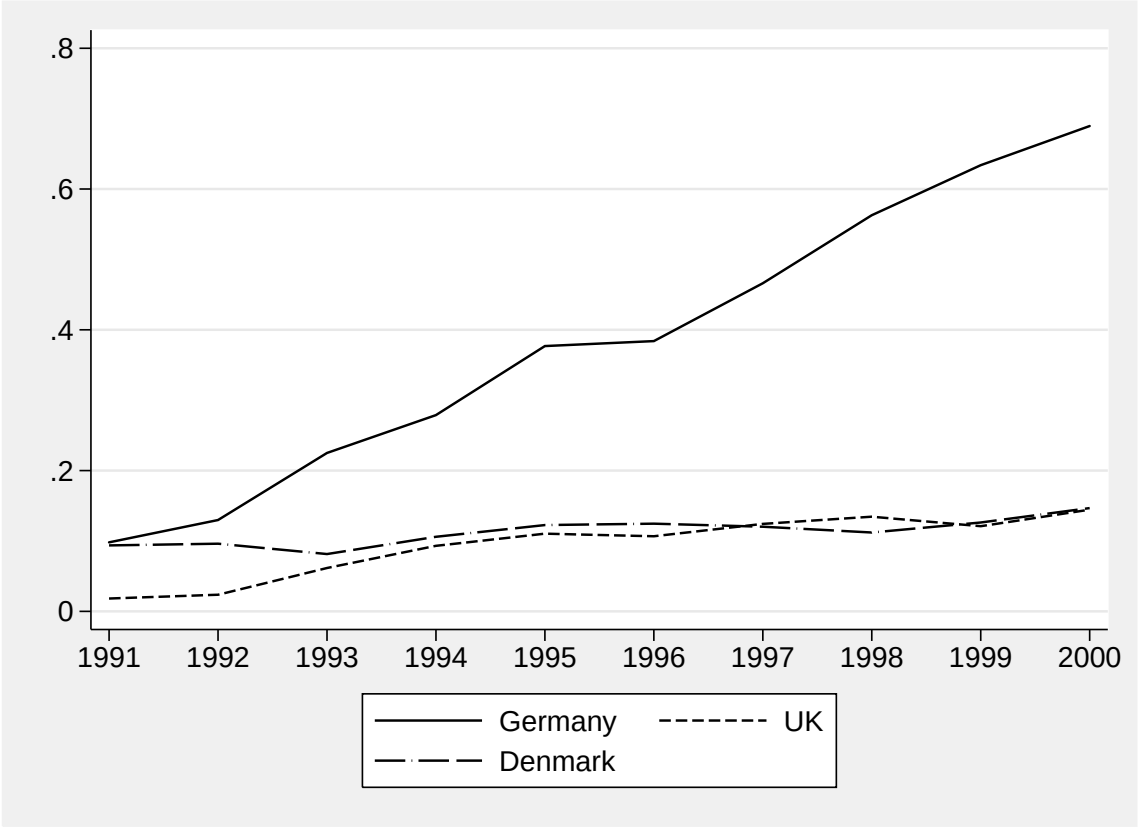

Figure 3: Outsourcing Intensity in %, Rest of World

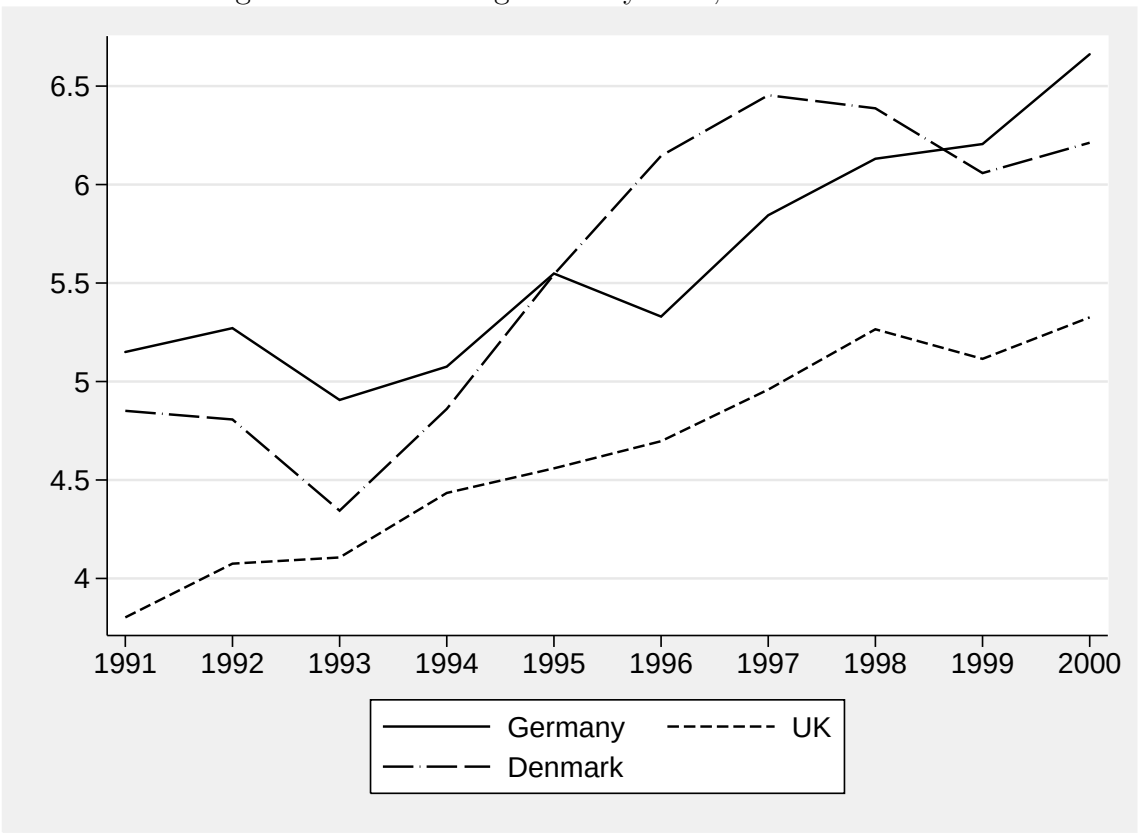

Table 3: Outsourcing Intensity in %, 1991-2000

Year	Whole World			CEECs			Rest of World		
	Germany	United Kingdom	Denmark	Germany	United Kingdom	Denmark	Germany	United Kingdom	Denmark
1991	5.25	3.82	4.94	0.10	0.02	0.09	5.15	3.80	4.85
1992	5.40	4.10	4.90	0.13	0.02	0.10	5.27	4.08	4.81
1993	5.13	4.17	4.43	0.23	0.06	0.08	4.91	4.11	4.34
1994	5.35	4.53	4.97	0.28	0.09	0.11	5.08	4.43	4.86
1995	5.93	4.67	5.67	0.38	0.11	0.12	5.55	4.56	5.54
1996	5.71	4.80	6.27	0.38	0.11	0.12	5.33	4.70	6.15
1997	6.31	5.08	6.57	0.47	0.12	0.12	5.84	4.96	6.45
1998	6.69	5.40	6.50	0.56	0.13	0.11	6.13	5.27	6.39
1999	6.84	5.24	6.18	0.63	0.12	0.13	6.21	5.12	6.06
2000	7.35	5.47	6.36	0.69	0.14	0.15	6.66	5.33	6.21
Growth Rate 1991-2000 in %	40.08	43.18	28.60	602.94	692.07	56.59	29.36	40.07	28.06

Table 4: Estimation results

	Germany		UK		Denmark	
	A	B	C	D	E	F
Age	0.0311	0.0324	0.0797	0.0788	0.0880	0.0881
	[2.02]*	[2.12]**	[11.48]***	[11.13]***	[9.52]***	[9.55]***
Age^2	-0.0003	-0.0003	-0.0005	-0.0005	-0.0009	-0.0009
	[1.87]*	[2.03]*	[7.31]***	[7.09]***	[9.06]***	[9.07]***
$Married : Dummy$	0.0354	0.0347	0.0143	0.0117	-0.0247	-0.0248
	[1.46]	[1.45]	[0.55]	[0.44]	[4.14]***	[4.16]***
$Children : Dummy$	-0.0080	-0.0093	-0.0075	-0.0068	-0.0095	-0.0096
	[0.53]	[0.61]	[0.68]	[0.60]	[1.73]*	[1.74]*
$Tenure$	0.0051	0.0049	0.0002	0.0002	0.0018	0.0017
	[1.32]	[1.29]	[2.14]**	[2.20]**	[2.20]**	[2.19]**
$Tenure^2$	-0.0002	-0.0002	0.0000	0.0000	-0.0001	-0.0001
	[1.68]	[1.66]	[1.37]	[1.39]	[3.18]***	[3.13]***
$FirmSize :< 20$	-0.0631	-0.0640	-0.0518	-0.0534	-0.0446	-0.0447
	[1.63]	[1.67]	[1.47]	[1.54]	[2.49]**	[2.50]**
$FirmSize : 20 - 200$	-0.0147	-0.0144	-0.0238	-0.0248	-0.0128	-0.0128
	[0.46]	[0.46]	[0.86]	[0.91]	[0.79]	[0.80]
$FirmSize : 200 - 2000$	-0.0167	-0.0168	0.0062	0.0049	0.0043	0.0043
	[0.78]	[0.79]	[0.20]	[0.16]	[0.30]	[0.30]
$Firm : PublicOwnershipDummy$	0.0348	0.0351	0.0625	0.0579		
	[1.16]	[1.16]	[0.74]	[0.68]		
$Educ : high - skilled$	0.0053	-0.0626	-0.0152	-0.0463	0.2062	0.1843
	[0.18]	[1.18]	[0.68]	[1.76]*	[5.08]***	[4.64]***
$Industryoutputvalue$	0.0000	0.0000	0.0000	0.0000	0.0023	0.0023
	[0.01]	[0.07]	[1.61]	[1.65]	[4.78]***	[4.68]***
OUT	-0.0090		0.0020		0.0002	
	[1.87]*		[0.53]		[0.12]	
$OUT \times Educ : high - skilled$		-0.0002		0.0052		0.0028
		[0.03]		[1.25]		[1.26]
$OUT \times Educ : low - skilled$		-0.0132		-0.0022		-0.0004
		[2.39]**		[0.60]		[0.25]
$Constant$	1.8084	1.7247	-0.2044	-0.1791	3.1472	3.1504
	[4.51]***	[4.29]***	[1.14]	[0.99]	[20.02]***	[19.97]***
Observations	7781	7781	5171	5171	254783	254783
R^2	0.82	0.82	0.85	0.85	0.8375	0.8376
Individual Fixed Effects	YES	YES	YES	YES	YES	YES
occupation Dummies	YES	YES	YES	YES	YES	YES
Industry Dummies	YES	YES	YES	YES	YES	YES
Region Dummies	YES	YES	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES

Note: t-statistics in parentheses * significant at 10%, ** at 5%,*** at 1%.

Table 5: Estimation results - CEECs differentiation

	Germany A	UK B	Denmark C
Age	0.0334	0.0796	0.0895
	[2.25]**	[11.14]***	[9.56]***
Age^2	-0.0003	-0.0005	-0.0009
	[2.03]*	[7.05]***	[9.09]***
$Married : Dummy$	0.0335	0.0118	-0.0251
	[1.42]	[0.44]	[4.23]***
$Children : Dummy$	-0.0086	-0.0078	-0.0100
	[0.58]	[0.69]	[1.81]*
$Tenure$	-0.0620	0.0002	0.0017
	[1.65]	[2.39]**	[2.11]**
$Tenure^2$	-0.0117	0.0000	-0.0001
	[0.38]	[1.55]	[3.00]***
$FirmSize :< 20$	-0.0172	-0.0538	-0.0446
	[0.81]	[1.54]	[2.49]
$FirmSize : 20 - 200$	0.0356	-0.0248	-0.0129
	[1.18]	[0.91]	[0.80]
$FirmSize : 200 - 2000$	0.0049	0.0050	0.0042
	[1.29]	[0.16]	[0.29]
$Firm : PublicOwnershipDummy$	-0.0002	0.0579	
	[1.70]	[0.68]	
$Educ : high - skilled$	-0.0596	-0.0522	0.1785
	[1.07]	[1.95]*	[4.43]***
$Industryoutputvalue$	0.0006	0.0000	0.0022
	[0.91]	[1.56]	[4.43]***
$OUT_{CEEC} \times Educ : high - skilled$	-0.0657	-0.1286	0.0552
	[1.55]	[3.25]***	[1.66]
$OUT_{CEEC} \times Educ : low - skilled$	-0.0562	-0.0658	-0.0742
	[1.54]	[1.22]	[3.57]***
$OUT_{Non-CEEC} \times Educ : high - skilled$	0.0046	0.0074	0.0020
	[0.79]	[1.81]*	[0.83]
$OUT_{Non-CEEC} \times Educ : low - skilled$	-0.0101	-0.0027	0.0016
	[1.73]*	[0.66]	[1.04]
$Constant$	1.6319	-0.2316	3.1117
	[3.85]***	[1.23]	[19.91]***
Observations	7781	5171	254783
R^2	0.82	0.85	0.84
Individual Fixed Effects	YES	YES	YES
occupation Dummies	YES	YES	YES
Industry Dummies	YES	YES	YES
Region Dummies	YES	YES	YES
Year Dummies	YES	YES	YES

Note: t-statistics in parentheses * significant at 10%, ** at 5%,*** at 1%.