Department of Economics and Statistics

Middlesex University Business School

Discussion Paper
No 137
March 2010

The Effect of Foreign Affiliate Employment on Wages, Employment, and the Wage Share in Austria*

Özlem Onaran

Contact address:
Middlesex University, W213,
The Burroughs, London NW4 4BT, London, UK
Email: o.onaran@mdx.ac.uk

***** This study has benefited from research funding by the Vienna Chamber of Labor. The author is grateful to Paul Ramskogler for the excellent research assistance, to two anonymous referees, Werner Raza, Sepp Zuckerstaetter, Martin Falk, Engelbert Stockhammer, Wilfried Altzinger, Christian Bellak, Thomas Grandner, Herbert Walther, Markus Leibrecht, Robert Stehrer, Mehtap Hisarcıklıoğlu, Michael Pfaffermayr and the participants of the 2008 Annual Conference of the Austrian Economic Association for fruitful discussions, and to Ursula Havel, Franz Granner, René Dell'mour, Karl Klein, Henriette Killian, and Andreas Buzek for their valuable support about data. All remaining errors are mine.

The Effect of Foreign Affiliate Employment on Wages, Employment, and the Wage Share in Austria

Abstract

This paper estimates the effects of outward Foreign Direct Investment (employment in the affiliates abroad) on employment, wages, and the wage share in Austria using panel data for the period of 1996-2005. There is evidence of significant negative effects of FDI on both employment and wages, and consequently on the wage share. The results are not limited to workers in low skilled sectors. The negative employment effect is mainly due to the rise in the employment in the foreign affiliates in Eastern Europe. The negative wage effects are originating from affiliate employment in both the East and the developed countries in the industry, but FDI in the East has positive wage effects in the services sector due to possible scope effects.

Keywords: FDI, wage, employment, labor share, Austria
Jel code: F160, J230, J300, O520

1. Introduction

The aim of this paper is to empirically analyze the impact of Foreign Direct Investment (FDI) outflows on the labor market outcomes in Austria. In the last fifteen years there has been a significant increase in the globalization of the Austrian economy through an increase in exports, final imports, offshoring (intermediate imports), and outward FDI. The integration of the Central and Eastern Europe (CEECs) to the European economic sphere, added a new dimension to the globalization of the Austrian economy, although Austrian FDI towards Western Europe also increased significantly during this period. The globalization of the economy has, however, coincided with adverse developments in the labor markets.[1] Since the 1980s industrial employment is decreasing, and total employment is stagnant in spite of the jobs created in services. The decline in manufacturing jobs is an ongoing process of structural change that started in the 1980s, but the decline did not decelerate after 1990 compared to the 1980-1990 period in spite of the improved trade position of Austria. The opposite trend in domestic employment compared with the increasing foreign affiliate jobs is rather striking as can be seen Figure 1. In the meantime real wages have stagnated in the total economy particularly since the mid 1990s. The service wages are even slightly declining in the 2000s. This development is in striking contrast to the strong improvement in labor productivity, which has always exceeded real wage increases since the 1980s with few exceptions. As a combination of these developments, the wage share (labor compensation/gross value added in non-agricultural sector) declined from a level of 65% in 1978 to 51% as of 2005.

The decline in labor share is not specific to Austria, although Austria has experienced one of the highest rates of decline in the wage share among the OECD countries. The general declining trend in labor's share in many OECD countries since the late-1970s and early 1980s has been analyzed by several previous studies (Harrison, 2002; Diwan, 2001; Epstein, 2000,

Guscina, 2006; Stockhammer et al, 2007), and is recently also discussed by the OECD (2007), IMF (2007), and the European Commission (2007). Both the deterioration in the wage share and industrial employment is a phenomenon that dates back to late 1970s, which is partly related to structural change and technological improvement. However the strong increase in the foreign affiliate employment in the same period brings forward the question whether the acceleration in the decline in the wage share and stagnation in employment since the mid-1990s is also related to increased multinational activity.

. Austria is an interesting case to investigate the effects of FDI on labor market outcomes, being a small economy, which is highly integrated to the other high wage as well as low wage countries. It is also a puzzling case, since the deterioration in labor market performance and income distribution continued in spite of the significant profitability gains due to Eastern enlargement in the past years (Altzinger, 2006).

In this paper first we estimate the effects of FDI on employment and wages for a panel of sectors for the period of 1996-2005, and then combining these effects we calculate the cumulative effects on functional income distribution, i.e. the wage share. In the estimations we control for technological change. The effects are separately estimated for low and high skilled sectors and the industry vs. services as well. We pay particular attention to the possible different effects of FDI in the developed countries vs. the CEECs, i.e. low wage countries.

The contribution of this paper is to analyze the home country effects of FDI on both wages and employment, and finally to combine these effects to address the effect on functional income distribution using detailed sectoral analysis. The existing literature on the home country effects of FDI for other countries estimates mostly the effects on employment (e.g. Blomström et al. 1997; Brainard and Riker 1997; Hatzius, 1998; Hanson et al, 2003; Konings and Murphy, 2006; Becker et al, 2005; European Commission, 2005, Cuyvers et al; 2005; Molnar et al 2007) and in a few cases also the effects on wages (e.g. Desai et al 2005). The issue of distribution is however only addressed with regards to within labor distribution,

i.e., the share of skilled workers in the wage bill (e.g. Slaughter, 2000; Head and Ries, 2002). The IMF (2007) and the European Commission (2007) estimate only the effects of outsourcing or trade on the labor share, but not of FDI. The methodological novelty of our paper is to estimate the effects on labor share as an outcome of labor demand as well as wage bargaining rather than in reduced form. In the case of Austria the existing studies analyze only the effects on employment; none of them estimates the effects on wages or labor share (Bellak and Altzinger, 2001; Marin, 2004; Pfaffermayr, 2001; Falk and Wolfmayr, 2007a, b). Our paper has also important differences in comparison to these papers with respect to the methodology of estimation of the employment effects, which will be discussed in more detail in Section five.

The rest of the paper is organized as follows. Section two presents the empirical model and the theoretical expectations about the effects of FDI on labor market outcomes. Section three discusses the data and methodological issues. Section four reviews the empirical literature. Section five presents the estimation results. Section six concludes.

2. The empirical model

This section presents the labor demand and wage bargaining equations, which then are solved simultaneously to calculate the effect of FDI on labor's share.

The industry's demand for labor is given as follows:

$$\ln(l) = \varphi + \varphi_w \ln(w) + \varphi_q \ln(q) + \varphi_K \ln(K) + \varphi_{wf} \ln(w_f) \qquad (1)$$

where ln(l), ln(w), ln(q), and ln(K) are employment, wage (labor compensation, deflated by sectoral producers price index), real value added, and real capital stock of the parent firm respectively; $\ln(w_f)$ is the wage in the foreign affiliates of the multinational firm. All variables are in logarithms. φ measures other possible determinants of labor demand. A similar function is estimated by Hanson et al (2003) to estimate the effects of multinational

activity on domestic employment. The constant-output own-wage elasticity of domestic labor demand, φ_w, is assumed to be negative.

Regarding the direction of the foreign wage effect, the question is whether foreign labor is a substitute or complementary to domestic labor. In a capital abundant country, it could be expected that increased multinational activity may lead to some increase in the use of capital and less demand for labor. In a skilled labor abundant country the demand for skilled labor's employment is also expected to increase relative to unskilled labor as headquarter services increase (Helpman and Krugman, 1985). But skilled labor might also be substituted by foreign labor through an overall increase of capital intensity at home. So initially employment at the parent company may fall due to substitution effects, but then there may be additional production of skill-intensive products to be exported to the foreign affiliates or elsewhere (scope effects), and a general increase in market share and output due to cost saving effects (scale effects), which may increase also overall employment (Hanson et al., 2003). Thus the net effect depends on the negative substitution vs. positive scope and scale effects, i.e. the net of jobs destroyed and created. Horizontal FDI, compared to vertical FDI, will have less effect on the composition of factor demand, but through the trade channel it may generate negative employment effects particularly in tradable sectors, since it replaces the exports of the country (Head and Ries, 2002); however horizontal FDI may also create more demand for skilled labor at the headquarters of the multinational firm. Similarly, vertical FDI may lead to more intermediate imports, which may substitute certain types of domestic labor, it may however also create more exports (to the foreign affiliate through intermediate exports and elsewhere if there is a cost advantage obtained through FDI) and more output through scale effects, which can partly or completely offset the labor replacement effects. If the cross-wage elasticity of domestic labor demand, φ_{wf}, is positive, then domestic and foreign labor are substitutes, thus lower costs for foreign labor decreases domestic labor

demand; if the elasticity is negative, domestic and foreign labor are complementary (Hanson et al, 2003), thus scale and scope effects dominate.

If there are positive scale effects, these will be already captured by output. To decrease this bias, we use value added instead of output as a control variable in Equation (1); but nevertheless part of the scale effect will still be captured by the value added.

Capital is treated as quasi-fixed as it is common in the current literature (Morrison, 1986; Berman et al, 1994; Slaughter, 2000; Head and Ries, 2000; Hanson et al 2003; Becker et al, 2005; Cuyvers et al, 2005; OECD 2007). This is also preferable from an empirical point of view, since it is hard to measure the capital costs.[2]

In the following we modify the empirical model due to data constraints: we do not have data about the wages in the affiliates of the multinationals; however we have data about the employment in the affiliates weighted by the share of the parent firm. The only data available on foreign wages is sectoral average wages in the host countries based on different data sources. However, the FDI literature reports significantly higher wages and productivity in foreign owned firms than in the domestically owned firms (Lipsey, 2004). Therefore average sectoral wages could be a misleading proxy; thus we prefer to use the affiliate employment as a proxy for the wages in the affiliates. Desai et al (2005), Molnar et al (2007), and Falk and Wolfmayr (2007a, b) also estimate domestic employment as a function of the foreign affiliate employment. Head and Ries (2002) estimate the share of the non-production workers in the wage bill as a function of the foreign affiliate employment/home employment. Our transformation follows the following logic: the foreign affiliate employment, ln(f), is a function of wages at the home country, ln(w), and at the affiliate, $\ln(w_f)$, as well as the value added, $\ln(q_f)$, and capital, $\ln(K_f)$ at the affiliate:

$$\ln(f) = \gamma + \gamma_{wf} \ln(w_f) + \gamma_q \ln(q_f) + \gamma_K \ln(K_f) + \gamma_w \ln(w) \qquad (2)$$

Solving for $\ln(w_f)$ in equation (2), and substituting in equation (1)

$$\ln(l) = \varphi + (\varphi_w - \frac{\varphi_{wf}\gamma_w}{\gamma_{wf}})\ln(w) + \varphi_q \ln(q) + \varphi_K \ln(K) + \frac{\varphi_{wf}}{\gamma_{wf}}\ln(f) - \frac{\varphi_{wf}}{\gamma_{wf}}(\gamma + \gamma_q \ln(q_f) + \gamma_K \ln(K_f)) \quad (3)$$

The problem of the lack of data for q_f and K_f can be solved by incorporating time effects in the equation to be estimated. Now the coefficient of ln(w) in the labor demand equation for the parent firm is modified. The sign of $(\varphi_w - \frac{\varphi_{wf}\gamma_w}{\gamma_{wf}})$ is ambiguous, if both cross-wage elasticities, φ_{wf} and γ_w, are positive or negative, and own-wage elasticities, φ_w and γ_{wf}, are both negative. Regarding the coefficient of the foreign affiliate employment, accepting the common assumption that γ_{wf} <0, if cross-wage elasticity of domestic labor demand, φ_{wf}, is positive, then $\frac{\varphi_{wf}}{\gamma_{wf}}$ <0, thus domestic and foreign labor are substitutes with respect to both wages and employment of foreign employees. If φ_{wf} <0, then $\frac{\varphi_{wf}}{\gamma_{wf}}$ >0, thus domestic and foreign labor are complementary with respect to wages as well as employment. However as opposed to the common assumption, if γ_{wf} >0, then the effect of foreign wage vs. foreign employment on domestic employment will be opposite.

Another data problem is that we have only data at sectoral level, not at firm level. Therefore in this paper we are estimating sector-specific labor demand. Thus the foreign affiliate employment will have not only a direct effect on employment in the parent companies but also an indirect effect due to the possible spillovers to the other domestic firms. Lipsey (2004) points out that there may be a difference between firm and industry level studies, since substitution among types of activities may take place not only between home and foreign operations of a firm, but also between parent firms and non-multinational firms in the same industry at home. It is possible to have a case where the parent company enjoys

positive scope and scale effects, but the employment in the sector overall is negatively affected through substitution of domestic supplier networks with the foreign affiliate supply.

Renaming the coefficients in equation (3), the sector's demand for labor is given as follows:

$$\ln(l_{i,t}) = \beta_i + \beta_t + \beta_w \ln(w_{it}) + \beta_q \ln(q_{i,t}) + \beta_k \ln(k_{i,t}) + \beta_{kict} \ln(ict_{i,t}) + \beta_f \ln(f_{i,t}) + \sigma_{t,i} \quad (4)$$

where i and t are the sector and time indices respectively. Capital stock is further disaggregated as information and communication technology (ICT) and non-ICT capital stock, $\ln(k_i)$ and $\ln(ict_i)$ respectively (both real values), in order to differentiate the technology effects from extensive investment. Non-ICT capital may be substituting or complementing labor; the latter would be the case if the firm has excess capacity. A negative substitution effect of ICT capital may be expected at least for less skilled workers (Chennels and Van Reenen, 1999). β_t is the time dummy, capturing time specific shocks such as exogenous technology shocks not captured by the ICT capital stock, or policy changes and other institutional factors such as employment taxes or employment legislation that may affect labor demand. β_i is a sector specific coefficient. The issue of endogeneity of wages will be handled by the use of proper instrumental variables at the estimation stage, as will be discussed in more detail in Section three.

The wage bargaining model is given as follows:

$$\ln(w_{i,t}) = \alpha_i + \alpha_t + \alpha_l \ln(l_{i,t}) + \alpha_k \ln(k_{i,t}) + \alpha_{kict} \ln(ict_{i,t}) + \alpha_f \ln(f_{i,t}) + \varepsilon_{t,i} \quad (5)$$

where all variables are as defined above. This model is consistent with union bargaining and efficiency wage models (Konings and Vandenbussche, 1995; Greenaway et al, 2000). In order to avoid the complications of modeling the formation of price expectations, an ex post bargained wage model is used. We thus look at the outcome of bargaining, i.e. the (ex post) real wage. Furthermore to be parallel to the labor demand equation, we are estimating real wages deflated by producers' prices rather than consumer prices[3]. The employment in the

foreign affiliates captures the effects of relocation on the bargaining power of domestic labor, and shifts the bargaining curve. Since employment in the foreign affiliates is also a function of domestic wages, proper instruments will be used at the estimation stage in order to avoid endogeneity.[4] For a given capital/labor ratio the effect, α_f, is positive, if foreign labor is complementary, and negative if it is a competitor. Particularly efficiency seeking FDI may generate negative effects through the so called threat effects as pointed out in the political economy literature (Onaran, 2009; Harrison, 2002; Diwan, 2001; Burke and Epstein, 2001; Rodrik, 1997; Crotty et al, 1998). The increase in international capital mobility and the consequent asymmetry between the fall back options of capital vs. labor may lead to a downward pressure on bargaining power of labor and thereby wage demands. This may particularly be the case if the destination of FDI is low wage countries. However even among high wage countries capital mobility may generate certain labor disciplining effects. Furthermore the threat effect may take place even in the absence of relocation, thus it may not be directly reflected in the actual volumes of capital flows (Burke and Epstein, 2001).

The capital/labor ratio, thus ln(k)+ln(ict)-ln(l), determines the productivity of labor and thereby worker's aspirations, and is expected to have a positive effect on wages, but the degree at which workers can index wages to productivity improvements will depend on their bargaining power. Also in more capital intensive sectors with a higher capital/output ratio the organizational strength and the bargaining power of the workers is expected to be higher, and firms would be more willing to accommodate wage demands, since labor costs are constituting a smaller part of their total costs. In the case of ICT-capital, however, the positive effect may be reversed with a technological replacement effect, particularly for the less skilled workers.

The employment in the sector captures the insider power and the demand effect, and will affect workers bargaining power positively and lead to a higher real wage. However the responsiveness of wages to employment will also depend on the strategy of the labor unions,

i.e. the trade-off between wages and employment for the unions during a recession. Unions may choose to bargain for job protection and accept stagnant wages, in which case the positive effect of employment on wages will disappear. Moreover in our model employment and capital stock are used both in logarithms. Thus the negative denominator effect of employment in the capital/labor ratio will also be incorporated to the coefficient of employment (in logarithm) in our model, making the interpretation of the sign of the coefficient hard. We nevertheless prefer this equation because it is parallel to the employment equation, which will have a computational advantage when deriving the wage share below. Capital stocks and employment are also treated as endogenous.

α_i is a sector specific coefficient. α_t is the time dummy, accounting for the economy wide labor market conditions that affect workers' outside options[5], an alternative economy wide wage[6], the institutional factors that may affect the bargaining power like union density, collective bargaining coverage[7], structural change in the composition of the workers, the effects of major changes in industrial relations after privatization[8], and the threat effects due to potential capital mobility not captured by actual volumes.

Finally the wage share (labor compensation share in value added) in logarithms, ln(ws), is by definition

$$\ln(ws)=\ln(w)+\ln(l)-\ln(q) \qquad (6)$$

Solving equations (4), (5), and (6) simultaneously we get:

$$\ln(ws_{i,t}) = \frac{\beta_i + \alpha_i + \beta_t + \alpha_t + \alpha_w\beta_w + \alpha_l\beta_l + (\alpha_x(1+\beta_w) + \beta_x(1+\alpha_l))x_{i,t} + \varepsilon_{t,i} + \sigma_{t,i}}{1-\beta_w\alpha_l} - \ln(q)$$

(7)

where x is the vector of ln(q), ln(k), ln(ict), and ln(f). We take the derivative of ln(ws) with respect to the components of x, e.g. the foreign affiliate employment, ln(f), for a given value added[9]:

$$\frac{\partial \ln(ws)}{\partial \ln f} = \frac{\alpha_f (1+\beta_w) + \beta_f (1+\alpha_l)}{1-\beta_w \alpha_l} \quad (8)$$

This expression incorporates the effect of the foreign affiliate employment on wages discounted by the effect of domestic wages on employment (if wages have a negative effect on employment) and the effect of the foreign affiliate employment on domestic employment amplified by the effect of domestic employment on domestic wages, both discounted by a common factor $(1-\beta_w \alpha_l)$[10]. If neither domestic wages nor employment affect each other ($\beta_w = \alpha_l = 0$), then the effect of the foreign affiliate employment on the wage share is simply the summation of its effects on domestic wages and employment.

3. Data and estimation methodology

The empirical analysis is based on the panel data of the sub-sectors of the industry and services. Appendix B reports the data sources. Employment in the foreign affiliates of Austria in each sector is further disaggregated as affiliates in developed countries with relatively higher wages vs. the East[11]. FDI to other countries is not incorporated as a third category since their share in total outward FDI is negligible. The sectors are defined according to the sector of the foreign affiliate.[12] The detailed data for employment in the foreign affiliates is available only at the level of 1-digit NACE classification and for the period of 1993-2004. Capital stock is also only available at 1-digit level.

In all equations lags of the explanatory variables and the dependent variable will be used to account for short vs. long run effects[13]. The lagged employment accounts for the adjustment process due to costs of hiring and firing. The lagged wage accounts for sticky wage adjustment through time. Furthermore, the capital stock and the foreign affiliate data ends in 2004; in order to be able to estimate the effects including 2005, we will use the first and second lags of these variables. By doing so we do not lose observations overall. Using deeper lags makes also economically sense, since the effect of both capital accumulation and FDI on labor markets may require a longer adjustment process.

Thus the equations (4) and (5) to be estimated for employment and wages take the following form respectively:

$$\ln(l_{i,t}) = \beta_i + \beta_t + \beta_l \ln(l_{i,t-1}) + \sum_{j=0}^{1} \beta_{wj} \ln(w_{i,t-j}) + \sum_{j=0}^{1} \beta_{q_j} \ln(q_{i,t-j}) + \sum_{j=1}^{2} \beta_{kj} \ln(k_{i,t-j}) + \sum_{j=1}^{2} \beta_{kictj} \ln(ict_{i,t-j}) + \sum_{c} \sum_{j=1}^{2} \beta_{fcnj} \ln(f_{c\ i,t-j}) + \varepsilon_{t,i} \quad (4a)$$

and

$$\ln(w_{i,t}) = \alpha_i + \alpha_t + \alpha_w \ln(w_{i,t-1}) + \sum_{j=0}^{1} \alpha_{lj} \ln(l_{i,t-j}) + \sum_{j=1}^{2} \alpha_{kj} \ln(k_{i,t-j}) + \sum_{j=1}^{2} \alpha_{kictj} \ln(ict_{i,t-j}) + \sum_{c} \sum_{j=1}^{2} \alpha_{fcnj} \ln(f_{c\ i,t-j}) + \varepsilon_{t,i} \quad (5a)$$

The sector index i=1,…,12 for the industry[14] i=13,…,20 for services, i=1,…,20 for the total economy[15], and t=1996-2005.[16] c is the affiliate country index corresponding to affiliates in developed countries vs. the East. We also estimate the effects for a pool of economy wide high and low skilled sectors including both manufacturing and service sectors in order to account for different impacts in sectors hiring pre-dominantly skilled vs. less skilled labor. Appendix C reports the skill taxonomy.

We estimate the dynamic equation in first difference form in order to transfer out the fixed effects, and use a generalized method of moments (GMM) technique as in Arellano and Bond (1991) to overcome the bias that will result in the coefficient of the lagged dependent variable due to differencing. The importance of the partial adjustment process are the reasons for estimating a dynamic specification in difference form rather than a fixed effects models, which would have the advantage of accounting for heterogeneity across sectors. Nevertheless the disadvantage of the dynamic estimation is the low number of cross-sections. We compute standard errors that are robust to the existence of sector specific serial correlation. Additionally, the real wage is endogenous and therefore instrumented in the employment equation. In the wage equation employment, capital stock, and foreign employment are all endogenous and instrumented. GMM technique of Arellano and Bond (1991) is particularly

useful in dealing with cases of endogeneity, when no good instruments are available outside the immediate data set (Roodman, 2006). In the employment equation the instruments are employment dated t-2 and earlier, the second and third lags of real wage[17], and the first differences of the exogenous variables, i.e. output, capital stock, foreign employment and their lags. In the wage equation the instruments are wages dated t-2 and earlier, the second and third lags of employment, the third and fourth lags of the capital stock, and foreign employment.

Based on these estimation results we calculate the long run coefficients using the contemporaneous and lagged effects and the speed of adjustment. The wage share effects in equation 8 are then calculated using these long run coefficients.

4. Empirical Literature

In the empirical literature regarding the home country effects of FDI, there are rather mixed results (Molnar, et al, 2007; Lipsey, 2004). Blomström et al. (1997) analyze the relation between employment in the parent firm and foreign production based on firm level data for the US and Sweden, and find some negative relationship in the US particularly due to activities in developing countries, but a robust positive relation in Sweden, suggesting differences in investment strategy. Contrarily Hatzius (1998) finds evidence for substitution in Sweden based on a positive effect of affiliate wages on parent employment. Braconier and Ekholm (2000) differentiates between the locations of the affiliates, and find evidence of a substitutionary relationship between Swedish parent and affiliate employment in other high income locations, but no effect due to affiliates in low-income locations. Sectoral differences are also important: Lipsey (2004) reports positive relation in the machinery sector in the US, but negative relation in the transport equipment sector. Lipsey et al (2000) find for Japan a positive effect of foreign output on domestic employment in the vast majority of the industries. For the case of the US, Brainard and Riker (1997) also find that there is substitution between labor at home and abroad, however the substitution is greater between

affiliates in different countries. Hanson et al (2003) find that the US manufacturing labor has a complementary relation with high skilled foreign labor, and a substitution relation with low-skilled labor. Desai et al (2005) find a complementary relation between the parent and foreign affiliates based on binary estimations for both wages and employment in the US manufacturing industry. Using outward FDI as the explanatory variable, Molnar et al (2007) find that multinational activity has a significant positive effect on employment growth in the US, but a negative effect in Japan, and no effect in Germany. In the case of multinationals in the EU, Konings and Murphy (2006) find substitution effect between parent employment and its affiliates in the EU15, but no effect with respect to the low wage regions in the EU and the CEECs. However Cuyvers et al (2005) find a negative effect of the foreign affiliate production in the CEEC on parent labor demand in the EU firms; Falk and Wolfmayr (2008) also find that the parent and foreign affiliate employment are substitutes in the EU firms, but the elasticity of substitution is lower in the case of the affiliates in the CEECs. For France and Belgium European Commission (2005) finds evidence of substitution based on the positive effects of the affiliate labor costs in the CEECs on employment, and for Germany and Sweden Becker et al (2005) also find substitution effects on parent employment due the positive effects of higher affiliate wages in both Western and Eastern Europe.

Regarding the effects of FDI on employment in Austria, Bellak and Altzinger (2001) find a negative effect of affiliate sales on parent employment using firm level data for 1995. However Marin (2004), again using firm level data for 1999-2001, finds no statistically significant effect of affiliate sales on parent company's employment, and even a complementary effect of the wages of the affiliates in the CEECs on parents' employment (negative coefficient), but no effect of wages of the affiliates in the South Eastern European or former Soviet Union countries. Falk and Wolfmayr (2007a) find no significant impact on industrial employment, but a negative effect on services due to affiliate employment in both developed countries and the five New Member States based on sectoral dynamic panel data

estimations for 1994-2004. Based on firm level data, they find no significant effect of affiliate employment on parent employment (Falk and Wolfmayr, 2007b). Pfaffermayr (2001) estimates relative employment at home vs. the foreign affiliates as a function of relative wages based on sectoral panel data for the manufacturing industry for 1990-96, and finds that employment at home industry relative to the employment in the foreign affiliates in developed countries have a positive cross-wage elasticity indicating substitution between home and foreign employees, whereas the opposite is true in the case of the affiliates in the four Eastern European neighbor countries.

5. Estimation results

5.1 Employment

Table 1 reports the estimation results for employment modeled as in equation (4a) for the industry, the total economy, low and high skilled sectors, and services. We will base our discussion of the regression results on the long-run effects, rather than separately discussing the current or lagged effects.

Please insert Table 1 approximately here

The Sargan test (from the homoskedastic estimator, which is reported at the end of the result tables) can not reject the null hypothesis that the overidentifying restrictions are valid. There is no second order autocorrelation in the first differenced residuals, which is an important condition for the validity of the estimations. The lagged dependent variable is significant in all specifications, verifying the need for a dynamic model.

In the industry an increase in the foreign affiliate employment in the East has a significant negative long run effect on employment in the same sector in Austria. The same effect takes place in the total economy and in both the low and high skilled sectors. The effects are economically significant as well. Table 2a shows the cumulative effect of each explanatory variable on employment, calculated as the long run coefficients multiplied by the actual change in the explanatory variable. A memo item in the last line reports the actual

change in employment. These results indicate that in the industry the 190% increase in affiliate employment in the East over the period of 1995-2004 has resulted in a decline of 6.96% in employment. Thus for a given positive effect of growth and a negative effect of technical change, employment would have declined 6.96% less in the industry, if there were no Austrian foreign investment in the East in this period. This means a loss of 43402 jobs in the industry in Austria during 1996-2005. Similarly the cumulative number of jobs that were lost in the total economy are estimated to be 155488 over 10 years (a decline of 5.97%) corresponding to an increase of 241% in employment in the affiliates in the East in all sectors. To put it differently each job that has been created additionally over this period in the Eastern affiliates of Austria has substituted 0.53 jobs in net terms in the industry, and 0.58 jobs in the total economy (as a ratio to jobs created in the Eastern affiliates). These numbers show the net of the jobs lost due to substitution and the jobs created due to scope and scale effects.

Please insert Table 2 approximately here

Regarding the employment in the foreign affiliates of Austria in developed countries while no effect can be detected in the industry, there seems to be a significant negative effect in services. However these results need to be interpreted with care, since estimations cover only few sectors (thereby few observations), and while the direction of the effects is indicative, the magnitudes can be misleading.

The workers working in the higher skilled sectors are more affected than those working in the lower skilled sectors; however employment declines in both sector groups due to outward FDI.

Regarding the other explanatory variables, while value added as well as non-ICT capital have positive effects, the ICT capital has a negative effect on industrial employment, reflecting the effects of labor saving technical change. The effect is economically highly significant in spite of the existence of time dummies. In the total economy the effect ICT capital as well as non-ICT capital is insignificant, whereas growth remains to be significant.

The technical change in this case is only captured by the time dummies. Employment does not seem to be responsive to changes in wages, however as discussed in section two, under plausible conditions, this coefficient could be negative. Braconier and Ekholm (2000) and Hatzius (1998) also do not find a significant own-wage elasticity of home employment for Sweden.

Time dummies remain significant despite the presence of capital stock as an explanatory variable. This captures not only the ongoing structural change but also other exogenous technical change effects that are not reflected by the capital stock.

These results, which indicate substitution effects of the low-wage foreign affiliate labor on employment in Austria, are consistent with the direction of the results in Hanson et al (2003) for the US, Hatzius (1998) for Sweden; Becker et al (2005) for Germany and Sweden; European Commission (2005) for France, and Belgium, and Cuyvers et al (2005) and Falk and Wolfmayr (2008) for the EU. It is harder to compare the magnitude of the effects, since all these studies estimate cross-wage elasticities.

Comparing with the other studies on Austria, the negative effects of Eastern affiliate employment are consistent with the findings in Bellak and Altzinger (2001), but not those in Marin (2004). However both studies are not directly comparable with ours, since they use firm level data and concentrate on the effects on the parent company and do not discuss the indirect effects at the sector level. Furthermore their periods of analysis cover earlier phases of Austrian FDI (1995 and 1999-2001), and the country coverage is also more limited than ours.

Pfaffermayr (2001)'s results indicate substitution of domestic manufacturing employment by developed host country employees, but when Austrian wages decline relative to affiliate wages in the Eastern host countries, relative employment at home decreases, which indicates complementarity. These results are different from ours. There are several differences that can contribute to these differences: most importantly his estimation period covers a very

early stage, 1990-96, when Austrian firms were having the initial market expansion phase despite rising relative wages, since foreign wages were still rather low and the firms had the motivation of market expansion. Contrarily we cover the later phase of 1996-2005. Pfaffermayr is covering only four Eastern European host countries. Furthermore he estimates relative employment as a function of relative wages, and indeed if we interpret the story behind the outcome, Pfaffermayr's results might be consistent with our results: after the initial transition shock there has been wage increases in the East both in absolute and relative terms; nevertheless employment in the Eastern foreign affiliates went on increasing (Pfaffermayr, 2001). This implies a positive own-wage elasticity of labor demand in the foreign affiliates. In the meantime manufacturing employment in Austria declined, implying a negative cross-wage elasticity of home labor demand, which supports the complimentarity thesis from the perspective of foreign wage elasticity. Given our discussion in section two, however, this implies a negative effect of the foreign affiliate employment on domestic employment, thus a substitution relation between the two quantities of labor. The two outcomes are consistent in this special case of the parallel movement of foreign wages and employment in the affiliates.

The most recent and comparable study on Austrian employment is by Falk and Wolfmayr (2007a) which uses the same data set as this paper, and finds a negative effect of affiliate employment in services (in the dynamic specification), which is consistent with our study; however there are differences with respect to the destination of FDI: we find no effect of Eastern affiliate employment in services, whereas they do. More importantly, in the industry they find no significant effects contrary to us. There are a number of methodological differences in detail, which could explain these different findings: One difference is that they cover only the Eastern employment in the five NMS, leaving out roughly one third of the foreign affiliate employees in Eastern Europe during the 2000s. The more important difference is the use of lags: while they do not use lagged effects, we find that this makes a difference in the results. They use the Arellano–Bover/Blundell–Bond system estimator, we

repeated our estimations using also this estimator using the lags of the foreign employment variables instead of just the current value, and we again find a negative effect of affiliate employment in the East.[18] However, when current values are used instead of the lagged values, the effects of foreign employment are not significant. Since it takes a while for domestic production and employment to adjust to the changes in the international division of labor and the possibility of new production locations abroad, lagged effects are important, and should not be disregarded.

Further evidence based on firm level data is supplied by Falk and Wolfmayr (2007b), according to which they find no significant effect of affiliate employment on parent companies' employment. However they report only static OLS estimations in differences; thus both dynamic estimations and lagged effects could significantly change these results. Furthermore even if there are no significant negative effects on the parent companies, the indirect spillovers might well be negative. Our sectoral estimations incorporate also such indirect effects, and negative effects seem to be dominating according to our results.

5.2 Real wages

Table 3 reports the estimation results for real wages modeled as in equation (5a).[19] According to the long-run coefficients, employment in the foreign affiliates in the East as well as developed countries have a significant negative effect on wages in the industry, but no effect in the total economy. This is due to the positive effects in the services: there is evidence of some positive effect of affiliate employment in the East on wages in the services as well as in the low skilled sectors. This could be explained by a positive scope effect and skill upgrading in the low skilled or services sectors, which have a complementary relation to Eastern affiliate employment. In the total economy the increase in affiliate employment in developed countries has a negative effect in only low skilled sectors, whereas there is a negative wage effect of Eastern affiliate employment in high skilled sectors.

Please insert Table 3 approximately here

Table 2b shows the cumulative effect of each explanatory variable on wages, calculated as the long run coefficients multiplied by the actual change in the explanatory variable. In terms of economic significance, the increase in the affiliate employment in the East and developed countries resulted in a 17.9% and 7.2% cumulative decline in real wages in the industry during the period of 1996-2005 respectively. Thus altogether real wages would have increased 25.2% more in the industry, if there were no Austrian foreign investment in this period.

Regarding the other explanatory variables, while employment has a negative effect on wages in the industry, non-ICT capital stock has a positive effect, reflecting an increase in wages together with the capital intensity of the sector. Again the time dummies remain significant and are mostly negative, indicating the significance of institutional factors as well as possible negative threat effects of potential capital mobility that is not reflected by the volume of actual transactions.

5.3 Wage share

Combining the long run effects on employment and wages as defined in equation (8), we get the joint effect of the changes in capital stock (ICT and non-ICT) and the employment in the foreign affiliates of Austria. Based on the calculated long run coefficients for the wage share, Table 2c reports the cumulative %-points effect[20] of the actual change in the explanatory variables. These effects are partial effects for a given level of value added.

According to the estimation results, in the industry the increase in employment in the foreign affiliates of Austria in the East and the developed countries has resulted in a cumulative decline of 13.2%-points and 4.7%-points in the wage share respectively during 1996-2005 (thus a total of -17.9%-points). These results overestimate the 8.2%-points actual decline in the wage share, however the direction is suggestive. In the total economy the effects are economically not very significant due to the lack of negative wage effects: the

increase in the Eastern affiliate employment has resulted in only a minor 1.8%-point decline in the wage share.

6. Conclusion

This paper estimates the effects of outward FDI on employment, wages, and the wage share in Austria. There is evidence of significant negative effects of FDI on both employment and wages. The negative employment effect of Austria's investment abroad is primarily due to the rise in the employment in the foreign affiliates in the East. The employment in the foreign affiliates in developed countries seems to have a negative effect in services only. The negative wage effects are originating from affiliate employment in both the East and the developed countries in the industry, but no effect is found in the total economy. There is evidence of some positive effect of affiliate employment in the East on wages in the services due to possible scope and skill-upgrading effects. Bringing together these effects we find that the increase in employment in the foreign affiliates of Austria has resulted in a deterioration of wage share with the effect originating from both country groups in the industry, and only from the East in the total economy. The results are not limited to workers in low skilled sectors; there are also negative effects in high skilled sectors.

Technological change also results in a significant decline in the industry wage share; however the negative effects of FDI remain significant after controlling for technological change, and are larger than that of the technological change. Time dummies are significant and mostly negative. In the employment estimation this captures not only the ongoing structural change but also other exogenous technical change effects that are not captured by the capital stock. In the wage equation time effects show the importance of institutional factors that are changing at the expense of labor's bargaining power and the possibility of threat effects of potential capital mobility beyond the actual FDI flows.

It could be said that these results nevertheless reflect a relatively short period of 10years, and thus only incorporate the substitution effects, and the stages of scope and scale

effects have not arrived yet. However labor market outcomes have persistence. Negative employment effects generate long term unemployment problems as well as a decline in labor's bargaining power. Additionally job losses lead to a negative popular perception of European Integration, leading to political tensions. Therefore the negative effects of FDI on labor market outcomes should be important concerns for national as well as EU-wide economic policy. The source of the problem is not FDI itself, but the large wage differentials within the EU, and the lack of any EU level public policy of social cohesion and regional development to accompany European EnlargementAttracting private FDI via low wages and taxes is perceived to be the only solution for growth in the New Member States. Thereby the multinationals have the chance to push labor at different production locations to compete with each other. However, the negative effects of openness are not an unavoidable destiny. On the contrary in the European context, labor in the Old and New Member States have more common ground than they currently exploit. There is scope for international cooperation, in case the coordination failure can be overcome. The process of European Integration could be seen as an advantage to redefine the rules of the game via coordinating the institutional setting of wage bargaining, incorporating productivity-led wage increases, and designing a European framework for the convergence of minimum wages, working hours and conditions. This also defines new tasks for the trade unions in the Old Member States in terms of communicating with the trade unions in the East, particularly if they are organized in different affiliates of the same multinational company. But most of all the issues of wage coordination and imposition of such minimum conditions require the consensus and effort of the labor in the New Member States. Understandably labor in the East can only be convinced to stop seeing lower wages as their only advantage to attract private FDI from the West, if there is a systematic EU public policy on regional convergence and social cohesion, which in turn requires an economically relevant EU budget.

References

Aiginger, K., Winter-Ebmer, R., Zweimuller, J. (1996) "Eastern European Trade and the Austrian Labour Market", *Weltwirtschaftliches Archiv*, (1996), 132(3): 476-500.

Altzinger, W. (2006) On the profitability of Austrian firms in the new EU member states, Vienna Institute for International Economic Studies, Monthly Report, 3/06, 4-10.

Arellano, M., and Bond, S. (1991) "Some tests of specification for panel data: Monte Carlo Evidence and an Application to Employment Equations" *Review of Economic Studies* 58, no. 2: 277-97.

Azmat, G., Manning, A., Van Reenen, J. (2007). Privatization, entry regulation and the decline of labour's share of GDP: a cross-country analysis of the network industries, Centre for Economic Policy Research Discussion Paper; 6348

Becker, S.O., Ekholm, K., Jaeckle, R., Muendler, M.A. (2005) "Location choice and Employment Decisions: A Comparison of German and Swedish Multinationals", *Review of World Economics*, 141(4): 693-731.

Bellak, C., Altzinger, W. (2001) "The impact of direct and indirect FDI in Eastern Europe on Austrian trade and employment", in: Narula, R. (ed.): *Trade and Investment in a Globalising World: Essays in Honour of H. Peter Gray*, Pergamon Press, Kidlington, 86-112.

Berman, E., Bound, J., Griliches, Z. (1994) "Changes in the Demand for Skilled Labor within U.S. Manufacturing: Evidence from the Annual Survey of Manufactures", *Quarterly Journal of Economics*, 109(2): 367-97.

Blomström, M., Fors, G., Lipsey, R. (1997) "Foreign Direct Investment and Employment: Home Country Experience in the United States and Sweden", *Economic Journal*, 445: 1787-97 .

Braconier, H., Ekholm, K. (2000) "Swedish Multinationals and Competition From High and Low Wage Locations", *Review of International Economics*, l, 448-461.

Brainard, S. L., Riker D.A. (1997) Are U.S. Multinationals Exporting U.S. Jobs? NBER Working Paper 5958.

Burke J, Epstein G. (2001) Threat effects and the internationalization of production, Political Economy Research Institute Working Papers; 15

Chennels, L., Van Reenen, J. (1999) Has technology hurt less skilled workers? An econometric survey of the effects of technical change on the structure of pay and jobs, The Institute for Fiscal Studies Working Paper Series; 99/27.

Crotty, J., Epstein. G., Kelly, P. (1998) "Multinational corporations in the neoliberal regime", in Baker D., Epstein G., Pollin R. (Eds), *Globalization and Progressive Economic Policy*, 117-143, (Cambridge: Cambridge University Press).

Cuyvers, L., Dumont, M., Rayp, G., Stevens, K. (2005) "Home Employment Effects of EU Firms' Activities in Central and Eastern European Countries", *Open Economies Review*, 16(2): 153-74.

Desai, M.A., Foley, C.F., Hines, J.R. (2005) Foreign Direct Investment and Domestic Economic Activity, NBER Working Paper Series No. 11717.

Diwan, I. (2001) Debt as sweat: Labor, financial crises, and the globalization of capital, Mimeo, The World Bank.

Epstein, G. (2000) Threat effects and the impact of capital mobility on wages and public finances: developing a research agenda, Political Economy Research Institute Working Papers; 7.

European Commission (2005) The Adjustment Challenge in the Labour Market, in The EU Economy 2005 Review, Commission of the European Communities, Brussels.

European Commission (2007) The labour income share in the European Union, Chapter 5 in: Employment in Europe, Brussels: European Commission.

Falk, M., Wolfmayr, Y. (2007a) Austrian FDI in Central-Eastern Europe and Employment in the Home Market, WIFO, mimeo

Falk, M., Wolfmayr, Y. (2007b) Home Market Effects of Outward FDI: Evidence Based on Amadeus Firm-Level Data, WIFO, mimeo

Falk, M., Wolfmayr, Y. (2008) The Impact of Outward FDI in Central and Eastern Europe on Employment in the EU-15 Countries, FIW Research Report No 016.

Greenaway, D., Hine, R., and Wright, P. (1999) "An empirical assessment of the impact of trade on employment in the United Kingdom", *European Journal of Political Economy* 15: 485-500.

Greenaway, D., Hine, R., and Wright, P. (2000) "Further evidence on the effect of foreign competition on industry level wages", *Review of World Economics*, 136(3): 522-38.

Guscina, A. (2006). Effects of globalization on labor's share in national income, IMF Working Paper; 06/294.

Hanson, G.H., Mataloni R.J., Slaughter, M.J. (2003) Expansion Abroad and the Domestic Operations of U.S. Multinational Firms, mimeo.

Hatzius, J. (1998). "Domestic Jobs and Foreign Wages", *Scandinavian Journal of Economics*, 100(4): 733-46.

Head, K., Ries, J. (2002) "Offshore Production and Skill Upgrading by Japanese Manufacturing Firms", *Journal of International Economics*, 58:81-105.

Helpman, E., Krugman P. (1985) *Market Structure and Foreign Trade*, MIT Press

Hine, R., Wright, P. (1997) "Trade and manufacturing employment in UK manufacturing", in: Borkakoti, J. and Milner, C. (Eds.) *International Trade and Labour Markets*, Macmillan, London, p. 118-139.

Harrison, A.E., (2002) Has globalization eroded labor's share? Some cross-country evidence, Mimeo, UC Berkeley.

IMF (2007) World Economic Outlook April 2007: Spillovers and Cycles in the Global Economy, World Economic and Financial Surveys, International Monetary Fund: Washington, D.C.

Konings, J., Murphy, A.P. (2006) "Do Multinational Enterprises Relocate Employment to Low Wage Regions? Evidence from European Multinationals", *Review of World Economics*, 142(2): 267-286.

Konings J, Vandenbussche H (1995) "The effect of foreign competition on UK employment and wages: evidence from a firm level panel", *Weltwirtschaftliches Archiv*, Vol. 131: 655-73.

Lipsey R. (2004) Home and host country effects of FDI, in: Baldwin, R. E. and Winters, L.A. (Eds.) Challenges to globalization: Analyzing the economics, University of Chicago Press, Chicago and London, p. 333-79

Lipsey R., Ramstetter, E., Blomström, M. (2000) "Outward FDI and Parent Exports and Employment: Japan, the United States, and Sweden", *Global Economic Quarterly*, 1(4):285-302.

Marin, D. (2004) A nation of poets and thinkers: Less so with Eastern enlargement? Austria and Germany, Center for Economic Policy Research Discussion Paper No. 4358, London.

Molnar, M., Pain N., Taglioni D. (2007) The Internationalisation of Production, International Outsourcing and Employment in the OECD, Economic Department Working paper, 561.

Morrison, C. (1986) Structural Models of Dynamic Factor Demands with Nonstatic Expectations: An Empirical Assessment of Alternative Expectations Specifications, *International Economic Review*, 27, (2): 365-86

OECD (2007) Employment Outlook, Paris.

Onaran, Ö. (2009) "Wage Share, Globalization, and Crisis: The case of manufacturing industry in Korea, Mexico, and Turkey", *International Review of Applied Economics*, 23(2): 113-134

Peneder, M. (2001) *Entrepreneurial Competition and Industrial Location*. Edward Elgar, Northampton.

Pfaffermayr, M. (2001) "Employment in domestic plants and foreign affiliates: a note on the elasticity of substitution", *Weltwirtschaftliches Archiv* 137(2):347-364.

Rodrik, D. (1997) Has globalization gone too far? Institute for International Economics, Washington DC.

Roodman, D. (2006) An Introduction to "Difference" and "System" GMM in Stata, The Center for Global Development Working Paper No 103.

Slaughter, M. (2000) "Production Transfer within Multinational Enterprises and American Wages", *Journal of International Economics*, 50(2): 449-72.

Stockhammer, E., Onaran, Ö., Ederer, S. (2009) "Functional income distribution and aggregate demand in the Euro-area", *Cambridge Journal of Economics*, 33: 139-159.

Figure 1: Domestic and Foreign Affiliate Employment, Industry

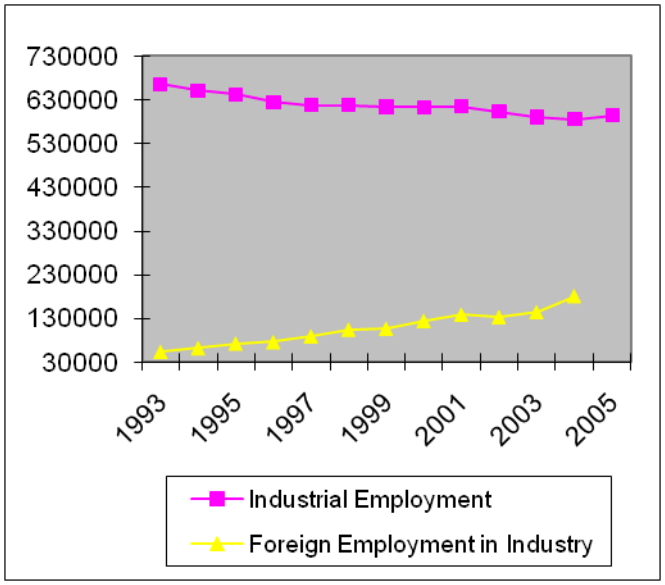

Table 1. Estimation results: Δln Employment (1996-2005)

Variable	Industry	Total Economy	Total low skilled	Total high skilled	Services
Δln Employment t-1	0.698	0.762	0.730	0.730	0.725
	0.000	*0.000*	*0.000*	*0.000*	*0.000*
Δln Real wage t	-0.082	-0.076	-0.120	-0.051	-0.387
	0.517	*0.457*	*0.439*	*0.568*	*0.040*
Δln Real wage t-1	-0.055	-0.056	0.300	-0.193	-0.087
	0.717	*0.597*	*0.105*	*0.152*	*0.585*
Δln Real value added t	0.383	0.289	0.455	0.215	0.161
	0.000	*0.000*	*0.000*	*0.000*	*0.145*
Δln Real value added t-1	-0.200	-0.177	-0.356	-0.073	0.088
	0.009	*0.000*	*0.003*	*0.101*	*0.146*
Δln Non-ICT capital t-1	-0.251	-0.104	0.346	-0.415	-0.178
	0.225	*0.614*	*0.320*	*0.001*	*0.696*
Δln Non-ICT capital t-2	0.324	0.238	-0.072	0.554	0.244
	0.076	*0.237*	*0.810*	*0.000*	*0.590*
Δln ICT capital t-1	0.140	0.049	0.097	0.079	0.053
	0.011	*0.351*	*0.296*	*0.057*	*0.128*
Δln ICT capital t-2	-0.150	-0.049	-0.115	-0.078	-0.063
	0.009	*0.343*	*0.208*	*0.053*	*0.098*
Δln foreign Employment developed t-1	0.001	0.000	0.013	-0.010	-0.001
	0.880	*0.976*	*0.048*	*0.101*	*0.756*
Δln foreign Employment developed t-2	-0.011	-0.007	-0.023	0.007	-0.017
	0.356	*0.192*	*0.008*	*0.255*	*0.002*
Δln foreign Employment eastern t-1	0.020	0.011	0.039	0.008	0.001
	0.005	*0.111*	*0.000*	*0.191*	*0.865*
Δln foreign Employment eastern t-2	-0.031	-0.017	-0.041	-0.014	0.007
	0.000	*0.010*	*0.000*	*0.070*	*0.130*
Constant	0.413	0.456	-3.006	1.212	2.123
	0.629	*0.678*	*0.035*	*0.296*	*0.369*
Number of observations	105	170	73	97	65
Number of groups	12	20	9	11	8
AR (2) p-value	0.947	0.486	0.101	0.232	0.112
Joint sign. of time dummies (p-value)	0.000	0.002	0.000	0.000	0.000
Sargan test (p-value)	0.654	0.595	0.706	0.320	0.187

Notes: p-values under coefficients (in italics). Dynamic panel estimations (GMM) including time effects. Standard errors are robust to the existence of sector specific serial correlation. The real wage is treated as endogenous and instrumented. See Appendix B for data sources and Appendix C for sectoral classification.

Table 2. Cumulative % change effects (1996-2005)

a. Employment: Cumulative % change during 1996-2005 due to:		
	Industry	**Total economy**
Real wage	0.00	0.00
Real value added	18.90	11.59
Non-ICT Capital	0.69	0.00
ICT Capital	-20.97	0.00
Foreign affliate employment-developed countries	0.00	0.00
Foreign affliate employment-east	-6.96	-5.97
Foreign employment total cumulative %change effect	-6.96	-5.97
Memo item: Actual cumulative % change in employment	-4.89	7.32
b. Wage: Cumulative % change during 1996-2005 due to:		
	Industry	**Total economy**
Employment	3.35	-3.31
Non-ICT Capital	0.93	0.00
ICT Capital	0.00	0.00
Foreign affliate employment-developed countries	-7.23	0.00
Foreign affliate employment-east	-17.93	0.00
Foreign employment total cumulative %change effect	-25.17	0.00
Memo item: Actual cumulative % change in wages	12.86	3.91
c. Wage share: Cumulative %-point change during 1996-2005 due to:		
	Industry	**Total economy**
Non-ICT Capital t-1	0.75	0.00
ICT Capital t	-4.32	0.00
Foreign affliate employment-developed countries	-4.74	0.00
Foreign affliate employment-east	-13.18	-1.82
Foreign employment total cumulative %change effect	-17.92	-1.82
Memo item: Actual cumulative %-point change in wage share	-8.24	-4.80

Note: The cumulative effect of each explanatory variable on employment is calculated as the long run coefficients calculated based on the estimation results in Table 1 for employment and Table 3 for wages multiplied by the actual change in the explanatory variable. The effect on the wage share is calculated by combining the effects on employment and wages as in Equation (8).

Table 3. Estimation results: Δln Real wage (1996-2005)

Variable	Industry	Total Economy	Total low skilled	Total high skilled	Services
Δln Real wage t-1	0.819	0.739	0.673	0.788	0.560
	0.000	*0.000*	*0.000*	*0.000*	*0.000*
Δln Employment	-0.045	-0.015	-0.038	-0.018	-0.157
	0.415	*0.790*	*0.589*	*0.755*	*0.034*
Δln Employment t-1	-0.124	-0.118	-0.110	-0.069	0.057
	0.042	*0.041*	*0.120*	*0.251*	*0.562*
Δln Non-ICT capital t-1	0.263	0.137	-0.621	0.217	0.323
	0.038	*0.292*	*0.219*	*0.012*	*0.331*
Δln Non-ICT capital t-2	-0.019	-0.022	0.642	-0.128	-0.369
	0.879	*0.873*	*0.118*	*0.265*	*0.296*
Δln ICT capital t-1	-0.036	0.044	-0.094	0.039	0.104
	0.409	*0.185*	*0.431*	*0.228*	*0.000*
Δln ICT capital t-2	0.052	-0.038	0.102	-0.031	-0.094
	0.224	*0.276*	*0.390*	*0.356*	*0.000*
Δln foreign Employment developed t-1	-0.015	-0.002	-0.015	0.006	-0.002
	0.001	*0.744*	*0.003*	*0.367*	*0.696*
Δln foreign Employment developed t-2	0.000	0.001	-0.002	-0.004	-0.005
	0.980	*0.817*	*0.578*	*0.609*	*0.470*
Δln foreign Employment eastern t-1	0.002	-0.002	0.017	-0.007	-0.003
	0.779	*0.512*	*0.035*	*0.086*	*0.431*
Δln foreign Employment eastern t-2	-0.017	0.002	-0.016	0.006	0.016
	0.004	*0.639*	*0.005*	*0.267*	*0.000*
Constant	1.612	3.073	4.860	2.226	6.019
	0.131	*0.002*	*0.000*	*0.035*	*0.000*
Number of observations	105	170	73	97	65
Number of groups	12	20	9	11	8
AR (2) p-value	0.197	0.125	0.376	0.227	0.740
Joint sign. of time dummies (p-value)	0.000	0.000	0.000	0.000	0.000
Sargan test (p-value)	0.219	0.048	0.289	0.394	0.521

Notes: p-values under coefficients (in italics). Dynamic panel estimations (GMM) including time effects. Standard errors are robust to the existence of sector specific serial correlation. Employment, capital stock, and foreign employment are all treated as endogenous and instrumented. See Appendix B for data sources, and Appendix C for sectoral classification. .

Appendix A: Annual % change in labor market outcomes (compund average)

	Wage share	Real value added	Employment	Real Wage	Foreign Employment developed*	Foreign Employment eastern*
TOTAL ECONOMY						
1976-1980	-0.03	2.80	1.45	2.09		
1980-1985	-0.62	1.26	-0.31	0.33		
1985-1990	-0.20	3.22	1.37	2.08		
1990-1995	-0.21	2.29	0.78	1.11	-0.12	29.46
1995-2000	-0.54	3.19	1.05	0.28	10.78	13.19
2000-2005	-0.49	1.74	0.33	-0.19	4.78	13.13
1990-2005	-0.47	2.40	0.72	0.40	9.34	18.15
TOTAL INDUSTRY						
1976-1980	0.51	2.93	0.49	2.49		
1980-1985	-1.11	0.78	-2.57	0.73		
1985-1990	-0.02	2.86	-0.50	2.68		
1990-1995	-0.11	0.93	-2.03	1.74	-3.28	30.27
1995-2000	-1.57	4.31	-0.93	1.08	6.47	12.40
2000-2005	-0.09	1.62	-0.62	0.58	3.58	13.09
1990-2005	-0.66	2.28	-1.19	1.13	8.06	15.89
TOTAL HIGH INDUSTRY						
1976-1980	0.74	6.70	1.80	2.86		
1980-1985	-0.74	1.23	-2.00	1.10		
1985-1990	-0.35	4.92	0.87	2.80		
1990-1995	-0.34	2.29	-1.70	1.94	-5.44	24.25
1995-2000	-1.76	5.17	-0.02	1.15	6.69	10.24
2000-2005	0.28	2.35	0.14	0.39	1.88	18.60
1990-2005	-0.68	3.26	-0.53	1.16	7.49	18.47
TOTAL LOW INDUSTRY						
1976-1980	0.31	0.21	-0.48	2.07		
1980-1985	-1.43	0.39	-3.01	0.33		
1985-1990	0.21	0.88	-1.69	2.33		
1990-1995	0.13	-0.61	-2.35	1.45	0.82	37.26
1995-2000	-1.32	3.20	-1.83	0.78	6.17	14.92
2000-2005	-0.58	0.59	-1.45	0.64	6.68	4.87
1990-2005	-0.67	1.05	-1.88	0.96	9.06	12.03
TOTAL SERVICE						
1976-1980	-0.19	2.75	1.98	1.89		
1980-1985	-0.36	1.42	0.81	0.19		
1985-1990	-0.20	3.34	2.17	1.89		
1990-1995	-0.15	2.71	1.81	0.99	4.05	28.38
1995-2000	-0.23	2.85	1.66	0.11	16.20	14.14
2000-2005	-0.60	1.77	0.59	-0.39	6.08	13.17
1990-2005	-0.37	2.44	1.35	0.23	10.85	20.68
TOTAL HIGH SERVICE						
1976-1980	-0.51	3.40	2.48	1.74		
1980-1985	-0.73	2.36	2.19	-0.07		
1985-1990	-0.44	3.26	2.37	1.65		
1990-1995	-0.53	2.83	1.79	0.86	9.18	31.54
1995-2000	0.03	2.85	2.52	-0.34	1.81	26.39
2000-2005	-0.64	2.03	0.94	-0.43	-2.22	15.77
1990-2005	-0.42	2.57	1.75	0.03	4.79	31.15
TOTAL LOW SERVICES						
1976-1980	0.09	1.88	1.52	1.91		
1980-1985	0.05	0.04	-0.55	0.07		
1985-1990	0.14	3.46	1.96	2.15		
1990-1995	0.48	2.53	1.84	1.18	1.99	27.07
1995-2000	-0.68	2.84	0.68	0.50	20.81	7.65
2000-2005	-0.51	1.36	0.18	-0.43	8.19	8.63
1990-2005	-0.27	2.24	0.90	0.42	12.64	11.73

Sources: Own calculations based on OENB data for foreign employment, and Statistics Austria for the others. See Appendix B for details.

Notes: The data for the foreign affiliate employment starts from 1993-2004. See Appendix C for the skill taxonomy. Eastern countries cover 20 countries including the 10 Eastern European new member states, five non-member South Eastern European countries, and four European countries of the Community of Independent States (Russia, Ukraine, White Russia, Moldavia).

Appendix B

Data sources

Statistics Austria, Panel data of industries, 1976 onwards, NACE 2-digit

FDI-database of Austrian National Bank, 1993 onwards, NACE 1-digit (At 2 digit level even total FDI data is hidden or does not exist in many sectors (15, 23, 25, 30, 33, 34, 35, 36) for all years or most years).

EU KLEMS Database, March 2007, http://www.euklems.net for the capital stock, 1976-2004, NACE 1-digit

Appendix C: Skill taxonomy
Industry

Skill groups	1-Digit
Low Skill	10-14: Mining and quarrying 15-16: Food products, beverages and tobacco 17-19: Textiles, textile products, leather and footwear 26: Other non-metallic mineral products 27-28: Basic metals and fabricated metal products 36-37: Manufacturing n.e.c.
High Skill	20: Wood and products of wood and cork 21-22: Pulp, paper, paper products, printing and publishing 23-25: Chemical, rubber, plastics and fuel products 29: Machinery and equipment, n.e.c. 30-33: Electrical and optical equipment 34-35: Transport equipment

Services

Skill groups	1-Digit
Low Skill	45: Construction 50-52: Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods 55: Hotels and restaurants
High Skill	40-41: Electricity, gas and water supply 60-64: Transport, storage and communications 65-67: Financial intermediation 70-74: Real estate, renting and business activities 85-93: Health and social work, Other community, social and personal service activities

Note: Classification is based on Peneder (1999). The medium skilled/blue collar industries are classified as medium skilled, whereas medium skilled/white collar industries sectors that are also technology driven are classified as high skilled; the other medium skilled/white industries are classified as medium skilled.

Appendix D Estimation results: ln Employment vs. Foreign affiliate employment,
Methodology: Arellano–Bover/Blundell–Bond system estimator (1996-2005)

Variable	Industry	Total Economy
ln Employment t-1	0.908	0.847
	0.000	*0.000*
ln Real wage t	-0.057	-0.138
	0.217	*0.086*
ln Real value added t	0.142	0.217
	0.013	*0.007*
ln Non-ICT capital t-1	-0.014	-0.043
	0.177	*0.056*
ln ICT capital t-1	-0.007	-0.007
	0.162	*0.320*
ln foreign Employment developed t-1	-0.003	-0.008
	0.522	*0.198*
ln foreign Employment eastern t-1	-0.005	-0.003
	0.026	0.462
Number of observations	132	215
Number of groups	12	20
Sargan test (p-value)	0.156	0.287
Hansen test (p-value)	1	0.979
AR (2) p-value	0.710	0.310

p-values below the coefficients (in italics)

Endnotes

[1] Appendix A shows the average annual change (compound average) of wages, employment, the wage share, value added, productivity as well as the foreign affiliate employment for the sub-periods during 1976-2005.

[2] Hatzius (1998), who also estimates a labor demand equation similar to Hanson et al (2003), does not make the assumption of quasi-fixed capital, but has capital costs in the theoretical model, and drops them at the stage of estimation due to data problems. Greenaway et al. (1999) and Hine and Wright (1998) rely on time dummies to reflect capital costs, but this is based on the assumption of perfect capital markets.

[3] Although the workers bargain for a targeted purchasing power based on expected CPI inflation, for the firms their producers' prices (determined by the wage costs and non-labor costs and their mark-up power) are the binding constraints regarding the wage demands of the workers. So one could estimate the real wage equation either deflated by consumer or producers' prices and account for these price differentials by adding the wedge, the ratio of CPI/PPI. But since it is not a core variable, we will drop it at the estimation stage to gain degrees of freedom.

[4] An alternative would be to estimate a system of three equations for domestic employment, foreign affiliate employment, and domestic wages. However, the focus of this study is on home country effects, and using proper instrumental variables handles the issue of endogeneity sufficiently. Furthermore the data limitations mentioned above do not make it possible to estimate parallel equations for affiliate wages.

[5] Economy wide unemployment to account for general labor market conditions is not added, since this also requires dropping the time dummies; also in a panel context economy wide variables are less useful.

[6] In Austria wage determination is a result of industry-wide collective bargaining, but pattern bargaining makes it highly centralized. But Aiginger et al. (1996) also mention that

subsequent negotiations at the firm level are possible, particularly in large firms, which are exposed to higher international competition. Nevertheless regarding the effects of an alternative wage as well as pattern bargaining, a reference wage like the average wage rate of the economy could be included. While this would make sense, if one were only interested in wage differentials, it is defeating in our context, since the average wage needs to be explained and not taken as given. Furthermore it would require dropping the time dummies.

[7] There is no collective bargaining coverage or union density data compatible with NACE classification.

[8] See Azmat et al (2007) which cites privatization as a major factor behind the decline in the wage bill in the OECD in the network industries.

[9] A constant PPI/value added deflator is assumed.

[10] $(1-\beta_w\alpha_l)$ needs to be positive to have a meaningful solution.

[11] 20 countries including the 10 Eastern European new member states, five non-member South Eastern European countries, and four European countries of the Community of Independent States (Russia, Ukraine, White Russia, Moldavia).

[12] This is also useful to measure the substitution effects in the same domestic sector. Analyzing the effects of FDI in one foreign sector on another domestic sector, e.g. the case of foreign sales affiliates of manufacturing firms, could also supply useful information, but the data does not include such detailed information.

[13] Further lags are not used due to the limited sample size. They were also not significant.

[14] The industry includes 11 manufacturing sectors and mining and quarrying. The results are qualitatively robust to the exclusion of mining.

[15] The total economy excludes agriculture, since labor market dynamics in agriculture has a rather different character.

[16] Estimating these two equations in systems form would potentially create efficiency gain, but they are not needed for consistency. Given our limited degrees of freedom and the complication of systems estimation with panel data, we restrict the estimation to separate equations with endogeneity.

[17] The instrument set in the case of the lags of employment is expanded as the panel progresses and the number of potential lags increases. This method is efficient; however it was not possible in the case of the other endogenous variable due to the limited matrix size of the estimation software (STATA 10).

[18] The estimation results using lagged values are in the Appendix D. The results of our alternative specification indicate even a larger economic significance of the employment in Eastern affiliates: a cumulative decline of 10.4%, which correspond to a loss of 64760 jobs, i.e. 0.79 jobs per job created in the East.

[19] The Sargan test except for the total economy cannot reject the null hypothesis that the overidentifying restrictions are valid. There is no second order autocorrelation in the first differenced residuals.

[20] Based on the long run elasticities for the wage share, we calculate the % change effect and finally express these effects in %-points, which makes more sense in the case of wage share.