

PD Dr. Özlem Onaran

# THE EFFECTS OF GLOBALIZATION ON EMPLOYMENT, WAGES AND THE WAGE SHARE IN AUSTRIA

Wirtschaftsuniversität Wien

Study commissioned by the Chamber of Labour of Vienna



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# **The Effects of Globalization on Employment, Wages and the Wage Share in Austria\***

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## Contents

Abstract .....	1
Executive Summary .....	2
1. Introduction .....	5
2. The model.....	7
3. The theoretical literature on the effects of globalization.....	9
3.1 Trade effects.....	9
3.2 Foreign Direct Investment and home country effects .....	11
4. Empirical literature.....	13
4.1 Empirical literature on Austria.....	15
5. Data, estimation methodology and specification of the equations.....	16
6. Stylized facts of our sample .....	19
6.1 The globalization of the economy .....	19
6.2 The developments in wages, employment, and the wage share.....	23
7. Estimation results for the effects of foreign affiliate employment.....	26
7.1 Employment .....	26
7.2 Real wages.....	30
7.3 Wage share .....	31
8. Estimation results for trade effects .....	32
8.1 Employment .....	32
8.2 Real wages.....	36
8.3 Wage share .....	39
9. Conclusion.....	39
10. Policy implications.....	41
Appendix A: Data sources.....	45
Appendix B: Sectoral classification at 1 and 1-digit NACE level .....	46
Appendix C: Skill taxonomy for manufacturing industries .....	48
Appendix D - Tables .....	49
References .....	58

## Abstract

This paper estimates the employment and wage effects of foreign trade and Austrian outward FDI on employment, wages, and the wage share in Austria. There is evidence of significant negative effects of imports and FDI on both employment and wages. The results are not limited to workers in low skilled sectors. Particularly workers in high skilled sectors experience negative effects. There are also negative effects on white collar workers, particularly due to outward FDI. Even after we take into consideration the positive export effects, it is unlikely that exports offset negative import and FDI effects.

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 foreign affiliates in developed countries seems to have a negative effect in services only, which could be interpreted as the horizontal FDI effect. The negative wage effects are originating from affiliate employment in both the East and the developed countries in industry, but no effect is found in the total economy. There is evidence of some positive wage effect of affiliate employment in the East in services sectors. 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 industry, and only from the East in the total economy. Growth of value added as well as non-ICT capital has a positive effect, and technological change (the growth of ICT capital) has a negative effect on employment growth in industry. At the economy-wide technological change effects only blue collar workers' employment. Technological change also results in a decline in the industry wage share.

Regarding import effects, in aggregate total imports also have a negative impact on both employment and wages, and thereby the wage share in manufacturing as well as the total economy (non-agricultural tradable sectors). The negative impact on employment is particularly due to offshoring to the East. However offshoring to the East has a positive effect on wages (in both manufacturing and total economy), which might be indicating that offshoring to the East has resulted in substitution of domestic employment with foreign employment, but in the meantime has resulted in skill upgrading. Offshoring to the developed countries also has a negative impact on both employment and wages in the total economy. In manufacturing as well as total economy imports from the rest of the world have positive employment and wage effects.

## Executive Summary

This paper estimates the employment and wage effects of foreign trade and Austrian outward FDI on employment, wages, and the wage share 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 Foreign Direct Investment (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 trade and FDI towards Western Europe also increased significantly during this period. In the meantime the increase in unemployment and stagnation in real wages attracted public attention to globalization, and in particular Eastern enlargement and brought up the following question: Did globalization or in particular offshoring or FDI to the CEECs by Austrian firms destroy jobs in Austria? Indeed Austria also experienced a dramatic change in the functional income distribution at the expense of labor in the last three decades: The wage share (labor compensation/gross value added in non-agricultural sector) declined from a level of 72% in 1978 to 54.9% as of 2005. The decline in labor share is not specific to Austria, albeit it has experienced one of the steepest declines in the EU. The gains from trade and enlargement in terms of growth have gone along with a worsening of functional distribution of income. In this study we focus on the effects of globalization to analyze how much of this decline is related to increased imports, offshoring in particular, and Austrian outward FDI.

The study finds evidence of significant negative effects of imports and 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 foreign affiliates in developed countries seems to have a negative effect in services only, which could be interpreted as the horizontal FDI effect. The negative wage effects are originating from affiliate employment in both the East and the developed countries in industry, but no effect is found in the total economy. There is evidence of some positive wage effect of affiliate employment in the East in services sectors. 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 industry, and only from the East in the total economy. While domestic growth and investment in Austria have positive effect on employment, technological change has a negative effect.

These results indicate that the increase in affiliate employment in the East has resulted in a decline of 7.7% in employment (a loss of 48145 jobs) in industry and 4.7% (a loss of 123179 jobs) in the total economy in Austria during 1996-2005. Thus each job that has been created additionally in the East has substituted 0.58 jobs in net terms in industry, and 0.46 jobs in the total economy. The increase in the affiliate employment in the East and developed countries resulted in a 25.2% cumulative decline in real wages in the industry during the period of 1996-2005. These developments led to deterioration in the wage share in industry by 18.1%-points due to outward investment towards both the East and the developed countries. Technological change (the increase in ICT capital) also results in a decline of 9.2%-points in the industry wage share.

Regarding import effects, in aggregate total imports also have a negative impact on both employment and wages, and thereby the wage share in manufacturing as well as the total economy (non-agricultural tradable sectors). The negative impact on employment is particularly due to offshoring to the East. However offshoring to the East has a positive effect

on wages (in both manufacturing and total economy), which might be indicating that offshoring to the East has resulted in substitution of domestic employment with foreign employment, but in the meantime has resulted in skill upgrading. Offshoring to the developed countries also has a negative impact on both employment and wages in the total economy. In manufacturing as well as total economy imports from the rest of the world have positive employment and wage effects.

Overall summing up the total import effects (final and intermediate) we find a net effect of 1.8% decline in manufacturing employment (12495 jobs) and a decline of 5.8% in the total economy (53262 jobs) during 1990-2005. Total imports have resulted also a cumulative decline of 3.4% in real wages in manufacturing and 4.2% in the total economy. All together the increase in import penetration resulted in a deterioration in the wage share by 3.6%-points in manufacturing and 6.6%-points in the total economy during the last 15 years.

Although the effect of imports are negative, when the effect of exports are also incorporated, we find a positive impact of total trade on employment in total manufacturing as well as in the total economy, however only regarding trade with the rest of the world. The positive effects of exports and negative effects of imports seem to cancel out each other in the case of trade with developed countries or the East. Regarding wages, there are positive effects of trade with both the East and the rest of the world in manufacturing and total economy; but trade with the developed countries has positive effects only on manufacturing wages.

The results point at existence of negative offshoring and in particular FDI effects on both wages and employment. The results are not limited to workers in low skilled sectors. Particularly workers in high skilled sectors experience negative effects. There are also negative effects on white collar workers, particularly due to outward FDI. Moreover the aggregate effects of both imports and FDI are negative. Even after we take into consideration the positive export effects, it is unlikely that exports offset negative import and FDI effects.

One policy reaction to this process in Austria could be to argue in favor of protectionist measures against capital outflow and offshoring. This is not an option within the EU. But even without the EU, it would not be economically very feasible for Austria, since it is a small country and all other countries are playing at the global level. Also it would be harder for the labor organizations in Austria alone to shift the balance of powers that radically against the excessively strong multinationals. Then Austria indeed has to see the European context as an advantage to push for more coordination of social and wage policy and regulation of capital markets.

Theoretically negative effects of openness or regional integration are not an unavoidable destiny, rather an outcome of the current domestic and international policies and the excessive power of the multinational companies. The fact that the cohesion funds are much more limited during the Eastern enlargement of the EU than those during the Southern enlargement makes these conditions worse, because the New Member States are finding themselves in a position where too much labor chases too little capital, and thereby the multinationals have the chance to push labor at different production locations to compete with each other.

However openness and regional integration can be also managed in a way to benefit both the richer and poorer partners, if trade and investment flows are designed as part of an egalitarian and growth-oriented international economic policy. In the European context, labor in the old and new member states as well as the accession countries have more common ground than they currently exploit. This common ground must combine the ruling out of destructive wage

(and tax) competition with a coherent and coordinated EU-wide policy for social and economic convergence. Thus redefining the rules of the game, coordinating the institutional setting of wage bargaining, incorporating productivity-led wage increases, and designing a European framework for minimum wages, working hours and conditions and corporate tax rates is the only alternative to readjust the playground back to conditions that are fairer to labor. Nevertheless the imposition of such minimum conditions is a process of adjustment that requires also the consensus of the labor in the lower wage areas of Eastern Europe. However labor in the East can only be convinced to stop seeing lower wages as an advantage and the only way to attract private FDI from the West, if there is a systematic EU policy on regional convergence and social cohesion, which requires an economically relevant EU budget. Furthermore international coordination for regulation in financial markets, tax harmonization, and with regards to capital flows need to be achieved.

This defines new roles and tasks for the trade unions in each country, since they will be the political agents who have interest and the power to push for such a shift in policy at the EU level. The task is not easy, since this also requires overcoming the coordination failure among the trade unions in different countries. The way until there is a rocky road, and before achieving big victories the trade unions in Austria and elsewhere in the old Member States must start with looking for ways of supporting the trade union movement in the new Member States. Positive experiences and improvements in working conditions can arise particularly if the trade unions organized in different affiliates of the same multinational company find ways of communicating and building solidarity networks.



## 1. Introduction

The aim of this paper is to empirically analyze the impact of globalization -as measured by the trade and capital flows- on the labor market outcomes in Austria. Austria is a small open economy, with a 54.2% ratio of exports of goods and services to GDP and 49.4% ratio of imports of goods and services to GDP as of 2005. 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 Foreign Direct Investment (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 trade and FDI towards Western Europe also increased significantly during this period. Austria is one of the relatively most integrated Western high wage-country to the low-wage East. Its geographical proximity as well as historical ties and its small size played a role in this fast integration.

The increase in unemployment (from 3.8% in 1989 to 5.8% as of 2006) and wage moderation in the meantime attracted public attention to globalization, and in particular Eastern enlargement and brought up the following question: Did globalization or in particular offshoring or FDI to the CEECs by Austrian firms destroy jobs in Austria? Although deriving causal relations requires a detailed analysis, the stylized facts of the labor market developments seem to provide some supportive evidence to these fears: 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 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 also striking. In the meantime real wages have stagnated dramatically in the total economy particularly since the mid 1990s. The service wages are even slightly declining in the last five years on average. 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 (in employment, wages, and productivity), the functional income distribution is changing at the expense of labor in the last three decades. The wage share (labor compensation/gross value added in non-agricultural sector) declined from a level of 72% in 1978 to 54.9% as of 2005<sup>1</sup>. The deterioration continued in the past years in spite of the profitability gains due to enlargement. Evidence shows that Austrian affiliates in the NMS are enjoying a high profitability (Havlik et al. 2005; Altzinger, 2006); but these gains from trade and enlargement have gone along with a worsening functional distribution of income. In this study we will focus on the effects of globalization to analyze how much of this decline is related to increased imports, offshoring in particular, and Austrian outward FDI. We will pay particular attention to the possible different effects of integration with the developed countries vs. the CEECs and the other low wage countries.

The decline in labor share is not specific to Austria, albeit it has experienced one of the steepest declines in the EU. Recently the mainstream international institutions like OECD and

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<sup>1</sup> The wage share index adjusted for the employment structure (basis year of 1970) and calculated as a ratio to net national income decreased even more sharply (Guger and Marterbauer, 2004). Guger and Marterbauer (2004) argue that rationalization waves and the decline in employment reduced the bargaining power of the workers; the increased international competitive pressures determined the conditions of wage bargaining; and the flexibilization of the labor market through outsourcing, increased temporary work contracts, new working time arrangements and part-time employment also created pressures.

IMF also could not stay indifferent to this development and addressed the issue, which is motivated by the increasing public discontent. OECD (2007) cites the 2005 Eurobarometer opinion poll, which shows that more people have a negative than a positive view of globalization and “relocation of jobs to countries where wages are lower” was the most frequently cited consequence of globalization. In OECD Employment Outlook (2007) Rodrik’s (1997) analysis pointing at the negative effects of globalization on labor is now playing an important role albeit with a delay of 10 years. OECD (2007) addresses that there has been a downward trend in the wage share, which has coincided with rapid growth in trade and FDI, but nevertheless they add an excusing remark afterwards that many other factors such as technological change, capital deepening and changes in the industry mix of output can contribute to that fall. IMF (2007) find that globalization (measured by changes in export and import prices, offshoring, and immigration) had a negative effect on the labor share in developed countries, but they cite globalization as one of several factors, and emphasize technological change and labor market policies as other important factors. However what is not discussed in these studies is that it is quite hard to disintegrate the technology shocks from trade induced technological change. The reverse is also true. Technological change facilitates international transactions true lower costs and thus generates the conditions for globalization. Interestingly in the study of IMF (2007) skilled labor share<sup>2</sup> decline much more due to globalization and in particular offshoring, and the technological change effect is less, although for the unskilled labor the effect of globalization is much smaller than the effect of technological change. Another interesting finding is that in small European countries, the effects of offshoring and trade prices are much larger than large countries, and the contribution of immigration is the smallest, and even smaller than the effect of offshoring in these countries. This is an important difference, since the IMF report indeed makes an effort to underscore the importance of globalization by focusing on the finding indicating a much larger negative effect of immigration than the other components of globalization, namely trade and offshoring. However this is not the case in the small economies according to the findings in the same report. Also in small European countries the effect of globalization in total is as large as the effect of technology.

Austria is a very interesting case to investigate the effects of trade and capital mobility on labor market outcomes, being a small economy, which is highly integrated to the other high wage as well as low wage countries. In this paper first we estimate the effects on employment and wages, and then combining the effects on both wages and employment we calculate the cumulative effects on functional income distribution, i.e. wage share. The estimations are made for a panel of sectors, which are subject to trade or FDI flows. The effects are separately estimated for low and high skilled sectors, industry vs. services, and blue vs. white collar workers. To the best of our knowledge, this is the first study that gives an econometrical account of the effects of globalization on the wage share in Austria.

Section 2 presents the model; section 3 reviews the theoretical expectations about the trade and FDI effects on labor market outcomes. Section 4 proceeds with the empirical literature review. Section five discusses the data and methodological issues. Section 6 presents the stylized facts of globalization and labor market outcomes in Austria. Section 7 and 8 present the estimation results about the effects of FDI and trade on employment, wages, and the wage share. Section 9 concludes and section 10 discusses the policy implications.

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<sup>2</sup> IMF (2007) presents a country panel at the aggregate level. The study claims that the income share of skilled workers rose by choosing the indicator as the share of skilled wage bill in economy wide value added, rather than the alternative indicator, which is the share of skilled wage bill in the skilled sectors’ value added, which is also mentioned in the paper. According to the latter indicator the labor share of skilled workers is also falling in Europe and Japan.

## 2. The model

The model exists of a pair of equations for labor demand and wage bargaining, which then is solved simultaneously and inserted into a wage share equation to calculate labor's share in value added.

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

$$l_{i,t} = \beta_i + \beta_t + \beta_w lwr_{i,t} + \beta_q lqr_{i,t} + \beta_k lknict_{i,t} + \beta_{kict} lkict_{i,t} + \beta_g g_{i,t} + \sigma_{t,i} \quad (1)$$

where  $l_{i,t}$ ,  $lwr_{i,t}$ ,  $lqr_{i,t}$ ,  $lknict_{i,t}$ , and  $lkict_{i,t}$  are the employment, real wage (labor compensation, deflated by sectoral producers price index), real value added, real non-ICT capital stock, and real ICT capital stock in sector  $i$  respectively, and all are in logarithms. Capital stock is disaggregated as normal and ICT capital to differentiate the technology effects from extensive investment. This function is based on a production function with a quasi-fixed capital constraint in the short run<sup>3</sup>. Theoretically a positive labor demand effect of output is expected. The demand for labor is expected to be negatively affected by the real wages from a classical point of view; however this is an empirical issue for this study to be tested. Non-ICT capital may be substituting or complementing labor; the latter would be the case if the firm has excess capacity. But a negative substitution effect of ICT capital may be expected at least for less skilled workers.  $\beta_i$  is a sector specific coefficient.  $\beta_t$  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, employment legislation that may affect labor demand.<sup>4</sup> The core model is augmented by a set of demand shifters,  $g$ , which capture the effects of globalization as we will discuss in more detail below.

The wage bargaining model is given as follows:

$$lwr_{i,t} = \alpha_i + \alpha_t + \alpha_l l_{i,t} + \alpha_k lknict_{i,t} + \alpha_{kict} lkict_{i,t} + \alpha_g g_{i,t} + \varepsilon_{t,i} \quad (2)$$

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, 1999b) 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<sup>5</sup>. The capital/labor ratio, thus  $lknict+lkict-l_{i,t}$  jointly, determines the productivity of labor and worker's aspirations and will have a positive effect on wages, but the degree at which they can index wages to productivity improvements will depend on their bargaining power. Also in more capital

<sup>3</sup> See Greenaway et al. (1999a) and Hine and Wright (1998) for a model with wage/capital cost as the explanatory variable. Since it is hard to measure the capital costs the authors then rely on time dummies to reflect this effect, assuming perfect capital markets. However if we assume that capital is quasi-fixed, then we obtain instead a capital constrained labor demand model. OECD (2007) estimates a similar labor demand function.

<sup>4</sup> The analysis of these effects, albeit interesting, are outside the scope of this paper.

<sup>5</sup> Although the workers bargain for a targeted purchasing power based on expected CPI inflation, for the firms it is their producers' prices (determined by the wage costs and non-labor costs and their mark-up power) which also is a binding constraint for the wage demands of 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.

intensive sectors with a higher capital/output ratio the organizational strength and the bargaining power of the workers will 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 in the case of less skilled workers, who may be substituted with ICT-capital. This effect will disappear if capital and labor are complementary. The employment in the sector captures the insider power and the demand effect, and will affect workers bargaining power positively and lead to 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, as opposed to a model with employment and capital/labor ratio. Thus the negative denominator effect of employment in the capital/labor ratio will also be incorporated to the coefficient of employment in our model, making the interpretation of the sign of the coefficient hard. We nevertheless prefer this model because it is parallel to the employment model, which will have a computational advantage when deriving the wage share below.  $\alpha_i$  is a sector specific coefficient.  $\alpha_t$  is the time dummy, accounting for the economy wide labor market conditions that affect workers' outside options<sup>6</sup>, an alternative economy wide wage<sup>7</sup>, and the institutional factors that may affect the bargaining power like union density, collective bargaining coverage<sup>8</sup>, and structural change in the composition of the workers. Again the core model is augmented by a set of variables,  $g$ , which capture the effects of globalization on the bargaining power of labor, and shift the bargaining curve as we will discuss in more detail below.

Finally the wage share, the share of wage bill<sup>9</sup>/gross value added of the sector ( $ws$ ) is by definition actual real wage (bargained wage deflated by producer's price index,  $wr$ ) over productivity (real value added/employee)<sup>10</sup>:

$$ws_t = wr_t / (qr / l)_t \quad (3)$$

Taking logarithms,  $lws$  is defined as

$$lws = lwr + ll - lqr \quad (4)$$

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<sup>6</sup> 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.

<sup>7</sup> 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 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.

<sup>8</sup> There is no collective bargaining coverage or union density data compatible with NACE classification.

<sup>9</sup> We use labor compensation rather than wage and salaries to account for the non-wage payments to labor such as social security contributions of the employers as well. A correction of the wage share to account for the labor income of the self-employed was not possible due to lack of detailed sectoral data.

<sup>10</sup> This is a simplification in order to explain the changes in the wage share, assuming that the change in the producers' price index and value added price index are the same, which in reality is different.

Substituting ll equation (1) in lwr (equation 2) we get lwr expressed only in terms of the explanatory variables, x, which is the vector of lqr, lknonict, lkict, and g as defined above:

$$lwr_{i,t} = \frac{\alpha_i + \alpha_t + \alpha_l \beta_l + (\alpha_x + \alpha_l \beta_x) x_{i,t} + \varepsilon_{t,i}}{1 - \beta_w \alpha_l} \quad (5)$$

Similarly substituting lwr (equation 2) in ll (equation 1), we get ll expressed only in terms x as above:

$$ll_{i,t} = \frac{\beta_i + \beta_t + \alpha_w \beta_w + (\beta_x + \beta_w \alpha_x) x_{i,t} + \sigma_{t,i}}{1 - \beta_w \alpha_l} \quad (6)$$

Then substituting both equation 5 & 6 in lws (equation 4) we get:

$$lws_{i,t} = \frac{\beta_i + \alpha_i + \beta_t + \alpha_t + \alpha_w \beta_w + \alpha_l \beta_l + (\alpha_g (1 + \beta_w) + \beta_g (1 + \alpha_l)) x_{i,t} + \varepsilon_{t,i} + \sigma_{t,i}}{1 - \beta_w \alpha_l} - lqr \quad (7)$$

Taking the derivative of lws with respect to the components of x, e.g. the globalization variable, g, which is our interest in this paper, we calculate the effect on ws for a given value added (lqr)<sup>11</sup>:

$$\frac{\partial lws}{\partial g} = \frac{\alpha_g (1 + \beta_w) + \beta_g (1 + \alpha_l)}{1 - \beta_w \alpha_l} \quad (8)$$

This expression incorporates the effect of globalization on wages discounted by the effect of wages on employment (if wages have a negative effect on employment) and the effect of globalization on employment amplified by the effect of employment on wages (if employment has a negative effect on employment), both discounted by a common factor  $(1 - \beta_w \alpha_l)$ <sup>12</sup>. If neither wages nor employment affect each other ( $\beta_w = \alpha_l = 0$ ), then the effect of globalization on the wage share is simply the summation of its effects on wages and employment.

### 3. The theoretical literature on the effects of globalization

The sector specific explanatory variables to account for the impact of globalization include both trade (exports, intermediate and final imports) and outward foreign direct investment (FDI) effects.

#### 3.1 Trade effects

The effects of international trade and capital flows on employment vary among economic theories. Based on Heckscher-Ohlin and Stolper-Samuelson theorems, traditional trade theory predicts that trade alters relative prices and therefore relative demand for the factors of

<sup>11</sup> Also a given and PPI/value added deflator is assumed.

<sup>12</sup>  $(1 - \beta_w \alpha_l)$  needs to be positive to have a meaningful solution.

production and their rewards. In a capital abundant developed country with a comparative advantage in more capital intensive sectors, after trade liberalization the employment of capital and profit rate is expected to increase, since it is the abundant factor used intensively in the export sectors and the scarce factor in the import competing sector. The employment of labor and wages (in nominal as well as real terms), however, declines in spite of aggregate welfare gains. When the model differentiates between skilled and unskilled labor, in a skilled labor abundant country, the prediction is that the employment and wages of unskilled labor or certain groups of labor specialized in import-competing industries will fall. It is also argued that these effects need not materialize in the short run due to the immobility of sector-specific capital, which prevents the optimal reallocation of production across sectors. This may result in a decline in real wages of the skilled labor as well in the short run. Nevertheless, once the transition period is over, the factors that are relatively abundant in the country are supposed to gain. In order to test the trade effects based on trade theory, one has to test the effect of trade on relative prices of exportables vs. importables; and then through the price channel, the effects on the demand for factors used more intensively in the exporting sectors (in the case of developed countries skilled labor and capital) vs. the import competing sectors can be estimated.

However the effects get rather complicated if one goes beyond a two-country and two factor of production framework. It is also unclear how trade would affect labor within this framework when countries with similar development levels trade with each other.

Indeed the methodological debates to test the effect of trade on employment has a long history by now, which also has its roots in differences in theoretical approaches. Apart from trade theory, labor economics approaches based on factor content analysis evaluate the effects of trade with regards to shifting labor demand in response to exports, which is a source of demand, and to imports, which is a reduction in demand (e.g. Borjas et al, 1992; Wood, 1994). Thus exports increase employment, whereas imports decrease. However this methodology is criticized by trade theoreticians, since it takes the changes in trade volumes and not relative prices as the starting point.

In a third approach different from the trade theory or factor content approaches, based on a microeconomic labor economics perspective, trade not only shifts the demand schedules, but also may bring together international competitive pressures, which may lead to trade induced labor saving technological change or increases in efficiency (thereby labor saving) by pushing the less productive firms out of business. This process also leads to negative bargaining pressures over wages, as firms find it harder to accommodate wage demands and the firms' profitability over which workers' could have their claim over may get squeezed (Greenaway et al., 1999b; Rodrik, 1997). Political economists have pointed out that opening up may also intensify distributional conflicts through increased competitive pressures and the threat effects associated with international capital mobility and offshoring, which leads to labor disciplining effects (Burke and Epstein, 2001; Rodrik, 1997; Crotty et al, 1998). These effects will be particularly significant if trade is taking place with lower wage countries. However even among high wage countries trade may generate certain labor disciplining effects and a race to the bottom.

However it is also important whether imports are substitute or complementary to domestic production. If imports are not the substitutes of domestically produced goods, but mostly complementary input goods, or final goods that are not being produced domestically, the negative effect will not be observed, or even a positive effect is possible. Thus in the case of a developed country final goods imports from the less developed countries do not necessarily

substitute domestic labor. Although it is more likely to have negative substitution effects of intermediate imports as discussed in the international outsourcing literature (Feenstra and Hanson, 1996), again if these are complementary inputs, the negative effect will not be observed (Davis and Mishra, 2005). Furthermore intermediate imports may decrease the costs of the firm, and despite a lower domestic value added increase total output, creating a positive scale effect (Grossman and Rossi-Hansberg, 2006). Thus even if offshoring decreases the demand for labor for a given level of value added, through the scale effect, i.e. higher output, the demand for labor increases. Thus the overall effect depends on the negative substitution vs. positive scale effects. In order to capture the scale effect of offshoring in the labor demand function, we will only control for value added rather than output. Thus the positive effect of intermediate imports on output will show up in the coefficient of imports. If output were to be used, these positive effects would have been absorbed by the output coefficient, and the coefficient of intermediate imports would only reflect the negative substitution effects.

Regarding the skill differentials, the competitive pressures can be higher in low skilled industries in the developed countries creating also skill-bias (Feenstra and Hanson, 1996). This skill upgrading is particularly expected through offshoring, i.e. intermediate imports.

In the empirical analysis, we test the labor demand effects of trade volumes due to both changing labor intensity of production for a given level of output and trade induced labor saving effects<sup>13</sup>. In that sense, the estimation methodology used here is not a direct test of the Heckscher-Ohlin framework. Foreign competition may also influence the capacity of the firms to pay higher wages, forming a downward shift of the wage bargaining curve, i.e. a negative wage effect. However, in the case of imports again the effect depends on whether imports are a substitute or complementary to domestic labor.

### **3.2 Foreign Direct Investment and home country effects**

FDI will generate two different channels of effects on the labor market outcomes through changing the magnitudes of trade and changing the allocation of types of production within the firm. Regarding both effects, it is important whether FDI has a vertical (cost seeking) vs. horizontal (market seeking) character. The labor market effects are expected to be the strongest for cost-saving vertical FDI.

With respect to the effects through the mechanism of trade, while vertical FDI will 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 as mentioned above, which can offset or can be offset by the labor replacement effects.

Horizontal FDI on the other hand replaces the exports of the country, and may generate negative employment effects in tradable sectors, but in services these effects are less likely to take place. In the extreme case, if the affiliates replicate all activities, then employment at home can decrease (Head and Ries, 2002). But if affiliates produce only the final goods of the company and use intermediate inputs from the parent firm, this will generate a skill upgrading effect.

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<sup>13</sup> See Hine and Wright (1998), Greenaway (1999a and b), OECD (2007) for similar estimations.

Vertical FDI is also expected to change the factor composition of production at home. As certain jobs are relocated abroad, others may be created at home. Thus foreign labor might substitute some factors of productions, but complement others. In a capital abundant country, it could be expected that there will be 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). 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 (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). The argument then follows that if labor markets are flexible, there will be negligible effect on total employment. The net effect on employment would then depend on the net of jobs destroyed and created. But skilled labor might also be substituted by foreign labor through an overall increase of capital intensity at home. Horizontal FDI will have less effect on the composition of factor demand, since it does not particularly change the international division of labor, but it can still create more demand for factors, e.g. skilled labor, that are used more intensively at the headquarters of the multinational firm.

In the literature the effects of FDI on home country labor markets is tested by estimating the effects of affiliate sales or employment or labor costs on parent employment and wages. The estimations usually include a control variable for the scale of production at home. Therefore these regressions are more likely to capture the effects of vertical FDI rather than horizontal FDI (Molnar et al, 2007). To decrease this bias, we will use value added instead of a control variable; but nevertheless part of the scale effect will still be captured by the value added effect in the case of the horizontal FDI. Regarding the direction of the employment effect, again the question is whether foreign labor is a substitute or complementary to domestic labor, and in the former case to what extent scale vs. labor replacement effects dominate. The effects are expected to be also larger for small home country relative to the location of the affiliates (Molnar et al., 2007).

Regarding the wage effect, for a given capital/labor ratio the effect would be positive if foreign labor is complementary, and negative if it is a competitor. But particularly efficiency seeking FDI may generate threat effects or a defensive race to the bottom of the wages at home, as pointed out by the political economists (Lee and Jayadev, 2005; Onaran, 2004; Harrison, 2002; Pollin, 2002; Diwan, 2001; Burke and Epstein, 2001; Rodrik, 1998; Crotty et al, 1998). This may particularly be the case if the destination of FDI is low wage countries. The threat effects associated with international capital mobility and the asymmetry between the fall back options of capital vs. labor may lead to downward pressure on wage demands, and this may even be the case in the absence of relocation. An increasing number of studies emphasize that labor disciplining and threat effects of globalization may not be directly reflected in the actual volumes of trade and capital flows, and call for direct qualitative evidence on these effects (Burke and Epstein, 2001). In this paper such threat effects without an actual relocation of production taking place will show up in the time effects in our estimations.



## 4. Empirical literature

Regarding the import effects, there is some evidence that trade -inter-industry trade with low wage countries as well as intra-industry-trade with developed countries- lead to job and income losses for workers in import competing industries and in particular for the less skilled labor (e.g. Revenga, 1992; Sachs and Shatz, 1994; Greenaway et al., 1999a and 1999b; Landesmann et al., 2001). Greenaway et al. (1999b) indeed finds negative effects on wages in the UK originating from exports as well as imports, and even stronger impact from the EU trade. OECD (2005) finds that employment fell more rapidly in industries that experienced the strongest growth in international competition in 11 out of 15 OECD countries. It is also argued that growing trade with low-wage countries, as well as rapid productivity gains and adverse shifts in the composition of consumption demand might have played some role in increasing wage inequality in many OECD countries. OECD (2007) finds that a higher share of imports from non-OECD countries in total imports is associated with lower sectoral employment. There are, however, important differences in the estimated magnitudes of the effects in different studies. There are also differences in the responsiveness of employment vs. wages across countries: the typical argument is that different from US, in Europe employment, rather than wages carry the burden of adjustment. The time dimension of the adverse effects is also not clear: the optimistic approach expects that they will gradually disappear as the welfare gains of trade lead to upgrading in the economy (Bhagwati et al, 2004; OECD, 2005).

Adding another dimension to the controversies, the studies that focus on the effects of trade flows to explain adverse labor market effects are criticized by trade-theoreticians, who argue that the observed changes in import prices and volumes have not been sufficient to explain the large changes in relative wages, and technological change is the main reason for the decline in the relative wage of the unskilled workers (e.g. Lawrence and Slaughter, 1993). More recently the rising importance of imports of intermediate inputs (offshoring) has generated some consensus that both intermediate goods trade with low wage countries and technology lead to deterioration in the labor market outcomes for less skilled labor (e.g. Feenstra and Hanson, 1999). It is also emphasized that import penetration may stimulate defensive innovation; thus trade may have a further indirect effect on wages (e.g. Stehrer, 2004; Greenaway et al., 1999b).

Regarding the offshoring effects, OECD (2007) finds that narrow offshoring has a negative effect on the demand for all skill groups, but the estimated effect is quite larger for low skilled workers; but by contrast services offshoring shifts relative demand away from high to low skill workers. OECD (2007) also finds that wage elasticity of labor demand increased during 1980-2002 due to offshoring. Falk and Wolfmayr (2005) find a significantly negative employment impact of imported materials from the low wage countries in less-skill intensive industries in seven EU countries (including Austria), whereas there is no negative impact from imports originating from developed countries. Also in higher skill industries there is no evidence of a negative effect. Falk and Wolfmayr (2007) find also a negative but small employment effect of offshoring of services to low-wage countries in services sector. Overall the results indicate that intermediate inputs, particularly from low-wage countries may have a different effect on employment than final goods imports (Molnar et al 2007). However IMF (2007) finds that offshoring has a negative effect on the labor share only in the skilled industries in the developed countries. So local labor market conditions and the proximity to lower cost countries with comparatively skilled labor may adversely affect the skilled workers at home as well (Molnar et al 2007).

Regarding FDI effects, there are rather mixed results (Molnar, et al, 2007; Lipsey, 2002). 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, but a robust positive relation in Sweden. Lipsey (2002) however finds positive relation in the machinery sector in the US, and negative effect in the transport equipment sector. Braconier and Ekholm (2001) show that Swedish firms' expansion in the CEE leads to job loss in mostly low wage EU countries than in high wage countries. Lipsey et al (2000) find for Japan a positive effect of foreign output on domestic employment. For the case of 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. Different from these previous studies Desai et al (2005) and Hanson et al (2003) find a positive effect of affiliate activity on employment in manufacturing in the US. Desai et al (2005) also find a positive association between wages between foreign affiliates and parent companies. Molnar et al (2007) find that outward investment has a significant positive effect on employment growth in the US, but a negative effect in Japan, and no effect in Germany; additionally they find that in manufacturing industries in the OECD with strong links to non-OECD countries, outward investment makes labor demand curve more elastic at home and increases the speed of adjustment; but in services outward FDI has a positive effect on employment. In the case of multinationals in the EU, Konings and Murphy (2003) finds 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. Regarding the effect of the affiliate labor costs in the CEECs on employment European Commission (2005) finds negative effects in France and Belgium, and Becker et al (2005) find negative effects in Germany and Sweden, albeit higher substitution effects are found with respect to EU15 in the latter study. Lipsey (2002) also points out that there may be a difference between firm and industry level studies: 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.

Overall in the empirical literature about Europe as well as the US, there is some evidence that trade has adverse effects on labor market outcomes in import competing industries and in particular for the less skilled labor either through direct effects or trade induced technology effects. However there is also evidence of high skilled workers or workers in high skilled sectors being increasingly more hurt via offshoring. Moreover there is no consensus on whether the deterioration in the labor market outcomes for the less skilled workers is accompanied by a general deterioration in labor's bargaining position in developed countries. While some authors from both labor economics and trade theory approaches argue that there is not a general downward pressure on the average wage level, but only a rise in wage inequality (Krugman, 1995; Lawrence and Slaughter, 1993; Revenga 1992; Sachs and Shatz 1994; Feenstra and Hanson, 1996), the labor disciplining effects and the increase in the wage elasticity of labor demand mentioned in both labor economics approaches (e.g. Freeman, 1998; Greenaway et al., 1999a and 1999b; Slaughter, 2001; OECD, 2007) and the political economy literature (e.g. Rodrik, 1997; Epstein, 2000) indicate that it is worth looking at the link between globalization and functional income distribution. This is particularly important given the general declining trend in labor's share in many developed countries, which until very recently was not addressed in most of the mainstream literature. Regarding the changes in labor's share, a first striking feature is the sharp decline in labor share (labor compensation as a ratio to GDP) in many OECD countries since the mid-1970s and early 1980s (Diwan, 2001; Epstein, 2000). This marks a reversal after a period of rise in the 1960s and 1970s. In the United States, the aggregate trend is still small with labor's share declining by several percentage points in GDP (Harrison, 2002), but the decline in the manufacturing sector is

much more dramatic (Epstein, 2000). In Europe, labor's share of aggregate income has declined as much as ten percentage points of GDP, whereas Canada, Japan, and Switzerland steadily increased their labor shares over more than thirty years (Harrison, 2002). Breuss (2007) finds that increased net trade with the East and FDI in general causes a decline in the labor share in the developed EU countries. Interestingly in two recent studies IMF (2007) and OECD (2007) also discuss the decline in the labor share as mentioned in the introduction of this paper.

#### **4.1 Empirical literature on Austria**

In earlier studies for Austria Aiginger et al. (1996) find a negative effect of imports and a small positive effect of exports from and to the East on wages based on individual data. Winter-Ebmer and Zimmermann (1998) find no effect of imports from the East on wages and a positive effect of exports to the rest of the World at a sectoral level. Hofer and Huber (2003) find no effect on white collar wages, but a positive export and negative import effect on blue-collar wages. Regarding the effects of trade on employment (or unemployment) either no or small impact of imports are found (Aiginger et al., 1996; Winter-Ebmer and Zimmermann, 1998; Hofer and Huber 2003); but a negative effect exists for blue-collar workers, the elderly, and low income workers (Aiginger et al. 1996; Hofer and Huber, 2003), or in low wage industries and in industries with a higher share of foreign workers (Winter-Ebmer and Zimmermann, 1998). There is a minor or insignificant impact of exports on employment (Aiginger et al. 1996; Winter-Ebmer and Zimmermann 1998, Hofer and Huber 2003).

Regarding the relative employment of high-skilled to low-skilled labor, Egger and Egger (2003) and Egger et al. (2001) find a positive effect of exports, a negative effect of imports (other than offshoring to the East), and a positive effect of offshoring to the CEECs. On the other hand Lorentowicz et al. (2005) find a negative effect of total offshoring on relative employment and wages of the skilled, which they interpret as an indicator that Austria is a human capital scarce country.

Breuss and Schebeck (1999) point at a slight shift in functional income distribution at the expense of wage earners for the benefit of employers based on simulation results about the effects of Eastern enlargement or trade with the CEECs. Kratena (2006) predicts a negative effect of both final goods trade and offshoring to Eastern Europe on unskilled labor; a negative effect of final goods trade on the skilled wage rate in the import competing sector, but a positive effect of offshoring on skilled wage rates in all sectors. Finally there is also a different finding indicating a decline in the relative wage of skilled to unskilled labor in Keuschnigg and Kohler (2002) based on a general equilibrium model.

Regarding the effects of FDI, Bellak and Alzinger (2001) find a negative effect of affiliate sales on parent employment. Based on firm level survey results, Marin (2004) predicts that 22.000 jobs were lost in Austria due to outward FDI towards the East during 1990-2001, most of which were skilled jobs. However she finds no statistically significant effect of affiliate wages on parent company's employment (Marin, 2004). Pfaffermayr (2001) finds that employment in the foreign affiliates of Austria in developed countries are substitutes for domestic labor, whereas foreign employment in the East is complementary, since domestic employment does not respond to wage differences with respect to the East. Falk and Wolfmayr (2007) find mixed evidence based on static vs. dynamic estimations: according to the static results, they find a significant negative effect of foreign affiliate employment in the five New Member States in the East on domestic industrial employment, and a positive effect

on services employment. However the dynamic estimation results point at no significant impact on industrial employment, but a negative effect on services due to both affiliate employment in developed countries and the East. At firm level data, they find no effect.

## **5. Data, estimation methodology and specification of the equations**

The empirical analysis is based on the panel data of the sub-sectors of industry and services. Appendix A reports the data sources. The panel data technique addresses the research questions based on variations both over time and across sectors. The other advantage of panel data is that it empirical tests possible with a database of relatively short time dimension.

Regarding the trade effects we use exports and imports of the sector, but to avoid multicollinearity problems we first estimate the import effects alone. Since the origin or destination of trade, whether it is a low wage or high wage country with similar factor composition may affect the direction of the impact, we differentiate imports from developed countries (high wage countries), the CEECs and South Eastern Europe (the East from now on)<sup>14</sup>, and the rest of the world (primarily other low wage countries). Next regarding imports it is important to distinguish whether they are intermediate inputs or final consumption goods. Therefore we additionally distinguish intermediate vs. final good imports from different origins. Intermediate import penetration (intermediate imports/domestic consumption) is a proxy for offshoring in the sector<sup>15</sup>. Then we also incorporate the export effect, but the high multicollinearity between imports and exports bias the coefficients of imports and lead to shifts of signs in the coefficients. In order to avoid this problem, we estimate a specification with total trade intensity (exports/output + imports/domestic consumption), however here the problem is that we restrict the coefficient of imports and exports to be equal, which biases the results, but can still be used as an indication of the overall effect of trade.

The effects of outward FDI on the labor market outcomes at home is measured by the effects of employment in the foreign affiliates of Austria (weighted by the share of the Austrian firm) in each sector disaggregated as affiliates in developed countries and the East<sup>16</sup>. FDI to other countries is not included 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.

In order to account for different impacts on skilled vs. less skilled labor, two methods will be used: first separate estimations are made for low and high skilled sector groups (Appendix B reports the list of the sectors and Appendix C reports the skill taxonomy); second the estimations are repeated for white-collar workers, who are assumed to represent skilled labor, vs. blue-collar workers, who are assumed to represent less skilled labor.

Due to differences in the availability of trade and FDI data, and low degrees of freedom, separate equations will be estimated for trade and FDI effects. FDI data is available only at

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<sup>14</sup> 16 countries including the 10 Eastern European new member states as well as five non-member South Eastern Europe (Croatia, Albania, Bosnia-Herzegovina, Serbia-Montenegro, Macedonia), and Turkey are grouped to account for arms length trade, which can particularly be important in the case of offshore outsourcing through international fragmentation of production.

<sup>15</sup> However import penetration ratio is different from both broad outsourcing (all intermediate imports purchased by sector  $i$  as a ratio to its value added) and narrow outsourcing (only intermediate imports purchased by sector  $i$  from the same sector as a ratio to value added). Both measures of outsourcing require input-output tables, which limit the availability of time series data.

<sup>16</sup> 20 countries including the 10 Eastern European new member states as well as five non-member South Eastern European countries, and four European countries of the Community of Independent States (Russia, Ukraine, White Russia, Moldavia).

the level of 1-digit NACE classification and for the period of 1993-2004, whereas disaggregated trade data is available at 2-digit level for the period of 1988-2005. Furthermore capital stock is only available at 1-digit level, thus will not be used in the trade estimations.

In all equations lags of the explanatory variables and the dependent variable will be used to account for short vs. longer run effects<sup>17</sup>. 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 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. Since the effect of both capital accumulation and FDI on labor markets make require a long adjustment process using deeper lags makes also economically sense.

Thus the equations (1) and (2) to be estimated for FDI effects on employment and wages take the following form respectively:

$$ll_{i,t} = \beta_i + \beta_t + \beta_l ll_{i,t-1} + \sum_{j=0}^1 \beta_{wj} lwr_{i,t-j} + \sum_{j=0}^1 \beta_{qj} lqr_{i,t-j} + \sum_{j=1}^2 \beta_{kj} lknonict_{i,t-j} + \sum_{j=1}^2 \beta_{kictj} lkict_{i,t-j} + \sum_c \sum_{j=1}^2 \beta_{fcnj} f_{c,i,t-j} + \varepsilon_{t,i}$$

(1a)

and

$$lwr_{i,t} = \alpha_i + \alpha_t + \alpha_w lwr_{i,t-1} + \sum_{j=0}^1 \alpha_{lj} ll_{i,t-j} + \sum_{j=1}^2 \alpha_{kj} lknonict_{i,t-j} + \sum_{j=1}^2 \alpha_{kictj} lkict_{i,t-j} + \sum_c \sum_{j=1}^2 \alpha_{fcnj} f_{c,i,t-j} + \varepsilon_{t,i}$$

(2a)

The sector index  $i=1,\dots,12$  for industry<sup>18</sup>  $i=13,\dots,20$  for services,  $i=1,\dots,20$  for total economy, and  $t=1996-2005$ .  $c$  is the affiliate country index corresponding to affiliates in developed countries vs. the East. We also estimate a pool for economy wide total high and low skilled sectors including both manufacturing and service sectors. Both equations are also repeated for blue and white collar workers for the period of 1997-2005 since data for blue vs. white collar workers start in 1995 in NACE level classification

We estimate the dynamic equation in first difference form in order to transfer out the fixed effects, and use a generalized method of moments technique as in Arrelano and Bond (1991) to overcome the bias that will result in the coefficient of the lagged dependent variable due to differencing<sup>19</sup>. Differencing also helps to overcome the possible problems associated with

<sup>17</sup> Further lags are not used due to the limited sample size. They were also not significant.

<sup>18</sup> Industry includes 11 manufacturing sectors and mining and quarrying. Mining is added to the pool to increase the sample size; however the results are qualitatively robust to the exclusion of mining.

<sup>19</sup> The only disadvantage with this methodology is the small number of cross-sections. 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, however the test is weakened by the use of many instruments, and indeed it being close to 1 points at a problem. However given the low number of cross-sections we could not avoid this problem. We at least tried to choose the specifications, where there is no second order autocorrelation in the first differenced residuals, which is an important condition for the validity of the estimations. Since the lagged dependent variable was significant in all specifications, estimating a static model would also have its

unit roots<sup>20</sup>. We also compute standard errors that are robust to the existence of sector specific serial correlation. Additionally, the real wage is treated as an endogenous variable in the employment equation, and in the wage equation employment, capital stock, and foreign employment are treated as endogenous. In the employment equation the instruments are employment dated t-2 and earlier, the second and third lags of real wage<sup>21</sup>, and the first differences of the exogenous variables, i.e. output, capital stock, foreign employment and their lags<sup>22</sup>. 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, foreign employment.

Based on these estimation results we then calculate the long run coefficients using the contemporaneous and lagged effects and the speed of adjustment for the vector of explanatory variables,  $x$ , for employment equation as

$$\beta_x = \frac{\sum_{j=0}^1 \beta_{xt-j}}{(1 - \beta_l)} \quad (9)$$

and for the wage equation as

$$\alpha_x = \frac{\sum_{j=0}^1 \alpha_{xt-j}}{(1 - \alpha_w)} \quad (10)$$

The wage share effects in equation 8 are then calculated based on these long run coefficients.

For the import effects<sup>23</sup>, we estimate the following pair of equations for employment and wages:

$$ll_{i,t} = \beta_i + \beta_t + \beta_l ll_{i,t-1} + \sum_{j=0}^1 \beta_{wj} lwr_{i,t-j} + \sum_{j=0}^1 \beta_{qj} lqr_{i,t-j} + \sum_c \sum_n \sum_{j=0}^1 \beta_{mcnj} mq_{cn\ i,t-j} + \varepsilon_{t,i} \quad (1b)$$

and

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weaknesses. Furthermore the existence of stochastic trend in the variables requires differencing to avoid spurious results, but then we lose information.

<sup>20</sup> Real wage, real value added, employment, capital stock, foreign employment, export, import ratios all suffer from unit root problems. Unit root tests are available upon request.

<sup>21</sup> 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).

<sup>22</sup> An alternative dynamic estimation technique (Arellano–Bover/Blundell–Bond system estimator) is also used to check for robustness, which estimates a system of equations: the difference equation as described above according to Arellano–Bond, adding the original equation in levels to the system, where variables in levels are instrumented with suitable lags of their own first differences. This method is particularly suitable for the employment equation which behaves like random walk. In the case of the wage equation, this is less of a problem. For consistency, we will base the analysis on Arellano–Bond estimations for both, but for the case of employment check the results with the Arellano–Bover/Blundell–Bond system estimator for robustness.

<sup>23</sup> We do not take the logarithm of the import/domestic absorption ratios because of the existence of many zero-values at a detailed level of disaggregation with respect to countries and final vs. intermediate imports.

$$lwr_{i,t} = \alpha_i + \alpha_t + \alpha_w lwr_{i,t-1} + \sum_{j=0}^1 \alpha_{lj} ll_{i,t-j} + \sum_{j=0}^1 \alpha_{qj} lqr_{i,t-j} + \sum_c \sum_n \sum_{j=0}^1 \alpha_{mcnj} mq_{cn\ i,t-j} + \varepsilon_{t,i} \quad (2b)$$

where  $i=1,\dots,21$  for manufacturing<sup>24</sup>,  $i=1,\dots,27$  for total tradable sectors (including mining and services industries<sup>25</sup>),  $t=1990-2005$ .  $c$  is the origin of country index for imports corresponding to developed countries, the East, and the rest of the world.  $n$  is the index for the type of goods, i.e. intermediate or final imports. As opposed to the equation 2b above, here real value added is included also in the wage equation to account for labor productivity, since capital stock is not available at the 2-digit level. A separate estimation for services only performed very poorly due to the small sample bias; therefore we are not reporting these results. Instead we are reporting the results for a pool of high skilled sectors including high skilled manufacturing and services. At the total economy level the low skilled will correspond to the low skilled manufacturing. The employment estimation is repeated for blue and white collar workers at 2 digit level but without the real wage, since the latter exists only at 1 digit level. The wage equation is estimated only at one digit level. The period of estimation is 1997-2005 in both cases. Unfortunately these results are not comparable with the results from the 2-digit level estimations. Another disadvantage with this method is the nature of the wage data. Since the only source of this data is the Association of Austrian Social Insurance, who reports the data at most up to the social security contribution ceiling, we will have to use median wage instead of average wage in a sector.

The estimation technique is as discussed above for equations 1a and 1b. In the wage equation in addition to employment import penetration is treated as endogenous variables, and the first differences of the exogenous variable, i.e. output and their lags are also used as instruments.

Finally we estimate a specification with total trade intensity, by using the current and lagged value of total trade intensity (exports/output + imports/domestic consumption,

$\sum_c \sum_{j=0}^1 \alpha_{xcj} tq_{c\ i,t-j}$ ) instead of import penetration variable in equation 1b and 2b.

## 6. Stylized facts of our sample

### 6.1 The globalization of the economy

Austria's integration to the global economy increased significantly over the last two decades, with Eastern enlargement playing an important role, albeit integration with the developed countries also deepened. Until 1989 trade with Germany, Switzerland, and Italy constituted slightly more than half of Austria's trade; trade with the CEECs was high relative to other

<sup>24</sup> Since we have more sectors at the 2-digit level we kept mining apart in the case of trade regressions for manufacturing, and included it only to the total pool. There is an important outlier in the output, value added, and wage bill/value added variable in computing equipment, which might be due to a classification problem. Independent of the cause, we did not want this extreme case to bias the results. It also constitutes only 0.2% of employment as of 2005. The recycling sector, which has no trade data, is also excluded.

<sup>25</sup> The trade data for services include only the services trade associated with merchandise trade, e.g. the software development service that is incorporated in the export or import of a CD for a computer program. This sort of service trade covers only a minor part of total service trade. Unfortunately the total service trade data is available only in the current account statistics, but the sectoral classification is not based on NACE; furthermore the data is not disaggregated as final vs. intermediate and also not disaggregated with respect to countries.

Western European countries, but still very low compared with pre-war ratios (Aiginger et al., 1996). Quite shortly after the fall of the Iron curtain, Austria's trade with the Eastern countries increased sharply. The CEECs constitute a much more important part of Austria's trade volume compared to other EU countries, with only Germany and Finland coming close to it (Egger and Egger, 2003). As of 2005, 17.4% of Austria's non-agricultural exports are going to Eastern and South Eastern Europe (10 new member states, Croatia, Turkey, referred as East from now on), and 13.1% of non-agricultural imports are coming from there. Austria's proximity to the East also facilitated offshoring significantly, which has been the most intensive in Austria in the EU (Falk and Wolfmayr, 2005). Nevertheless even for Austria, the observed overall increase in offshoring is due mainly to the increase in offshoring to other high-wage countries. But offshoring to the CEECs is most intense and most dynamic for Austria followed by Germany and Finland (Falk and Wolfmayr, 2005).

Table 1a shows the period averages for the export/output and import/domestic consumption ratios and Table 1b shows the cumulative change in these ratios during 1990-2005 (in %-points).

Table 1a. Period averages in export and import ratios (%)

	Exports/output to			Intermediate Imports/Domestic absorption			Final Imports/Domestic absorption		
	Developed	East	ROW	Developed	East	ROW	Developed	East	ROW
<b>TOTAL ECONOMY</b>									
1988-1990	25.91	1.43	7.66	14.99	0.60	2.37	15.74	0.49	3.75
1990-1995	25.55	3.07	6.27	14.85	1.11	1.87	15.74	0.90	3.68
1995-2000	29.89	6.41	6.19	17.19	2.37	1.78	17.14	1.94	3.59
2000-2005	33.51	8.17	7.26	18.84	3.36	2.17	17.13	2.74	4.66
1990-2005	29.63	5.87	6.59	16.92	2.27	1.96	16.65	1.86	3.99
<b>TOTAL MANUFACTURING</b>									
1988-1990	32.75	1.81	9.70	19.27	0.72	3.04	19.84	0.43	3.12
1990-1995	33.31	4.06	8.23	19.61	1.41	2.46	20.48	0.98	3.42
1995-2000	39.64	8.62	8.31	23.38	3.13	2.43	23.05	2.41	2.98
2000-2005	44.94	11.32	9.99	25.97	4.78	3.00	23.88	3.67	4.05
1990-2005	39.27	7.99	8.87	22.92	3.10	2.65	22.45	2.36	3.54
<b>TOTAL HIGH MANUFACTURING</b>									
1988-1990	48.02	3.14	14.39	23.90	0.18	3.09	33.80	0.23	5.35
1990-1995	45.51	6.05	13.10	23.00	1.37	3.04	32.16	0.71	4.87
1995-2000	49.11	13.69	12.76	26.18	4.20	3.38	33.22	2.97	4.73
2000-2005	52.64	16.85	15.82	26.40	6.84	4.47	35.13	4.45	6.69
1990-2005	48.95	12.18	13.97	25.14	4.12	3.62	33.50	2.72	5.49
<b>TOTAL LOW MANUFACTURING</b>									
1988-1990	25.43	1.20	7.49	14.34	0.53	2.44	13.37	0.75	3.52
1990-1995	25.04	2.98	6.00	14.05	0.96	2.08	14.13	1.71	3.80
1995-2000	31.94	6.56	5.99	16.79	2.19	2.08	18.08	3.45	3.87
2000-2005	37.79	9.62	7.29	19.08	3.22	2.62	19.59	5.10	5.09
1990-2005	31.53	6.39	6.42	16.55	2.12	2.28	17.20	3.43	4.28
<b>TOTAL SERVICES</b>									
1988-1990	1.63	0.01	0.36	0.42	0.22	0.03	0.48	0.00	0.05
1990-1995	1.57	0.06	0.13	0.28	0.23	0.06	0.66	0.01	0.09
1995-2000	2.38	0.15	0.16	0.45	0.35	0.04	0.74	0.01	0.10
2000-2005	4.66	0.24	0.39	2.78	0.16	0.31	0.83	0.01	0.04
1990-2005	2.95	0.15	0.24	1.26	0.24	0.15	0.74	0.01	0.06



Table 1b. Cumulative %-point change in export and import ratios (1990-2005)

	Manufacturing			Services
	Low-skilled	High skilled	Total	
Exports/output to:				
Developed countries	14.99	9.44	12.63	5.41
East	9.37	11.08	10.57	0.27
Rest of the world	0.53	0.50	0.88	0.21
Intermediate imports/domestic absorption from:				
Developed countries	5.41	7.36	7.32	5.42
East	3.09	5.33	4.57	0.01
Rest of the world	0.65	0.30	0.49	0.12
Final imports/domestic absorption from				
Developed countries	5.82	0.63	3.28	0.23
East	4.90	2.59	3.35	0.01
Rest of the world	2.51	0.53	1.22	0.01

Austria's foreign trade with the East grew much more than that with the developed countries in the last decade in volume. As a ratio to output it grew almost as much as the developed countries: during 1990-2005 Austrian exports to the developed countries as a ratio to output (of only non-agricultural tradable sectors<sup>26</sup>) increased by 8.3%-points and imports (as a ratio to domestic absorption) by 5.3%-points, whereas exports to the East grew by 7.5%-points and imports by 5.3%-points, (all non-agricultural, and as a ratio to output and domestic absorption in tradable sectors only). Given that the export intensity and import penetration ratios regarding trade with the East were a mere 1.9 and 1.5%-points in 1990, this is a huge increase. Despite this fast growth of trade with the East, Austria's trade surplus with the East improved. As of the average of 2000-05, Austria is running a trade deficit with the CEECs only in wearing apparel, wood, petroleum, and furniture sectors, and the trade balance is almost zero in publishing, non-metallic minerals, electrical machinery, other transport equipment, and recycling. As of 2000-05, in manufacturing industry Austria has a trade deficit with the rest of the world in textiles, wearing apparel, leather, publishing, petroleum, chemicals, rubber, computing machinery, professional equipment and wood. When the trade relations with only developed countries are concerned, there is also a trade deficit in food, non-metallic minerals, machinery and equipment, radio-TV, motor vehicles, and other transport equipment.

The share of exports to the East in the total exports of Austria in manufacturing industry has increased from 4.1% as of 1990 to 18.0% in 2005. The sectors with an above average share in total exports of the sector are leather, petroleum, rubber, computing machinery, electrical machinery, and radio-TV. The share of the East in imports to Austria in manufacturing has increased to 13.5% as of 2005 from a level of 2.5% as of 1990. The share in textiles, wearing apparel, leather, wood, petroleum, non-metallic minerals, basic metal, fabricated metal, electrical machinery, radio-TV, furniture is above average.

Regarding sectoral differences, export to both developed countries and the East increased as a ratio to output in both low and high skilled manufacturing during 1990-2005. Service exports to developed countries increased also substantially. The increase is particularly remarkable since mid 1990s.

<sup>26</sup> In this section regarding all data about exports and imports, we refer only to the trade of the sectors as a ratio to the output of the tradable sectors. Trade in services refers to data in our working sample as discussed in footnote 25. To be consistent with our working sample, we are excluding computing equipment in these figures, as mentioned in section 5.

Intermediate imports from developed countries and the East increased much faster than the increase in final goods particularly in high skilled manufacturing, whereas in low skilled sectors final goods imports from developed countries and the East increased slightly faster. The increase in imports from the rest of the world is mostly due to the increase in final goods imports in the low skilled manufacturing industry. In services the relevant increase in imports is the intermediate imports from the developed countries, with a minor increase in all other imports as well.

Although the composition of imports regarding the share of intermediate imports in total manufacturing industry is relatively stable from 1990 (49.0%) to 2005 (52.7%), there are important sectoral differences. Firstly, many sectors in Austria have above average shares of intermediate imports (above 51.0% according to 2000-05 averages): wood, paper, petroleum, chemicals, rubber, other non-metallic minerals, basic metals, fabricated metal, electrical machinery. In these sectors the share of intermediate imports has been mostly increasing when compared to 1990 (except for chemicals, rubber, basic metals). But the share is also increasing in machinery and equipment, computing equipment, professional equipment, motor vehicles, other transport equipment, and furniture. The source of this increase is particularly intermediate imports from the East in wood, paper, electrical machinery, and professional equipment, whereas in the other sectors developed countries are also playing an important role.

Austrian FDI is also increasing from early 1990s onwards to both the developed countries and the East, with the increase towards the latter being higher. Austria's total FDI stock in the East as of 2004 is 38.0% of its total FDI stock. Austria's market share in all NMS FDI stocks reached 9.5% in 2003, with particularly high rates in Slovenia and Slovakia (30% and 26% respectively, Havlik et al., 2005). Austrian FDI is predominantly in services, but the ten biggest Austrian investors in the NMS represent a mix of financial and industrial capital. Regarding FDI outflow the banking sector makes up 30% of the total (Havlik et al., 2005).

Table 2 shows the cumulative % change in foreign affiliate employment during 1995-2004. The share of the employment in the foreign affiliates of Austria in the East in the total employment in foreign affiliates is 71.9% as of 2004, and is much higher than that of the affiliates in the developed countries (24.4%). Particularly in the high skilled services sectors the share of the East increases to 91.9%. Employment in the affiliates of Austria in the East increased 190.9% in industry and 302.8% in services during 1995-2004. The increase in the high skilled industry has been 252%, exceeding that in low skilled sectors significantly. However the increase in the employment in the foreign affiliates of Austria in the East in the high skilled services has been phenomenal with a rate of 824%. Employment in the affiliates of Austria in the developed countries also increased remarkably, albeit with lower rates: 87.3% in industry and 161.5% in services during 1995-2004. In the services the increase has been more important in the low skilled sectors, mainly construction and trade.

	Industry			Services			Total Economy
Employment in the foreign affiliates of Austria	Low skilled	High skilled	Total	Low skilled	High skilled	Total	
Developed	63.70	96.35	83.03	208.15	47.52	161.50	117.79
East	81.88	252.55	177.01	86.56	824.46	302.85	241.01

The increase in Austrian FDI goes along with the increase in Austrian exports as well as intermediate imports from the East. Austria's international trade with the East is dominated by intra-firm trade. Almost 70% of Austria's imports from the East and 22% of exports are trade within a multinational enterprise (Marin, 2004).

## **6.2 The developments in wages, employment, and the wage share**

How did the labor markets perform during this period of major internationalization? Table 3 shows the average annual change (compound average) in the labor market variables for the sub-periods during 1976-2005 (and for the cumulative of 1990-2005). The total economy excludes agriculture, since labor market dynamics in agriculture has a rather different character and therefore it is also excluded in our estimations.

The growth of value added in the total economy during the 1980-2005 period has been 2.6% per year, but it has been slower than the growth rate of 3.1% during the second half of the 1970s, partly influenced also by the severe stagnation in 1981, 1984, 1993, and 2000. Growth is strongest in the high skilled industries, followed by the high skilled and then low skilled services.

As opposed to the positive growth in value added, since the 1980s industrial employment is decreasing, whereas total (non-agricultural) is stagnant (a mere increase of 0.7% per year during 1990-2005) and employment in services is increasing. The increase in the services employment is due to high skilled services (1.7% per year during 1990-2005), while low skilled services employment is just stagnating. Within industry, the decline in low skilled industrial employment is stronger (1.9% per year during 1990-2005) than that in high skilled industrial employment, where employment has been also decreasing except for the stagnation in 2000-05 (-0.5% per year during 1990-2005). The opposite trend in domestic industrial employment compared with the increasing foreign affiliate jobs is striking. There is also a negative correlation between the decline in employment in manufacturing and the increase in overall import penetration (-0.30), and in particular import penetration from the East (-0.36).

In parallel to the unfavorable developments in employment, real wages (per employee, deflated by CPI) stagnate in the total economy (non-agricultural) during the first half of the 1980s. This is followed by a recovery during 1985-89, albeit at a slower rate of growth compared to the 1970s, and the slow down continues also during the first half of the 1990s, which is followed again by a complete stagnation during the second half of the 1990s. In the last five years (2000-05) there has been even a slight decline (-0.2% per year). This trend is the same in industry as well, but the growth rates are slightly higher and the last period is marked with a stagnation rather than decline. The low skilled industry sectors have experienced more remarkable wage moderation than high skilled and a longer period of stagnation with only 0.7% annual average increase in the last 10 years during 1995-2005. The service wages have been even declining in the last five years on average (-0.4% per year), and the decline starts even earlier in the high skilled services, which have declined 0.4% per year during the last 10 years (1995-2005). This trend is similar for product wages (deflated by PPI), but the stagnation is more modest in this case. Although the integration of Austria to the global economy seems to have affected employment much more than real wages and although the changes across sectors in wages are much more similar than in employment, the degree of wage moderation points at significant changes in labor's bargaining power in the 1980s and then further since the second half of the 1990s. The extend of wage moderation becomes clearer when we compare the % change in product wages (deflated by PPI) vs. labor productivity (real value added per employee): in the aggregate economy as well as in manufacturing real wage increases have exceeded the productivity increases during the 70s, but have lagged behind productivity afterwards with few exceptions.

Table 3 Annual % change in labor market outcomes (compund average)

	Wage share	Real value added	Employment	Real Wage	Real Wage blue collar*	Real wage white collar*	Employment blue collar*	Employment white collar*
<b>TOTAL ECONOMY</b>								
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				
1995-2000	-0.54	3.19	1.05	0.28	0.60	2.16	-0.23	1.03
2000-2005	-0.49	1.74	0.33	-0.19	0.13	-0.53	-0.39	0.63
1990-2005	-0.47	2.40	0.72	0.40	0.37	0.81	-0.31	0.83
<b>TOTAL INDUSTRY</b>								
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				
1995-2000	-1.57	4.31	-0.93	1.08	1.32	1.06	-1.30	0.34
2000-2005	-0.09	1.62	-0.62	0.58	0.70	0.15	-1.69	-1.77
1990-2005	-0.66	2.28	-1.19	1.13	1.01	0.61	-1.49	-0.72
<b>TOTAL HIGH INDUSTRY</b>								
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				
1995-2000	-1.76	5.17	-0.02	1.15	1.14	0.77	-0.50	1.73
2000-2005	0.28	2.35	0.14	0.39	0.60	0.12	-1.31	-2.70
1990-2005	-0.68	3.26	-0.53	1.16	0.87	0.44	-0.91	-0.51
<b>TOTAL LOW INDUSTRY</b>								
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				
1995-2000	-1.32	3.20	-1.83	0.78	1.41	1.16	-1.90	-1.42
2000-2005	-0.58	0.59	-1.45	0.64	0.77	0.44	-2.00	-0.52
1990-2005	-0.67	1.05	-1.88	0.96	1.09	0.80	-1.95	-0.97
<b>TOTAL SERVICE</b>								
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				
1995-2000	-0.23	2.85	1.66	0.11	0.30	2.45	0.31	1.14
2000-2005	-0.60	1.77	0.59	-0.39	-0.03	-0.53	0.21	0.96
1990-2005	-0.37	2.44	1.35	0.23	0.14	0.95	0.26	1.05
<b>TOTAL HIGH SERVICE</b>								
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				
1995-2000	0.03	2.85	2.52	-0.34	0.52	3.47	1.51	1.48
2000-2005	-0.64	2.03	0.94	-0.43	0.41	-0.61	0.99	1.10
1990-2005	-0.42	2.57	1.75	0.03	0.47	1.41	1.25	1.29
<b>TOTAL LOW SERVICES</b>								
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				
1995-2000	-0.68	2.84	0.68	0.50	0.32	-0.12	-0.46	0.33
2000-2005	-0.51	1.36	0.18	-0.43	-0.22	-0.35	-0.35	0.61
1990-2005	-0.27	2.24	0.90	0.42	0.05	-0.23	-0.41	0.47

\*1995-2005

\*...1995-2000

These developments have led to a significant erosion in the share of labor as a whole in value added in the aggregate economy as well as its sub-sectors since the late 1970s with a further acceleration since mid-1990s. Wage share declined from a level of 72% in 1978 to 54.9% as of 2005. The decline in the wage share in the last ten years has been highest in the high skilled industry (9.0%-points in cumulative during 1996-2005), followed by low skilled industry (7.0%-points), and low skilled services (6.3%-points), and even high skilled services took their share of the loss with a decline in the wage share by 2.2%-points in cumulative during 1996-2005.

Regarding the relative wage and employment of skilled labor<sup>27</sup>, in the total economy blue collar employment declined 0.3% per year, and white collar employment increased 0.8% per year during 1995-2005. In industry both types of jobs were lost, with the decline in blue collar employment being more remarkable (-1.5% vs. -0.7% per year during 1995-2005). In high skilled services both types of jobs increased with almost the same rate (1.2% and 1.3% per year for blue and white collared respectively), whereas in low skilled services blue collar employment declined by 0.4% per year and white collar employment increased slightly 0.5%. The relative employment of white to blue collar workers is highest in the high skilled services (3.2 on average during 2000-2005), followed by low skilled services (1.0), high skilled industry (0.8), and low skilled industry (0.4). In industry (in both low and high skilled sectors) real wages (deflated by CPI) of the blue collar workers increased slightly more than that of the white collar over the course of the last 10 years (1.0% vs. 0.6% per year during 1995-2005). In high skilled services the real wages of the blue collar workers increased slower than that of the white collar (0.5% vs. 1.4% per year), whereas in the low skilled service blue collar wages stayed constant while white collar wages declined 0.2% per year. Indeed in the last five years (2000-2005) real wages of both type of workers in the low skilled services, and of the white collar workers in the high skilled services declined. The relative wage of white to blue collar workers is highest in the high skilled services and industry (both 1.4 on average during 2000-2005), followed by low skilled industry (1.3) and low skilled services (1.1). During the period of 1995-2005 the relative employment of white to blue collar workers increased in industry as well as low skilled services, while their relative wage decreased (in cumulative 4.0% vs. -4.1% in high skilled industry, 10.4% vs. -2.8% in low skilled industry, and 2.2% vs. 1.8% in low skilled services), whereas both relative employment and wages of the white collar workers increased in high skilled services (0.4% and 9.7%). In aggregate the relative employment of white collar workers increased by 12.0%, while their wages increased only by 4.5%; however this aggregate figure hides the opposite dynamics in different sectors. Indeed the relative movements in the high skilled services point at a rather flexible response.

It is also hard to assume that all white collar workers are skilled workers, and all blue collar workers are low skilled workers. While white collar workers in both high skilled manufacturing and services industries can be skilled workers, they may well be low skilled workers in low skilled services sectors as much as the blue collar workers. Similarly blue collar workers in high skilled industries can be much more skilled than the white collar workers in low skilled services, or even as skilled as the white collar workers in high skill services. There are also differences in the bargaining patterns that may account for different wage dynamics of blue vs. white collar workers. The trade unions of the blue-collar workers are organised according to nine branches of the industry and bargaining takes place at a sectoral level, whereas the white-collar workers in the non-state sector all belong to the Union of Private Sector Employees (GPA), and thereby their bargaining is much more centralised

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<sup>27</sup> The source of blue and white collar employment and wages is the Social Security records and wages are median wages, whereas aggregate employment and wages are based on national accounts and wages are mean wages. Therefore there are some differences in their changes.

(Hofer, and Huber, 2003). In the payment schemes of white-collar workers tenure plays a much more important role. However, there is also a tendency in some sectors (e.g electrical machinery) for a coordinated bargaining between the white and blue-collar workers.

## 7. Estimation results for the effects of foreign affiliate employment

### 7.1 Employment

Table 4 reports the estimation results for employment modeled as in equation 1a. The respective columns of the Table are for total industry, total economy, low and high skilled sectors (including industry and services), and services. The respective long run coefficients for the estimation results are in Table 5a. A full version of the estimation results including also the pools of low, and high skilled industry as well as blue and white collar workers are in the Appendix D Table 1.

**Table 4. Estimation results:  $\Delta \ln$  Employment vs. Foreign affiliate employment (1996-2005)**

Variable	Industry	Total Economy	Total low skilled	Total high skilled	Services
$\Delta \ln$ Employment t-1	0.703	0.745	0.706	0.768	0.584
	0.000	0.000	0.000	0.000	0.000
$\Delta \ln$ Real wage t	-0.082	-0.090	-0.141	-0.015	-0.474
	0.523	0.432	0.377	0.840	0.027
$\Delta \ln$ Real wage t-1	-0.072	-0.040	0.280	-0.233	-0.057
	0.683	0.789	0.124	0.066	0.745
$\Delta \ln$ Real value added t	0.382	0.294	0.461	0.195	0.241
	0.000	0.000	0.000	0.001	0.110
$\Delta \ln$ Real value added t-1	-0.202	-0.178	-0.353	-0.077	0.065
	0.007	0.021	0.003	0.095	0.375
$\Delta \ln$ Non-ICT capital t-1	-0.260	-0.076	0.257	-0.496	-0.056
	0.251	0.684	0.460	0.000	0.910
$\Delta \ln$ Non-ICT capital t-2	0.331	0.234	0.028	0.568	0.278
	0.093	0.126	0.926	0.000	0.478
$\Delta \ln$ ICT capital t-1	0.132	0.047	0.132	0.084	0.040
	0.014	0.256	0.133	0.041	0.388
$\Delta \ln$ ICT capital t-2	-0.153	-0.041	-0.113	-0.093	-0.034
	0.011	0.348	0.236	0.020	0.568
$\Delta \ln$ foreign Employment developed t-1	0.000	0.001	0.014	-0.012	0.000
	0.998	0.801	0.036	0.041	0.962
$\Delta \ln$ foreign Employment developed t-2	-0.012	-0.007	-0.022	0.009	-0.016
	0.318	0.222	0.022	0.178	0.001
$\Delta \ln$ foreign Employment eastern t-1	0.019	0.012	0.038	0.006	0.003
	0.040	0.037	0.000	0.308	0.584
$\Delta \ln$ foreign Employment eastern t-2	-0.031	-0.017	-0.043	-0.013	0.005
	0.000	0.019	0.000	0.072	0.184
Constant	0.003	-0.002	-0.008	0.004	-0.005
	0.555	0.416	0.090	0.011	0.202
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)	1.000	1.000	1.000	1.000	1.000

**Table 5. Long run coefficients (1996-2005):**

<b>a. Employment</b>					
	<b>Industry</b>	<b>Total economy</b>			<b>Services</b>
	<b>Total</b>	<b>Total</b>	<b>Low</b>	<b>High</b>	<b>Total</b>
Real wage	0.000	0.000	0.000	-0.991	-1.000
Real value added	0.606	0.455	0.367	0.509	0.000
Non-ICT capital	1.114	0.000	0.000	0.310	0.000
ICT capital	-0.071	0.000	0.000	-0.039	0.000
Foreign affiliate employment-developed countries	0.000	0.000	-	-0.052	-0.038
Foreign affiliate employment-east	-0.040	-0.020	0.017	-0.056	0.000
<b>b. Wage</b>					
	<b>Industry</b>	<b>Total economy</b>			<b>Services</b>
	<b>Total</b>	<b>Total</b>	<b>Low</b>	<b>High</b>	<b>Total</b>
Employment	-0.685	-0.631	0.366	-0.726	-0.347
Non-ICT capital	1.448	0.000	2.022	0.810	0.000
ICT capital	0.000	0.000	0.000	0.000	0.036
Foreign affiliate employment-developed countries	-0.083	0.000	0.035	0.000	0.000
Foreign affiliate employment-east	-0.094	0.000	0.049	0.000	0.034
<b>c. Wage share</b>					
	<b>Industry</b>	<b>Total economy</b>			<b>Services</b>
	<b>Total</b>	<b>Total</b>	<b>Low</b>	<b>High</b>	<b>Total</b>
Non-ICT capital	1.798	0.000	2.022	0.328	0.000
ICT capital	-0.022	0.000	0.000	-0.038	0.000
Foreign affiliate employment-developed countries	-0.083	0.000	0.052	-0.051	-0.038
Foreign affiliate employment-east	-0.107	-0.007	0.060	-0.055	0.000

In total manufacturing an increase in foreign affiliate employment in the East has a negative long run effect on employment in the same sector in Austria. The same effect takes place in the total economy as well as the low and high skilled sectors at the level of both industry and total economy. No effect can be detected for the blue collar workers, whereas there is a negative effect for white collar workers in both industry and total economy. The effects are economically significant. Table 6a 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 industry the 190% increase in affiliate employment in the East (82406 new jobs) over the period of 1995-2004 has resulted in a decline of 7.7% in employment, which means a loss of 48145 jobs in industry in Austria during 1996-2005. Similarly the cumulative number of jobs that were lost in the total economy are estimated to be 123179 over 10 years (a decline of 4.7% in 2005 compared to 1995) corresponding to an increase of 241% (188207 new jobs) 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 0.58 jobs in net terms in industry, and 0.46 jobs in the total economy (as a ratio to jobs created in the Eastern affiliates in all sectors). These are the net

effects showing the net of the jobs lost due to substitution and jobs created due to complementary and scale effects. These numbers are overestimating the actual change in employment, which has declined 4.9% in industry, and increased 7.3% in total economy. But they indicate that for a given positive effect of growth and a negative effect of technical change, employment would have declined 7.7% less industry if there were no Austrian foreign investment in the East in this period.

**Table 6. Cumulative % change effects (1996-2005)**

<b>a. Employment: Cumulative % change during 1996-2005 due to:</b>					
	<b>Industry</b>	<b>Total economy</b>			<b>Services</b>
	<b>Total</b>	<b>Total</b>	<b>Low</b>	<b>High</b>	<b>Total</b>
Real wage	0.00	0.00	0.00	-2.89	-1.59
Real value added	18.90	11.21	7.06	14.38	0.00
Non-ICT Capital	0.71	0.00	0.00	8.81	0.00
ICT Capital	-44.77	0.00	0.00	-8.22	0.00
Foreign affiliate employment-developed countries	0.00	0.00	-4.02	-4.34	-6.21
Foreign affiliate employment-east	-7.72	-4.73	-1.68	-23.77	0.00
Foreign employment total cumulative %change effect	-7.72	-4.73	-5.70	-28.11	-6.21
Memo item: Actual cumulative % change in employment	-4.89	7.32	0.12	14.05	11.16
<b>b. Wage: Cumulative % change during 1996-2005 due to:</b>					
	<b>Industry</b>	<b>Total economy</b>			<b>Services</b>
	<b>Total</b>	<b>Total</b>	<b>Low</b>	<b>High</b>	<b>Total</b>
Employment	3.35	-4.61	-0.04	-10.20	-3.87
Non-ICT Capital	0.93	0.00	3.91	22.98	0.00
ICT Capital	0.00	0.00	0.00	0.00	8.10
Foreign affiliate employment-developed countries	-7.23	0.00	-5.20	0.00	0.00
Foreign affiliate employment-east	-17.93	0.00	-4.82	0.00	10.30
Foreign employment total cumulative %change effect	-25.17	0.00	-10.02	0.00	10.30
Memo item: Actual cumulative % change in wages	12.86	3.91	2.83	2.91	1.59
<b>c. Wage share: Cumulative %-point change during 1996-2005 due to:</b>					
	<b>Industry</b>	<b>Total economy</b>			<b>Services</b>
	<b>Total</b>	<b>Total</b>	<b>Low</b>	<b>High</b>	<b>Total</b>
Non-ICT Capital t-1	0.75	0.00	26.90	4.37	0.00
ICT Capital t	-9.23	0.00	0.00	-5.42	0.00
Foreign affiliate employment-developed countries	-4.74	0.00	-3.44	-3.32	-3.07
Foreign affiliate employment-east	-13.34	-0.97	-8.00	-7.35	0.00
Foreign employment total cumulative %-point change effect of foreign affiliate employment	-18.08	-0.97	-11.44	-10.67	-3.07
Memo item: Actual cumulative %-point change in wage share	-8.24	-4.80	-6.73	-3.44	-3.76

Regarding the employment in the foreign affiliates of Austria in developed countries while no effect can be detected in industry (at the aggregate level), there seems to be a negative effect in services (both white and blue collar). In the total economy affiliate employment in the developed countries seem to be substituting blue collar workers at home, but there is no effect at the aggregate level<sup>28</sup>. The results indicate that for each job that was generated in the services industry in the developed countries 4.5 jobs were lost at home (a loss of 123148 service jobs in Austria per 27546 new jobs created in the developed countries). However these results need to be interpreted with care for estimations covering only few sectors (thereby few observations), and while the direction of the effects is indicative, the magnitudes can be misleading.

Regarding skill differentials, at the level of the total economy, the employment of blue collar workers seemed to be more affected by the rise of employment in the Austrian foreign affiliates relative to the white collar workers, although both types of workers experience a decline in employment. But interestingly the workers working in the higher skilled industries

<sup>28</sup> Although there are negative effects for both low and high skilled sectors at the level of the total economy, these results are less reliable due to the low number of observations, and wherever they are not consistent with the total finding, we will not emphasize them.



are more affected than those working in the lower skilled industries; once again however employment declines in both sector groups due to capital outflow.

We checked the robustness of these results by using an alternative dynamic estimation technique (Arellano–Bover/Blundell–Bond system estimator), and these effects are robust in the specification using the lags for the industry, but not for total economy. The estimation results are in the Appendix D Table 2. However when current values are used instead of lagged values, the results are not significant. Nevertheless, 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. Also the shift from substitution to scope and scale effect can also be only observed through a longer time horizon. The results of the alternative specification indicate even a larger effect 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.

Regarding other explanatory variables, while growth of value added as well as non-ICT capital has a positive effect on employment, the growth of ICT capital has a negative effect on employment growth in industry reflecting the effects of labor saving technical change. The effect is 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. The negative technological change effect of ICT capital is evident for the employment of blue collar workers economy-wide, but not for white collar workers. Non-ICT capital also has a negative effect on total blue-collar employment. In industry while blue-collar employment is responsive to changes in production, white collar wages are not; the demand for white collar workers are also less responsive to wage changes. At the total economy level only the demand for blue collar workers is sensitive to wages.

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

If we compare our results with the previous research results, the negative effects of Eastern affiliate employment is consistent with the findings in Bellak and Altzinger (2001), and the survey evidence in Marin (2004), but she finds no negative effect of affiliate wages. Regarding Falk & Wolfmayr (2007) while the negative effect of affiliate employment in services is consistent with their dynamic estimation results, we find no effect of Eastern affiliate employment in services, whereas they do. Furthermore for industry they find no significant effects both at sectoral and firm level. One difference is that they cover only the Eastern employment in the five NMS. However this is not expected to make a big difference. 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, but our results using the same estimator and using lagged effects also indicate a negative effect of affiliate employment in the East. However, Falk & Wolfmayr (2007) also mention that aggregate studies might be hiding important firm level adjustment processes, which we also agree. Based on firm level data they find no significant effect.

## 7.2 Real wages

Table 7 reports the estimation results for real wages modeled as in equation 2a. The respective columns of the table are for total industry, total economy, low and high skilled sectors (including industry and services), and services. The respective long run coefficients for the estimation results are in Table 5b. A full version of the estimation results including also the pools of low, and high skilled industry as well as blue and white collar workers are in the Appendix D Table 3.

**Table 7. Estimation results:  $\Delta \ln$  Real wage vs. Foreign affiliate employment (1996-2005)**

Variable	Industry	Total Economy	Total low skilled	Total high skilled	Services
$\Delta \ln$ Real wage t-1	0,819	0,759	0,631	0,821	0,559
	<i>0,000</i>	<i>0,000</i>	<i>0,000</i>	<i>0,000</i>	<i>0,000</i>
$\Delta \ln$ Employment	-0,045	-0,014	-0,039	0,020	-0,153
	<i>0,414</i>	<i>0,813</i>	<i>0,556</i>	<i>0,652</i>	<i>0,037</i>
$\Delta \ln$ Employment t-1	-0,124	-0,152	-0,135	-0,130	0,011
	<i>0,045</i>	<i>0,012</i>	<i>0,067</i>	<i>0,055</i>	<i>0,923</i>
$\Delta \ln$ Non-ICT capital t-1	0,262	0,213	-0,704	0,344	0,371
	<i>0,030</i>	<i>0,117</i>	<i>0,143</i>	<i>0,005</i>	<i>0,202</i>
$\Delta \ln$ Non-ICT capital t-2	-0,019	-0,045	0,746	-0,199	-0,363
	<i>0,877</i>	<i>0,742</i>	<i>0,050</i>	<i>0,087</i>	<i>0,257</i>
$\Delta \ln$ ICT capital t-1	-0,037	0,039	-0,037	0,027	0,100
	<i>0,362</i>	<i>0,217</i>	<i>0,752</i>	<i>0,378</i>	<i>0,002</i>
$\Delta \ln$ ICT capital t-2	0,052	-0,016	0,098	-0,007	-0,084
	<i>0,255</i>	<i>0,644</i>	<i>0,404</i>	<i>0,843</i>	<i>0,003</i>
$\Delta \ln$ foreign Employment developed t-1	-0,015	0,001	-0,013	0,009	-0,001
	<i>0,001</i>	<i>0,873</i>	<i>0,015</i>	<i>0,131</i>	<i>0,902</i>
$\Delta \ln$ foreign Employment developed t-2	0,000	0,001	0,000	-0,006	-0,004
	<i>0,976</i>	<i>0,877</i>	<i>0,957</i>	<i>0,426</i>	<i>0,513</i>
$\Delta \ln$ foreign Employment eastern t-1	0,002	0,000	0,014	-0,004	-0,002
	<i>0,771</i>	<i>0,921</i>	<i>0,109</i>	<i>0,272</i>	<i>0,646</i>
$\Delta \ln$ foreign Employment eastern t-2	-0,017	0,001	-0,018	0,006	0,015
	<i>0,004</i>	<i>0,808</i>	<i>0,001</i>	<i>0,203</i>	<i>0,000</i>
Constant	0,000	-0,004	-0,011	-0,004	-0,002
	<i>0,969</i>	<i>0,005</i>	<i>0,007</i>	<i>0,040</i>	<i>0,144</i>
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)	1,000	1,000	0,414	1,000	1,000

p-values below the coefficients (in italics)

In the case of wages both employment in the foreign affiliates in the East as well as developed countries have a negative effect in industry, but no effect in total economy. In the industry the negative effect of Eastern affiliate employment is valid for both blue and white collar workers but the negative effect of affiliate employment in the developed countries is only valid for the white collar workers in the industry. In the total economy only the wages of workers working in low skilled sectors (including both low skilled industry and service sectors) are negatively affected from the increase in both type of affiliate employment, whereas there seems to be no effect on the wages of workers working in high skilled sectors. There is evidence of some positive effect of affiliate employment in the East on wages in services sectors (for both blue and white collar workers).

Table 6b 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 25.1% more in industry if there were no Austrian foreign investment in this period. When the low skilled sectors of industry and services are analyzed together there is still a negative cumulative effect of 5.8% and 4.8% of affiliate employment in the East and the developed countries respectively.

At the level of total economy there seems to be no differential wage response for blue and white collar workers. But the workers working in low skilled sectors have experienced downward wage pressures due to capital mobility, whereas there seems to be no wage effect in high skilled sectors.

Regarding other effects, in industry while employment has a negative effect on wages, non-ICT capital stock has a positive effect, reflecting an increase in wages together with the capital intensity of the sector. The same is true also for the total economy as well as the low and high skilled sectors of the total economy.

Again the time dummies remain significant and are mostly negative, indicating the significance of institutional factors as well as possible negative effects of capital mobility that is not necessarily reflected in the volume of actual transactions.

### **7.3 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 foreign affiliates of Austria. Table 5c reports the calculated long run coefficients for the wage share for total industry, total economy, low and high skilled sectors (including industry and services), and services. Table 6c reports the cumulative %-points effect<sup>29</sup> of the actual change in the explanatory variable. These effects are partial effects for a given level of value added.

Based on the estimation results, in 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 13.3%-points and 4.7%-points in the wage share respectively during 1996-2005 (thus a total of -18.1). These results overestimate the 8.2%-points actual decline in the wage share, however the direction is suggestive. In industry, during 1996-2005 capital mobility affects both the employment and wages, thus also the wage share of the high skilled workers more. A possible explanation for that might be that the low skilled sectors were already on the decline before foreign direct investment Austria increased substantially. Again in the services a 3.1%-points negative effect of the rise in affiliate employment in the developed countries is found. Overall in the total economy the increase in the Eastern affiliate employment has resulted in a 1%-points decline in the wage share. The results are estimated to be much larger for the sub-groups of low and high skilled sectors (industry and services together), but the magnitudes between sectors do not differ. However these large numbers are unreliable since estimated coefficients tend to be larger due to the low number of observations, when the sample is split.

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<sup>29</sup> 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.

Technological change (the increase in ICT capital) also results in a decline of 9.2%-points in the industry wage share. A minor positive effect comes from the growth in non-ICT capital stock. In the total economy there is evidence of ICT effect only at the sub-sector level. ICT capital leads to a cumulative erosion of the wage share by 4.4%-points in the high skilled sectors of the total economy.

## **8. Estimation results for trade effects**

### **8.1 Employment**

Table 8 reports the estimation results for employment modeled as in equation 1b. The respective columns of the table are for low and high skilled manufacturing, total manufacturing, total economy, total high skilled sectors (including industry and services). The respective long run coefficients for the estimation results are in Table 9a. A full version of the estimation results including also the pools of blue and white collar workers for the total economy and manufacturing are in the Appendix D Table 4. In the following we refer to the total tradable non-agricultural sectors as total economy simply.

Offshoring (intermediate import penetration) to the East is substituting jobs in Austria in total manufacturing as well as in total economy. The effect is present in the high skilled sectors in manufacturing as well as the total economy (including services as well). Offshoring to the developed countries has a negative effect in the total economy, but a positive effect in manufacturing. Final imports from the East also have a negative effect in low skilled manufacturing. In manufacturing as well as total economy total imports from the rest of the world have a positive employment effect, indicating the dominance of scale effects to substitution effects and the presence of a complementary relationship.

**Table 8. Estimation results:  $\Delta \ln$  Employment vs. Imports, 1990-2005**

Variable	Manufacturing			Economy	
	Low	High	Total	Total	High
$\Delta \ln$ Employment t-1	0.798	0.978	0.954	0.950	0.964
	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>
$\Delta \ln$ Real wage t	-0.061	0.066	-0.012	-0.007	0.000
	<i>0.428</i>	<i>0.425</i>	<i>0.836</i>	<i>0.889</i>	<i>1.000</i>
$\Delta \ln$ Real wage t-1	-0.061	-0.051	0.012	-0.007	-0.032
	<i>0.439</i>	<i>0.572</i>	<i>0.853</i>	<i>0.901</i>	<i>0.648</i>
$\Delta \ln$ Real value added t	0.118	0.100	0.100	0.130	0.143
	<i>0.000</i>	<i>0.015</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>
$\Delta \ln$ Real value added t-1	-0.046	-0.100	-0.100	-0.107	-0.121
	<i>0.002</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>
$\Delta$ Intermediate Imports: Developed	-0.168	-0.347	-0.218	-0.258	-0.314
	<i>0.290</i>	<i>0.020</i>	<i>0.037</i>	<i>0.007</i>	<i>0.013</i>
$\Delta$ Intermediate Imports: Developed t-1	-0.210	0.394	0.271	0.199	0.340
	<i>0.089</i>	<i>0.007</i>	<i>0.008</i>	<i>0.037</i>	<i>0.006</i>
$\Delta$ Final Imports: Developed	0.016	-0.013	-0.014	0.024	0.021
	<i>0.900</i>	<i>0.818</i>	<i>0.718</i>	<i>0.508</i>	<i>0.653</i>
$\Delta$ Final Imports: Developed t-1	0.116	0.055	0.014	0.024	0.024
	<i>0.387</i>	<i>0.354</i>	<i>0.718</i>	<i>0.504</i>	<i>0.625</i>
$\Delta$ Intermediate Imports: East	1.105	0.809	0.622	0.787	0.699
	<i>0.020</i>	<i>0.026</i>	<i>0.035</i>	<i>0.005</i>	<i>0.025</i>
$\Delta$ Intermediate Imports: East t-1	-0.463	-1.045	-0.832	-0.905	-0.910
	<i>0.319</i>	<i>0.006</i>	<i>0.006</i>	<i>0.001</i>	<i>0.005</i>
$\Delta$ Final Imports: East	-0.629	0.079	-0.220	-0.210	-0.238
	<i>0.002</i>	<i>0.766</i>	<i>0.148</i>	<i>0.116</i>	<i>0.298</i>
$\Delta$ Final Imports: East t-1	0.186	-0.017	0.002	0.091	0.026
	<i>0.381</i>	<i>0.939</i>	<i>0.990</i>	<i>0.491</i>	<i>0.892</i>
$\Delta$ Intermediate Imports: ROW	1.152	0.202	0.493	0.465	0.264
	<i>0.000</i>	<i>0.513</i>	<i>0.034</i>	<i>0.032</i>	<i>0.323</i>
$\Delta$ Intermediate Imports: ROW t-1	1.223	-0.267	0.096	0.226	0.112
	<i>0.018</i>	<i>0.452</i>	<i>0.705</i>	<i>0.352</i>	<i>0.714</i>
$\Delta$ Final Imports: ROW	-0.079	0.133	0.202	0.191	0.234
	<i>0.791</i>	<i>0.195</i>	<i>0.007</i>	<i>0.002</i>	<i>0.009</i>
$\Delta \ln$ Final Imports: ROW t-1	0.039	-0.049	0.084	-0.005	0.057
	<i>0.874</i>	<i>0.693</i>	<i>0.357</i>	<i>0.945</i>	<i>0.596</i>
Constant	-0.001	0.001	0.000	-0.001	-0.001
	<i>0.104</i>	<i>0.569</i>	<i>0.941</i>	<i>0.460</i>	<i>0.596</i>
Number of observations	144	192	336	432	272
Number of groups	9	12	21	27	17
AR (2) p-value	0.252	0.430	0.600	0.955	0.985
Joint sign. of time dummies (p-value)	0.000	0.013	0.000	0.000	0.000
Sargan test (p-value)	1.000	1.000	0.959	0.009	1.000
p-values under coefficients (in italics)					

**Table 9. Long run coefficients (1990-2005):**

<b>a. Employment</b>					
	<b>Manufacturing</b>			<b>Total Economy</b>	
	<b>Low</b>	<b>High</b>	<b>Total</b>	<b>Total</b>	<b>High</b>
Real Wages	0.000	0.000	0.000	0.000	0.000
Real value added	0.356	0.000	0.000	0.460	0.611
Intermediate imports from developed countries	-1.040	2.136	1.152	-1.180	0.722
Final imports from developed countries	0.000	0.000	0.000	0.000	0.000
Intermediate imports from East	5.470	-10.727	-4.565	-2.360	-5.861
Final imports from East	-3.114	0.000	0.000	0.000	0.000
Intermediate imports from rest of the world	11.757	0.000	10.717	9.300	0.000
Final imports from rest of the world	0.000	0.000	4.391	3.820	6.500
<b>b. Wage</b>					
	<b>Manufacturing</b>			<b>Total Economy</b>	
	<b>Low</b>	<b>High</b>	<b>Total</b>	<b>Total</b>	<b>High</b>
Employment	0.000	0.000	0.000	0.000	0.000
Real value added	0.373	0.000	0.000	0.000	0.000
Intermediate imports from developed countries	0.000	-0.462	-0.848	-1.544	-2.466
Final imports from developed countries	1.567	0.353	0.000	0.000	0.000
Intermediate imports from East	0.664	0.470	0.382	1.000	0.000
Final imports from East	0.000	-1.590	0.000	0.000	-7.086
Intermediate imports from rest of the world	-6.276	0.000	0.000	0.000	0.000
Final imports from rest of the world	3.881	0.602	0.863	0.000	3.638
<b>c. Wage share</b>					
	<b>Manufacturing</b>			<b>Total Economy</b>	
	<b>Low</b>	<b>High</b>	<b>Total</b>	<b>Total</b>	<b>High</b>
Intermediate imports from developed countries	-1.040	1.675	0.304	-2.724	-1.743
Final imports from developed countries	1.567	0.353	0.000	0.000	0.000
Intermediate imports from East	6.134	-10.257	-4.183	-1.360	-5.861
Final imports from East	-3.114	-1.590	0.000	0.000	-7.086
Intermediate imports from rest of the world	5.481	0.000	10.717	9.300	0.000
Final imports from rest of the world	3.881	0.602	5.254	3.820	10.138

Table 10a 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. According to these results, intermediate import penetration from the East, which increased 4.6%-points during 1990-2005 in manufacturing, has resulted in a cumulative decline of 20.9% in total manufacturing employment, which actually decreased 16.4% during 1990-2005. While this effect might be overestimating the size of the effects, in the total economy the negative cumulative effect of offshoring to the East is still a 7.2% decrease in employment, corresponding to 66343 jobs. Overall summing up the negative effect of offshoring to the East with the other import effects we find a net effect of 1.8% decline in manufacturing employment due to total imports (12495 jobs), and a decline of 5.7% in the total economy (53262 jobs). Employment would have decreased 1.8% less in manufacturing or would have increased 5.7% more in the total economy without imports.

**Table 10. Cumulative % change effects of imports (1990-2005)**

<b>a. Employment: Cumulative % change during 1996-2005 due to:</b>					
	Manufacturing			Total Economy*	
	Low	High	Total	Total	High
Real wage	0.00	0.00	0.00	0.00	0.00
Real value added	3.84	0.00	0.00	23.40	42.48
Intermediate imports from developed countries	-5.62	15.72	8.44	-5.51	3.39
Final imports from developed countries	0.00	0.00	0.00	0.00	0.00
Intermediate imports from East	16.89	-57.18	-20.86	-7.17	-18.60
Final imports from East	-15.25	0.00	0.00	0.00	0.00
Intermediate imports from rest of the world	7.63	0.00	5.28	0.77	0.00
Final imports from rest of the world	0.00	0.00	5.36	6.16	0.25
Total cumulative % change effect of imports	3.65	-41.46	-1.78	-5.76	-14.96
Memo item: Actual cumulative % change in employment	-27.72	-6.77	-16.49	-4.12	9.23
<b>b. Wage: Cumulative % change during 1990-2005 due to:</b>					
	Manufacturing			Total Economy*	
	Low	High	Total	Total	High
Employment	0.00	0.00	0.00	0.00	0.00
Real value added	4.02	0.00	0.00	0.00	0.00
Intermediate imports from developed countries	0.00	-3.40	-6.21	-7.21	-11.59
Final imports from developed countries	9.13	0.22	0.00	0.00	0.00
Intermediate imports from East	2.05	2.50	1.75	3.04	0.00
Final imports from East	0.00	-4.12	0.00	0.00	-11.07
Intermediate imports from rest of the world	-4.07	0.00	0.00	0.00	0.00
Final imports from rest of the world	9.73	0.32	1.05	0.00	0.14
Total cumulative % change effect of imports	16.84	-4.48	-3.41	-4.17	-22.51
Memo item: Actual cumulative % change in wages	28.75	40.16	37.97	32.62	30.70
<b>c. Wage share: Cumulative %-point change during 1990-2005 due to:</b>					
	Manufacturing			Total Economy*	
	Low	High	Total	Total	High
Intermediate imports from developed countries	-3.87	8.42	1.53	-8.43	-5.39
Final imports from developed countries	6.29	0.15	0.00	0.00	0.00
Intermediate imports from East	13.04	-37.35	-13.10	-2.74	-12.23
Final imports from East	-10.50	-2.82	0.00	0.00	-7.28
Intermediate imports from rest of the world	2.45	0.00	3.62	0.51	0.00
Final imports from rest of the world	6.70	0.22	4.40	4.08	0.26
Total cumulative %-point change effect of imports	14.11	-31.38	-3.56	-6.58	-24.64
Memo item: Actual cumulative %-point change in wage share	-12.01	-9.93	-10.70	-11.37	-11.11

\* Total economy here includes only the service industries which have trade in services associated with merchandise trade (see Appendix B for the sectors included); thus it excludes most of the unskilled services, and therefore the changes in wages and employment are not comparable to those in Table 6 for the total economy. Additionally the time period is also different.

The results for the blue and white collar workers are mixed and not always consistent with the results for the aggregate industry or total economy. The intermediate imports from the East do not play any significant role. One problem is that they come from a different source and their results are not comparable. Second to be able to estimate it at 2digit level we had to exclude the real wage from the equation. Third the period of estimation is 1997-2005. But overall the results hint at an expected finding: The cumulative effect of imports on blue collar workers' employment in manufacturing is negative (a cumulative effect of -4.4% during 1997-2005) and on white collar workers is positive (a cumulative effect of 8.1% during 1997-2005). In the total economy both types of workers seem to have experienced an increase in employment due to imports with the white collar workers' employment increasing more than that of the blue collared (a cumulative effect of 1.3% for the blue collared vs. 4.3% for the white collared). However, regarding sectoral differences again the workers in the high skilled

sectors seem to have lost more, whereas in low skilled sectors scope effects seems to have dominated the substitution effects as production in Austria specializes in the higher skilled range within the traditional low skilled sectors and low skilled blue collar workers are replaced by both higher skilled blue and white collar workers.

To check for robustness, we estimated the effects using an alternative dynamic estimation method (Arellano–Bover/Blundell–Bond system estimator) as well (see Appendix D Table 5)<sup>30</sup>. According to these results the effect of offshoring to the East is rather robust and the cumulative effect is calculated to be a decline of 16.9% in total manufacturing and 12.0% in total employment, which are even larger than the above mentioned results.

The expected negative effect of wages exists only in the total high skilled sectors that also include services. In industry the coefficients of the lagged and current values of real value added has alternating signs, which indicates that a one %-points increase in the rate of growth is leading to a 0.1% growth in employment, but in the long run there is no affect. This finding is perverse and indeed when the time effects are not controlled for, there is also a positive long run effect of 0.32. But since time effects are jointly significant and since they are the only measure of technical change in the absence of capital stock, we will rely on the specification with the time effects. In the total economy the long run elasticity of employment with respect to value added is 0.46.

Although the effect of imports are mixed, when the effect of exports are also incorporated, we find a positive total trade effect in total manufacturing as well as in the total economy, however only regarding trade with the rest of the world. The results are in Appendix D Table 6. The positive effects of exports and negative effects of at least some import components seem to cancel out with respect to the effect of trade with developed countries or the East. With respect to the cumulative effects (see Appendix D Table 7), total trade with the rest of the world contributed a positive effect of 10.8% (an absolute number of 60507 jobs) and 6.5% (75578 jobs) to employment growth in manufacturing and the total economy respectively. Regarding the blue vs. white collar workers, the total effects are similar.

Finally we compare our results with those of the previous research, although a strict comparison is not possible due to the differences in the period of analysis as well as methodological differences, particularly in the case of studies using individual data. Nevertheless, our results are consistent with the negative import effect in Winter-Ebmer and Zimmermann (1998), but we do not find higher effects in low wage industries. We find significant of imports different from Aiginger et al. (1996) for a much earlier period; our finding of negative effects on the blue-collar workers is however slightly comparable with their finding about higher effects for the more disadvantaged.

## **8.2 Real wages**

Table 11 reports the estimation results for real wages modeled as in equation 2b. The respective columns of the table are for low and high skilled manufacturing, total manufacturing, total economy, total high skilled sectors (including industry and services). The respective long run coefficients for the estimation results are in Table 9b. A full version of the estimation results including also the pools of blue and white collar workers are in the Appendix D Table 8.

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<sup>30</sup> In this estimation we also used orthogonal transformation instead of differencing to maximize the sample size in the presence of missing observations.



**Table 11. Estimation results:  $\Delta \ln$  Real Wage vs. Imports, 1990-2005**

Variable	Manufacturing			Economy	
	Low	High	Total	Total	High
$\Delta \ln$ Real wage t-1	0.866	0.751	0.796	0.918	0.942
	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>
$\Delta \ln$ Employment	-0.051	0.059	-0.010	-0.026	0.000
	<i>0.508</i>	<i>0.367</i>	<i>0.901</i>	<i>0.738</i>	<i>1.000</i>
$\Delta \ln$ Employment t-1	0.049	-0.004	0.025	0.057	0.031
	<i>0.563</i>	<i>0.955</i>	<i>0.734</i>	<i>0.392</i>	<i>0.645</i>
$\Delta$ Intermediate Imports: Developed	-0.138	0.161	0.034	0.002	0.042
	<i>0.492</i>	<i>0.053</i>	<i>0.633</i>	<i>0.977</i>	<i>0.477</i>
$\Delta$ Intermediate Imports: Developed t-1	-0.135	-0.276	-0.173	-0.139	-0.143
	<i>0.279</i>	<i>0.009</i>	<i>0.071</i>	<i>0.073</i>	<i>0.046</i>
$\Delta$ Final Imports: Developed	0.210	0.088	0.047	0.029	0.032
	<i>0.018</i>	<i>0.015</i>	<i>0.242</i>	<i>0.480</i>	<i>0.521</i>
$\Delta$ Final Imports: Developed t-1	-0.047	0.010	0.006	0.017	-0.031
	<i>0.594</i>	<i>0.851</i>	<i>0.901</i>	<i>0.608</i>	<i>0.432</i>
$\Delta$ Intermediate Imports: East	-1.127	-0.771	-0.654	-0.545	-0.558
	<i>0.013</i>	<i>0.080</i>	<i>0.078</i>	<i>0.040</i>	<i>0.108</i>
$\Delta$ Intermediate Imports: East t-1	1.216	0.888	0.732	0.635	0.669
	<i>0.001</i>	<i>0.076</i>	<i>0.064</i>	<i>0.036</i>	<i>0.107</i>
$\Delta$ Final Imports: East	0.206	-0.396	-0.132	0.041	-0.411
	<i>0.124</i>	<i>0.068</i>	<i>0.507</i>	<i>0.820</i>	<i>0.049</i>
$\Delta$ Final Imports: East t-1	-0.084	0.077	0.140	0.099	0.074
	<i>0.567</i>	<i>0.720</i>	<i>0.433</i>	<i>0.531</i>	<i>0.726</i>
$\Delta$ Intermediate Imports: ROW	-0.841	-0.092	-0.264	-0.281	0.116
	<i>0.002</i>	<i>0.631</i>	<i>0.330</i>	<i>0.377</i>	<i>0.530</i>
$\Delta$ Intermediate Imports: ROW t-1	0.227	-0.096	0.018	0.091	-0.250
	<i>0.428</i>	<i>0.789</i>	<i>0.953</i>	<i>0.718</i>	<i>0.460</i>
$\Delta$ Final Imports: ROW	0.520	0.150	0.176	0.061	0.211
	<i>0.000</i>	<i>0.008</i>	<i>0.003</i>	<i>0.470</i>	<i>0.001</i>
$\Delta$ Final Imports: ROW t-1	-0.049	0.240	0.182	0.101	0.298
	<i>0.834</i>	<i>0.197</i>	<i>0.235</i>	<i>0.393</i>	<i>0.138</i>
$\Delta$ Real value added t	0.101	0.025	0.041	0.030	-0.009
	<i>0.000</i>	<i>0.444</i>	<i>0.149</i>	<i>0.437</i>	<i>0.859</i>
$\Delta$ Real value added t-1	-0.051	0.000	-0.024	-0.038	-0.006
	<i>0.075</i>	<i>0.996</i>	<i>0.429</i>	<i>0.160</i>	<i>0.911</i>
Constant	-0.001	0.004	0.002	0.000	0.000
	<i>0.347</i>	<i>0.007</i>	<i>0.033</i>	<i>0.603</i>	<i>0.692</i>
Number of observations	144	192	336	432	272
Number of groups	9	12	21	27	17
AR (2) p-value	0.783	0.226	0.212	0.215	0.240
Joint sign. of time dummies (p-value)	0.000	0.000	0.000	0.000	0.000
Sargan test (p-value)	1.000	1.000	1.000	1.000	1.000
p-values under coefficients (in italics)					

The wage effects of imports are rather mixed. In total manufacturing intermediate imports from the East have a positive effect in contrast to the negative effect on employment. This result might be indicating that offshoring to the East has resulted in substitution of domestic employment with foreign employment, but in the meantime has resulted in skill upgrading through a scope change. However intermediate imports from developed countries have now a negative effect on total manufacturing wages as opposed to their positive effect on employment. This effect seems to be dominated by high skilled manufacturing sectors. Indeed in manufacturing intermediate imports from countries with similar level of development are generating more blue collar jobs than white collar jobs, and since these jobs are lower paid jobs, the overall wage effect is negative. There is a positive effect of final imports from the rest of the world. In the total economy there is a negative effect of intermediate imports from

developed countries as well, consistent with the employment effect, but again a positive effect of intermediate imports from the East, which is different from the employment effect. The economy wide effects of offshoring to the developed countries can be interpreted as simultaneous negative employment and bargaining pressures coming from countries with a similar composition of skills. In the total high skilled sector including both manufacturing and services, there are negative effects of intermediate imports from the developed countries and final imports from the East, but positive effects of final imports from the rest of the world. Table 10b 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. The total cumulative effect of imports is negative in both total manufacturing and total economy and the high skilled manufacturing and service sectors. According to these results during 1990-2005 in manufacturing the cumulative increase in offshoring to developed countries has resulted in a 6.2% decline in real wages, whereas offshoring to the East and final imports from the rest of the world has resulted in 1.7% and 1.1% increases respectively. Overall, if there were no imports real wages would have increased 3.4% more in manufacturing and 4.2% more in the total economy in cumulative terms during the last 15 years.

The results for the blue and white collar workers for wages are more comparable than employment with the results for the aggregate industry or total economy. But differences are even more possible now, since blue and white collar wage estimations were made at the 1-digit level in addition to the before mentioned problems. Now intermediate imports from the developed countries play no negative role. Intermediate imports from the East have a negative effect for both workers in the total economy, and for blue collar workers in manufacturing, but a positive effect for white collar workers. Overall the results again hint at an expected finding: The cumulative effect of imports on blue collar workers' wages in manufacturing is negative (a cumulative effect of -0.3% during 1997-2005) and on white collar workers is positive (a cumulative effect of 8.2% during 1997-2005). In the total economy both types of workers seem to have experienced a decline in wages due to trade, but white collar workers' wages decrease less than that of the blue collared (a cumulative effect of -1.4% for the blue collared vs. -0.9% for the white collared). However, regarding sectoral differences again the workers in the high skilled sectors seem to have lost more. In the low skilled sectors, however, imports overall have a positive wage effect, primarily due to final imports but also intermediate imports from the East. This indicates that there has been important scope change as a result of import penetration in the traditional low skilled sectors, which has replaced low wage blue collar workers with skilled, higher wage white collar workers.

Taking into consideration also the exports, there are positive wage effects of trade with both the East and the rest of the world in total manufacturing and total economy (See Appendix D Table 9). In manufacturing there is also positive effect of trade with the developed countries. However in the total economy there is a negative effect of trade with the developed countries. Regarding the cumulative effects (See Appendix D Table 7), overall trade contributed 17.1% and 14.3% to the real wage growth in manufacturing and total economy respectively. An interesting difference emerges at the level of blue vs. white collar workers: Trade with the East has a negative effect on blue collar wages in manufacturing, but a positive effect in the total economy. For the white collar workers the only effect is due to trade with the rest of the world in manufacturing.

Again due qualifications mentioned above about the employment effects, we compare the results with the previous research. The findings are consistent with the negative import effect on blue-collar workers in Hofer and Huber (2003). They find no effect on white collar wages, but we find a positive effect of intermediate imports from the East. Aiginger et al. (1996) find

a negative effect of imports from the East, which we also do, but only in the high skilled industries. Different from Winter-Ebmer and Zimmermann (1998), who find no effect of imports, we do find negative effects.

### **8.3 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 import penetration and net exports. Table 9c reports the calculated long run coefficients for the wage share and Table 10c reports the cumulative %-points effect of the actual change in the explanatory variable for low and high skilled manufacturing, total manufacturing, total economy, total high skilled sectors (partial effects for a given level of value added).

Offshoring to the East resulted in a 13.1%-points cumulative decline in the wage share in manufacturing during 1990-2005 and offshoring to the developed countries as well as rest of the world and final imports from the rest of the world contributed positively. In the total economy offshoring to the East and the developed countries have led to a decline of 2.7%-points and 8.4%-points respectively. The increase in import penetration overall seems to have resulted in a deterioration in the wage share of 3.6%-points in manufacturing and 6.6%-points in the total economy during the last 15 years. During this period actual wage share has declined 11.4%-points in total economy (non-agricultural tradable) and 10.7%-points in manufacturing.

Regarding total trade effects, trade with all countries have a positive overall effect on the wage share in total manufacturing, whereas trade with only the East and the rest of the world have a positive effect in the total economy. In the total economy there is also negative effect of trade with the developed countries. In the skilled sectors the only positive effect is restricted to trade with the East. Overall trade contributed a positive effect of 19%-points and 17.9%-points to the wage share in the manufacturing and the total economy respectively (See Appendix D Table 7).

## **9. Conclusion**

This paper estimates the employment and wage effects of foreign trade and outward FDI on employment, wages, and the wage share in Austria. There is evidence of significant negative effects of imports and 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 foreign affiliates in developed countries seems to have a negative effect in services only, which could be interpreted as the horizontal FDI effect. The negative wage effects are originating from affiliate employment in both the East and the developed countries in industry, but no effect is found in the total economy. There is evidence of some positive wage effect of affiliate employment in the East in the services. 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 industry, and only from the East in the total economy.

Regarding skill differentials, at the level of the total economy, the employment of blue collar workers seems to be affected more by outward FDI relative to the white collar workers, although both types of workers experience a decline in employment with the effects on the blue collared originating from the developed countries and on the white collared originating from the East. This provides some evidence of relocation of skilled white collared jobs in both the industry and the services. Both blue and white collar wages in the industry are negatively affected by the Eastern affiliate employment, but there is an additional negative impact on white collar wages originating from the developed countries. In aggregate the negative wage effect on the blue collar workers is still larger. At a sectoral level in the total economy interestingly employment in the higher skilled sectors are affected more than those working in the lower skilled industries albeit the presence of negative effects in both sector groups; but the effects are opposite regarding wages: only the wages in low skilled sectors are negatively affected by both type of affiliate employment, whereas there seems to be no effect in high skilled sectors. The latter combined with the former evidence on employment can be thought as an evidence of negative substitution effect on lower skilled workers in the high skilled sectors associated with skill upgrading and thereby positive scope effects on wages.

Growth of value added as well as non-ICT capital has a positive effect, and technological change (the growth of ICT capital) has a negative effect on employment growth in industry. At the economy-wide level, technological change effects only blue collar workers' employment. Technological change also results in a decline in the industry wage share. Time dummies remain significant and are mostly negative. In the employment estimation this not only captures the ongoing structural change but also other exogenous technical change effects that are not captured by the capital stock. In the wage equation this shows 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, which has not been realized yet.

Regarding import effects, in aggregate total imports have a negative impact on both employment and wages, and thereby the wage share in manufacturing as well as the total economy (non-agricultural tradable sectors). The negative impact on employment is particularly due to offshoring to the East. However offshoring to the East has a positive effect on wages (in both manufacturing and total economy), which might be indicating that Eastward offshoring has resulted in substitution of domestic employment with foreign employment, but in the meantime has resulted in skill upgrading through a scope change. Offshoring to the developed countries has a negative impact on both employment and wages in the total economy, but a positive employment and a negative wage effect in manufacturing. Indeed in manufacturing intermediate imports from countries with similar level of development are generating more blue collar jobs than white collar jobs, and since these jobs are lower paid jobs, the overall wage effect is negative. The economy wide effects of offshoring to the developed countries can be interpreted as simultaneous negative employment and bargaining pressures coming from countries with a similar composition of skills. In manufacturing as well as total economy imports from the rest of the world have positive employment and wage effects, indicating the dominance of a complementary relationship. As a result, offshoring to the East resulted in a decline in the wage share in manufacturing but offshoring to the developed countries and overall imports from the rest of the world contributed positively, although the total effect is still negative. In the total economy offshoring to both the East and the developed countries have led to a decline in the wage share.

In terms of skill differentials, the cumulative effect of imports on blue collar workers' employment and wages in manufacturing is negative, while they both are positive for white

collar workers. However, regarding sectoral differences both wages and employment in the high skilled sectors seem to have lost more. The negative Eastward offshoring effect on employment is present in the high skilled sectors in manufacturing as well as the total economy (including services as well). Similarly offshoring to the developed countries have a negative effect particularly in the high skilled sectors.

Although the effect of imports are negative, when the effect of exports are also incorporated, we find a positive impact of total trade on employment in total manufacturing as well as in the total economy, however only regarding trade with the rest of the world. The positive effects of exports and negative effects of imports seem to cancel out each other in the case of trade with developed countries or the East. Regarding wages, there are positive effects of trade with both the East and the rest of the world in manufacturing and total economy; but trade with the developed countries has positive effects only on manufacturing wages and a negative effect in the total economy. An interesting difference emerges at the level of blue vs. white collar workers: Trade with the East has a negative effect on blue collar wages in manufacturing, but a positive effect in the total economy. Thus exports and imports form competitive downward pressures on blue collar manufacturing wages. For the white collar workers the only effect is due to trade with the rest of the world in manufacturing, which is positive.

The results point at the existence of negative offshoring and in particular FDI effects on both wages and employment. The results are not limited to workers in low skilled sectors. Particularly workers in high skilled sectors experience negative effects. There are also negative effects on white collar workers, particularly due to outward FDI. Moreover the aggregate effects of both imports and FDI are negative. It is not easy to compare the total trade and FDI effects, since they not only come from different estimations but they also use different levels of aggregation. But it is unlikely that exports offset negative import and FDI effects.

It could be said that these results are nevertheless reflecting a relatively short period of 10-15 years, and thus only incorporating the substitution effects, and the stages where scope and scale effects are expected has not arrived yet. However this may also be an excuse to postpone sharing the increased prospects for growth with labor. Moreover labor market outcomes have persistence. Negative employment effects generate long term unemployment problems as well as a secular decline in labor's bargaining power. So it would be too optimistic for labor to hope for a time when the gains would eventually be shared more equally.

## **10. Policy implications**

These results indicate that the aggregate effects do matter and are negative albeit the presence of winners and losers, as opposed to what is often argued in the policy conclusions of the international organizations. For e.g. OECD (2007) after having addressed the negative consequences of imports from non-OECD countries and offshoring on labor, in the conclusion still argues that aggregate employment in general is not affected, and globalization is just changing the pattern of sectoral specialization to better exploit comparative advantage. Not based on their empirical findings about the negative employment effects of offshoring they also conclude that while some jobs are lost when production activities are relocated abroad, offshoring also generates a similar number of new jobs because it increases the scale of production by making firms more competitive. Similarly after having found the negative globalization effects on labor share, IMF (2007) conclude by claiming that the effects on

labor shares do not show how workers' well-being is affected, and although the wage share went down, cheaper imports in developed countries increased the size of the pie and resulted in a net gain in total workers' compensation. Also in a previous report OECD (2005) concludes that it is not clear that trade with low-wage countries has been a barrier to achieving high employment and rising living standards in OECD countries. So the story is again that foreign competition disproportionately affects low skilled workers. However, they now also feel the need to add that the future need not resemble a smooth extrapolation of the past. Offshoring in not only low skilled manufacturing production but also high skilled service jobs is discussed with caution as part of this new form of international integration.

Once the results are evaluated as a mere indicator of a process with winners and losers, then the typical liberal policy implications follow: the need for further labor market deregulation, and methods to increase the wage flexibility and mobility of the unskilled workers as well as the so-called stability-oriented macroeconomic policy (e.g. OECD, 2005 and 2007; IMF, 2007). It is accepted that there may be the need for a temporary compensation of the displaced workers, but the use of active labor market policies is seen as the major key. However they see new hopes in the shift of the adverse effects towards skilled labor: particularly if the increasing tradability of services result in the displacement of workers with higher skills, then there may even be less need for proactive labor market schemes to acquire the necessary new skills.

Nevertheless, the discourse about more flexible labor markets, which sounds positive, is often hiding the fact that these policies increase the insecurity of workers. Particularly in the absence of policies to enhance the growth and job creation potential of the economy, labor market flexibility just ensures further losses of labor. Moreover regarding the existing labor market institutions in Europe, there is empirical evidence, which shows that not their strength but their erosion goes hand in hand with the rise in unemployment and within labor inequality<sup>31</sup>. If so, labor market deregulation creates only distributional effects, without changing the route of the problem, or making it even worse due to demand deficiency problems. Rather than dismantling the labor market institutions in Europe, we have to derive lessons from the achieved standards in the most developed cases for the New Member States.

The current income and growth policy in Europe, which places wage competitiveness at its center, is not only undesirable but also not sustainable. Wages that lag behind productivity growth, i.e. a low wage share in GDP, leads to a deficiency in aggregate demand, and even with flexible labor markets fails to generate growth with jobs. Thus there is room for improving the wage share and growth at an EU level (Stockhammer et al, 2007). The policy design needs to address the bottlenecks at the demand side of the labor market, rather than a mere focus on the supply side.

The presence of robust negative effects of offshoring and outward FDI and the insistence in anti-labor policy recommendations are showing that capital is enjoying asymmetrically from the benefits of openness via an uncontrolled mobility to exploit lower wages, worse working conditions or lower taxes elsewhere. Currently the organizational and political power of labor vs. capital is rather asymmetrical at an international scale. The unlimited freedom to move goods and capital across different markets and production units is very important for the profitability of the multinational corporations, and therefore they are willing to invest enormous resources through their collective organizations and individually to push for

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<sup>31</sup> Time series evidence shows that employment protection legislation, the generosity of minimum wages, and unemployment benefits do not explain the rise in the European unemployment (Stockhammer, 2004; Howell, 2005). Stockhammer (2004) relates the rise to the slow down in investment and the rise in financialization.

international rules that enhance their protections (e.g. investment agreements) and to avoid rules that limit their own mobility, flexibility, and access to profitable projects across the world (Burke and Epstein, 2001).

The fact that the cohesion funds are much more limited during the Eastern enlargement of the EU than those during the Southern enlargement makes these conditions worse. In this second stage of enlargement, EU has abandoned the task of cohesion and convergence to private capital flows and international trade. Stability and Growth Pact as well as the market friendly rules of the EU are in the meantime limiting any possibility in the NMS themselves for public investments as part of an industrial policy with well-defined strategic priorities. Similarly it is impossible for the NMS to manage FDI inflows according to an industrial policy. Disarmed of their policy tools, NMS find it a positive prospect to plainly attract FDI, particularly as opposed to a pure reliance on financial capital flows, which have had much more destructive effects in South East Asia and Latin America in the 1990s. So they are finding themselves in a position where too much labor chases too little capital, and thereby the multinationals have the chance to push labor at different production locations to compete with each other. These are the objective conditions under which the NMS find themselves obliged to get involved in wage as well as tax competition.

One policy reaction to this process in Austria could be to argue in favor of protectionist measures against capital outflow and offshoring. This is not an option within the EU. But even without the EU, it would not be economically very feasible for Austria, since it is a small country and all other countries are playing at the global level. Also it would be harder for the labor organizations in Austria alone to shift the balance of powers that radically against the excessively strong multinationals. Then Austria indeed has to see the European context as an advantage to push for more coordination of social and wage policy and regulation of capital markets.

Under these conditions the current dilemma of the European labor movement can be summarized as follows: While the workers of the West are scared of losing their jobs and former gains, the workers of the East are suspicious that the Western workers are protecting the good jobs from them, and in the meantime benefiting from their cheap labor in terms of cheap imports of consumption goods. As this poses obstacles to cooperation and coordination, firms are benefiting from this coordination failure. In the meantime, it is not clear that workers in the East are benefiting from openness under the current terms of bargaining between labor and capital. The host country effects of FDI or offshoring has not necessarily brought positive aspects for labor in the Eastern European countries. Their wage moderation has taken the form of modest wage increases in parallel with phenomenal productivity increases and significant job losses in manufacturing (Onaran, 2007; Onaran and Stockhammer, 2006). All workers may lose from such developments, with workers in higher-wage countries facing wage moderation while the prospects to improve wages in lower-wage countries get limited.

However, negative effects of openness or regional integration are not an unavoidable destiny, rather an outcome of the current domestic and international policies. Openness and regional integration can be also managed in a way to benefit both the richer and poorer partners, if trade and investment flows are designed as part of an egalitarian and growth-oriented international economic policy. In the European context, labor in the old and new member states as well as the accession countries have more common ground than they currently exploit. There is scope for international cooperation, in case the coordination failure can be overcome. This common ground must combine the ruling out of destructive wage (and tax)

competition with a coherent and coordinated EU-wide policy for social and economic convergence. Thus redefining the rules of the game, coordinating the institutional setting of wage bargaining, incorporating productivity-led wage increases, and designing a European framework for minimum wages, working hours and conditions and corporate tax rates is the only alternative to readjust the playground back to conditions that are fairer to labor. Nevertheless the imposition of such minimum conditions is a process of adjustment that requires also the consensus of the labor in the lower wage areas of Eastern Europe. However labor in the East can only be convinced to stop seeing lower wages as an advantage and the only way to attract private FDI from the West, if there is a systematic EU policy on regional convergence and social cohesion, which requires an economically relevant EU budget. Industrial and technology policy should set investment priorities and recognize the significance of public investment to achieve these ends. The regional and cross-country distribution of these investment programs should be based on dynamic long term targets instead of static comparative advantages. The target of monetary and fiscal policy should be to achieve full employment under decent working conditions as opposed to mere price stability. The flow of goods, services and capital should be subject to these social and economic convergence priorities. To achieve stability, particularly international coordination for regulation in financial markets, tax harmonization, and with regard to capital flows need to be achieved.

This defines new roles and tasks for the trade unions in each country, since they will be the political agents who have interest and the power to push for such a shift in policy at the EU level. The task is not easy, since this also requires overcoming the coordination failure among the trade unions in different countries. The way until there is a rocky road, and before achieving big victories the trade unions in Austria and elsewhere in the old Member States must start with looking for ways of supporting the trade union movement in the new Member States. Positive experiences and improvements in working conditions can arise particularly if the trade unions organized in different affiliates of the same multinational company find ways of communicating and building solidarity networks. Such experiences can then form the building blocks for the macro level coordination of labor organizations.



## **Appendix A: Data sources**

1. Statistics Austria, Panel data of industries, 1976 onwards, NACE 2-digit
2. Bilateral trade database of Austrian Institute of Economic Research, NACE 2-digit level, 1988 onwards.
3. 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).
4. Association of Austrian Social Insurance, employment and median wage for white and blue collar workers, only 1995 onwards at a comparable classification, NACE 1-digit for wages and NACE 2-digit for employment.
5. EU KLEMS Database, March 2007, <http://www.euklems.net> for the capital stock, 1976-2004, NACE 1-digit

## Appendix B: Sectoral classification at 1 and 1-digit NACE level

1-Digit

10-14 Mining and quarrying

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### MANUFACTURING

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15-16 Food products, beverages and tobacco

17-19 Textiles, textile products, leather and footwear

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

26 Other non-metallic mineral products

27-28 Basic metals and fabricated metal products

29 Machinery and equipment, n.e.c.

30-33 Electrical and optical equipment

34-35 Transport equipment

36-37 Manufacturing nec

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40-41 Electricity, gas and water supply

45 Construction

50-52 Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods

55 Hotels and restaurants

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

2-Digit

10-14 Mining and quarrying

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MANUFACTURING

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15	Food products and beverages
16	Tobacco products
17	Textiles
18	Wearing apparel, dressing and dyeing of fur
19	Leather, leather products and footwear
20	Wood and products of wood and cork
21	Paper and paper products
22	Publishing, printing and reproduction of recorded media
23	Coke, refined petroleum products and nuclear fuel
24	Chemicals and chemical products
25	Rubber and plastics products
26	Other non-metallic mineral products
27	Basic metals
28	Fabricated metal products, except machinery and equipment
29	Machinery and equipment, n.e.c.
30	Office, accounting and computing machinery
31	Electrical machinery and apparatus, nec
32	Radio, television and communication equipment
33	Medical, precision and optical instruments, watches and clocks
34	Motor vehicles, trailers and semi-trailers
35	Other transport equipment
36	Furniture; manufacturing n.e.c.
37	Recycling

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40	Electricity, gas and water supply
72	Computer and related activities
74	Other business activities
92	Recreational, cultural, sport activities
93	Other service activities

### Appendix C: Skill taxonomy for manufacturing industries

SKILL CLASSIFICATION		
Skill groups	1-Digit	2-Digit
Low Skill	15-16	15
	17-19	16
	26	17
	27-28	18
	36-37	19
		25
		26
		27
		36
		37
High Skill	20	20
	21-22	21
	23-25	22
	29	23
	30-33	24
	34-35	28
		29
		30
		31
		32
	33	
	34	
	35	

Service

SKILL CLASSIFICATION		
Skill groups	1-Digit	2-Digit
Low Skill	45	-
	50-52	
	55	
High Skill	40-41	40
	60-64	72
	65-67	74
	70-74	92
	85-93	93

Total economy: Includes also mining and quarrying (classified as low skilled)

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 - Tables

Appendix D Table 1 Estimation results:  $\Delta \ln$  Employment vs. Foreign affiliate employment, (1996-2005)\*

Variable	Industry					Total Economy					Services		
	Low	High	Total	Blue	White	Total	Low	High	Blue	White	Total	Blue	White
$\Delta \ln$ Employment t-1	0.728	0.644	0.703	0.873	0.811	0.745	0.706	0.768	0.940	0.847	0.584	0.885	0.884
	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>
$\Delta \ln$ Real wage	-0.090	0.044	-0.082	-0.445	-0.295	-0.090	-0.141	-0.015	0.116	-0.126	-0.474	0.379	-0.023
	<i>0.680</i>	<i>0.822</i>	<i>0.523</i>	<i>0.088</i>	<i>0.039</i>	<i>0.432</i>	<i>0.377</i>	<i>0.840</i>	<i>0.521</i>	<i>0.110</i>	<i>0.027</i>	<i>0.001</i>	<i>0.423</i>
$\Delta \ln$ Real wage t-1	0.198	-0.398	-0.072	-0.175	0.102	-0.040	0.280	-0.233	-0.267	0.100	-0.057	-0.529	-0.039
	<i>0.338</i>	<i>0.022</i>	<i>0.683</i>	<i>0.536</i>	<i>0.555</i>	<i>0.789</i>	<i>0.124</i>	<i>0.066</i>	<i>0.087</i>	<i>0.375</i>	<i>0.745</i>	<i>0.000</i>	<i>0.524</i>
$\Delta \ln$ Real value added	0.460	0.396	0.382	0.111	0.041	0.294	0.461	0.195	0.082	0.058	0.241	-0.115	0.051
	<i>0.001</i>	<i>0.000</i>	<i>0.000</i>	<i>0.006</i>	<i>0.342</i>	<i>0.000</i>	<i>0.000</i>	<i>0.001</i>	<i>0.054</i>	<i>0.135</i>	<i>0.110</i>	<i>0.472</i>	<i>0.449</i>
$\Delta \ln$ Real value added t-1	-0.394	-0.100	-0.202	-0.006	-0.005	-0.178	-0.353	-0.077	0.033	0.004	0.065	0.504	0.001
	<i>0.000</i>	<i>0.000</i>	<i>0.007</i>	<i>0.914</i>	<i>0.868</i>	<i>0.021</i>	<i>0.003</i>	<i>0.095</i>	<i>0.527</i>	<i>0.903</i>	<i>0.375</i>	<i>0.000</i>	<i>0.981</i>
$\Delta \ln$ Non-ICT capital t-1	0.524	-0.943	-0.260	-0.572	-0.303	-0.076	0.257	-0.496	-0.899	-0.449	-0.056	-0.622	-0.503
	<i>0.136</i>	<i>0.000</i>	<i>0.251</i>	<i>0.074</i>	<i>0.393</i>	<i>0.684</i>	<i>0.460</i>	<i>0.000</i>	<i>0.001</i>	<i>0.023</i>	<i>0.910</i>	<i>0.121</i>	<i>0.131</i>
$\Delta \ln$ Non-ICT capital t-2	-0.263	0.850	0.331	0.660	0.474	0.234	0.028	0.568	0.849	0.544	0.278	0.576	0.578
	<i>0.312</i>	<i>0.000</i>	<i>0.093</i>	<i>0.015</i>	<i>0.065</i>	<i>0.126</i>	<i>0.926</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.478</i>	<i>0.092</i>	<i>0.084</i>
$\Delta \ln$ ICT capital t-1	0.078	0.229	0.132	0.132	0.030	0.047	0.132	0.084	0.132	0.061	0.040	-0.073	-0.018
	<i>0.694</i>	<i>0.000</i>	<i>0.014</i>	<i>0.027</i>	<i>0.678</i>	<i>0.256</i>	<i>0.133</i>	<i>0.041</i>	<i>0.101</i>	<i>0.228</i>	<i>0.388</i>	<i>0.323</i>	<i>0.801</i>
$\Delta \ln$ ICT capital t-2	-0.210	-0.307	-0.153	-0.141	-0.075	-0.041	-0.113	-0.093	-0.156	-0.068	-0.034	0.051	0.028
	<i>0.040</i>	<i>0.000</i>	<i>0.011</i>	<i>0.018</i>	<i>0.247</i>	<i>0.348</i>	<i>0.236</i>	<i>0.020</i>	<i>0.063</i>	<i>0.228</i>	<i>0.568</i>	<i>0.497</i>	<i>0.735</i>
$\Delta \ln$ foreign Employment developed t-1	0.021	-0.023	0.000	-0.016	-0.014	0.001	0.014	-0.012	-0.012	0.002	0.000	-0.009	0.004
	<i>0.147</i>	<i>0.023</i>	<i>0.998</i>	<i>0.154</i>	<i>0.024</i>	<i>0.801</i>	<i>0.036</i>	<i>0.041</i>	<i>0.030</i>	<i>0.549</i>	<i>0.962</i>	<i>0.017</i>	<i>0.326</i>
$\Delta \ln$ foreign Employment developed t-2	-0.038	0.015	-0.012	-0.008	0.008	-0.007	-0.022	0.009	-0.008	-0.001	-0.016	-0.020	-0.005
	<i>0.062</i>	<i>0.146</i>	<i>0.318</i>	<i>0.492</i>	<i>0.431</i>	<i>0.222</i>	<i>0.022</i>	<i>0.178</i>	<i>0.059</i>	<i>0.874</i>	<i>0.001</i>	<i>0.000</i>	<i>0.047</i>
$\Delta \ln$ foreign Employment eastern t-1	0.036	-0.018	0.019	-0.011	-0.015	0.012	0.038	0.006	-0.005	-0.015	0.003	0.009	0.002
	<i>0.052</i>	<i>0.021</i>	<i>0.040</i>	<i>0.312</i>	<i>0.020</i>	<i>0.037</i>	<i>0.000</i>	<i>0.308</i>	<i>0.590</i>	<i>0.050</i>	<i>0.584</i>	<i>0.308</i>	<i>0.212</i>
$\Delta \ln$ foreign Employment eastern t-2	-0.038	-0.024	-0.031	-0.009	0.001	-0.017	-0.043	-0.013	0.006	0.000	0.005	0.009	-0.002
	<i>0.000</i>	<i>0.010</i>	<i>0.000</i>	<i>0.348</i>	<i>0.909</i>	<i>0.019</i>	<i>0.000</i>	<i>0.072</i>	<i>0.391</i>	<i>0.998</i>	<i>0.184</i>	<i>0.210</i>	<i>0.336</i>
Constant	0.023	0.018	0.003	0.011	0.013	-0.002	-0.008	0.004	0.008	0.003	-0.005	0.002	-0.002
	<i>0.470</i>	<i>0.000</i>	<i>0.555</i>	<i>0.393</i>	<i>0.081</i>	<i>0.416</i>	<i>0.090</i>	<i>0.011</i>	<i>0.097</i>	<i>0.4364</i>	<i>0.202</i>	<i>0.403</i>	<i>0.5499</i>
Number of observations	50	55	105	96	95	170	73	97	154	153	65	58	58
Number of groups	6	6	12	12	12	20	9	11	20	20	8	8	8
AR (2) p-value	0.150	0.148	0.947	0.115	0.139	0.486	0.101	0.232	0.119	0.042	0.112	0.430	0.474
Joint sign. of time dummies (p-value)	0.258	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sargan test (p-value)	1.000	1.000	1.000	0.174	0.632	1.000	1.000	1.000	0.006	0.629	1.000	0.999	0.665

\*1997-2005 for Blue and White Collar data

p-values below the coefficients (in italics)

Appendix D Table 2 Estimation results: In Employment vs. Foreign affiliate employment,  
Methodology: Arellano–Bover/Blundell–Bond system estimator (1996-2005)

Variable	Industry	Total Economy
In Employment t-1	0.908	0.847
	<i>0.000</i>	<i>0.000</i>
In Real wage t	-0.057	-0.138
	<i>0.217</i>	<i>0.086</i>
In Real value added t	0.142	0.217
	<i>0.013</i>	<i>0.007</i>
In Non-ICT capital t-1	-0.014	-0.043
	<i>0.177</i>	<i>0.056</i>
In ICT capital t-1	-0.007	-0.007
	<i>0.162</i>	<i>0.320</i>
In foreign Employment developed t-1	-0.003	-0.008
	<i>0.522</i>	<i>0.198</i>
In foreign Employment eastern t-1	-0.005	-0.003
	<i>0.026</i>	<i>0.462</i>
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)

**Appendix D Table 3 Estimation results:  $\Delta \ln$  Wages vs. foreign affiliate employment (1996-2005)\***

Variable	Industry					Total Economy					Services		
	Low	High	Total	Blue	White	Total	Low	High	Blue	White	Total	Blue	White
$\Delta \ln$ Real wage t-1	0.649	0.705	0.819	0.447	0.412	0.759	0.631	0.821	0.845	0.530	0.559	0.824	0.572
	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.004</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>
$\Delta \ln$ Employment	-0.031	-0.031	-0.045	-0.135	-0.287	-0.014	-0.039	0.020	0.158	-0.097	-0.153	0.539	-0.045
	<i>0.653</i>	<i>0.632</i>	<i>0.414</i>	<i>0.002</i>	<i>0.000</i>	<i>0.813</i>	<i>0.556</i>	<i>0.652</i>	<i>0.437</i>	<i>0.262</i>	<i>0.037</i>	<i>0.052</i>	<i>0.736</i>
$\Delta \ln$ Employment t-1	-0.106	-0.038	-0.124	-0.007	0.094	-0.152	-0.135	-0.130	-0.217	-0.117	0.011	-0.502	-0.032
	<i>0.185</i>	<i>0.640</i>	<i>0.045</i>	<i>0.866</i>	<i>0.049</i>	<i>0.012</i>	<i>0.067</i>	<i>0.055</i>	<i>0.265</i>	<i>0.228</i>	<i>0.923</i>	<i>0.043</i>	<i>0.868</i>
$\Delta \ln$ Non-ICT capital	-0.617	0.244	0.262	0.020	0.094	0.213	-0.704	0.344	0.004	0.433	0.371	-1.656	1.174
	<i>0.069</i>	<i>0.000</i>	<i>0.030</i>	<i>0.898</i>	<i>0.602</i>	<i>0.117</i>	<i>0.143</i>	<i>0.005</i>	<i>0.987</i>	<i>0.047</i>	<i>0.202</i>	<i>0.012</i>	<i>0.023</i>
$\Delta \ln$ Non-ICT capital t-1	0.580	0.187	-0.019	0.337	0.292	-0.045	0.746	-0.199	0.128	-0.072	-0.363	1.329	-1.075
	<i>0.019</i>	<i>0.044</i>	<i>0.877</i>	<i>0.037</i>	<i>0.102</i>	<i>0.742</i>	<i>0.050</i>	<i>0.087</i>	<i>0.530</i>	<i>0.694</i>	<i>0.257</i>	<i>0.016</i>	<i>0.032</i>
$\Delta \ln$ ICT capital t-1	-0.205	-0.018	-0.037	0.016	-0.018	0.039	-0.037	0.027	0.113	0.049	0.100	0.325	0.188
	<i>0.000</i>	<i>0.632</i>	<i>0.362</i>	<i>0.691</i>	<i>0.560</i>	<i>0.217</i>	<i>0.752</i>	<i>0.378</i>	<i>0.169</i>	<i>0.318</i>	<i>0.002</i>	<i>0.007</i>	<i>0.035</i>
$\Delta \ln$ ICT capital t-2	0.140	0.060	0.052	-0.008	-0.003	-0.016	0.098	-0.007	-0.106	-0.015	-0.084	-0.336	-0.166
	<i>0.208</i>	<i>0.305</i>	<i>0.255</i>	<i>0.864</i>	<i>0.937</i>	<i>0.644</i>	<i>0.404</i>	<i>0.843</i>	<i>0.226</i>	<i>0.767</i>	<i>0.003</i>	<i>0.010</i>	<i>0.037</i>
$\Delta \ln$ foreign Employment developed t-1	-0.020	0.003	-0.015	-0.007	-0.011	0.001	-0.013	0.009	0.000	-0.002	-0.001	-0.009	-0.005
	<i>0.019</i>	<i>0.754</i>	<i>0.001</i>	<i>0.253</i>	<i>0.086</i>	<i>0.873</i>	<i>0.015</i>	<i>0.131</i>	<i>0.991</i>	<i>0.787</i>	<i>0.902</i>	<i>0.001</i>	<i>0.526</i>
$\Delta \ln$ foreign Employment developed t-2	-0.009	0.013	0.000	0.001	-0.002	0.001	0.000	-0.006	-0.005	-0.004	-0.004	0.005	-0.013
	<i>0.458</i>	<i>0.211</i>	<i>0.976</i>	<i>0.939</i>	<i>0.830</i>	<i>0.877</i>	<i>0.957</i>	<i>0.426</i>	<i>0.468</i>	<i>0.306</i>	<i>0.513</i>	<i>0.315</i>	<i>0.021</i>
$\Delta \ln$ foreign Employment eastern t-1	0.024	-0.005	0.002	-0.015	-0.016	0.000	0.014	-0.004	-0.005	0.000	-0.002	-0.008	0.003
	<i>0.005</i>	<i>0.479</i>	<i>0.771</i>	<i>0.027</i>	<i>0.003</i>	<i>0.921</i>	<i>0.109</i>	<i>0.272</i>	<i>0.305</i>	<i>0.962</i>	<i>0.646</i>	<i>0.471</i>	<i>0.289</i>
$\Delta \ln$ foreign Employment eastern t-2	-0.019	-0.015	-0.017	-0.014	-0.007	0.001	-0.018	0.006	0.010	0.003	0.015	0.036	0.016
	<i>0.003</i>	<i>0.002</i>	<i>0.004</i>	<i>0.016</i>	<i>0.223</i>	<i>0.808</i>	<i>0.001</i>	<i>0.203</i>	<i>0.246</i>	<i>0.525</i>	<i>0.000</i>	<i>0.001</i>	<i>0.007</i>
Constant	0.015	-0.004	0.000	0.003	0.011	-0.004	-0.011	-0.004	-0.004	-0.006	-0.002	0.002	-0.001
	<i>0.426</i>	<i>0.555</i>	<i>0.969</i>	<i>0.552</i>	<i>0.028</i>	<i>0.005</i>	<i>0.007</i>	<i>0.040</i>	<i>0.065</i>	<i>0.198</i>	<i>0.144</i>	<i>0.417</i>	<i>0.840</i>
Number of observations	50	55	105	96	95	170	73	97	154	153	65	58	58
Number of groups	6	6	12	12	12	20	9	11	20	20	8	8	8
AR (2) p-value	0.203	0.255	0.197	0.041	0.555	0.125	0.376	0.227	0.094	0.310	0.740	0.087	0.420
Joint sign. of time dummies (p-value)	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.484	0.000	0.000	0.000	0.034
Sargan test (p-value)	1.000	1.000	1.000	1.000	1.000	1.000	0.414	1.000	0.610	0.925	1.000	1.000	1.000

\*1997-2005 for Blue and White Collar data

p-values below the coefficients (in italics)

**Appendix D Table 4. Estimation results:  $\Delta \ln$  Employment vs. imports, Blue and White collared workers 1997-2005**

Variable	Manufacturing		Economy	
	Blue	White	Blue	White
$\Delta \ln$ Employment t-1	0.894	0.742	0.898	0.740
	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>
$\Delta \ln$ Real value added t	0.002	0.095	0.018	0.117
	<i>0.977</i>	<i>0.009</i>	<i>0.733</i>	<i>0.001</i>
$\Delta \ln$ Real value added t-1	0.050	0.002	0.038	0.018
	<i>0.328</i>	<i>0.954</i>	<i>0.469</i>	<i>0.645</i>
$\Delta$ Intermediate Imports: Developed	0.088	0.082	0.008	-0.101
	<i>0.704</i>	<i>0.621</i>	<i>0.973</i>	<i>0.491</i>
$\Delta$ Intermediate Imports: Developed t-1	0.524	0.293	0.378	0.261
	<i>0.018</i>	<i>0.069</i>	<i>0.113</i>	<i>0.084</i>
$\Delta$ Final Imports: Developed	-0.106	0.153	-0.108	0.162
	<i>0.196</i>	<i>0.007</i>	<i>0.210</i>	<i>0.002</i>
$\Delta$ Final Imports: Developed t-1	0.204	0.084	0.250	0.127
	<i>0.008</i>	<i>0.240</i>	<i>0.003</i>	<i>0.054</i>
$\Delta$ Intermediate Imports: East	0.377	1.214	0.227	1.150
	<i>0.546</i>	<i>0.006</i>	<i>0.731</i>	<i>0.006</i>
$\Delta$ Intermediate Imports: East t-1	0.299	0.020	0.415	-0.156
	<i>0.647</i>	<i>0.966</i>	<i>0.538</i>	<i>0.714</i>
$\Delta$ Final Imports: East	0.562	0.273	0.859	-0.317
	<i>0.134</i>	<i>0.331</i>	<i>0.025</i>	<i>0.200</i>
$\Delta$ Final Imports: East t-1	-0.634	0.230	-0.648	0.200
	<i>0.043</i>	<i>0.490</i>	<i>0.047</i>	<i>0.499</i>
$\Delta$ Intermediate Imports: ROW	-0.087	0.264	-0.073	-0.241
	<i>0.858</i>	<i>0.437</i>	<i>0.887</i>	<i>0.448</i>
$\Delta$ Intermediate Imports: ROW t-1	-1.175	0.846	-1.320	-0.794
	<i>0.035</i>	<i>0.035</i>	<i>0.025</i>	<i>0.031</i>
$\Delta$ Final Imports: ROW	0.283	0.057	0.225	-0.052
	<i>0.103</i>	<i>0.675</i>	<i>0.193</i>	<i>0.648</i>
$\Delta$ Final Imports: ROW t-1	0.154	0.330	0.058	-0.322
	<i>0.547</i>	<i>0.079</i>	<i>0.816</i>	<i>0.040</i>
Constant	-0.006	0.003	-0.004	-0.002
	<i>0.044</i>	<i>0.194</i>	<i>0.098</i>	<i>0.312</i>
Number of observations	189	188	243	242
Number of groups	21	21	27	27
AR (2) p-value	0.473	0.073	0.103	0.018
Joint sign. of time dummies (p-value)	0.479	0.018	0.251	0.073
Sargan test (p-value)	0.132	0.004	0.001	0.004
p-values under coefficients (in italics)				



Appendix D Table 5 In Employment Arellano–Bover/Blundell–Bond system estimator (1990-2005)

Variable	Industry	Total Economy		
In Employment t-1	0.921	0.829		
	<i>0.000</i>	<i>0.000</i>		
In Real wage t	0.185	-0.023		
	<i>0.082</i>	<i>0.933</i>		
In Real wage t-1	-0.212	-0.056		
	<i>0.045</i>	<i>0.842</i>		
In Real value added t	0.147	0.227		
	<i>0.006</i>	<i>0.000</i>		
In Real value added t-1	-0.050	-0.037		
	<i>0.155</i>	<i>0.283</i>		
Intermediate Imports: Developed t	-0.318	-0.398		
	<i>0.089</i>	<i>0.041</i>		
Intermediate Imports: Developed t-1	0.306	0.301		
	<i>0.075</i>	<i>0.137</i>		
Final Imports: Developed t	0.010	0.021		
	<i>0.833</i>	<i>0.694</i>		
Final Imports: Developed t-1	0.057	0.061		
	<i>0.169</i>	<i>0.178</i>		
Intermediate Imports: East t	1.044	0.870		
	<i>0.040</i>	<i>0.101</i>		
Intermediate Imports: East t-1	-1.478	-1.545		
	<i>0.088</i>	<i>0.076</i>		
Final Imports: East t	-0.052	0.036		
	<i>0.824</i>	<i>0.893</i>		
Final Imports: East t-1	0.049	0.071		
	<i>0.859</i>	<i>0.801</i>		
Intermediate Imports: ROW t	0.473	0.437		
	<i>0.102</i>	<i>0.195</i>		
Intermediate Imports: ROW t-1	-0.203	0.169		
	<i>0.659</i>	<i>0.696</i>		
Final Imports: ROW	0.054	0.016		
	<i>0.300</i>	<i>0.851</i>		
Final Imports: ROW t-1	-0.124	-0.202		
	<i>0.169</i>	<i>0.019</i>		
Constant	-0.969	-1.459		
	<i>0.409</i>	<i>0.016</i>		
Number of observations	374	459		
Number of groups	22	27		
Sargan test (p-value)	0.000	0.000		
AR (2) p-value	0.170	0.610		
Joint sign. of time dummies (p-value)	0.000	0.000		
p-values under coefficients (in italics)				

**Appendix D Table 6. Estimation results:  $\Delta \ln$  Employment vs. Total trade, 1990-2005**

	Manufacturing					Service	Total Economy			
	low	medium	total	Blue	White	total	Total	High	Blue	White
$\Delta \ln$ Employment t-1	0.985	0.977	0.973	0.950	0.752	0.705	0.957	0.973	0.936	0.778
	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>
$\Delta \ln$ Real wage t	-0.204	0.010	-0.055			-0.507	-0.033	-0.016		
	<i>0.038</i>	<i>0.906</i>	<i>0.346</i>			<i>0.002</i>	<i>0.533</i>	<i>0.813</i>		
$\Delta \ln$ Real wage t-1	0.204	-0.074	0.015			0.246	-0.024	-0.042		
	<i>0.075</i>	<i>0.411</i>	<i>0.814</i>			<i>0.174</i>	<i>0.670</i>	<i>0.553</i>		
$\Delta \ln$ Real value added t	0.114	0.106	0.099	0.010	0.046	0.471	0.119	0.142	0.038	0.061
	<i>0.001</i>	<i>0.001</i>	<i>0.000</i>	<i>0.851</i>	<i>0.173</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.482</i>	<i>0.093</i>
$\Delta \ln$ Real value added t-1	-0.108	-0.123	-0.108	0.014	-0.031	-0.160	-0.102	-0.124	0.021	-0.002
	<i>0.003</i>	<i>0.000</i>	<i>0.000</i>	<i>0.690</i>	<i>0.374</i>	<i>0.152</i>	<i>0.000</i>	<i>0.000</i>	<i>0.638</i>	<i>0.969</i>
$\Delta$ Total Trade developed t	0.032	-0.021	-0.019	-0.115	0.001	0.091	-0.022	-0.025	-0.107	-0.002
	<i>0.539</i>	<i>0.413</i>	<i>0.329</i>	<i>0.266</i>	<i>0.940</i>	<i>0.675</i>	<i>0.226</i>	<i>0.268</i>	<i>0.288</i>	<i>0.918</i>
$\Delta$ Total Trade developed t-1	-0.034	0.031	0.003	0.014	0.033	0.074	-0.006	0.021	0.025	0.063
	<i>0.555</i>	<i>0.278</i>	<i>0.890</i>	<i>0.594</i>	<i>0.549</i>	<i>0.787</i>	<i>0.753</i>	<i>0.400</i>	<i>0.419</i>	<i>0.385</i>
$\Delta$ Total Trade east t	-0.141	0.054	-0.025	0.345	-0.033	3.011	-0.033	0.017	0.347	-0.032
	<i>0.195</i>	<i>0.599</i>	<i>0.720</i>	<i>0.182</i>	<i>0.524</i>	<i>0.051</i>	<i>0.602</i>	<i>0.848</i>	<i>0.139</i>	<i>0.630</i>
$\Delta$ Total Trade east t-1	0.232	-0.088	0.043	-0.096	0.039	-1.858	0.066	-0.047	-0.137	0.034
	<i>0.032</i>	<i>0.393</i>	<i>0.525</i>	<i>0.280</i>	<i>0.742</i>	<i>0.165</i>	<i>0.290</i>	<i>0.588</i>	<i>0.188</i>	<i>0.756</i>
$\Delta$ Total Trade ROW t	0.023	0.018	0.056	0.170	0.109	1.020	0.066	0.047	0.164	0.108
	<i>0.893</i>	<i>0.680</i>	<i>0.108</i>	<i>0.000</i>	<i>0.012</i>	<i>0.126</i>	<i>0.043</i>	<i>0.227</i>	<i>0.000</i>	<i>0.000</i>
$\Delta$ Total Trade ROW t-1	0.099	0.088	0.093	0.276	-0.067	0.235	0.101	0.107	0.280	-0.083
	<i>0.605</i>	<i>0.065</i>	<i>0.017</i>	<i>0.000</i>	<i>0.059</i>	<i>0.781</i>	<i>0.004</i>	<i>0.010</i>	<i>0.000</i>	<i>0.030</i>
Constant	-0.001	0.002	0.001	-0.004	0.000	-0.007	0.000	0.000	-0.004	0.000
	<i>0.501</i>	<i>0.222</i>	<i>0.615</i>	<i>0.049</i>	<i>0.923</i>	<i>0.000</i>	<i>0.990</i>	<i>0.993</i>	<i>0.052</i>	<i>0.997</i>
Number of observations	144	192	336	189	188	80	432	272	243	242
Number of groups	9	12	21	21	21	5	27	17	27	27
Joint sign. of time dummies (p-value)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
p-values under coefficients (in italics)										

Appendix D Table 7. Cumulative % change effects of total trade (1990-2005)	Total Economy		
	Manufacturing	Total	High
<b>Employment: Cumulative % change during 1990-2005 due to:</b>			
Total trade with developed countries	0.00	0.00	0.00
Total trade with the East	0.00	0.00	0.00
Total trade with the rest of the world	10.79	6.54	-1.02
Total cumulative %change effect of total trade	10.79	6.54	-1.02
Memo item: Actual cumulative % change in employment	-16.49	-4.12	9.23
<b>Wage: Cumulative % change during 1990-2005 due to:</b>			
Total trade with developed countries	2.14	-2.25	0.00
Total trade with the East	14.03	15.95	22.17
Total trade with the rest of the world	0.87	0.61	-0.19
Total cumulative %change effect of total trade	17.05	14.32	21.98
Memo item: Actual cumulative % change in wages	37.97	32.62	30.70
<b>Wage share: Cumulative %-point change during 1990-2005 due to:</b>			
Total trade with developed countries	1.47	-1.49	0.00
Total trade with the East	9.62	10.57	14.58
Total trade with the rest of the world	7.99	8.81	-1.57
Total cumulative %change effect of total trade	19.08	17.89	13.01
Memo item: Actual cumulative %-point change in wage share	-10.70	-11.37	-11.11

**Appendix D Table 8. Estimation results:  $\Delta \ln$  Real Wage vs. Imports, Blue and White collared, 1997-2005**

Variable	Manufacturing		Economy	
	Blue	White	Blue	White
$\Delta \ln$ Real wage t-1	0.515	0.489	0.756	0.666
	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>
$\Delta \ln$ Employment	-0.121	-0.148	-0.142	-0.152
	<i>0.010</i>	<i>0.012</i>	<i>0.018</i>	<i>0.031</i>
$\Delta \ln$ Employment t-1	0.032	0.028	0.094	0.103
	<i>0.581</i>	<i>0.590</i>	<i>0.077</i>	<i>0.080</i>
$\Delta$ Intermediate Imports: Developed	0.049	0.053	0.011	-0.015
	<i>0.544</i>	<i>0.354</i>	<i>0.922</i>	<i>0.913</i>
$\Delta$ Intermediate Imports: Developed t-1	0.004	0.094	-0.014	0.069
	<i>0.970</i>	<i>0.363</i>	<i>0.888</i>	<i>0.534</i>
$\Delta$ Final Imports: Developed	0.012	0.088	0.004	0.107
	<i>0.850</i>	<i>0.221</i>	<i>0.960</i>	<i>0.362</i>
$\Delta$ Final Imports: Developed t-1	0.048	-0.045	0.025	-0.063
	<i>0.476</i>	<i>0.473</i>	<i>0.748</i>	<i>0.543</i>
$\Delta$ Intermediate Imports: East	-1.643	-1.656	-1.925	-2.060
	<i>0.001</i>	<i>0.000</i>	<i>0.001</i>	<i>0.000</i>
$\Delta$ Intermediate Imports: East t-1	1.587	2.152	1.457	1.658
	<i>0.001</i>	<i>0.000</i>	<i>0.008</i>	<i>0.005</i>
$\Delta$ Final Imports: East	0.111	0.275	0.305	0.466
	<i>0.492</i>	<i>0.341</i>	<i>0.121</i>	<i>0.153</i>
$\Delta$ Final Imports: East t-1	0.145	0.081	0.061	-0.054
	<i>0.474</i>	<i>0.804</i>	<i>0.791</i>	<i>0.889</i>
$\Delta$ Intermediate Imports: ROW	0.328	0.322	0.910	0.911
	<i>0.501</i>	<i>0.510</i>	<i>0.130</i>	<i>0.113</i>
$\Delta$ Intermediate Imports: ROW t-1	0.354	0.183	0.041	0.014
	<i>0.567</i>	<i>0.712</i>	<i>0.953</i>	<i>0.980</i>
$\Delta$ Final Imports: ROW	0.096	0.291	-0.161	0.009
	<i>0.647</i>	<i>0.062</i>	<i>0.150</i>	<i>0.955</i>
$\Delta$ Final Imports: ROW t-1	-0.039	-0.247	0.104	0.057
	<i>0.746</i>	<i>0.271</i>	<i>0.370</i>	<i>0.744</i>
$\Delta \ln$ Real value added t	0.067	0.080	0.079	0.058
	<i>0.055</i>	<i>0.063</i>	<i>0.044</i>	<i>0.154</i>
$\Delta \ln$ Real value added t-1	0.023	0.000	-0.004	0.018
	<i>0.501</i>	<i>0.992</i>	<i>0.925</i>	<i>0.776</i>
Constant	-0.003	-0.004	-0.004	-0.003
	<i>0.295</i>	<i>0.260</i>	<i>0.004</i>	<i>0.048</i>
Number of observations	99	98	135	134
Number of groups	11	11	15	15
AR (2) p-value	0.145	0.215	0.036	0.195
Joint sign. of time dummies (p-value)	0.000	0.000	0.000	0.000
Sargan test (p-value)	1.000	1.000	1.000	1.000
p-values under coefficients (in italics)				

Appendix D Table 9. Estimation results:  $\Delta \ln$  Real Wage vs. Total trade, 1990-2005

	Manufacturing					Service	Total Economy			
	low	medium	total	Blue	White	total	Total	High	Blue	White
$\Delta \ln$ Real wage t-1	0.851	0.792	0.805	0.521	0.439	0.919	0.903	0.939	0.776	0.672
	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>
$\Delta \ln$ Employment t	-0.160	0.009	-0.053	-0.149	-0.184	-0.124	-0.053	-0.013	-0.133	-0.154
	<i>0.209</i>	<i>0.867</i>	<i>0.436</i>	<i>0.000</i>	<i>0.001</i>	<i>0.154</i>	<i>0.420</i>	<i>0.789</i>	<i>0.024</i>	<i>0.096</i>
$\Delta \ln$ Employment t-1	0.116	0.046	0.075	0.054	0.091	0.128	0.091	0.071	0.076	0.108
	<i>0.278</i>	<i>0.186</i>	<i>0.167</i>	<i>0.267</i>	<i>0.107</i>	<i>0.055</i>	<i>0.087</i>	<i>0.080</i>	<i>0.067</i>	<i>0.215</i>
$\Delta$ Total Trade developed t	0.085	0.026	0.018	0.011	0.017	0.045	0.015	0.008	-0.001	0.009
	<i>0.020</i>	<i>0.115</i>	<i>0.073</i>	<i>0.692</i>	<i>0.638</i>	<i>0.706</i>	<i>0.123</i>	<i>0.645</i>	<i>0.982</i>	<i>0.839</i>
$\Delta$ Total Trade developed t-1	-0.054	-0.024	-0.020	0.024	0.005	-0.210	-0.016	-0.020	-0.002	-0.002
	<i>0.114</i>	<i>0.214</i>	<i>0.136</i>	<i>0.558</i>	<i>0.899</i>	<i>0.063</i>	<i>0.094</i>	<i>0.193</i>	<i>0.961</i>	<i>0.965</i>
$\Delta$ Total Trade east t	-0.048	-0.106	-0.068	-0.308	-0.184	0.403	-0.044	-0.066	-0.232	-0.082
	<i>0.375</i>	<i>0.139</i>	<i>0.103</i>	<i>0.047</i>	<i>0.139</i>	<i>0.566</i>	<i>0.252</i>	<i>0.113</i>	<i>0.129</i>	<i>0.591</i>
$\Delta$ Total Trade east t-1	0.118	0.158	0.148	0.225	0.151	2.174	0.121	0.117	0.189	0.075
	<i>0.096</i>	<i>0.006</i>	<i>0.004</i>	<i>0.011</i>	<i>0.207</i>	<i>0.000</i>	<i>0.005</i>	<i>0.020</i>	<i>0.029</i>	<i>0.491</i>
$\Delta$ Total Trade ROW t	-0.081	0.054	0.054	0.136	0.260	1.412	0.035	0.044	0.003	0.105
	<i>0.518</i>	<i>0.002</i>	<i>0.000</i>	<i>0.174</i>	<i>0.000</i>	<i>0.012</i>	<i>0.084</i>	<i>0.000</i>	<i>0.983</i>	<i>0.411</i>
$\Delta$ Total Trade ROW t-1	0.226	0.016	0.023	0.081	0.125	0.834	0.023	0.021	0.092	0.175
	<i>0.284</i>	<i>0.777</i>	<i>0.599</i>	<i>0.384</i>	<i>0.219</i>	<i>0.001</i>	<i>0.616</i>	<i>0.719</i>	<i>0.248</i>	<i>0.197</i>
$\Delta \ln$ Real value added t	0.088	0.030	0.047	0.062	0.072	0.145	0.039	0.007	0.057	0.045
	<i>0.001</i>	<i>0.153</i>	<i>0.052</i>	<i>0.074</i>	<i>0.109</i>	<i>0.001</i>	<i>0.182</i>	<i>0.814</i>	<i>0.163</i>	<i>0.372</i>
$\Delta \ln$ Real value added t-1	-0.055	-0.040	-0.053	0.024	-0.014	-0.112	-0.059	-0.042	-0.020	0.004
	<i>0.015</i>	<i>0.080</i>	<i>0.001</i>	<i>0.453</i>	<i>0.789</i>	<i>0.162</i>	<i>0.000</i>	<i>0.047</i>	<i>0.613</i>	<i>0.949</i>
Constant	-0.001	0.003	0.002	-0.002	-0.002	-0.002	0.000	0.000	-0.003	-0.003
	<i>0.297</i>	<i>0.000</i>	<i>0.011</i>	<i>0.335</i>	<i>0.514</i>	<i>0.270</i>	<i>0.964</i>	<i>0.773</i>	<i>0.145</i>	<i>0.094</i>
Number of observations	144	192	336	99	98	80	432	272	135	134
Number of groups	9	12	21	11	11	5	27	17	15	15
Joint sign. of time dummies (p-value)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
p-values under coefficients (in italics)										

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