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Wage and Mobility Effects of Trade and Migration on the Austrian Labour Market

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Founded in 1963 by two prominent Austrians living in exile – the sociologist Paul F. Lazarsfeld and the economist Oskar Morgenstern – with the financial support from the Ford Foundation, the Austrian Federal Ministry of Education and the City of Vienna, the Institute for Advanced Studies (IHS) is the first institution for postgraduate education and research in economics and the social sciences in Austria. The **Economics Series** presents research done at the Department of Economics and Finance and aims to share "work in progress" in a timely way before formal publication. As usual, authors bear full responsibility for the content of their contributions.

Das Institut für Höhere Studien (IHS) wurde im Jahr 1963 von zwei prominenten Exilösterreichern – dem Soziologen Paul F. Lazarsfeld und dem Ökonomen Oskar Morgenstern – mit Hilfe der Ford-Stiftung, des Österreichischen Bundesministeriums für Unterricht und der Stadt Wien gegründet und ist somit die erste nachuniversitäre Lehr- und Forschungsstätte für die Sozial- und Wirtschafts-wissenschaften in Österreich. Die **Reihe Ökonomie** bietet Einblick in die Forschungsarbeit der Abteilung für Ökonomie und Finanzwirtschaft und verfolgt das Ziel, abteilungsinterne Diskussionsbeiträge einer breiteren fachinternen Öffentlichkeit zugänglich zu machen. Die inhaltliche Verantwortung für die veröffentlichten Beiträge liegt bei den Autoren und Autorinnen.

Abstract

This study analyses the effect of trade and migration on wages and labour market mobility. We estimate wage growth equations and a multinomial logit mobility equation on an individual data set for 1991 to 1994. We find substantial differences in the reactions of white and blue-collar workers wages and mobility to trade and migration. In Austria exports have a positive and imports a negative impact on wage growth only for blue-collar workers. Migrants also reduce only blue-collar workers wage growth. Our results indicate that higher imports and an inflow of migrants reduce sectoral mobility of all types of workers. The risk of being out of work by contrast is increased by migration and imports for only blue-collar workers, but reduced by exports for all types of workers. In general, our results suggest enlargement of the EU would have only small effects on the Austrian labour market.

Keywords

Wages, migration, trade

JEL Classifications

F16, F31, F15

Comments

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Contents

I. Introduction

Austria was one of the countries most strongly affected by the breakdown of the communist regimes in Eastern Europe. Due to its geographical proximity and its historic ties to this region, the stock of migrants in Austria almost doubled in the period from 1989 to 1994, imports from Central and Eastern Europe Countries (CEECs) almost tripled and exports quadrupled. This experience has aroused substantial interest in both the public debate and scientific discussion.

Furthermore, with the challenges of enlargement of the European Union ahead, the effects of trade and migration on the domestic labour market have once again raised concern in Austria. A large number of recent studies (Pichelmann 1998, Walterskirchen, 1998, and Faßmann and Hintermann, 1997) devote their attention to forecasting the trade and migration flows to be expected from “Eastern Enlargement”. Scenarios for these forecasts have varied substantially and, not surprisingly, so have results. In a recent study Boeri and Brücker (2000) forecast a migration potential of around 210.000 residents from the CEEC-10. Egger (2000) forecasts a 0.5 % trade growth in excess of the baseline without enlargement for the immediate post accession years.

Recent research on the reaction of wages and unemployment to migration and trade in Austria has focused primarily on the period from 1988 to 1992 and suggested that both the significance and magnitude of these effects vary greatly among demographic groups and time periods. In this paper we focus on a different time period and on the differences between white and blue-collar workers with respect to wage and mobility reactions to trade and migration. We estimate wage growth equations on an individual data set ranging from 1991 to 1994. We find that blue-collar workers wages react more strongly to both trade and migration than white-collar workers wages and that industry stayers are more strongly affected than industry movers. Finally, we analyse how trade and migration have affected the mobility of workers and show that the induced mobility patterns differ markedly between blue and white-collar workers as well. Moves in and out of unemployment respond more strongly to trade and migration for blue-collar workers than for white-collar workers, while other aspects of mobility are more similar for these two groups.

The paper is organised as follows: Section two discusses previous results on the impact of trade and migration. The next section presents the data for this study. Section four discusses theoretical issues and presents a labour market model in terms of which we cast our discussion, while section five presents results. Section six concludes the paper.

II. Previous Studies

1. Trade and Wages

Empirical studies on the link between international trade and wages have been characterised by three distinct methodological approaches. The first is represented by computable general equilibrium models (see Keuschnigg and Kohler, 1998), the second is in the tradition of labour market models, and the third comes from a trade theoretic background. In particular, the differences in method between labour market and trade theoretic approaches have spurred some debate in recent years (see Krugman, 2000 and Leamer, 2000). Essentially this debate concerns two interrelated issues: First, the choice of theoretical model: labour theoretic approaches tend to use a simple closed economy labour demand and labour supply models and consider trade an exogenous shock to labour demand. Trade theoretic approaches, in contrast, typically cast their discussion in terms of a Heckscher Ohlin model. Second, the correct choice of exogenous variables to measure the impact of trade: labour market approaches tend to use traded quantities, while trade theories argue prices to be the truly exogenous variable (see Haskel, 1999).

Neither of these methods yields clear-cut evidence. In a recent survey of the American literature, Cline (1997) reports that both labour market and trade approach have yielded both positive as well as negative results concerning the link between wages and trade. Thus, the evidence on this link so far remains inconclusive irrespective of the chosen underlying approach. European evidence seems to suggest, if anything, a weaker link between trade and wages. In a recent collective volume by Dewatripont et al. (1999), a number of cross-country studies come to this conclusion. In particular, Freeman and Revenga (1999) show that both employment and wages in Europe are less sensitive to quantity measures of trade than in the US. In addition Neven and Wyplosz (1999) find few Heckscher – Ohlin type effects of output prices on the skill content of labour. These results, however, are not uncontroversial. For instance Greenaway et al. (1999) find a significant negative impact of trade quantities on employment for the UK.

Given the substantial increase in trade and migration with the CEEC's in the post 1989 period and the expectations of substantial further increases, the primary focus of the literature on the labour market impact of trade has been East – West Trade in Austria. Furthermore, due to lack of price data for Austria only a labour market approach to analysing the wage effects is feasible. Aiginger, et al. (1996) using individual data find that the increase in CEEC's exports as a share of total production, increased wage growth between 1989 and 1991. The growth in import share in contrast has a significantly negative effect on wage growth. This study, however, focuses exclusively on CEE Exports.

In contrast, Winter-Ebmer and Zimermann (1998) in a more recent study use industry level data to test simultaneously the effects of migration and trade. This study finds significant (positive) effects of exports to the rest of the world, but no effects of trade with the CEEC's on wages. Also, there are no effects of migration on total employment growth, although migration does reduce domestic employment.

Winter-Ebmer and Zweimüller (1996b) analyse unemployment risk as well as unemployment duration in response to changes in trade and migration. A change in the share of foreigners in a particular industry increases the unemployment risk only if no industry dummies are included in the control variables. Both changes in imports as well as exports with the CEE increase the risk of becoming unemployed. Exports to the rest of the world reduce the risk of unemployment. Changes in the migrant share have a significant positive impact on the duration of unemployment, while trade with the CEE remains insignificant.

2. Migration and the Labour Market

Studies focusing exclusively on the effects of migration on individual wages and unemployment suggest a relatively complex reaction of the Austrian labour market to immigration. In particular, the studies show that effects are far from homogeneous across time periods and different labour market groups. For instance, Winter-Ebmer and Zweimüller (1994) find that at the industry level foreign employment had a significant impact on the probability of workers to become unemployed only in the period 1988 to 1989, but not from 1991 to 1992. Effects also vary substantially among sub-groups: blue-collar workers are more strongly affected than white-collar workers and workers in non-seasonal industries more strongly than others.

Winter-Ebmer and Zweimüller (1996) find no negative impact of migration on the wage rate. The results, however, differ strongly among high and low-income-earning men. The wage of male high-income earners is positively correlated with migration. For young, middle-aged, and blue-collar workers the largest positive impact is found. Low-income men in contrast are negatively affected by immigration. This influence is especially strong for middle-aged workers, older workers, and blue-collar workers. Similarly, Winter-Ebmer and Zweimüller (1996a), concentrating on the wage levels of young male Austrian blue-collar workers, find a significant positive impact of the share of foreign workers on the level of wages, but a negative effect of the change in foreigner share on wage growth.

III. Data

These results and the importance of the issue in the light of the anticipated enlargement of the European Union imply, that an analysis based on a different data set than that used in other studies for another time period, could provide further insights on the impact of migration and trade on the labour market. For our analysis we use the Austrian SSEDP (Social Security Employment Data Panel), which is a 0.5 percent random sample of all individuals, who were registered as employed by the social insurance administration at least for one day between 1991 and 1994. Workers who are marginally employed, self-employed, or civil servants are not included. For the period 1983 to 1994, information is available for the workers on all economic characteristics that are relevant for the calculation of old age pensions. As the data has been collected for administrative purposes, several drawbacks exist. First, we have no information about occupation, schooling and working time. Second, no information about family circumstances is available.

We omit females from our sample, because we do not have information on family characteristics and working time. Furthermore, we excluded workers with unknown or foreign nationality. To eschew problems with apprenticeship and early retirement, we concentrate on workers above the age of 19 and below the age of 56. We exclude workers with monthly wages below ATS 6.000 and persons with a wage growth of over 70 %, since such wage changes can be attributed to a change in working hours only. These restrictions result in a usable sample of 11.149 individuals employed in 1991. Of these 8.945 were employed on May 31, 1994. 6317 were industry stayers, and 2.628 moved to another industry. Descriptive statistics on this sample are reported in Table 1, where we also give information on the sub-sample of individuals, employed in 1994. Note, that 9.5 % of the wages of the workers are top-coded. We decided to exclude these workers from our wage regressions.[1]

We analyse data for 1991 to 1994. This period differs substantially from the 1988 to 1992 period analysed in much of the earlier research in Austria. These differences relate to the business cycle, migration policy and trade developments. While the period from 1989 and 1992 was dominated by a boom, which had been, in part, triggered by German unification and opening of Central and Eastern Europe and caused employment to grow at almost 1.9 % annually over the five year period, the period from 1991 to 1994 was characterised by lower employment growth rates and the beginning of a recession in 1993.

Furthermore, migration policy changed substantially in 1992. Annual growth rates of foreign employment peaked in 1990 – 1991; in 1992 the Austrian government substantially reduced the number of work permits issued to migrants and embarked on a more restrictive immigration policy. The average annual increase in the stock of foreign labour, thus, was around 13 percentage points lower in the 1991 to 1994 period than in the 1988 to 1992

[1] Including the workers with top-coded wages and adding censoring-dummies yielded similar results.

period. Despite this, our migration data, which is available for ten manufacturing industries and was provided by the Austrian Labour Offices display considerable variance across industries. The change in the share of foreign employment varies from a 2.1 percentage point increase in metal products and machinery manufacturing to a decline of 1.7 percentage points in chemicals production.

Table 1: Basic statistics: individual workers

	Total Sample		Employed 1994	
	Mean	SD	Mean	SD
Age	34,31	9,15	33,71	8,58
Blue-Collar Worker	0,758	0,429	0,711	0,453
Ln monthly wage 1991	9,89	0,268	9,90	0,256
Ln monthly wage 1994			10,04	0,276
D ln monthly wage			0,142	0,167
Top-coded wages			0,104	0,306
Industrial mobility				
Sector stayers	0,567		0,706	
Sector mover	0,236			
Non-employed	0,198			
Number of observations	11149		8945	

Trade development in the period from 1991 to 1994 was also more tranquil. In particular, export growth to the CEE countries reduced from over 30 % per year to around 13 % in the later period. Our trade data for the 25 industries in Austria and Germany comes from the UN world trade database.[2] We match data on industry characteristics such as trade growth on the basis of industry classification of each individual in 1991. According to this data, the average growth of exports of manufacturing industries in Austria was 3.03 % and the average growth of imports was 3.56 %. Domestic demand grew by 4.5 %. There is, however, considerable variance in this data. For instance the largest export growth was experienced by the manufacturers of musical instruments, sports goods, and toys with 5 % while the largest decline was in the textile sector (-4 %). The change of import share was largest in manufacture of wearing apparels (+22 %) and smallest in manufacturing of precision instruments, watches, and jewellery (–7.8 %).

[2] The labour data are coded at the “1968 Industrial Classification” (Betriebssystematik 1968: BS68) officially used in Austrian economic statistics until 1994. There are 25 distinct industries of employment in our sample.

Table 2: Basic statistics concerning aggregate data

	1988 – 1992	1991 –1994
Average annual Employment Growth	1.88	1.37
Overall Average Annual Export Growth	12.00	3.03
Average Annual Export Growth to the CEE	30.06	13.38
Overall Average Annual Import Growth	10.41	2.64
Average Annual Import Growth to the CEE	17.04	12.28
Average Annual Growth of Foreign Labour	16.85	3.56

IV. The Model

The starting point of our analysis is a simple model of the labour market proposed by Freeman and Katz (1991). In this model the labour demand schedule as a function of wages and output in an industry is given by:

$$\Delta L^d = -a\Delta W + \Delta X \tag{1}$$

with Δ the difference operator, L^d the logarithm of employment, W log wages and X a shift term in labour demand such as could be caused by an import or an export shock. α is the elasticity of labour demand with respect to wages. Changes in labour supply are given by:

$$\Delta L^s = b\Delta W + \Delta M \tag{2}$$

with L^s the (log) labour supply. In this equation the term ΔM refers to an unexpected shock to labour supply as could result from migration and β is the wage elasticity of labour supply.

Solving (1) and (2) for wages and employment and using the equilibrium condition ($L^s=L^d=L$), the changes in labour market equilibrium wage and employment level are given by:

$$\Delta W = \frac{\Delta X - \Delta M}{a + b} \tag{3}$$

$$\Delta L = \frac{b\Delta X - a\Delta M}{a + b} \tag{4}$$

Given measures of ΔM and ΔX, the coefficient on this variable in a wage equation is an inverse function of the sum of the labour demand and labour supply elasticities. As noticed by Freeman and Katz (1991), we do not observe the shifts in derived labour demand induced by, e.g., an increase in world market competition in our data. What we do observe are industry sales, which are endogenous with respect to wages. Our indicators for shifts in labour demand and labour supply are market sales, exports, and imports. Sales, however,

depend on both industry supply and demand. To assess the magnitude of this simultaneity bias we take the demand for industry products to be given by

$$\Delta Q = -c\Delta P + \Delta X \tag{5}$$

where c denotes the elasticity of product demand with respect to prices. The industry production technology is taken to be constant returns to scale. In consequence prices depend solely on costs of production

$$\Delta P = l\Delta W \tag{6}$$

where l is labour's share in total cost and industry wages are determined according to (3). Substituting (6) into (5) we get a relationship between output and wages. For our purposes, however, it is more convenient to formulate this relationship in terms of sales which are the sum of log Output (Q) and log Prices (P) ($\Delta Y = \Delta Q + \Delta P$). This gives:

$$\Delta Y = l(1-c)\Delta W + \Delta X \tag{7}$$

Solving (7) for ΔX and substituting into (3), finally yields the wages in an industry as a function of industry sales and the labour supply shock:

$$\Delta W = \frac{\Delta Y - \Delta M}{a + b + l(1-c)} \tag{8}$$

Furthermore Freeman and Katz (1991) suggest identifying the shock to labour supply by

$$\Delta M = b\Delta IMS \tag{9}$$

where IMS is the share of immigrants employed in the industry under consideration. They also show that total nominal sales can be decomposed into changes of the logarithm of domestic demand (D), exports (E) and changes in import share (MSHR) in the following way:

$$\Delta Y = w_1\Delta D + w_2\Delta E - w_3\Delta MSHR \tag{10}$$

with MSHR the share of imports in total domestic demand. Equation 10 states that the total change in industry wide sales is the weighted sum of the change of different product demand components (domestic demand, exports and import shares). The weights are, respectively, the share of domestic consumption in total sales (i.e. ω_1 = (Y-E)/Y), the exports to sales ratio (ω_2 = E/Y), and the share of demand for domestic production (ω_3 = (Y-E+M)/Y).

Substituting (9) and (10) into (8) thus gives

$$\Delta W = \frac{w_1 \Delta D + w_2 \Delta E - w_3 \Delta MSHR - b \Delta IMS}{a + b - l(1-c)} \tag{11}$$

the expression for the industry wide wage growth.

To move from industry level wages to individual wages, we augment a simple Mincer type earnings function with the trade related variables as suggested in our model.[3] Let Δ ln $W_{ij,t}$ denote the change in log earnings between time periods t and t-1 for individual i in industry j at time t. For these individuals we estimate the regression

$$\Delta W_{ij,t} = g' Z_{ij,t} + d_1(w_{1,j} \Delta D_{j,t}) + d_2(w_{2,j} \Delta E_{j,t}) + d_3(w_{3,j} \Delta MSHR_{j,t}) + d_4 \Delta IMS_{j,t} + e_{ij,t} \tag{12}$$

where Z is a vector of personal and industry characteristics in the industry of employment of the worker in 1991. γ, δ_1, δ_2, δ_3 and $\delta 4$ are the parameters to be estimated. The $\omega_{k,j}$ are weights as defined above and have been used in the construction of the data. In equation (12) the marginal effects of domestic demand growth, export and import growth are thus not given by the estimated parameters (δ_i), but by the parameters times the average weights over industries ($\delta_i \omega_{i,j}$). In our case the manufacturing wide weights take on the following values: ω_1=0,56, ω_2=0,94 and ω_2=1,11.

Since equation (9) is in first differences only individual characteristics shifting the wage profile should be included in our regression. We include the change in age squared, a dummy for region stayers as well as a dummy variable for sector movers and an interaction variable for age and blue-collar worker status in the vector (Z). This is necessary, since industry movers reach only 2/3 of the wage growth of industry stayers and since previous research has shown that earnings profiles of white-collar worker are much steeper than the profiles of blue-collar workers in Austria (see e.g. Hofer et al. 1998).

V. Results

Since theory suggests that the volume of trade, domestic demand, and migration are endogenous, we use instrumental variable techniques. Our instruments are the change in German export- and import growth between 1991 and 1994, Austrian export and import

3 Formally, this can be justified by assuming that individual wage growth is the sum of an individual specific and an industry specific effect. The industry specific effect is explained by industry demand and supply and the individual specific effect by individual variables.

shares in 1991, the migration share in 1991, the change in migration between 1991 and 1988, the change in capital intensity between 1991 and 1994, and the R&D to sales ratio.[4]

Table 3: Effects of Changes in Domestic Demand and Trade on Wage Growth, 1991-94

	Total Workers		Industry Stayers	Industry Movers
	(1)	(2)	(3)	(4)
constant	0.179 (0.010)	0.185 (0.010)	0.201 (0.013)	0.256 (0.030)
weighted change in domestic demand	0.147 (0.043)	0.121 (0.042)	0.092 (0.036)	0.110 (0.107)
weighted change in exports	0.273 (0.107)	0.261 (0.106)	0.201 (0.086)	0.328 (0.331)
weighted change in import share	-0.182 (0.092)	-0.194 (0.091)	-0.049 (0.073)	-0.256 (0.276)
change in share of foreigners	-0.191 (0.169)	-0.218 (0.168)	-0.002 (0.136)	-0.931 (0.503)
change in age squared (*100)	-0.017 (0.003)	-0.022 (0.003)	-0.019 (0.003)	-0.006 (0.012)
region stayer	0.042 (0.005)	-0.011 (0.006)	-0.006 (0.012)	-0.010 (0.011)
interaction blue-collar worker times change in age squared (*100)	-0.014 (0.002)	-0.013 (0.002)	-0.012 (0.001)	-0.015 (0.005)
sector stayer		0.071 (0.006)		
lambda			0.036 (0.007)	-0.089 (0.028)
test $ß_D=ß_X= -ß_{MSR}$	0.768	1.043	1.237	0.259
R^2	0.03	0.04	0.06	0.03

Note: To account for the potential selectivity of the mobility decision we adopt Lee's (1983) correction methodology in regressions for movers and stayers. The multinomial logit selection equation contains age, experience, job tenure, unemployment 1987-90, dummy for blue-collar worker, trade openness in industry 1991, employment growth in industry 1980-91 and the inter-industry wage differential. The following instruments are used: change in German export and import growth 1991-94, Austrian export and import shares in 1991, migration share in 1991, change in migration between 1991-88, change in capital intensity between 1991-94 and R&D to sales ratio.

4 We performed a Davidson/McKinnon test for exogeneity (see Davidson and McKinnon 1993, 237-240). The test statistic of 9.35, which is F-distributed, rejects the null that an OLS estimation would yield consistent estimates. Therefore, we decide to present only results of instrumented equations.

Our estimation results from equation (9) point to a significant negative influence of changes in imports on wage growth. The effect of migration is also negative, but not statistically significant at the 10 % level. In contrast, domestic demand and exports growth influence wage growth positively. When we adjust the coefficients of our estimates by the relevant weights to calculate marginal effects, our estimates suggest that a 10 percent increase in domestic demand yields an additional wage growth rate of about 0.65 to 0.8 percent, an equivalent increase in exports leads to a wage growth of about 2.5 percent, and an increase of the import share by 10 percentage points leads to a reduction of wage growth of 2.0 to 2.2 percentage points. Finally, an increase of the migrant share in an industry by 10 percentage points reduces wages by 2 percentage points. This effect is not significant at the 10 % level, however.

In comparison to other studies, these coefficients are relatively high. Thus, for Austria as a small open economy, foreign trade variables have a much stronger effect on wages than in the US. Katz and Freeman (1991) found a highly significant coefficient for the change in domestic sales (0.029) and insignificant coefficients for change in exports (0.008) and change in import share (-0.011) for the US. Edin, Fredrickson and Lundberg (1999) report coefficients of 0.0487, 0.0549 and -0.0598 for Sweden.[5] In comparison to other Austrian studies, our results are, however, of a comparable magnitude. Winter-Ebmer and Zimmermann (1998) report coefficients of –0.164 for the foreigner share and insignificant results for all but rest of the world export share with a coefficient of 0.240.

The coefficients of the control variables used in the different specifications are in line with a priori expectations. Wage growth is negatively related to the square of age. Workers not changing their region of work receive an additional wage growth of 0.04 percent, at least as long as we do not control mobility across industries. In accordance with our hypothesis, white-collar workers have a steeper wage-profile than blue-collar workers. Finally, a change of industry is associated with a significant reduction of wage growth amounting to 0.07 percentage points.

The R^2 of our wage growth regressions is rather low. To test the robustness of our results we experimented with additional control variables such as dummies for resource intensive, labour intensive and capital intensive industries and a dummy variable for changes from white-collar to blue-collar status as well as the change in average labour productivity in the industry. The results are robust to these changes. Depending on the specification, the coefficient of domestic sales is between 0.10 and 0.15. For exports we found a variation between 0.37 and 0.19. The effect of imports varies between –0.20 and –0.01, and the coefficients on the share of migrants ranges between –0.19 and –0.42.

5 One should be careful in comparing the different results, since there is evidence that the size of the reported coefficients depend on the number of industries under consideration. For example, using only 36 industries for Sweden yield in stronger effects (0.0622, 0.092 and -0.0885).

Our model assumes that labour markets respond similarly to changes in sales due to trade-related factors and to those due to domestic factors. When labour markets are unionised with unions giving substantial power to senior workers there may be, however, substantial asymmetries in the reaction. In such a labour market, a positive export shock would be mainly absorbed through increased wages, since the employment of new workers weighs little relative to a possible wage increase in the eyes of existing insiders. Increased imports by contrast could be absorbed mainly through quantity adjustments of junior workers. To investigate this issue further and as an additional specification test, we estimate our baseline equations with the restriction $\delta_1=\delta_2=-\delta_3$ and test this hypothesis. We cannot reject this hypothesis in any of the specifications tried.[6]

Finally, Aiginger et al. (1996) argue that it is important to distinguish between industry stayers and movers. A worker expecting a wage cut because of negative trade shocks may move to another industry. The possible endogeneity of industry mobility leads to a methodical problem. Confining regression analyses to workers without industry change may lead to biased estimates if workers select themselves non-randomly. Therefore, we follow Aiginger et al. (1996) and adopt Lee's (1983) correction method. This two-stage method involves the estimation of a multinomial logit model in the first stage, which estimates the probability that an individual is in one of the several possible states. In a second step, OLS for subgroups can be run, including a selectivity correction term calculated from multinomial logit (see: Greene 1995, 648-650).

The selectivity term in our regressions (reported in columns 3 and 4 in table 3) is significant, which confirms the necessity to control for endogeneity. The wages of industry stayers respond positively to improved demand conditions. In particular, the response to export growth is stronger than the response to domestic demand. Imports and migration, in contrast, have no significant negative influence on wage growth of industry stayers.

For industry movers coefficients of trade variables and domestic demand are larger than for industry stayers, but are not statistically significant at any conventional significance level. This suggests substantial heterogeneity of industry movers with respect to their trade and migration induced wage growth. Thus, in contrast, to Aiginger et al. (1996) we find no evidence that industry changers are able to escape from jobs more vulnerable to imports or migration. The negative influence from migration is even statistically significant at the 10 %-level. These different results may be due to differences in the business cycle situation. In the years from 1988 to 1991 the Austrian economy boomed, whereas the period from 1991 to 1994 was characterised by only moderate economic growth.

6 Finally, we were also concerned, whether trade with the CEE had a different impact on wages than trade with the rest of the world. Thus, we tested this hypothesis, and could not reject equal effects for both imports and exports from/to the CEE and the rest of the world.

1. Blue and White-Collar Workers

In the next step we analyse the distributional consequences of trade. This topic received substantial attention in the economic literature (see Cline, 1997 for a recent survey). Some authors argue that increasing trade with low-wage countries is the main cause for the increased inequality in the U.S. The hypothesis that globalisation primarily hurts low skilled labour, has at best, mixed empirical support.

In the Austrian case, there are furthermore differences in the wage bargaining process and in the earnings profiles of (less-skilled) blue–collar and (skilled) white-collar workers, which would lead us to expect white-collar workers to respond less strongly to trade and migration shocks. The trade unions of the blue-collar workers (there are currently 9 of them) are organised according to the branch of industry. All salaried employees in the non-state sector belong in contrast to the Union of Salaried Private Sector Employees.[7] This may have implications for wage flexibility in the face of import and export shocks.

Finally, in the payment schemes of white-collar workers seniority plays a much more important role than for blue-collar workers. This may also reduce responsiveness of wages to external shocks. Therefore, we analyse separately the labour market consequences of trade for blue-collar and white-collar workers.

Table 4: Effects of Changes in Domestic Demand and Trade on Wage Growth, 1991-94 Blue-Collar Worker (N=6706) and White-Collar Worker (N=2239); robust t-values in parenthesis

	(1)	*(2)*	*(3)*	*(4)*
	Blue-Collar		*White-Collar*	
weighted change in domestic demand	0.173 (0.046)	0.144 (0.045)	-0.067 (0.120)	-0.077 (0.119)
weighted change in exports	0.236 (0.115)	0.228 (0.114)	0.161 (0.288)	0.133 (0.288)
weighted change in import share	-0.261 (0.100)	-0.268 (0.099)	0.116 (0.203)	0.108 (0.203)
change in share of foreigners	-0.237 (0.184)	-0.290 (0.182)	0.197 (0.462)	0.254 (0.463)

Note: Regressions (1) and (3) include controls for age squared, and a region stayer dummy. Regressions (2) and (4) include additionally a sector stayer dummy. The following instruments are used: change in German export and import growth 1991-94, Austrian export and import shares in 1991, migration share in 1991, change in migration between 1991-88, change in capital intensity between 1991-94 and R&D to sales ratio.

[7] See Pollan (2000) for a recent survey of Austrian wage bargaining institutions.

In accordance with these arguments we find no significant influence of trade on wage growth for white-collar workers. Indeed, our results indicate that changes in domestic demand also do not affect wage growth of white–collar workers. In consequence, the wage structure of white-collar workers does not seem to be flexible with respect to changes in product market conditions in particular industries. This is in line with our hypothesis that under a centralised system of wage bargaining and an important role for seniority – as in the case for Austrian white-collar workers – shifts in product demand have little effect on wages.

The results for blue-collar workers, where wage bargaining takes place on a sectoral level and seniority is less important for pay, in contrast, show significant responses of wage growth to changes in product market demand conditions. Higher domestic demand and higher export growth increase wage growth significantly, whereas higher import growth as well as migration reduce wage growth. The influence of migration is, however, only marginally significant.

VI. Sectoral Mobility and Non-employment

If the wage structure is not flexible with respect to trade and migration shocks, employment adjustments will occur. Negative shocks could force workers to switch to another industry or trigger unemployment. This topic is examined by investigating the labour market status of our sample of male Austrian workers in May 1994. We differentiate between three groups. Those who stayed in the same industry (6317 workers in our sample), those who moved to another industry (2628 people), and those who were not employed in May 1994.

We apply a multinomial logit model (see Greene 1997). This model estimates the probability that an individual is in one of several possible states. The following three states are used: industry stayer, industry mover and non-employed. As reference category we define employment in the same industry in May 1991 and May 1994 (state 0). An individual is in state 1, if he changed industry. If an individual is out of work in May 1994 he belongs to state 2.

The selection of individual i into one of these categories is determined by a vector of individual specific variables $\tilde{Z}_{ij}$. The multinomial logit specifies the probability that individual i is found in state j, P_{ik} is given by:

$$P_{ik} = \frac{\exp(\mathbf{b}'_k \tilde{\mathbf{Z}}_{ij})}{1+\sum_k \exp(\mathbf{b}'_k \tilde{\mathbf{Z}}_{ij})} \tag{13}$$

where b_j (j=1,2) is a vector of coefficients determining the selection into state j. $b_0 = 0$ is taken as a normalisation. The model implies that we can compute J log-odds ratios

($\ln(P_{ij}/P_{io})= b_j'Z$, and $\ln(P_{ij}/P_{ik})=Z_i' (b_j-b_k)$), respectively. Therefore, we may write $\delta\ln(P_{ij}/P_{io})= b_j$ and $\delta \ln(P_{ij}/P_{ik})= (b_j-b_k)$. This means that a positive coefficient increases the likelihood to be found in state j rather than in the reference state 0 (industry stayer). The difference between the coefficients is relevant to evaluate the impact of some variables on the probability ratio between the states 1 and 2.

The vector Z contains the following control variables: age and its square, a dummy for blue-collar worker, two dummies for firm size (20-100 employees; above 100 employees), 2 regional variables (Vienna; other cities with more than 100.000 inhabitants), tenure, number of jobs until 1991, and the industry wage premium[8] in 1991.

The estimated coefficients of the control variables are all in line with our expectations. Younger workers tend to be more mobile between industries and have a higher chance to become unemployed. The strong influence of the age squared term, however, points to an increasing risk of unemployment with age. Blue-collar workers have a higher probability of being out of work. Working in a bigger firm increases the likelihood of being employed in the same industry as in 1991 and reduces the risk of non-employment. Workers with long tenure also face a higher probability of working in the same industry. An unstable working-career increases sectoral mobility and the risk of non-employment. The industry wage premium is an important determinant of the mobility decision. Furthermore, working in an industry with positive employment growth since 1980 reduces the unemployment risk, and, finally, workers in resource-intensive and in scale and capital intensive industries are more likely to stay in the same industry.

The estimation results concerning sectoral mobility confirm our earlier conjecture that in the 1991 to 1994 period mobile workers were not able to escape from sectors affected by trade and migration growth. Higher import growth rates as well as higher migration are actually negatively correlated with the probability to move across sectors for both blue-collar and white-collar workers. These coefficients, however, are insignificant for changes in migration.

[8] See Hofer (1996) for a calculation of the inter-industry wage differentials.

Table 5: Multinomial Logit Model: Sectoral Mobility, Non-employment and Migration and Trade

	Industry Mover Vs Industry Stayer			Non-Employment Vs Industry Stayer		
	Total	Blue-Collar	White-Collar	Total	Blue-Collar	White-Collar
constant	2.581	2.328	2.995	4.322	5.156	2.861
	(0.393)	(0.454)	(0.836)	(0.432)	(0.481)	(1.046)
age	-0.118	-0.114	-0.096	-0.375	-0.422	-0.232
	(0.023)	(0.028)	(0.045)	(0.024)	(0.027)	(0.054)
blue-collar	-0.061			0.302		
	(0.058)			(0.074)		
size2	-0.390	-0.314	-0.638	-0.584	-0.538	-0.755
	(0.070)	(0.081)	(0.143)	(0.087)	(0.098)	(0.187)
size3	-0.594	-0.587	-0.731	-0.688	-0.653	-0.832
	(0.065)	(0.074)	(0.135)	(0.082)	(0.090)	(0.181)
Vienna	0.042	-0.042	0.225	0.013	0.092	-0.141
	(0.062)	(0.076)	(0.113)	(0.073)	(0.086)	(0.151)
big city	-0.005	0.023	0.012	0.009	-0.137	0.325
	(0.080)	(0.094)	(0.159)	(0.095)	(0.115)	(0.185)
tenure	-0.138	-0.127	-0.171	-0.105	-0.112	-0.088
	(0.011)	(0.013)	(0.023)	(0.013)	(0.015)	(0.307)
number of Jobs	0.071	0.079	0.017	0.120	0.124	0.112
	(0.007)	(0.008)	(0.020)	(0.008)	(0.009)	(0.237)
inter industry wage differential	2.662	3.089	0.836	1.812	2.104	0.525
	(0.628)	(0.751)	(1.194)	(0.772)	(0.903)	(1.517)
employment growth in industry	-0.855	-0.355	-2.163	0.267	-0.116	1.402
	(0.407)	(0.425)	(1.256)	(0.546)	(0.535)	(1.779)
age squared (*100)	0.122	0.107	0.106	0.570	0.643	0.341
	(0.032)	(0.039)	(0.061)	(0.032)	(0.037)	(0.072)
resource intensive industry	-0.453	-0.332	-1.031	-0.175	-0.004	-0.210
	(0.155)	(0.164)	(0.574)	(0.194)	(0.203)	(0.758)
labour int. industry	0.376	0.287	0.456	-0.089	-0.068	-0.143
	(0.100)	(0.114)	(0.225)	(0.132)	(0.145)	(0.319)
scale int. industry	-0.605	-0.570	-1.004	-0.048	-0.630	-0.159
	(0.168)	(0.191)	(0.473)	(0.206)	(0.233)	(0.625)
weighted change in exports	-4.620	-3.718	-9.036	-7.489	-5.968	-12.725
	(1.800)	(2.133)	(3.581)	(2.188)	(2.517)	(4.660)
weighted change in import share	-6.904	-3.899	-9.695	4.279	4.714	3.859
	(1.658)	(1.828)	(3.931)	(2.448)	(2.483)	(5.961)
weighted change in domestic demand	2.388	2.300	3.342	0.036	0.439	0.144
	(0.880)	(0.945)	(2.972)	(1.108)	(1.188)	(3.800)
change in share of foreigners	-9.608	-6.328	-24.137	11.608	10.556	8.608
	(3.685)	(3.866)	(13.474)	(4.698)	(4.682)	(18.742)

Note: Standard errors are in parenthesis. The following instruments are used: change in German export and import growth 1991-94, Austrian export and import shares in 1991, migration share in 1991, change in migration between 1991-88, change in capital intensity between 1991-94 and R&D to sales ratio. *** (**,*) significant at 1 % (5 %, 10 %) level.

In the less favourable macro-economic environment during the 1991 to 1994 period, labour market adjustments were primarily carried by movements to non-employment. Exports had a positive impact on the labour market opportunities of workers, whereas imports and migration harmed the affected workers. Workers unemployment risk was strongly affected by trade and migration variables. Increased exports reduce the unemployment risk, while both higher imports and migration shares increase the unemployment probability. Once again these results indicate quite different responses for blue- and white-collar workers. While both these worker types significantly profit from increased exports through lower non-employment risks, only blue-collar workers face a significantly higher non-employment risk, through increased import growth and migration.

VII. Conclusions

Austria was strongly affected from the breakdown of the communist regimes in Eastern Europe. It is a consensus opinion that Austria profited from the opening of Eastern Europe. Export induced employment demand has outperformed employment losses due to increased imports. This paper presents evidence with respect to the labour market consequences of trade from the time period 1991 to 1994 and a data set not previously analysed for this purpose. We concentrate on the experience of male workers employed in manufacturing in 1991. We focus mainly on wage and mobility effects.

Our results suggest that in the period 1991 to 1994 Austrian wages responded significantly to changes in domestic sales, export growth, import growth and migration. Furthermore, they indicate substantial differences in the wage responses of blue-collar workers and white-collar workers. The wage structure of white-collar workers seems to be rigid with respect to changes in migration and trade as well as domestic demand. Blue-collar workers wages are significantly affected by all these variables. An one-percentage point increase in export (import) share increases (reduces) wage growth of blue- collar workers by approximately 0.2 to 0.3 percent. An increase in the share of foreigners in a particular industry by one percentage point reduces the wage growth of blue-collar workers by 0.2 percentage points over the time period. This effect, however, is only marginally significant.

The markedly different response of blue and white-collar wage growth in response to trade and migration leads us to examine the connection between trade, migration and mobility. Overall, we find a that an increase in exports reduces the likelihood of a worker becoming unemployed relative to staying in the same industry, while increased imports increase the chances of moving into non-employment. Also, higher exports as well as higher imports imply a lower chance of a move across sectors rather than staying within the industry. Migration, finally, reduces the relative probability of moving sectors and increases the chances of moving to non-employment relative to staying within an industry.

When we estimated our multinomial logit model for blue and white-collar workers separately, we found only blue-collar workers are confronted by higher unemployment risks from increased migration and imports.

Some limitations for interpretation of the study have to be mentioned. Our analysis considers only workers already employed in manufacturing in 1991. We exclude the recruitment of new workers in manufacturing, which also may be affected by trade. The concentration on manufacturing with respect to trade is necessary due to data availability. Furthermore, the explanatory power of our wage regressions is rather weak. There are huge differences in wage growth within the industries. The problems of matching employment data with trade and migration data may contribute to the weak statistical significance of some of our results. We could distinguish only 25 industries with respect to trade and 10 with migration. A more detailed industry classification, which would allow a better concordance between trade data and employment data, could improve the precision of our estimated impacts.

Aside from these limitations our results support the view that an Eastward Enlargement of the European Union would have only small consequences for the Austrian wage development. For instance, a recent study by Boeri and Bruecker (2000) calculates a migration potential of around 210.000 additional foreign residents in Austria by 2010. Under the extreme assumption that the labour market participation rate among these migrants is 100 %, this amounts to a 5.3 percent increase of the foreigner share in the labour force and would imply a reduction in the wage growth for blue-collar workers equal to 1.1 percent, relative to a scenario without migration. White-collar workers remain unaffected. Egger (2000) calculates an additional growth of approximately 0.5 % annually for both imports and exports triggered by enlargement of the European Union. Since the hypothesis that coefficients for imports and exports are equal cannot be rejected in any of our results, the total wage effect from foreign trade should be negligible.

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