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March 2008

WORKINGPAPER SERIES

Number 165

POLITICAL ECONOMY RESEARCH INSTITUTE

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Abstract

This paper estimates a labor demand equation based on the panel data of manufacturing industry in the Central and Eastern European Countries (the Czech Republic, Hungary, Poland, Slovakia, Slovenia, Lithuania, Bulgaria, and Romania) in order to test the effect of domestic factors (wages and output) and international factors (exports, imports, and FDI) on employment during the era of post-transition recovery. The findings indicate that employment does not respond to wages in more than half of the cases. The output elasticity of labor demand is mostly positive, but low, with a number of cases where employment is completely de-linked from output. An impressive speed of integration to the European economic sphere through FDI and international trade has not prevented job losses in the manufacturing industry. While there are very few cases of positive effects, insignificant effects of trade and FDI dominate the findings with some evidence of negative effects as well.

Key words: Central and Eastern European Countries, employment, FDI, trade
JEL Code: F16, F21, J23

[1] The author is grateful to Paul Ramskogler for the excellent research assistance, to an anonymous referee, Engelbert Stockhammer, and Markus Leibrecht for fruitful discussions, and to the Vienna Institute of International Studies, and in particular to Monika Schwarzhappel, and Renate Prasch for their valuable support about data. Needless to say, all remaining errors are mine.

1. Introduction

This paper aims at exploring the employment developments in the Central and Eastern European Countries (CEECs) in the post-transition era and the effects of integration with the world economy on employment, in particular with the European economic sphere through trade openness and FDI. In the early 1990s during the initial phase of transition CEECs faced a severe recession due to both supply and demand shocks as well as major institutional changes. The adjustment in labor markets to these shocks took place under the starting conditions of high levels of disguised unemployment along with high labor force participation rates in the centrally planned economies due to the target of full employment (Brada, 1989; Kornai, 1995; Blanchard, 1998). Nevertheless, in the early phase of transition the reduction in output was much more pronounced than the increase in unemployment. Izyumov and Vahaly (2003) show that the linkages between unemployment change and output were highly unstable during the early transition period. The political concerns about unemployment, the preservation of soft budget constraints in many state owned firms, low labor mobility particularly due to firm-specific non-wage benefits or infra-structure problems are cited as some reasons explaining this inertia. The transition crisis was replaced by a recovery in output starting from the second half of the 1990s in the Visegard Countries and Slovenia and in the late 1990s in the Baltic States and Bulgaria and Romania, but as market transition matured dramatic changes in the sectoral structure of employment and wages emerged in the CEECs (Havlik and Landesmann, 2005; Boeri and Terrell, 2002). In aggregate compared to the pre-transition era there has been a sharp contraction in employment, an increase in open unemployment, a massive exit from the labor market, and only moderate job creation.

One question is how much of that negative development in employment in the post-transition era can be related to the previous labor hoarding. While earlier research on “idle employment”

in the CEECs indicates the continuation of the problem (eg. Kajzer, 1995; Jackman, 1994) or even an increase in "overemployment" or "labor hoarding" (e.g. Gora, 1995) during the early transition era, later studies find out that employment became much more responsive to recessions after mid 1990s, indicating that the labor hoarding problem of the previous phase had already started to be reversed (Boeri and Garibaldi, 2005; Basu et al, 2005); also firms in the transition economies started to impose hard budget constraints on each other later during the transition phase (Schaffer, 1998). Basu et al (2005) estimate employment elasticities with respect to sales based on firm level data and find that Hungary had already high elasticities at the beginning of the transition phase; Poland went into the transition less reformed but achieved high elasticities through the transition years; and Czech and Slovak Republics also rapidly reached to high elasticities, although they started from employment regimes, which were rather unresponsive to sales. The evidence presented by Basu et al (2005) also do not support the hypothesis that State Owned Enterprises responded less flexibly to sales conditions. Based on a panel data analysis for the aggregate economy, Boeri and Garibaldi (2005) show that in the aftermath of 1996, recession periods led to significant job destruction, whereas expansions in GDP did not lead to statistically significant job creation in the CEE-10. Indeed high rates of output growth in the CEECs in the post-recession era generated fewer jobs than stagnation in the other countries of the EU (Boeri and Garibaldi, 2005). Izyumov and Vahaly (2003) find a lower Okun's coefficient of -0.526 (effect of GDP growth on the change in unemployment) in the 10 CEECs in the post-recession era of 1995-2000 compared to the coefficient for EU15 (-0.799). Based on the empirical evidence in Basu et al (2005) and Boeri and Garibaldi (2005) that labor hoarding had already started to be reversed during the transition era, the continuation of the problem of jobless growth more than a decade after the starting of a major processes of privatization and structural change is worth further analysis going beyond the old over employment problems of the planned economies. Lehmann (1995) argues that severe and persistent shortages in capital and managerial ability may result in

keeping labor demand weak in the medium term. OECD (2005) points out that the large negative structural shocks in the CEECs, such as those associated with opening economies to trading at world prices have resulted in a substantial increase in unemployment that persists for a considerable period of time. It is one of the concerns of this study to explore the link between employment and output particularly for the period of 2000s –at a time when the countries had achieved a long way in terms of integration to world economy through market mechanisms.

The situation in manufacturing employment is even more dramatic, which decreased in all countries not only in the first period of transition recession, but also in the post-recession period. In aggregate the jobs created in the services have off-set the negative effects of the major downsizing in the manufacturing industry, but even during the uninterrupted growth years of 2000s new service jobs have just sufficed to generate stagnation in total employment (Hungary, Czech Republic, Slovakia, Lithuania, Bulgaria), or in some cases could not even compensate for the job losses in manufacturing (Poland, Romania); only in Slovenia, Estonia, and Latvia there has been modest increases in employment. Table 1 shows the annual average growth rates in GDP and total employment for the period of 2000-2005.

Table 1 can be inserted approximately here

Another important concern is about the quality of the jobs created in the service sector. Although the shift in employment from industry towards services is a pattern, which goes along with improvements in productivity, and can be observed in developed countries as well, Reinert and Kattel (2004) point out that the type of deindustrialization in the CEECs is qualitatively very different from the slow 'de-industrialization' of high-income countries, which

upgrade into a knowledge-intensive service sector; in contrast the service jobs created in the CEECs are mostly low –skilled and low-paying jobs.

A further controversial fact is that rapid improvements in exports and foreign direct investment have so far not been able to reverse the stagnation in aggregate employment or the decline in manufacturing employment in the CEECs. Hunya and Geishecker (2005) provide evidence about the nature of FDI flows, which can account for this development to some extent. About half of the FDI in the New Member States between 1990 and 1998 was in the form of privatization-related acquisition, and the restructuring of the former state-owned enterprises led to massive labor shedding. In later years, especially in manufacturing, most of the new FDI has been investment in new assets; however even then although new capacities usually increased employment, technological progress also led to lay-offs simultaneously. Moreover most of the greenfield jobs have been created in the services sector such as banking, retail and real estate. Irrespective of the initial method of entry, FDI is now increasingly taking the form of reinvestment of profits, the results of which are yet to be seen. Apart from the direct effects, indirect negative effects of FDI are also observed (Hunya and Geishecker, 2005): jobs were destructed through negative spillovers as foreign investors replaced traditional domestic suppliers by imports or domestic firms disappeared or downsized due to intensified competition of larger and technologically more advanced subsidiaries of multi-national enterprises. Overall Hunya and Geishecker (2005) find that domestically-owned manufacturing companies reduced the number of employed while foreign-owned enterprises expanded that number. In this study the effects of FDI as well as foreign trade on employment at a sectoral level will be estimated in order to shed light on the aggregate direct and indirect job creation and destruction effects.

Regarding the role of labor market institutions in determining labor demand many indicators show that the newly formed labor markets in the CEECs are rather flexible. Thus wage or employment rigidity does not seem to be the reason behind the disappointing employment performance in the 2000s. Based on panel data estimation of wage bargaining equations for the sub-sectors of manufacturing in the CEECs, Onaran and Stockhammer (2006) find that wages are highly flexible with respect to unemployment. Boeri and Garibaldi (2005) report that wage floors in the New Member States (NMS) are often not binding, and are rarely enforced in the private sector; the ratio of minimum wage to the average wage is around 30% compared to a ratio of 50% on average in EU15. Also collective bargaining coverage rates are very low compared to the EU-15, although union density rates are more comparable (Boeri and Garibaldi, 2005). Regarding employment flexibility, Hungary, Czech Republic, and Slovakia are ranked in the more flexible half of the OECD countries according to the Index of Rigidity of Employment Protection Legislation of OECD (2004). The Employment Rigidity Index in World Bank's Doing Business Report (2006) rank the four OECD members in CEE (Czech Republic, Poland, Hungary, and Slovakia, the first being the most flexible) at a level between fifth to ninth among 20 countries, where Ireland is ranked the sixth.

The analysis in this paper covers only the manufacturing industry due to data limitations; nevertheless manufacturing industry is rather significant for the economy, accounting for an important part of total GDP and employment, almost half of the FDI, and almost all of the merchandise exports and imports. Also manufacturing employment has been hit the hardest throughout the process of transition, and it has not recovered since then. The paper first estimates a labor demand equation for the sub-sectors of manufacturing industry in order to test the effect of output and wages on employment. Second, after controlling for wage and output, the paper tests whether integration to the world economy via foreign trade and FDI improved the employment creation capacity of the manufacturing industry, or quite on the

contrary, whether intense competitive pressures have led to a downward shift of the labor demand curve. The labor demand equation is estimated for each country separately based on the panel data of manufacturing industry, supplied by the Vienna Institute of International Studies. Due to data availability for trade and FDI at a sectoral level the period of analysis is the later stages of post-transition recovery. Thus, the severe contractions in economic activity in the early and mid 1990s, as well as the possible continuity of the post-recession adjustment process in terms of reducing over employment do not distort the estimations. The countries explored are the eight CEECs, for which data is available - the Czech Republic, Hungary, Poland, Slovakia, Slovenia, Lithuania, Bulgaria, and Romania. The other two Baltic countries, Estonia and Latvia, are left out of analysis due to data problems regarding changing sectoral classification through time.

The paper consists of five sections, including this introductory one. Section 2 presents the labor demand equation. Section 3 discusses the descriptive statistics of the working sample. Section 4 presents the estimation methodology and empirical results, and Section 5 concludes.

2 Labor demand model

The analysis in the paper is based on a labor demand equation, derived from a production function following the methodology used in Greenaway et al. (1999) and Hine and Wright (1998) for UK, and Milner and Wright (1998) for Mauritius. This methodology was also used by Stehrer (2004) for analysing trade effects on employment in the OECD countries. The analysis is based on a fairly simple model of a profit maximising firm with a Cobb-Douglas production function:

$$Q_i = A^{\delta} L_i^{a} K_i^{b} \quad (1)$$

where Q_i is real output, L_i is employment and K_i is capital stock in sector i; a and b represent factor share coefficients and δ allows for factors changing the efficiency of production process. Substituting marginal productivity equations into the production function, where real returns to labour (WR) equals marginal productivity of labour and returns to capital (C) equals marginal productivity of capital in the case of a profit maximising firm, the following expression for output is obtained:

$$Q_i = A^{\delta} (L_i a/b * WR/C)^{a} L_i^{b} \quad (2)$$

Taking logarithms and rearranging the terms, the industry's derived demand for labour is obtained as:

$$\ln L_i = c_0 - c_1 \ln (WR/C)_i + c_2 \ln Q_i \quad (3)^2$$

Theoretically a positive labor demand effect of output is expected, but given the massive rationalization and downsizing in the CEECs, the output elasticity of labor demand might be rather low. Again the demand for labor is expected to be negatively affected by the real wages from this point of view; however this is an empirical issue for this paper to be tested in the context of CEECs. Moreover wages may also be affected by the demand for labor, leading

[2] In this equation $c_0=-(\delta \ln A+a\ln a-a\ln b)/(a+b)$; $c_1=-a/(a+b)$; $c_2= 1/(a+b)$ (see Greenaway et al, 1999).

to a problem of endogeneity, which will be handled below at the stage of econometrical estimation by using the lag of wages as explanatory variable or implementing instrumental variable techniques.

In this model, for the sake of simplicity, the cost of capital is supposed to vary only over time, assuming perfect capital markets; thus its variation is captured by time dummies at the stage of estimation (Milner and Wright, 1998). Although this is a strong assumption, it is convenient in our case where there is no reliable data about the costs of capital, and interest rates are not a good proxy. Also it is not convenient to assume a priori that capital is a substitute for labour, rather it can be a complementary input, or it is also possible that the cost of capital can have no direct impact on the demand for labour, since technology is fixed in the short-run. This would also be the case if the firm has excess capacity.

Additionally the technical efficiency of production, A, which is part of the constant term, c_0, is expected to increase over time, and this effect will be captured by time dummies. At this stage in order to test the effects of openness on labor demand, technical efficieny is modelled as a function of international trade, hypothesizing trade induced technological change (Greenaway et al., 1999). In Milner and Wrigt (1998) and Hine and Wright (1998) expected effects of trade liberalization due to the changes in the labor intensity of production as a response to the comparative advantage of the country are also discussed. The effects of trade through these different channels are discussed in more detail below. As an extension to these models we also integrate the effect of FDI on the technical efficiency and labor intensity of production.

Thus the following function forms the basis of the estimations:

$$\ln L_i = f\left(\beta_i, \alpha_t, \ln Q_i, \ln WR_i, FDIQ, XQ_i, MQ_i\right) \qquad (4)$$

where $\ln L_i$, $\ln Q_i$, $\ln WR_i$, $FDIQ_i$, XQ_i and MQ_i are the employment (in logs), real output (in logs), real wage (in logs), inward FDI stock/output, exports/output and imports/output in sector i respectively. β_i is a sector specific coefficient. α_t is the time dummy, capturing the changes in capital costs and other time specific shocks as well as technical change not captured by international trade and FDI. Other factors such as employment taxes or institutional factors like employment legislation that may affect labor demand are captured also by the time dummy, since the analysis of these effects, albeit interesting, are outside the scope of this paper.

The effects of international trade and capital flows on employment vary among economic theories. Based on Heckscher-Ohlin theorem, traditional trade theory indicates that in a labor and particularly unskilled labor abundant developing country, after trade liberalization the employment of unskilled labor, and in general employment in export sectors increases due to the comparative advantage of the economy in more labor intensive sectors, whereas the employment of skilled labor or certain groups of labor specialized in import-competing industries may fall in spite of aggregate welfare gains. These effects are generated by the changes in relative prices of exportables and importables after trade liberalization. Therefore 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 developing countries labor) vs. the import competing sectors can be estimated.

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[3]. However this methodology is criticized by trade theoreticians, since it takes the changes in trade volumes and not relative prices as the starting point. Finally different from the trade theory or labor economics approaches, based on a microeconomic perspective, trade not only shifts the demand schedules, but also may bring together international competitive pressures, which may lead to trade induced technological change or efficiency gains (Greenaway et al., 1999; Rodrik, 1997). Particularly in the empirical literature for the advanced countries, there is an increasing consensus that the magnitude of trade flows are far too low to account for the changes in the labor market outcomes, but defensive innovation stimulated by international competition may have an indirect negative effect on employment (e.g. Stehrer, 2004; Greenaway et al., 1999). Similarly, stylized facts from many labor abundant developing countries indicate that an impressive performance in terms of increasing exports has not brought with it parallel increases in employment contrary to the expectations (Horton, et al., 1994; Amsden and Hoeven, 1996; Onaran, 2001; Pollin et al., 2004; Ghosh**,** 2005).

In this paper, following Hine and Wright (1998) and Greenaway (1999) regression analysis is used to test the labor demand effects of trade due to both changing labor intensity of production for a given level of output and trade induced labor saving effects. In that sense, the estimation methodology used here is not a direct test of the Hecksher-Ohlin framework.

[3] However, if imports are not the substitutes of domestically produced goods, but mostly complementary input goods, that are not being produced domestically, this negative effect will not be observed, or even a positive effect is possible (Onaran, 2001).

However since mainstream policy is based on a narrower reading of the Hecksher-Ohlin framework in formulating an optimistic expectation in terms of job creation due to increased trade liberalization and volume, this can be regarded as a test of these policy expectations as well.

In the case of foreign direct investment, opposing effects are at work once again. If multinational enterprises are bringing together a labor saving, more capital intensive technology, it would lead to a negative effect on employment even in the export-oriented sectors. Moreover the nature of FDI, whether it is in the form of greenfield FDI, which creates new production capacity, or brownfield FDI, which involves mergers and acquisitions, matters. If FDI is mostly through mergers and acquisitions, rather than a genuine long term investment, then labor shedding and downsizing may dominate positive employment creation capacity. Second, even when the positive firm level effects of FDI are realized, the spill-over effects can be quite limited, which may lead to a dual economy, without any linkages to the domestic economy, and may even create negative effects on sector wide employment through competitive pressures on the domestic firms (Mencinger, 2003; Gallagher and Zarsky, 2004). Mencinger (2003) reports that multinational enterprises contributed more to imports than exports, since they use their international suppliers rather than the domestic firms for intermediate inputs; and the spillovers from single firms to the sector do not seem to be sufficiently strong to increase growth. FDI could also force small local competitors out of business. In this case FDI can favor a particular group of skilled labor, while the unskilled labor's employment may decline. Thus it is an empirical issue whether the positive or negative effects dominate at the sectoral level.

In the empirical analysis the effects on different sectors are also distinguished by grouping sectors as high skilled and medium-low skilled. In the traditional trade theory the expected

positive export effect is mostly limited to medium-low skilled sectors in countries where high skilled labor is scarce. According to the trade induced efficiency theories, the competitive pressures can be higher in high skilled industries in the CEECs, leading to a higher negative effect of trade. Differently, there are studies that emphasize the skill-bias in international trade and capital flows, which expect a positive effect of openness on employment in the high skilled sectors, and a negative effect on medium-low skilled sectors even in the countries, where skilled labor is relatively scarce. Feenstra and Hanson (1996) illustrate this result based on the case of US and Mexico trade, where skill intensity of production is increasing in both the skilled labor abundant North and the skilled labor scarce South.

4. Descriptive statistics of the sample

This section presents the stylized facts of our working sample for each country for the total manufacturing industry as well as high, medium, and low skilled sector groups. Appendix A shows the list of the sectors, and Appendix B lists the sectoral classification based on the skill content.

Some notes about the data are in place here. The FDI data is only available at one-digit level, i.e. corresponding to 14 sectors[4], and covers only 1997/1999-2004 for most countries. Furthermore, for Romania and Bulgaria there is no sector specific FDI time series data. Regarding trade, the focus is on trade of the CEECs with the EU15, since that reflects a pattern of international division of labor and specialization in trade between the center and the periphery. Trade with EU15 reflects roughly 50-75% of the foreign trade volume of the

[4] The rest of the data is at two-digit sectoral classification for Hungary, Poland, Slovenia, and Lithuania, and at one-digit level for the other countries.

CEECs. Trade data based on the records of the member states themselves is available only from 1999 onwards.

Table 2 shows the average annual % change (compound average) in employment, real output, real wage, productivity, and the averages of export/output, import/output, and FDI (inward stock)/output ratios for the pools of high, medium, and low skilled industries, and aggregate manufacturing industry during the period of 1999-2004 for each country. Although the results suggest mixed performance across countries as well as industries within the same country, one result seems to be clear: The relatively strong opening up of the economies, improved exports in manufacturing and strong FDI inflow does not go along with a parallel strong improvement in the employment creation capacity in the manufacturing industry, and productivity increases seem to be based on downsizing and labor saving to a significant extent. The trends in employment in the era of transition determined by rationalization and labor saving seem to be continuing. During 1999-2004 employment has decreased in most of the sectors, with the exception of the medium skilled sectors in Slovenia, Slovakia, Czech Republic, and Lithuania, and the low skilled sectors in Bulgaria. At a more detailed sectoral level (not reported in the Table), it is observed that employment has increased only in a minority of the industries, which in the case of Hungary correspond to the strong exporting and growing sectors. In Bulgaria and Romania employment decreased in almost all sectors. In Slovenia output has also decreased in half or more than half of the sectors, leading to an expectedly poor employment performance as well. In Hungary, Czech Rep., and Slovakia the sectors, where employment has increased are mostly the skilled sectors, whereas in Poland, and Lithuania they were the unskilled sectors, and in Slovenia it is more mixed.

Table 2 can be inserted approximately here

These developments contrast sharply to the increases in output in almost all sectors in the same period, with the exception of high and low skilled sectors in Slovenia. Output has been increasing with quite high rates in some of the leading exporter industries like electronics or automotive industry.

In the meantime real wages significantly lag behind productivity in aggregate manufacturing industry as well as in almost all sector groups in all countries during the post-recession era, with the single exception of low skilled industries in Slovenia. In Poland, Hungary, and Slovakia the difference is most pronounced. However, this decline in unit labor costs due to high productivity and low wage increases has not sufficed to stimulate employment[5].

During the same period, the trade and FDI record of all the countries are impressive. Regarding the pattern of trade, in all countries the highest export/output ratios (to EU) are in the low skilled sectors, and the highest import/output (from EU) ratios are in the high skilled sectors (except Hungary); however usually import ratios in other sectors are also quite high. These stylized facts indicate the existence of intra-industry trade in all sectors along with some comparative advantage in low skilled sectors. Initially the CEECs started with a profile typical of less developed economies in terms of the concentration of their exports to EU15 in the labor intensive sectors. But over time trade positions in capital, R&D and skill intensive industries improved in the more advanced CEECs, with Hungary experiencing the most remarkable change, while Romania and Bulgaria stayed remarkably different from the CEE-5 (Havlik et al., 2001). Advanced CEECs are likely to follow a "Spanish model" based on

[5] However it should be noted that unit labor costs in Euros have been increasing in most cases during this period in spite of the positive difference between productivity and wage increases because of the appreciated local currencies.

catching-up, industrial diversification and intra-industry trade, while the rest of East could lag behind on a permanent basis (Dupuch et al, 2004). Nevertheless as of now in high and medium skilled sectors there is a trade deficit with the EU in all countries and a trade surplus in the low skilled industries.

In terms of the stock of FDI as a ratio to output, in Czech Republic and Hungary, all sectors including some high skilled sectors like electronics are important receivers. In Slovenia and Lithuania high skilled sectors followed by the medium skilled have the highest FDI intensities. In Slovakia the medium skilled industries are the leading FDI receivers. Poland is the only country, which has the highest FDI stock/output ratio in the low skilled industries.

Regarding the relative importance of firms with 10% or more foreign shareholders, foreign penetration of the domestic economy is highest in manufacturing in Hungary, with 45% of the workforce employed in foreign subsidiaries as of 2001; this is followed by the Czech Republic, Slovakia and Poland, with a penetration rate of around 35% (Hunya and Geishecker 2005). Romania shows lower foreign penetration (close to 30.7%). Slovenia has the lowest foreign penetration in manufacturing due to the domestic economic policy which has not encouraged capital inflows, since the Slovenian companies had been integrated internationally and were largely competitive already at the outset of transformation and competitiveness was supported through a policy of a stable real exchange rate (Hunya and Geishecker, 2005). In general, foreign affiliates are characterized by higher labor productivity due to more up-to-date technology than domestic companies as well as narrower specialization on assembly and component production, i.e. benefiting from economies of scale (Hunya and Geishecker, 2005).

5. Estimation methodology and the results

In order to analyze the determinants of employment, country specific panel data estimations will be used. The panel data technique addresses the research questions based on variations both over time and across sectors within each country, while allowing for cross country heterogeneity. The other advantage of panel data is the technical capacity, which makes empirical tests possible with a database of relatively short time dimension.

At the first step versions of the following static employment equation are estimated:

$$\ln L_{i,t} = \beta_i + \alpha_t + \beta_1 \ln QR_{i,t} + \beta_2 \ln WR_{i,t-1} + \beta_3 FDIQ_{i,t} + \beta_4 XQEUQ_{i,t} + \beta_5 MQEU_{i,t} + \varepsilon_{t,i} \quad (5)$$

where lnL, lnQR, lnWR, FDIQ, XQEU, and MQEU are the employment (in logarithm), real output (in logarithm), real wage (in logarithm), FDI stock/output, exports to EU/output and imports from EU/output respectively. All the variables are sector specific variables; i is the sector indicator (i=1,…,23 for two-digit sectoral classification, and i=1,…,14 for the one-digit sectoral classification). β_i is a sector specific fixed effect. The time period, t, varies according to country and the availability of the variables. α_t is the time effect, capturing the common period specific shocks and technical change. Since wages are also affected by the changes in the demand for labor in a sector, in order to avoid endogeneity problems, the first lag of the real wage is used in the static model. Three versions of the static employment equation will be estimated. The first specification is the basic specification, which includes only the real output and wage. For this specification the estimation period in most countries is 1999 – 2004, and 1999-2001 for Lithuania. A second specification adds export and import ratios, and alternately a third specification introduces the FDI ratio. The estimation period becomes shorter in some cases depending on the availability of FDI or trade data. Also the estimations with FDI can be made only at one-digit sectoral level for all countries. Due to

sectoral classification differences as well as short time series, a specification with both trade and FDI variables are not reported, but the results were fairly robust.

Some remarks about the specification of the variables are in place here. Real wage, real output, and employment are variables that may suffer from unit root problems. However, with short time-series the power of the unit root tests are low and the problem is less significant in a panel setting, and it is advised to work with the logarithmic level of these variables, which we will follow here (Wooldridge, 2002; Hamilton, 1994). Export, import and FDI ratios traditionally tend to be stationary, particularly for a short time period. Nevertheless, the existence of a trend in most of these variables requires the use of a time trend, which in our case is reflected by the period specific effects. Finally, we compute standard errors that are robust to the existence of sector specific serial correlation (White 1982; Arellano, 1987; Wooldridge, 2002).

In a second specification, the first lag of employment is also added as the explanatory variable, since adjusting employment may take time due to costs associated with hiring and firing. For this purpose, versions of the following dynamic model are estimated:

$$LL_{i,t} = \beta_i + \alpha_t + \beta_1 LL_{i,t-1} + \beta_2 LQR_{i,t} + \beta_3 LWR_{i,t} + \beta_4 FDIQ_{i,t} + \beta_5 XQEUQ_{i,t} + \beta_6 MQEU_{i,t} + \varepsilon_{t,i} \quad (6)$$

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. Differencing also helps to overcome the possible problems associated with unit roots. Additionally, the real wage is treated as an endogenous variable. The instruments are the second and third lags of employment and real wage, and the first differences of the strictly

exogenous variables, i.e. output, FDI, export, and import ratios. Due to degrees of freedom limitations the use of more lags is not possible. Time effects are also used again. Also robust standard errors are calculated as above. Equation 6 is also estimated for the three specifications mentioned above, i.e. basic, with foreign trade, and with FDI sequentially. Due to degrees of freedom limitations, Eq. 6 is not estimated for Lithuania.

Both equations are estimated separately for each country. The estimations are made first for the total pool of all the sectors, and then for two separate pools of high skilled (HS) and medium-low skilled (MLS) sectors. Due to the low number of observations in the empirical estimations low and medium skilled sectors are grouped together as a joint category of medium-low skilled.

From a theoretical point of view dynamic specification is more appropriate due to the partial adjustment process in labor demand in the existence of hiring and firing costs. It also allows us to calculate both short-run and long-run elasticities of labor demand. From an econometrical point of view this method is also convenient in terms of dealing with endogeneity of wages as well. However, the reliability of the dynamic specification depends on certain factors. Before proceeding with the estimation results, some issues about the tests regarding the dynamic estimation method need to be clarified. The dynamic estimation method is preferred whenever two conditions are satisfied: 1. the lag of employment in the dynamic specification is significant; 2. 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[6]. If these two conditions are not satisfied, in the analysis below we will rely on the static estimation results.

The F and Chi-square tests for the joint significance of the fixed effects and their probabilities are reported at the end of each specification. The cross-section fixed effects are jointly significant in all static specifications. The time specific effects are significant in most cases, and we kept them in the few cases when they were insignificant due to the existence of trend in the variables as well as to preserve the same structure between the static and dynamic specifications, since in the static specifications where time effects were insignificant, they were significant in the corresponding dynamic specifications.

We first analyze the basic specification, where only output and wages are used as explanatory variables without the international integration variables. The results for the basic specification estimated by pooling all the sectors using both the static and the dynamic estimation methods are in Table 3.1 (M1 stands for the static model, and M2 for the dynamic model). Table 3.2 and 3.3 report the results for the HS and MLS sectors respectively. The method that is preferred based on the Sargan test results and the significance of the lagged dependent variable is marked with a star. Based on these results in Tables 3.1-3.3, the first block of Table 4 presents a summary of the significance of the coefficients of output in different countries. The preferred method based on the Sargan test results and the significance of the lagged dependent variable is again marked with a star. According to the results of the

[6] Unfortunately the existence of second order autocorrelation in the first differenced residuals cannot be rejected in most cases. Also the small number of cross-sections (ranging between 5 and 25 depending on the specification) limit the power of the dynamic estimation method.

aggregate pool, in six countries output has a significant positive effect on employment[7]. In only Lithuania and Romania the effect is insignificant[8].

These results are different from the insignificant elasticities found in Boeri and Garibaldi (2005) for the positive growth years during the period of 1996-2002 based on panel data estimations for the aggregate economy. Thus firms are not completely reluctant to hire during expansion during the 2000s. However, the short run elasticity with respect to output is rather low (according to the static model), ranging between 0.31 (Hungary) and 0.57 (Czech Republic)[9]; the short-run elasticity becomes even smaller in the dynamic estimations, with the short-run elasticity ranging between 0.10 in Slovenia and 0.35 in Slovakia[10], since the lagged effect of employment is also controlled for. However, in these cases the long-run elasticities reach relatively higher levels (0.70 in Slovakia, 0.75 in Slovenia, and 1.46 in Bulgaria, the latter of which is too high, but not robust in different sector groups as will be discussed below), but the speed of adjustment is relatively low. When we calculate the long-run elasticities based on the dynamic specifications for other countries, where the lagged

[7] The effect in Poland becomes insignificant in the dynamic specification. But the Sargan test rejects the validity of the instruments in the case of Poland. In the other countries the results are robust.

[8] The effect in Romania is significant in the static model but becomes insignificant in the dynamic specification, which is more reliable based on the Sargan test verifying the validity of the instruments and the significant lagged employment.

[9] This range is covering countries where the static model is valid and the coefficient is significant, i.e. Hungary, Poland, and Czech Republic.

[10] This range is covering countries where the dynamic model is valid and the coefficient is significant, i.e. Slovenia, Slovakia, and Bulgaria.

employment was significant but the Sargan test was invalid, the values are still quite low in some cases: 0.16 in Romania, 0.31 in Poland, 0.51 in Czech Republic, and 0.66 in Hungary. Comparing these elasticities with those estimated by Basu et al (2005) for the transition period (the periods differ between 1990 to 1993 for different countries), both the short and long-run elasticity for Poland and Slovak Republic are quite close to the estimations here for the period after 1999; our estimates for Hungary are lower but not too different; but for the Czech Republic we find significantly lower elasticities. The difference can be due to the initial high response of employment in the Czech Republic to the big bang recession with a dramatic decline in labor hoarding, and once the over employment and recession is over, firms might have become less responsive to expansion under competitive pressures.

In the pool of HS industries (Table 3.2), the coefficient of output is positively significant in more cases (all but Lithuania, where the coefficient is even negatively significant) compared to the MLS sectors (significant only in five countries: Hungary, Poland, Slovenia, Slovakia, Lithuania). However the demand elasticity of employment is also lower in the HS sectors compared to the MLS sectors in five countries (Hungary, Poland, Slovenia, Slovakia, Lithuania). Thus in these countries, labor saving growth is stronger in the HS sectors compared to the MLS sectors in the short-run. However when the long-run elasticities are compared across sector groups, in all the three cases where lagged employment is significant in both sector groups (Slovakia, Bulgaria, Romania), the long run elasticity is higher in the HS sectors. So although labor saving may dominate in the HS sectors in the short-run, in these three countries the long-run effects of growth in skilled industries may be more favorable than in low skilled sectors. However it must be also added that the long-run elasticities in the sector groups are much lower than those calculated based on the total pool: in the HS sectors, in countries where the dynamic specification is valid, the long-run elasticity is 0.27 in Slovenia, 0.50 in Romania, 0.53 in Bulgaria, and 0.92 in Slovakia, which is the only country

with a high elasticity. The case of Bulgaria is particularly interesting since the long-run elasticity for the pool of total sectors was even greater than one. In the MLS sectors the long run elasticities are as follows (only for the countries, where the dynamic specification is valid): 0.30 in Bulgaria, 0.89 in Slovakia, 0.99 in Czech Republic.

Table 3.1-3.3 can be inserted approximately here

Table 4 can be inserted approximately here

The effect of real wage on labor demand is mixed across countries and sectors as can be seen in Tables 3.1-3.3. Based on these results, the second block of Table 4 presents a summary of the results for the wage variable. According to the results for the pool of all sectors, the classical assumption of a negative effect of wages on labor demand is only valid in three countries (Slovakia, Romania Lithuania). In all other countries the effect is insignificant[11]. In the HS sectors, in four countries (Hungary, Slovenia, Romania, Czech Republic) wages have a negative significant effect on employment[12]. In three countries (Slovakia, Lithuania, Poland) wages are again insignificant in the HS sectors. In Bulgaria the effect is even positively significant. This controversial finding for Bulgaria is also the case in the MLS sectors, consistent with the stylized facts indicating a parallel decline in both employment and real wages in the MLS sectors. For Poland also a positive wage coefficient is found. The effect of wages is insignificant in the MLS sectors in five countries (Hungary, Slovenia,

[11] In Poland the result is not robust, but the more reliable static estimation results indicate an insignificant effect of wages.

[12] In Czech Republic this is only the case in the static specification, which is preferred due to the insignificance of the lagged employment variable and the Sargan test in the dynamic estimation. In the other countries the result is robust in both static and dynamic models.

Czech Republic, Slovakia, Romania). Only in Lithuania a negative significant wage effect can be found in the MLS sectors. Thus the job performance of most economies, particularly in the MLS sectors, can not be explained by the developments in wages. In the HS sectors labor demand is sensitive to wages in half of the countries, but again in the other half low wages do not lead to higher employment.

Finally if we compare the absolute value of the effect of output and wages on employment in the three cases in total manufacturing, only in Slovakia the output effect is relatively larger[13]. In the HS sectors in all four countries, and in the MS sectors in Lithuania, which is the only country with a significant negative wage effect, the wage effect is dominant. So in the minority cases where there is a negative and significant wage effect, wage moderation seems to be a relatively more effective strategy to create jobs compared to demand policies. In the rest of the cases wage competition does not cure the problem of low employment.

Regarding the effect of foreign trade, the estimation results are presented in Tables 5.1-5.3 where exports to EU15 and imports from EU15 as a ratio to output are added to the basic specification as explanatory variables. These results are summarized in the third block of Table 4. The results for foreign trade are robust when total exports and imports are used instead of those to/from EU. According to the results for the pool of all sectors (Table 5.1), export ratio has a robust positive effect on employment only in Romania. In all other countries (Hungary, Poland, Slovenia, Slovakia, Czech Republic, Bulgaria, Lithuania) the effect is insignificant[14]. The positive effects of exports on employment in Romania is limited

[13] The Wald coefficient tests are available upon request.

[14] In Slovenia the effect becomes insignificant in the dynamic specification, which is more relevant due to the significant lagged employment coefficient and the Sargan test. In Slovakia

only to the HS sectors, with a 1%-point increase in the export ratio leading to a 0.53% increase in employment in the HS sectors (in the MSL sectors the effect is insignificant[15]). In the HS sectors, the effect is also positive in Lithuania, with a similar degree of economic significance as in Romania. In the HS sectors the effect of exports are negatively significant in Slovakia and robust to specifications. A 1%-point increase in the export/output ratio (to EU15) in the HS sectors in Slovakia is leading to a 0.33% decrease in employment (according to the dynamic specification). In five countries exports have no significant effect on employment in the HS sectors. In the MLS sectors, there is no country with a positive export effect on employment[16]. To summarize, in five countries (Hungary, Poland, Slovenia, Czech Republic, Bulgaria) the effect is insignificant in both HS and MLS sectors. In Slovakia in the HS sectors exports have a negative effect. Only in Lithuania and Romania and only in the HS sectors there is a positive effect of exports.

Table 5.1-5.3 can be inserted approximately here

The effect of import ratio is also insignificant in the majority of the countries according to the results from the estimations based on the total pool as well as sector groups as can be seen in Tables 5.1-5.3, the results of which are also summarized in the fourth block of Table 4. Only

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in the static specification the effect is negative, however in the dynamic specification the effect becomes insignificant, which is again more reliable. In the other five countries the effect is robust.

[15] The coefficient of lagged employment, Sargan test, and the autocorrelation test all indicate that the dynamic estimation results are preferrable in the MLS sectors in Romania

[16] The results for Romania and Slovenia are not robust, but for both countries the dynamic specification is used based on the test results. For the other countries the result is robust.

in Bulgaria there is evidence for a positive significant effect according to the results of the total pool, however this effect cannot be robustly verified at the sectoral levels. In HS sectors the effect of imports is significantly negative in Lithuania and Slovenia. However this negative effect is economically not very significant: a 1%-point increase in imports from EU/output in Slovenia decreases HS employment by 0.07% (according to the dynamic results). The effect is even lower in Lithuania. The effect of imports is positive in Hungary in the MLS sectors, and the economic significance is also relevant with a 1%-point increase in imports from EU/output in the MLS sectors leading to a 0.43% increase in employment (according to the static results). Other than the HS sectors in Slovenia and Lithuania, there is no evidence of a negative demand or efficiency induced effect of imports on employment. In Hungary the positive effect of imports on labor demand in the MLS sectors can be an indicator that imports are complementary rather than substitute for domestic production.

Finally, Tables 6.1-6.3 report the estimation results with FDI stock as a ratio to output as an explanatory variable in addition to output and real wages. The last block of Table 4 summarizes the results. According to the total pool results, FDI has a significant positive effect on employment only in Lithuania, but the effect cannot be verified in the sector groups for the HS or MLS sectors. In all other five countries the effect is insignificant. Bulgaria and Romania are not included due to lack of FDI data. FDI has a positive effect on employment at a sectoral level only in the MLS sectors in Slovakia[17]. But in the HS sectors in Slovakia and Slovenia the effect of FDI on sectoral employment is negative. These results are robust when FDI is used without the output variable. Hunya and Geishecker (2005) also estimate the

[17] In Poland in the MLS sectors the results are not robust, but the significnace of the lagged employment and the Sargan test suggest that the dynamic model is valid, where the effect is insignificant.

effect of FDI on the skill composition of employment in the CEECs, and find that FDI results in more employment of high skilled non-manual workers and low skilled workers, although the magnitude of this effect is modest. To compare their results with those of this paper, if we assume that manual workers are dominating the trends in total manufacturing employment in the HS sectors, the findings of Hunya and Geishecker is in line with the findings of this paper for the negative effects in the HS sectors in Slovakia and Slovenia, and positive effects in the MLS sectors in Slovakia. However, this is not a general finding in this paper, since the effects are insignificant in all other cases.

Table 6.1-6.3 can be inserted approximately here

Conclusion

The paper has analyzed the links between employment and domestic and international factors in the CEECs based on the case of manufacturing industry during the period after the transition recession. Regarding the domestic factors, an interesting finding is that employment does not respond to wages in more than half of the cases, thus jobless growth in manufacturing is taking place irrespective of the wage developments in the majority of the cases. The response of employment to output is mostly positive, however the output elasticity of labor demand is rather low in the short-run, and in four cases lower in the high skilled industries. There are also a number of cases where employment is completely de-linked from output, mostly in the medium and low skilled sectors (in Czech Republic, Bulgaria and Romania). Although the starting conditions before transition indicate underutilization of labor and therefore high employment rates in these countries, the process of transition shock reversed these conditions significantly; therefore further downsizing almost a decade after transition indicate the relevance of international competitive pressures in determining the

continuation of downsizing and productivity enhancing job destruction in the 2000s**.** Wherever partial adjustment model was significant, the long-run output elasticities were also calculated, and although they were higher than the short-run elasticities, in many cases, particularly at the level of sector groups, the values were still not very high, and the speed of adjustment is found to be low.

Regarding the international factors, it can be concluded that overall an impressive speed of integration to the European economic sphere through FDI and international trade has not prevented job losses in the manufacturing industry. Among eight CEECs, only in Romania and Lithuania and only in the high skilled sectors exports have the expected positive effect on employment. In Slovakia the effect of exports on employment in the high skilled sectors has been negative. The insignificant effects in the MLS sectors are particularly inconsistent with the optimistic expectations regarding increased labor demand in sectors where these countries are supposed to have their comparative advantage. The positive effect of exports in the high skilled sectors is also a result not expected according to the traditional trade theory, but is consistent with the arguments suggesting an increased skill bias of foreign trade. The negative effect of exports in the high skilled sectors in Slovakia is in line with both the comparative advantage based explanations of traditional trade theory and the arguments about the efficiency inducing effects of foreign trade dominating job creation effects. Regarding imports, in the high skilled sectors a negative effect on employment is found in Slovenia and in Lithuania. In Hungary in the medium and low skilled sectors imports have a positive impact on employment. This positive effect indicates the complementary character of imports rather than being a substitute for domestic production –a result related to the import dependency of production. Finally FDI has a significantly positive effect on employment only in the medium and low skilled sectors in Slovakia, but a negative effect on employment in the high skilled sectors in Slovakia and Slovenia, where the induced efficiency effects of FDI and

the possible negative spill over effects on domestic firms are dominating the positive demand effects. There is no significant robust effect in the other countries.

The results suggest that the positive demand effects of integration to the world economy have been offset by international competitive pressures, leading to labor saving growth without generating jobs. These results combined with the flexibility in the institutional structure of the labor market and the wage setting mechanism, show that the source of the problem results from the demand side of the labor market, rather than the supply side. Until now the catching-up and integration process, which involved specialization in export-oriented manufacturing sectors, where the CEECs have a low wage advantage compared to Western Europe, also necessitated a continuous productivity improvement based on declining employment in these sectors, since sectoral productivity levels were nevertheless lower than those in the West. However, this is also leading to a deviation between two outcomes: the success in terms of growth led by exports and FDI vs. the stagnant high unemployment or low employment rates. This divergence in turn can lead to a deterioration in the popular support for European integration and create the ground for political instability.

This pattern seems hard to reverse as long as the economic policy relies mostly on the highly crowded export markets as a source of demand, and low wage increases and labor saving as a key to resist competitive pressures, which in turn leads to a bottleneck regarding domestic demand. However the small size of the domestic markets in these countries also does not leave much area for maneuver to reverse this pressure. This dilemma can only be overcome via an EU level coordinated macroeconomic and industrial policy targeting employment increase along with wage and productivity convergence in the medium and the long run. Indeed as Western European workers fear that relocation and outsourcing to the East lead to job losses in the West, the same process is not necessarily leading to job creation in the East.

This perverse situation prepares the ground for cooperation and coordination between the East and the West. Regarding the FDI related aspects, industrial policy to promote not only greenfield investments and reinvestment of profits but also strong backward linkages with the domestic economy may facilitate job creation via positive spill-over effects.

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Table 1: Growth in GDP and Employment (2000-2005 period average)

	GDP	Employment
Czech R.	3.6	0.1
Hungary	4.1	0.4
Poland	3.1	-0.4
Slovakia	4.3	0.6
Slovenia	3.4	1.2
Estonia	7.4	0.8
Latvia	7.9	1.1
Lithuania	6.9	0.2
Bulgaria	5.0	0.6
Romania	5.0	-0.3

Source: Vienna Institute for International Economic Studies

Table 2: Developments in the manufacturing industry

Average annual percentage change (compound average, 1999-2004)					Annual Average (1999-2004*)		
	Employment	Real output	Real wage	Productivity	Export/output	Import/output	FDI stock/output**
HUN							
total	-1.04%	9.56%	5.03%	10.71%	0.539	0.482	0.260
high skilled	-0.31%	8.22%	5.39%	8.66%	0.495	0.601	0.267
medium skilled	-0.28%	6.15%	5.06%	6.41%	0.279	0.437	0.229
low skilled	-4.25%	1.49%	4.15%	5.93%	0.939	0.752	0.255
POL							
total	-3.30%	6.58%	1.00%	10.21%	0.248	0.319	0.142
high skilled	-3.64%	6.68%	1.78%	10.73%	0.279	0.497	0.124
medium skilled	-1.22%	7.79%	0.20%	9.12%	0.175	0.245	0.126
low skilled	-4.21%	3.64%	0.31%	8.18%	0.360	0.290	0.238
SLO							
total	0.01%	3.82%	2.46%	3.81%	0.481	0.588	0.112
high skilled	-7.43%	-2.04%	2.75%	6.17%	0.507	0.655	0.161
medium skilled	1.24%	3.02%	1.45%	1.76%	0.341	0.449	0.133
low skilled	-1.88%	-3.18%	1.90%	-1.34%	0.595	0.533	0.082
LIT***							
total	-1.74%	10.28%	0.84%	12.23%	0.327	0.438	0.140
high skilled	-4.70%	9.57%	2.51%	14.92%	0.376	1.293	0.161
medium skilled	1.20%	16.60%	1.37%	15.21%	0.246	0.644	0.153
low skilled	-1.13%	12.50%	1.69%	14.12%	0.453	0.268	0.106
SLK							
total	-0.81%	8.94%	1.70%	9.83%	0.413	0.384	0.134
high skilled	-2.17%	9.81%	2.94%	12.37%	0.472	0.544	0.103
medium skilled	1.18%	7.22%	1.17%	5.92%	0.225	0.298	0.183
low skilled	-1.53%	8.11%	1.00%	9.74%	0.576	0.335	0.099
CZ							
total	-1.08%	6.64%	3.97%	7.80%	0.492	0.479	0.221
high skilled	-0.13%	8.11%	3.80%	8.29%	0.530	0.635	0.225
medium skilled	0.87%	6.55%	3.26%	5.66%	0.321	0.385	0.193
low skilled	-6.32%	0.24%	3.60%	6.80%	0.630	0.492	0.215
BU							
total	-0.81%	10.16%	-0.51%	11.06%	0.354	0.103	
high skilled	-6.12%	8.03%	1.97%	15.20%	0.233	0.875	
medium skilled	-1.68%	12.10%	-0.77%	14.30%	0.300	0.657	
low skilled	1.78%	14.20%	1.15%	12.22%	0.944	0.470	
RO							
total	-2.11%	7.07%	5.74%	9.38%	0.312	0.103	
high skilled	-3.75%	6.45%	7.15%	10.81%	0.254	0.875	
medium skilled	-2.35%	9.51%	6.08%	12.17%	0.128	0.657	
low skilled	-0.58%	6.15%	4.69%	6.91%	1.051	0.470	

**For Bulgaria and Romania 1999-2003

**FDI data for Czech Rep., Poland, Slovenia covers 1999-2003

***For Lithuania 1999-2001

Table 3.1. Total

	HUN				POL				SLO				SLK				CZ				BU				RO				LIT	
	M1: Static*		M2: Dynamic		M1: Static*		M2: Dynamic		M1: Static		M2: Dynamic*		M1: Static		M2: Dynamic*		M1: Static*		M2: Dynamic		M1: Static		M2: Dynamic*		M1: Static		M2: Dynamic*		M1: Static*	
Period	99 04		99 04		99 04		99 04		99 04		00 03		99 04		99 04		99 04		99 04		99 04		99 04		99 04		99 04		99 01	
Sections	23		23		23		23		22		22		14		14		14		14		14		14		14		14		21	
Obs.	138		138		138		138		132		88		84		84		84		84		84		84		84		84		63	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
Constant	11.439	0.014			8.384	0.000			11.734	0.018			10.170	0.000			8.490	0.312			4.739	0.101			19.101	0.000			15.540	0.000
Log Labor (-1)			0.533	0.003			0.553	0.000			0.866	0.001			0.496	0.001			0.688	0.000			0.882	0.000			0.520	0.000		
Log Output t	0.313	0.001	0.308	0.008	0.362	0.001	0.141	0.122	0.321	0.003	0.101	0.047	0.480	0.001	0.355	0.000	0.572	0.000	0.159	0.101	0.607	0.001	0.172	0.027	0.260	0.008	0.075	0.416	0.147	0.305
Log Wage*	-0.469	0.281	-0.190	0.734	-0.096	0.765	0.588	0.008	-0.539	0.198	-0.279	0.631	-0.555	0.000	-0.309	0.061	-0.435	0.641	0.195	0.724	0.289	0.594	0.736	0.224	-0.832	0.000	-0.385	0.008	-1.145	0.001
Adjusted R-squared	0.993				0.996				0.997				0.989				0.995				0.988				0.986				0.994	
Prob(F-statistic)	0.000				0.000				0.000				0.000				0.000				0.000				0.000				269.784	
Tests																														
Cross-section F	0.000				0.000				0.000				0.000				0.000				0.000				0.000				0.000	
Cross-section Chi-sq	0.000				0.000				0.000				0.000				0.000				0.000				0.000				0.000	
Period F	0.872		0.055		0.000		0.000		0.247		0.001		0.000		0.000		0.097		0.003		0.000		0.000		0.048		0.000		0.111	
Period Chi-square	0.805		0.048		0.000		0.000		0.135		0.001		0.000		0.000		0.033		0.001		0.000		0.000		0.013		0.000		0.026	
Sargan			0.000				0.000				0.730				0.660				0.000				0.650				0.390			
2nd order autocorrel.			0.000				0.000				0.001				0.000				0.001				0.000				0.000			

Note: In M1 the first lag of logWage is used. In M2 (the dynamic estimations), second and third lags of logWage are used as instrumental variables for the current value.

Table 3.2. High Skilled

	HUN				POL				SLO				SLK				CZ				BU				RO				LIT	
	M1: Static*		M2: Dynamic		M1: Static*		M2: Dynamic		M1: Static		M2: Dynamic*		M1: Static		M2: Dynamic*		M1: Static*		M2: Dynamic		M1: Static		M2: Dynamic*		M1: Static		M2: Dynamic*		M1: Static*	
Period	99 04		99 04		99 04		99 04		99 04		00 03		99 04		99 04		99 04		99 04		99 04		99 04		99 04		99 04		99 01	
Sections	11		11		11		11		10		10		6		6		6		6		6		6		6		6		9	
Obs.	66		66		66		66		60		40		36		36		36		36		36		36		36		36		27	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
Constant	16.988	0.000			10.973	0.000			15.732	0.000			0.996	0.665			29.707	0.001			2.810	0.217			17.377	0.000			8.596	0.000
Log Labor (-1)			0.231	0.342			0.491	0.001			0.393	0.119			0.588	0.000			0.130	0.708			0.643	0.001			0.478	0.010		
Log Output t	0.182	0.031	0.164	0.052	0.200	0.036	0.207	0.049	0.269	0.029	0.164	0.000	0.894	0.000	0.380	0.006	0.226	0.037	0.088	0.665	0.317	0.171	0.189	0.043	0.383	0.056	0.260	0.053	-0.221	0.020
Log Wage*	-0.815	0.056	-1.508	0.066	-0.281	0.364	-0.304	0.352	-0.842	0.015	-1.683	0.000	-0.083	0.550	-0.097	0.527	-2.246	0.006	-2.932	0.111	0.925	0.074	0.500	0.089	-0.863	0.000	-0.411	0.001	0.110	0.461
Adjusted R-squared	0.992				0.996				0.996				0.991				0.997				0.987				0.978				0.999	
Prob(F-statistic)	0.000				0.000				0.000				0.000				0.000				0.000				0.000				1274.488	
Tests																														
Cross-section F	0.000				0.000				0.000				0.000				0.000				0.000				0.000				0.000	
Cross-section Chi-squ	0.000				0.000				0.000				0.000				0.000				0.000				0.000				0.000	
Period F	0.191		0.019		0.000		0.002		0.293		0.000		0.000		0.000		0.327		0.000		0.000		0.000		0.431		0.000		0.004	
Period Chi-square	0.078		0.011		0.000		0.000		0.142		0.000		0.000		0.000		0.129		0.000		0.000		0.000		0.207		0.000		0.000	
Sargan			0.000				0.030				0.440				0.130				0.070				0.170				0.110			
2nd order autocorrel.			0.003				0.000				0.028				0.003				0.067				0.000				0.006			

Note: In M1 the first lag of logWage is used. In M2 (the dynamic estimations), second and third lags of logWage are used as instrumental variables for the current value.

Table 3.3. Medium and Low Skilled

	HUN				POL				SLO				SLK				CZ				BU				RO				LIT	
	M1: Static*		M2: Dynamic		M1: Static*		M2: Dynamic		M1: Static*		M2: Dynamic		M1: Static		M2: Dynamic*		M1: Static		M2: Dynamic*		M1: Static		M2: Dynamic*		M1: Static		M2: Dynamic*		M1: Static*	
Period	99 04		99 04		99 04		99 04		99 04		00 03		99 04		99 04		99 04		99 04		99 04		99 04		99 04		99 04		99 01	
Sections	12		12		12		12		12		12		8		8		8		8		8		8		8		8		12	
Obs.	72		72		72		72		72		48		48		48		48		48		48		48		48		48		36	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
Constant	8.249	0.265			1.803	0.302			7.577	0.196			11.491	0.000			-0.979	0.907			5.510	0.080			19.987	0.000			12.306	0.000
Log Labour (-1)			0.413	0.000			0.348	0.237			0.120	0.693			0.607	0.004			0.808	0.002			0.660	0.000			0.627	0.000		
Log Output t	0.565	0.000	0.528	0.000	0.714	0.000	0.385	0.128	0.509	0.000	0.400	0.007	0.332	0.006	0.349	0.000	0.579	0.000	0.190	0.286	0.420	0.075	0.104	0.290	0.179	0.156	-0.024	0.677	0.475	0.001
Log Wage*	-0.445	0.564	-0.904	0.155	0.395	0.043	0.123	0.738	-0.351	0.458	-0.854	0.120	-0.521	0.003	-0.294	0.365	0.590	0.572	-1.146	0.263	0.430	0.570	1.223	0.088	-0.794	0.002	-0.152	0.651	-0.943	0.008
Adjusted R-squared	0.995				0.997				0.997				0.991				0.993				0.991				0.987				0.989	
Prob(F-statistic)	0.000				0.000				0.000				0.000				0.000				0.000				0.000				212.655	
Tests																														
Cross-section F	0.000				0.000				0.000				0.000				0.000				0.000				0.000				0.000	
Cross-section Chi-squ	0.000				0.000				0.000				0.000				0.000				0.000				0.000				0.000	
Period F	0.287		0.002		0.000		0.000		0.629		0.187		0.033		0.000		0.165		0.000		0.014		0.000		0.324		0.000		0.021	
Period Chi-square	0.146		0.001		0.000		0.000		0.470		0.165		0.005		0.000		0.053		0.000		0.001		0.000		0.151		0.000		0.001	
Sargan			0.050				0.000				0.010				0.470				0.150				0.810				0.330			
2nd order autocorrel.			0.005				0.418				0.061				0.002				0.030				0.016				0.017			

Note: In M1 the first lag of logWage is used. In M2 (the dynamic estimations), second and third lags of logWage are used as instrumental variables for the current value.

Table 4: Dependent variable: Employment (log)* - Total, High, Medium-low skill sectors

Explanatory variables

		Total		High Skilled		Medium & Low Sk.	
	Coefficient	M 1 Static	M 2 Dynamic	M 1 Static	M 2 Dynamic	M 1 Static	M 2 Dynamic
1. Log real output t**	Significant positive	7 (H*, P*, SL, SK, C*, B, R)	5 (H, SL*, SK*, C, B*)	6 (H*, P*, SL, SK, C*, R)	6 (H, P, SL*, SK*, B*, R*)	7 (H*, P*, SL*, SK, C, B, L*)	3 (H, SL, SK*)
	Significant negative			1 (L*)			
	Stat. insig.	1 (L*)	2 (P, R*)	1 (B)	1 (C)	1 (R)	4 (P, C*, B*, R*)
2. Log real wage**	Significant positive		1 (P)	1 (B)	1 (B*)	1 (P*)	1 (B*)
	Significant negative	3 (L*, SK, R)	2 (SK*, R*)	4 (H*, SL, C*, R)	3 (H, SL*, R*)	3 (L*, SK, R)	
	Stat. insig.	5 (H*, P*, SL, C*, B)	4 (H, SL*, C, B*)	3 (P*, L*, SK)	3 (P, SK*, C)	4 (H*, SL*, C, B)	6(H, P, SL, SK*, C* R*)
3. Export to EU/ Output t	Significant positive	2 (SL, R)	1 (R*)	3 (SL, L*, R)	1 (R*)	2 (SL, R)	
	Significant negative	1 (SK)		1 (SK)	1 (SK*)		
	Stat. insig.	5 (H, P, C*, B, L*)	6 (H*, P*, SL*, SK*, C, B*)	4 (H*, P*, C*, B)	5 (H, P, SL*, C, B*)	6 (H*, P, SK, C, B, L*)	7 (H, P*, SL*, SK*, C*, B*, R*)
4. Import from EU /Output t	Significant positive	1 (P)	1 (B*)		1 (P)	2 (H*, SK)	1 (H)
	Significant negative	2 (SL, B)	1 (SL*)	2 (SL, L*)	1 (SL*)	1 (SL)	
	Stat. insig.	5 (H, SK, C*, R, L*)	5 (H*, P*, SK*, C, R*)	6 (H*, P*, SK, C* B, R)	5 (H, SK*, C, B*, R*)	5 (P, C, B, R, L*)	6 (P*, SL*, SK*, C*, B*, R*)
5. FDI stock / output t***	Significant positive	1 (L*)				2 (P, SK)	1 (SK*)
	Significant negative			2 (SL, SK)	2 (SL*, SK*)		
	Stat. insig.	5 (H*, P*, SL*, SK, C*)	5 (H, P, SL, SK*, C)	4 (H*, P*, C*, L*)	3 (H, P, C)	4 (H*, SL*, C, L*)	4 (H, P*, SL, C*)

*Country initials in paranthesis. For Lithuania the dynamic equations are not reported.

** Both the coefficient of output and wages are summarized based on the findings in Tables 3.1-3.3. In Method 1 the first lag of logWage is used. In Method 2 (the dynamic estimations), second and third lags of logWage are used as instrumental variables for the current value.

***The specifications with FDI can not be estimated for Bul and Rom.

Table 5.1 Total

	HUN				POL				SLO				SLK				CZ				BU				RO				LIT	
	M1: Static		M2: Dynamic*		M1: Static		M2: Dynamic*		M1: Static		M2: Dynamic*		M1: Static		M2: Dynamic*		M1: Static*		M2: Dynamic		M1: Static		M2: Dynamic*		M1: Static		M2:Dynamic*		M1: Static*	
Period	99 04		00 04		99 04		00 04		99 04		00 03		99 04		00 04		99 04		00 04		99 03		00 03		99 03		00 03		99 01	
Sections	23		23		22		22		21		21		14		14		14		14		14		14		14		14		20	
Obs.	138		115		132		110		125		84		84		70		84		70		70		56		70		56		60	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
Constant	11.028	0.022			7.676	0.003			9.523	0.017			9.145	0.000			11.652	0.227			4.379	0.133			19.877	0.000			12.220	0.000
Log Labour (-1)			0.361	0.065			0.636	0.000			0.844	0.008			0.451	0.018			0.287	0.448			1.046	0.001			0.895	0.000		
Log Output t	0.316	0.015	0.149	0.117	0.411	0.000	0.298	0.000	0.245	0.001	0.089	0.009	0.520	0.000	0.335	0.000	0.455	0.001	0.454	0.022	0.668	0.000	0.345	0.172	0.280	0.003	0.055	0.434	-0.080	0.504
Log Wage*	-0.440	0.320	0.542	0.476	-0.062	0.858	-1.235	0.002	-0.284	0.377	-0.736	0.016	-0.469	0.009	-0.050	0.830	-0.615	0.531	-2.834	0.055	0.312	0.504	-1.566	0.049	-0.921	0.000	-0.499	0.002	-0.451	0.029
Exports (EU)/ Output	0.084	0.199	-0.036	0.404	-0.004	0.972	-0.163	0.183	0.385	0.000	0.105	0.275	-0.474	0.040	-0.231	0.141	-0.216	0.376	0.122	0.462	-0.038	0.753	0.007	0.961	0.434	0.001	0.243	0.015	0.158	0.689
Imports (EU)/ Output	-0.018	0.917	-0.028	0.700	0.115	0.021	0.068	0.341	-0.148	0.001	-0.072	0.057	0.041	0.880	-0.183	0.169	-0.036	0.803	-0.074	0.466	-0.143	0.044	0.305	0.087	-0.275	0.599	-0.357	0.383	-0.004	0.735
Adjusted R-squared	0.993				0.996				0.997				0.991				0.995				0.991				0.989				0.993	
Prob(F-statistic)	0.000				0.000				0.000				0.000				0.000				0.000				0.000				0.000	
Tests																														
Cross-section F	0.000				0.000				0.000				0.000				0.000				0.000				0.000				0.000	
Cross-section Chi-squa	0.000				0.000				0.000				0.000				0.000				0.000				0.000				0.000	
Period F	0.926		0.273		0.000		0.138		0.426		0.000		0.000		0.013		0.206		0.001		0.000		0.084		0.003		0.000		0.074	
Period Chi-square	0.879		0.265		0.000		0.127		0.272		0.000		0.000		0.007		0.084		0.000		0.000		0.067		0.000		0.000		0.010	
Sargan			0.100				0.170				0.380				0.320				0.000				0.970				0.120			
2nd order autocorrel.			0.000				0.000				0.000				0.003				0.001				0.079				0.049			

Note: In M1 the first lag of logWage is used. In M2 (the dynamic estimations), second and third lags of logWage are used as instrumental variables for the current value.

Table 5.2. High Skilled

	HUN				POL				SLO				SLK				CZ				BU				RO				LIT	
	M1: Static*		M2: Dynamic		M1: Static*		M2: Dynamic		M1: Static		M2: Dynamic*		M1: Static		M2: Dynamic*		M1: Static*		M2: Dynamic		M1: Static		M2: Dynamic*		M1: Static		M2: Dynamic*		M1: Static*	
Period	99 04		00 04		99 04		00 04		99 04		00 03		99 04		00 04		99 04		00 04		99 03		00 03		99 03		00 03		99 01	
Sections	11		11		11		11		10		10		6		6		6		6		6		6		6		6		9	
Obs.	66		55		66		55		59		40		36		30		36		30		30		24		30		24		27	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
Constant	17.797	0.000			10.666	0.000			13.904	0.000			5.001	0.006			33.888	0.002			3.718	0.094			15.472	0.002			9.258	0.000
Log Labour (-1)			0.234	0.279			0.043	0.824			0.353	0.105			0.556	0.001			-0.107	0.623			0.533	0.069			0.509	0.003		
Log Output t	0.156	0.093	0.070	0.217	0.258	0.023	0.370	0.001	0.170	0.001	0.140	0.000	0.740	0.000	0.265	0.166	0.108	0.677	0.263	0.322	0.230	0.396	0.394	0.083	0.396	0.089	0.422	0.064	-0.072	0.148
Log Wage*	-0.852	0.035	-1.094	0.003	-0.316	0.261	-1.193	0.000	-0.604	0.048	-1.810	0.000	-0.298	0.150	-0.227	0.301	-2.525	0.003	-5.254	0.002	0.882	0.110	1.226	0.403	-0.765	0.000	-0.893	0.000	-0.129	0.219
Exports (EU)/ Output	-0.033	0.615	-0.039	0.392	-0.072	0.672	-0.143	0.254	0.385	0.000	0.117	0.182	-0.702	0.005	-0.336	0.014	-0.199	0.550	0.199	0.571	-0.161	0.812	0.353	0.337	0.680	0.000	0.527	0.000	0.549	0.001
Imports (EU)/ Output	-0.072	0.628	-0.017	0.821	0.103	0.154	0.104	0.028	-0.185	0.000	-0.069	0.022	0.073	0.743	-0.115	0.414	-0.047	0.810	-0.095	0.621	0.000	0.999	0.094	0.532	0.308	0.480	0.171	0.782	-0.017	0.002
Adjusted R-squared	0.992				0.996				0.997				0.993				0.997				0.989				0.983				0.999	
Prob(F-statistic)	0.000				0.000				0.000				0.000				0.000				0.000				0.000				0.000	
Tests																														
Cross-section F	0.000				0.000				0.000				0.000				0.000				0.000				0.000				0.000	
Cross-section Chi-squar	0.000				0.000				0.000				0.000				0.000				0.000				0.000				0.000	
Period F	0.224		0.023		0.000		0.047		0.782		0.000		0.029		0.020		0.287		0.000		0.000		0.000		0.105		0.000		0.001	
Period Chi-square	0.085		0.012		0.000		0.031		0.623		0.000		0.001		0.004		0.076		0.000		0.000		0.000		0.009		0.000		0.000	
Sargan			0.000				0.030				0.300				0.150				0.350				0.540				0.110			
2nd order autocorrel.			0.036				0.000				0.003				0.088				0.059				0.013				0.011			

Note: In M1 the first lag of logWage is used. In M2 (the dynamic estimations), second and third lags of logWage are used as instrumental variables for the current value.

Table 5.3. Medium and Low Skilled

	HUN				POL				SLO				SLK				CZ				BU				RO				LIT	
	M1: Static*		M2: Dynamic		M1: Static		M2: Dynamic*		M1: Static		M2: Dynamic*		M1: Static		M2: Dynamic*		M1: Static		M2:Dynamic*		M1: Static		M2:Dynamic*		M1: Static		M2:Dynamic*		M1: Static*	
Period	99 04		00 04		99 04		00 04		99 04		00 03		99 04		00 04		99 04		00 04		99 03		00 03		99 03		00 03		99 01	
Sections	12		12		11		11		11		11		8		8		8		8		8		8		8		8		11	
Obs.	72		60		66		55		66		44		48		40		48		40		40		32		40		32		33	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
Constant	8.848	0.160			-1.286	0.746			6.662	0.153			12.165	0.000			5.037	0.490			4.288	0.211			21.364	0.000			12.988	0.001
Log Labour (-1)			0.545	0.000			0.660	0.000			0.610	0.127			0.653	0.026			0.841	0.000			0.723	0.003			0.659	0.000		
Log Output t	0.766	0.000	0.720	0.000	0.726	0.000	0.155	0.135	0.385	0.000	0.094	0.440	0.437	0.000	0.233	0.012	0.463	0.004	0.110	0.535	0.762	0.004	0.286	0.257	0.163	0.254	-0.075	0.356	0.272	0.307
Log Wage*	-0.741	0.332	-1.055	0.002	0.831	0.147	-0.546	0.198	-0.161	0.676	0.640	0.501	-0.724	0.016	1.004	0.006	0.093	0.914	-0.406	0.704	0.234	0.679	0.551	0.666	-0.874	0.009	-0.002	0.996	-0.804	0.044
Exports (EU)/ Outp	0.019	0.884	0.022	0.564	-0.461	0.140	-0.177	0.383	0.446	0.000	-0.130	0.630	-0.149	0.420	-0.087	0.596	-0.074	0.852	-0.248	0.240	-0.088	0.239	-0.066	0.738	0.348	0.046	0.277	0.110	-0.539	0.213
Imports (EU)/ Outp	0.431	0.068	0.375	0.001	0.178	0.343	-0.084	0.350	-0.056	0.064	-0.018	0.879	0.607	0.043	-0.058	0.739	-0.103	0.452	0.039	0.679	0.199	0.113	0.353	0.256	-1.505	0.224	-0.257	0.660	0.137	0.686
Adjusted R-squared	0.996				0.995				0.992				0.992				0.993				0.993				0.989				0.985	
Prob(F-statistic)	0.000				0.000				0.000				0.000				0.000				0.000				0.000				0.000	
Tests																														
Cross-section F	0.000				0.000				0.000				0.000				0.000				0.000				0.000				0.000	
Cross-section Chi-s	0.000				0.000				0.000				0.000				0.000				0.000				0.000				0.000	
Period F	0.103		0.001		0.000		0.000		0.048		0.146		0.010		0.000		0.488		0.018		0.001		0.032		0.219		0.000		0.289	
Period Chi-square	0.028		0.000		0.000		0.000		0.008		0.121		0.001		0.000		0.255		0.006		0.000		0.013		0.056		0.000		0.077	
Sargan			0.070				0.450				0.530				0.470				0.200				0.420				0.390			
2nd order autocorrel.			0.005				0.168				0.010				0.013				0.022				0.389				0.162			

Note: In M1 the first lag of logWage is used. In M2 (the dynamic estimations), second and third lags of logWage are used as instrumental variables for the current value.

Table 6.1. Total

	HUN				POL				SLO				SLK				CZ				LIT	
	M1: Static*		M2: Dynamic		M1: Static*		M2: Dynamic		M1: Static*		M2: Dynamic		M1: Static		M2: Dynamic*		M1: Static*		M2: Dynamic		M1: Static*	
Period	99 03		99 03		99 03		99 03		99 03		99 03		99 04		99 04		99 03		99 03		99 01	
Sections	14		14		10		10		13		13		14		14		14		14		13	
Obs.	70		70		50		50		65		65		84		84		70		70		39	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
Constant	13.429	0.196			9.426	0.004			7.043	0.045			9.507	0.001			6.303	0.538			4.213	0.039
Log Labour (-1)			0.306	0.250			0.584	0.000			0.248	0.467			0.484	0.005			0.580	0.000		
Log Output t	0.539	0.000	0.302	0.004	0.357	0.014	0.242	0.000	0.348	0.002	0.239	0.063	0.465	0.001	0.353	0.000	0.486	0.000	0.155	0.097	0.706	0.000
Log Wage*	-0.869	0.350	-0.395	0.506	-0.155	0.650	0.213	0.488	-0.130	0.685	-0.692	0.255	-0.464	0.050	-0.285	0.260	-0.101	0.928	0.449	0.396	0.049	0.843
FDI/ Output	0.196	0.417	-0.071	0.614	-0.036	0.937	-0.026	0.830	0.044	0.772	-0.054	0.311	-0.299	0.499	-0.053	0.874	0.103	0.456	-0.055	0.487	0.493	0.012
Adjusted R-squared	0.991				0.997				0.996				0.989				0.995				0.994	
Prob(F-statistic)	0.000				0.000				0.000				0.000				0.000				0.000	
Tests																						
Cross-section F	0.000				0.000				0.000				0.000				0.000				0.000	
Cross-section Chi-squar	0.000				0.000				0.000				0.000				0.000				0.000	
Period F	0.818		0.135		0.000		0.000		0.413		0.023		0.001		0.000		0.072		0.000		0.000	
Period Chi-square	0.705		0.118		0.000		0.000		0.233		0.014		0.000		0.000		0.017		0.000		0.000	
Sargan			0.110				0.010				0.340				0.671				0.000			
2nd order autocorrel.			0.055				0.000				0.028				0.088				0.004			

Note: In M1 the first lag of logWage is used. In M2 (the dynamic estimations), second and third lags of logWage are used as instrumental variables for the current value.

Table 6.2. High Skilled

	HUN				POL				SLO				SLK				CZ				LIT	
	M1: Static*		M2: Dynamic		M1: Static*		M2: Dynamic		M1: Static		M2: Dynamic*		M1: Static		*		M1: Static*		M2: Dynamic		M1: Static*	
Period	99 03		99 03		99 03		99 03		99 03		99 03		99 04		99 04		99 03		99 03		99 01	
Sections	6		6		5		5		5		5		6		6		6		6		5	
Obs.	30		30		25		25		25		25		36		36		30		30		15	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
Constant	34.609	0.001			9.994	0.000			9.919	0.009			0.404	0.795			28.268	0.005			9.841	0.001
Log Labour (-1)			0.182	0.575			0.362	0.253			0.468	0.000			0.571	0.000			-0.175	0.689		
Log Output t	0.489	0.006	0.280	0.039	0.174	0.041	0.177	0.000	0.122	0.104	0.101	0.170	0.788	0.000	0.363	0.001	0.183	0.218	0.110	0.647	0.177	0.057
Log Wage*	-2.654	0.001	-1.363	0.011	-0.027	0.907	0.293	0.481	-0.143	0.643	-0.509	0.077	0.109	0.437	0.081	0.606	-2.054	0.029	-4.253	0.130	-0.257	0.062
FDI/ Output	0.375	0.227	-0.188	0.242	-0.150	0.566	-0.499	0.344	-0.133	0.000	-0.109	0.005	-0.786	0.014	-0.443	0.001	0.214	0.603	-0.107	0.741	-0.016	0.916
Adjusted R-squared	0.991				0.998				0.997				0.991				0.996				0.998	
Prob(F-statistic)	0.000				0.000				0.000				0.000				0.000				0.000	
Tests																						
Cross-section F	0.000				0.000				0.000				0.000				0.000				0.000	
Cross-section Chi-squar	0.000				0.000				0.000				0.000				0.000				0.000	
Period F	0.379		0.029		0.039		0.000		0.182		0.000		0.011		0.000		0.667		0.000		0.002	
Period Chi-square	0.135		0.008		0.001		0.000		0.024		0.000		0.000		0.000		0.410		0.000		0.000	
Sargan			0.040				0.190				0.470				0.157				0.180			
2nd order autocorrel.			0.624				0.001				0.008				0.001				0.184			

Note: In M1 the first lag of logWage is used. In M2 (the dynamic estimations), second and third lags of logWage are used as instrumental variables for the current value.

Table 6.3. Medium and Low Skilled

	HUN				POL				SLO				SLK				CZ				LIT	
	M1: Static*		M2: Dynamic		M1: Static		M2: Dynamic*		M1: Static*		M2: Dynamic		M1: Static		M2: Dynamic*		M1: Static		M2: Dynamic*		M1: Static*	
Period	99 03		99 03		99 03		99 03		99 03		99 03		99 04		99 04		99 03		99 03		99 01	
Sections	8		8		5		5		8		8		8		8		8		8		8	
Obs.	40		40		25		25		40		40		48		48		40		40		24	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
Constant	-8.563	0.097			-3.399	0.009			-3.411	0.433			11.503	0.000			-16.531	0.090			3.821	0.180
Log Labour (-1)			0.742	0.148			0.497	0.000			0.135	0.651			0.435	0.005			0.769	0.016		
Log Output t	0.513	0.000	0.362	0.009	0.690	0.000	0.350	0.000	0.542	0.000	0.338	0.017	0.326	0.007	0.327	0.000	0.446	0.001	0.158	0.394	0.801	0.000
Log Wage*	1.155	0.013	-0.741	0.331	1.159	0.000	-0.002	0.992	0.566	0.139	-1.320	0.209	-0.522	0.035	-0.183	0.545	2.424	0.034	-0.796	0.325	0.039	0.914
FDI/ Output	0.120	0.374	-0.068	0.832	1.192	0.000	0.010	0.948	0.291	0.188	0.178	0.309	0.577	0.025	0.469	0.000	-0.014	0.915	-0.061	0.604	-0.371	0.559
Adjusted R-squared	0.996				0.998				0.996				0.992				0.995				0.993	
Prob(F-statistic)	0.000				0.000				0.000				0.000				0.000				0.000	
Tests																						
Cross-section F	0.000				0.000				0.000				0.000				0.000				0.000	
Cross-section Chi-squar	0.000				0.000				0.000				0.000				0.000				0.000	
Period F	0.002		0.042		0.000		0.000		0.424		0.000		0.011		0.000		0.002		0.007		0.014	
Period Chi-square	0.000		0.022		0.000		0.000		0.203		0.000		0.001		0.000		0.000		0.001		0.000	
Sargan			0.760				0.140				0.770				0.600				0.210			
2nd order autocorrel.			0.137				0.079				0.068				0.002				0.057			

Note: In M1 the first lag of logWage is used. In M2 (the dynamic estimations), second and third lags of logWage are used as instrumental variables for the current value.

Appendices

A. List of the sectors

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

1 digit
15-16: food products, beverages and tobacco products
17-18: textiles and textile products
19: Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
20: wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
21-22: Pulp, paper, paper products, printing and publishing
23: coke, refined petroleum products and nuclear fuel
24: chemicals and chemical products
25: rubber and plastics products
26: other non-metallic mineral products
27-28: 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: Manufacture n.e.c., Recycling

Appendix B: Skill taxonomy

Two-digit sectoral classification

High Skilled	Medium Skilled	Low skilled
16	15	17
22	21	18
23	25	19
24	27	20
29	28	26
30		36
31		37
32		
33		
34		
35		

One-digit sectoral classification

High Skilled	Medium Skilled	Low skilled
21-22	15-16	17-18
23	25	19
24	27-28	20
29		26
30-33		36-37
34 35		

Source: Landesmann et al (2004)