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Industrial Competitiveness and Labour Market Transformation in Hungary: Macroeconomic Developments and Empirical Analysis

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SUMMARY

The paper explores how employment responded to changes in competitiveness in Hungary over the last few years. First, as a background, an account of the main economic and employment trends is given, and some insight into the relationship between unemployment and the quality of labour is also provided. The second part describes the empirical results of our research.

Foreign capital played a decisive role in improving competitiveness and restructuring of the economy in general. The importance of foreign investment is also clear in terms of employment. Although inactivity is still very high in Hungary even compared to most other Central and East-European countries, FDI has certainly helped ease tensions on the labour market. Rapid devaluation of obsolete skills and increasing return to education might have also contributed to better performance in terms of competitiveness. Skill-biased technological development, introduced mainly by foreign enterprises, has played an important part in helping Hungary attain its present position.

The results of our empirical research show that the employment level of the Hungarian manufacturing industries is only slightly and negatively correlated with change in market shares (our competitiveness indicator) during the second half of the 1990's and the first few years of the new Millennium. We have, however, found strong evidence that change in revenues from sales is strongly correlated with the level of employment. This suggests that during this period Hungarian manufacturing had arrived at an expansive period of development. Though we know that in some industries, particularly in some firms, productivity increased very quickly, these (typically foreign owned firms) were counterbalanced by other "sleeping" market players.

1) Introduction: the definition of competitiveness – a theoretical background

Although competitiveness has become one of the most commonly used keywords and concepts over the last 20 years, there is no single universally accepted definition. Thus the term is not clearly defined and a handful of indicators are associated with it (see a list of definitions in: Buzás, 2005.) The most important and commonly accepted factors of competitiveness seem to be the ability of certain industries or countries to improve their income and/or market share while simultaneously improving the quality of life. One possible way for this to happen might be that in expanding industries (with increasing market share and income) employment is also growing. It is well known, however, that in most cases an important prerequisite of improvements in competitiveness (income and market share) is higher productivity, almost always achieved by reducing employment, or at least through declining unit labour costs. This does not mean that competitiveness is necessarily connected to diminishing income levels and quality of life for the employees But in the short run they definitely feel only these effects. In the long run and in a broader sense, however, positive effects can be felt as well, especially if shareholders are also considered. In addition, those employees who are laid off as a consequence could be employed in other industries (depending of course on qualifications, age and other individual characteristics, as well as on the macroeconomic environment, including the level of unemployment). Therefore, it is an open question how the level of employment will ultimately respond to changes in competitiveness (market shares for example). Similarly, changes in employment cannot *per se* be linked to growing competitiveness in a straightforward way.

Nonetheless, the empirical part of our research focuses on change in competitiveness and its impact on the labour market (the level of employment). Before describing this part of our research, we provide an account of the main economic and employment trends. Further, we provide some insight into the relationship between unemployment and the quality of labour.

1.1. Shifts in employment across the main economic sectors, changes within manufacturing and productivity and the role of foreign enterprises

As in most other countries of Central and Eastern Europe, employment not only fell in Hungary in the early years of transition, a major shift in employment also occurred, primarily from agriculture but also from industry to services. This trend continued such that the

employment share of agriculture declined by almost half between 1992 and 2000 (from more than 10% to 5-6%). The employment share of industry also fell, albeit to a much smaller extent (from 30% to 27%) during this period. Employment gains were evident in the case of the service sector where the share of employment increased from 54% to 60%. The growth of industrial production was already considerable in 1994. At that time, however, employment was still declining in this sector, so labour productivity increased considerably. Looking at manufacturing data, the main focus of our research, it becomes clear that a major labour reallocation occurred within this sector,[1] a shift from the collapsing giant state firms to the newly established private (foreign or domestic) enterprises. This is also evident from micro-level data. Even in the second half of the 90s, behind stagnating (or just slightly increasing) employment on the macro-level, an intensive process of job destruction and job creation took place (Kőrösi, Surányi, 2002.).

In terms of productivity, the Hungarian economy as a whole seems to have recovered very quickly from the recession (including the severe downturn in output in 1991), since between 1992-1997 real productivity more than doubled (Fazekas, 2002.). Without doubt large inflows of Foreign Direct Investment (FDI) played an important role in the recovery of the Hungarian economy and in improving efficiency. Foreign firms' increasing share in employment[2] helped to ease tension on the labour market, and some performance indicators that compare foreign and domestic firms clearly show the outstanding role foreign firms played in improving competitiveness and efficiency. For example, in the year 2000 labour productivity (value added per employee) in the non-financial business sector was 2.6 times higher than in comparable Hungarian companies. At the same time, wage costs were 1.9 times higher. Of course, labour productivity differentials reveal significant sectoral variation, ranging from 1.5 (mining and quarrying) to 5.7 (transport and communication).

In terms of both employment and sales, foreign firms' are clearly dominant in manufacturing. For example, in the year 2000 among foreign-owned companies, the employment share stood at 63% of total employment, whereas the employment share of all manufacturing companies was only 37%. As regards sales, the respective shares were 53% and 36%. In terms of employment, this meant that as a whole foreign manufacturing companies employed 47% of the labour force (as opposed to 34% in the economy as a whole).

[1] The majority of the labour reallocation took place in this sector.

[2] This share continues to increase and the share in employment of companies with 100% foreign ownership has also been rising. Whereas in 1997 the total share of foreign companies in employment had reached 31.8%, by 2001 it had increased to 34.9%. During the same period, the share of companies with 100% foreign ownership rose from 12.2% to 19.0% (Source: Employment Office, Budapest, 2002).

1.2. Unemployment and quality of labour force

During the period of economic transition, Hungary, like most other Central and East European (CEE) countries, saw unemployment rise to levels comparable to those classed as "high" in developed countries. The drastic fall in employment in the early 1990s was the result of declining output, caused by the contraction of foreign and domestic demand, and the collapse of giant state-owned firms. As a consequence, the national labour force shrank by over 1.5 million between 1988 and 1997.

At the beginning of the transition, the growing imbalance in the labour market led not only to unemployment, but also to a sharp fall in the labour force participation rate. CEE countries in the state-socialist period had participation levels far higher than the developed market economies. Hungary was no exception. Participation has now fallen to a level comparable with Western countries, partly because of measures against unemployment and partly because of massive, voluntary withdrawal from the labour market. Although the level of unemployment has been falling since 1993, the participation rate is still among the lowest even in the CEE countries.

Major changes occurred also in skill patterns. During the transition the relationship between skill and earnings increased significantly.[3] This happened because job destruction, especially in the early transition when net job-destruction characterised the labour market, was concentrated in the low-skilled job segment and proceeded on a massive scale. In addition, the above mentioned significant reallocation of labour across industries meant that, partly due to the emergence of more skill-intensive industries, there was a major shift towards skill-intensive jobs. In this respect, foreign capital played a decisive role. FDI inflows represented a significant demand for skills. As Kézdi (2002) points out, demand initially met inelastic supply and this explains the increasing earnings-based skill premium. According to his findings, technological innovation also contributed to skill premium through foreign ownership. The data illustrates that from the second half of the 90s the increasing demand for skills is more and more strongly related to skill-biased technological change. However, Kezdi argues that this should not be regarded as a special feature of transition, but rather as a worldwide trend.

Statistical data presented in the paper on the quality of the labour force, show that major skill changes occurred not only in the sectoral structure, but also in the occupational groups and educational patterns of the labour force. Doubtless

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As mentioned by Kertesi and Kölló, this was especially characteristic of young age cohorts (Kertesi, Kölló, 2002.). In another paper these authors concluded that young and educated workers were paid rising wages. They found that these types of workers yield higher productivity returns, especially in a modern environment."

these shifts point in one direction: modernisation of the economy. Whether and to what an extent these developments improve competitiveness however remains an open question. These changes were obviously influenced primarily by strong competitive pressures from old EU-members, especially our main trading partners, Germany, Austria and Italy.

2) EMPIRICAL RESEARCH ON THE RELATIONSHIP BETWEEN COMPETITIVENESS AND THE LABOUR MARKET[4]

2.1. Porter' approach to the competitiveness of regions[5]

The continued growth of a nation, country or region depends on productivity, the way in which human, capital and natural resources are put to use. Productivity is expressed as the value of goods and services produced per unit of labour and capital. The last 10-15 years have demonstrated that competitiveness derives from productivity. In order to achieve and maintain success it becomes necessary to completely alter the approach to competitiveness which was previously based upon low cost and effectiveness. The new approach is based upon innovation and dynamics. Productivity is a function of three factors: the political, legal and macroeconomic framework; the quality of the microeconomic business environment, the productivity of the company and the type of strategy developed. These factors create a quality microeconomic business environment and are expressed in Michael Porter's so-called "diamond model".

Successful economic development is a process of gradual renewal and updating. Porter defines four development states of growth which industry and its branches go through. Individual stages can overlap with one another and the development of an economy can move in both directions.

The first three stages are called economic driving factors, involving investment and innovation which bring about gradual improvements in national prosperity. The fourth stage called industrialisation is driven by welfare and results in a decrease in the competitiveness of a nation. As the economy of a nation develops, the characteristics of competitive advantage also change, along with the means of competing, and the weight and content of particular determinants of competitiveness (Skokan, 2004).

All of the above-mentioned approaches describe factors influencing the competitiveness of countries and describe rela-

[4] On the general approach, the model, methods, and the data used see details in the paper of our Polish partners, who as project leaders who worked on some of the general introductory part of this project.

[5] The next three part is the work of our Czech partners (with only minor adaptations to fit the Hungarian case), who as leader of this work package made some part of the general introductory parts of our work. See: Filipova *et al.*, 2004.

tionships between particular aspects of the economy and their significance for competitiveness. However, when analysing the relationship between these factors, few attempts are made to model these relationships with the help of formal modelling.

For the purposes of this research we now focus specifically on the relationship between competitiveness and the labour market. A change in the competitiveness of an economy is particularly reflected in the labour market from the side of demand which determines and, as a result of development, changes the requirements for the labour force which consequently adjusts to these changes. On the other hand, the ability of the labour force to rapidly and flexibly adapt to the demands of the market creates a form of competitive advantage and strengthens the competitiveness of the economy. This mutual implication is expressed in the following scheme:

The optimal functioning of the labour market is a function of supply and demand on the labour market. The optimal allocation of labour is defined by quantitative and qualitative characteristics of the individual and depend on what jobs require. The wage level represents both the willingness of the employer to pay for work performed and the willingness of the employee to supply labour for a specific wage. The following chart illustrates our approach to the investigation of the quality (but not only quality) of the labour market. Our intent is to identify groups of people with the best or the worst position on the labour market, what factors have the greatest influence on this, how strong these processes are on the labour market and what factors contribute to the emergence of these processes.

From the perspective of our research aims, we examine the demand for labour and its development as a result of changes in the competitiveness of the economy. Labour demand and its modelling have been the subject of interest for a range of economists and studies. The choice of specification of an individual empirical labour demand function essentially reflects the use to which the results are to be put. Methodologies differ not only in terms of their assumptions regarding the underlying operationalization, *i.e.* the mathematical form of the production function, but also in terms of the variables included in the function to be estimated and the implicit or explicit model in which the labour demand function is embedded. Rather than review the extensive literature dealing with labour demand functions, we would like to concentrate on *three basic specifications*.

The first is derived directly from the profit maximising position of a price taking firm employing labour, L, at a wage, W, a set of m other variable inputs with prices, P_1, P_2, …, P_m and k fixed inputs with quantities, Z_1, Z_2, …., Z_k.

The labour demand function may then be written as

$$L = L\left(\frac{W}{P}, \frac{P_1}{P}, \ldots, \frac{P_m}{P}, Z_1, \ldots, Z_k\right) \quad (1)$$

where P is the output price. This function tells us how the labour employed will vary given, for example, a rise in the wage rate where the product price, other variable input prices and the fixed input quantities are held constant.

The second approach concentrates upon the firm's cost-minimising decision where all inputs are variable. This version may be written as

$$L = L\left(\frac{W}{P_1},....,\frac{W}{P_m},Q\right) \quad (2)$$

where Q represents output. This function tells us, for example, how the labour employed will vary given a change in the wage rate where the output and other input prices are given. This formulation therefore only reflects the substitution effects arising from a given input price change. On the micro level, it is thus most applicable to the case where output is demand-constrained. At the macro level, this formulation is appropriate if we assume that the output of the economy is, in the long run, determined by the condition of full employment.

If capital is the only input included in the production function other than labour, then the previous equation (2) may be rewritten as

$$L = L\left(\frac{W}{R},Q\right) \quad (3)$$

where R represents the rent on capital. Here, capital is treated as a variable input.

The third formulation concentrates on the marginal productivity condition for labour. If we assume that the production function is divisible between non-labour inputs and labour and takes the constant elasticity of substitution form with constant returns to scale, then;

$$Q = A\left[\alpha g(z)^{\theta} + (1-\alpha)L^{\theta}\right]^{1/\theta} \quad (4)$$

where A is an efficiency parameter which may vary over time due to the effects of technical progress and g(z) represents a function of a vector of non-labour inputs, z. The marginal productivity condition may then be written as;

$$\log\frac{Q}{L} = -\sigma\log(1-\alpha) - \sigma\theta\log A + \sigma\log\frac{W}{P} \quad (5)$$

The elasticity of substitution, $\sigma(=1/(1-\theta))$, may then be estimated by regressing the log of Q/L on the log of W/P with a further variable such as a time trend to pick up the effects of variation in A. The elasticity of demand for labour can be derived from the formula;

$$E_{LL/Q} = (1-v_L) \quad (6)$$

where $E_{LL/Q}$ is the elasticity of demand for labour with respect to price (i.e. the wage) with output given and v_L is the share of labour.

2.2. The approach used in our research

The approach used in this paper is based on the third specification which was modified for our needs following Tokarski (2003). Analysing the influence of competitiveness indicators on labour demand, we start from the Cobb-Douglas production function;

$$Y = AK^{\alpha}L^{1-\alpha} \qquad \alpha \in (0;1) \quad (7)$$

where A is total factor productivity (TFP). Assuming that TFP is an increasing function of the competitiveness indicator θ, we can re-write as follows:

$$\ln(A) = \alpha_0 + \alpha_1 t + \alpha_2 \ln\theta \quad (8)$$

where $\alpha_1>0$ is the TFP growth rate resulting from the impact of factors other than changes in competitiveness and $\alpha_2>0$ is the elasticity of TFP with respect to the competitiveness indicator.

From equations (7) and (8) we obtain:

$$\frac{\dot{Y}}{Y} = \alpha_1 + \alpha_2\frac{\dot{\theta}}{\theta} + \alpha\frac{\dot{K}}{K} + (1-\alpha)\frac{\dot{L}}{L} \quad (9)$$

from which, after certain modifications, we can then obtain a dynamic demand function (for technical details see Tokarski 2003):

$$\frac{\dot{L}}{L} = \left(\frac{\alpha\delta}{1-\alpha} - \frac{\alpha_1}{1-\alpha}\right) + \\ + \frac{1}{1-\alpha} * \frac{\dot{Y}}{Y} + \frac{\alpha_2}{1-\alpha} * \frac{\dot{\theta}}{\theta} - \frac{\alpha}{(1-\alpha)v} * \frac{I}{Y} \quad (10)$$

In this equation, I/Y represents the rate of investment.

This equation can be estimated based upon a time series for particular economies (using dynamic econometric models) or based upon time-series cross-sectional data for branches of the economy (using the fixed effects procedure).

θ - our competitiveness indicator is expressed as follows:

Either: the share of accession country (AC) manufacturing suppliers producing for the domestic market as a share of AC apparent consumption (CC1)

Or: the share of Hungarian exports in total internal exports of the European Union (CCC)

According to equation 10, rising shares of both indicators mean increasing production of manufacturing sectors which should lead to a decline in employment due to the related rise in labour productivity. However, the structure of our competitiveness indicator causes the opposite effect: the rising share of both competitiveness indicators leads to an increase in employment which however does not exclude growth in labour productivity. On the basis of our results we must modify equation 10 as follows: the minus sign in front of the competitiveness indicators is changed to a plus sign and the modified equation is as follows:

$$\frac{\dot{L}}{L} = \left(\frac{\alpha\delta}{1-\alpha} - \frac{\alpha_1}{1-\alpha}\right) + \\ + \frac{1}{1-\alpha} * \frac{\dot{Y}}{Y} - \frac{\alpha_2}{1-\alpha} * \frac{\dot{\theta}}{\theta} - \frac{\alpha}{(1-\alpha)v} * \frac{I}{Y} \quad (11)$$

2.3. The model, method and data used in our estimations

Cross-sectional analysis

In order to estimate the impact of competitiveness and other indicators on the labour market (and thus employment), we employed an standard OLS cross-sectional analysis for each year (1997 – 2001 for two digit level estimations and

1999–2001 for three digit level estimations). The dependent variable is the *ln of the number of employees* – weighted by full-time employment in all models. The following types of functions have been estimated at the two and three digit levels, with:

1.
$$\Delta \ln E_t = \alpha_1 + \alpha_2 \Delta \ln Y_t + \alpha_3 \Delta CC1_t (orCCC) - \\ - \alpha_4 \frac{I}{Y}_t + \varepsilon_t$$

where t stands for the t^{th} time period,

Y is output measured by the revenues from production and goods sold at nominal or real prices (for three digit level data available only from 1998),

I/Y is the rate of investment measured as total investment in tangible property (without financial leasing and lands, for three digit level data available only from 1998 to 2001),

CC1 is the competitiveness index counted as the share of Hungarian manufacturing suppliers relative to total production for the domestic market in Hungarian consumption, (data available for the period 1996 – 2003),

CCC is the competitiveness index counted as the share of exports from Hungary in the total internal exports of the European Union (data available for period 1996 – 2003).

Panel data regression analysis

The fixed effects regression model, known also as the least-squares dummy variable model (LSDV), assumes that slope coefficients are constant but intercepts vary over industries.

2.
$$\Delta \ln E_{it} = \alpha_1 + \alpha_2 D_{2i} + ... + \alpha_n D_{ni} + \beta_2 \Delta \ln Y_{it} + \\ + \beta_3 \Delta CC1_{it} (orCCC) - \beta_4 \frac{I}{Y}_{it} + \varepsilon_{it}$$

where D is a dummy variable for industry.

3.
$$\Delta \ln E_{it} = \gamma_0 + \gamma_2 Dum_{99} + ... + \gamma_4 Dum_{01} + \beta_2 \Delta \ln Y_{it} + \\ + \beta_3 \Delta CC1_{it} (orCCC) - \beta_4 \frac{I}{Y}_{it} + \varepsilon_{it}$$

where Dum is a dummy variable for time. (*pooled regressions with time dummy)*

The LSDV model, where slope coefficients are constant but intercepts vary over time as well as industry is as follows;

4.
$$\Delta \ln E_{it} = \alpha_1 + \alpha_2 D_{2i} + ... + \alpha_n D_{ni} + \gamma_0 + \gamma_2 Dum_{99} + ... \\ + \gamma_4 Dum_{01} + \beta_2 \Delta \ln Y_{it} + \beta_3 \Delta CC1_{it} (orCCC) - \beta_4 \frac{I}{Y}_{it} + \varepsilon_{it}$$

Statistical Data

The analysis is based on NACE and CPA 2- and 3-digit level of classifications according to the following rules:

1. Instead of the total turnover of each 3 digit CPA product group we use the total value of production revenues in the related NACE group. CPA (product) data are not available at such a detailed level of classification, but the 3 digit level NACE producer data is available.
2. The converse situation is true for our foreign trade data: Import/Export

statistics are derived only from CPA data (product), and not from NACE (producer) data.

Regarding HUN and EU apparent consumption (calculated as turnover minus (extra EU) exports plus (extra EU) imports), we join product indicators (CPA data) with producer indicators (NACE). This mixture is acceptable on the macroeconomic level for a general assessment of the manufacturing industry in HUN and EU apparent consumption. But for structural analyses using the 3-digit level of classification, in individual sectors obvious and not so obvious mistakes begin to appear that were impossible to eliminate. In the case of "share indicators" obvious mistakes were all those figures over 100% and negative shares. We have not deleted these industries (our Czech colleagues however have deleted them!), because we cannot decide (in particular in the case of negative shares), whether they represent errors in the data, or whether re-exports are lurking behind the strange numbers!

In the case of the Hungarian manufacturing industry, it is important to keep in mind that there are many firms producing goods that belong to more than 1 division of the 3-digit level of classification. However all production of 1 firm can only be included in 1 division (sectoral classification).

2.4. Main results of the empirical research

The tables below illustrate consistent correlation between employment and revenues and (in two cases) the rate of investment. In some cases, home country market share dynamics and some industry dummies were also significant, which suggests our model is acceptable despite the fact that important factors have been omitted. In particular, the use of lagged variables might provide interesting results. Unfortunately due to the short period for which we have reliable data, we were obliged to ignore them.

As illustrated by the three-digit level results (Tables 1–5), employment and sales revenues are positively correlated in every equation we have estimated. More interesting is the fact that the rate of investment is correlated with change in employment only in the year 2000. In this case, it may be more meaningful—and might possibly yield more robust results—if lagged variables were used

Another very interesting result is that we were unable to find any correlation between change in our competitiveness indicator (market share in the home market, or market share in the EU internal export market) and employment at the three digit level. Again, this may in part be the result of not having any lagged variables in our equations. But it is also possible that this is a sign of the rigidity of the labour market. It is possi-

ble that only the level of production is changing while the level of employment remains relatively stable in the mid term. Thus the change in market share is presumably a result of changes in the level of productivity (in this case: number of employees/level of production).

We have not found any significant industry-to-industry variation.

Results at the 2-digit level of analysis are somewhat more glaring. In one case, we find that changes in domestic market shares are significant, and are negatively correlated with change of the level of employment. So in the short term, growing market shares mean falling employment. Certainly this decline is relative. In absolute terms, the combination of growing output and growing productivity can imply more employment.

We found that employment in some industries, for example the "Manufacture of other transport equipment" (NACE 35) and the "Manufacture of office machinery and computers" (NACE 30) are more sensitive to changes in market share (both on the domestic and EU markets) than other industries.

But after this short description of our results we are forced to admit that our main result is that we did not find very strong or revealing correlations.

Below we provide the main results of our estimations and in the appendix we provide the complete output of our estimations (all models were estimated using Stata 6.0).

Table 1
Model: 3 digit level with CC1, cross section, real prices

Model year	Significant variables	Sign	Significance level
Year 1999	dlnY	+	5%
Year 2000	dlnY	+	5%
	I/Y	+	5%
	Constant	–	5%
Year 2001	dlnY	+	5%
	Constant	–	5%
Year 2002	dlnY	+	5%
	Constant	–	5%
Year 2003	dlnY	+	5%
	constant	–	5%

Table 2
Model: 3 digit level with CCC, cross section, real prices

Model year	Significant variables	Sign	Significance level
Year 1999	dlnY	+	5%
	Constant	–	5%
Year 2000	dlnY	+	5%
Year 2001	dlnY	+	5%
	dccc	–	10%
	Constant	–	5%
Year 2002	dlnY	+	5%
	Constant	–	5%
Year 2003	dlnY	+	5%
	Constant	–	5%

Table 3
Model: 3 digit level, pooled regression with time dummy, real prices

	Significant variables	Sign	Significance level
With CC1	dlnY	+	5%
	Year 2001	–	5%
	Constant	–	5%
With CCC	dlnY	+	5%
	Year 2001	–	5%
	Constant	–	5%

Table 4
LSDV (least-squares dummy variable model), 3 digit level

	Significant variables	Sign	Significance level
With CC1	dlnY	+	5%
With CCC	dlnY	+	5%

Table 5
LSDV (least-squares dummy variable model) + time effect, 3 digit level

Model year	Significant variables	Sign	Significance level
With CC1	dlnY	+	5%
	Year 2001	–	5%
With CCC	dlnY	+	5%

Table 6
Model: 2 digit level with CC1, cross section, real prices

Model year	Significant variables	Sign	Significance level
Year 1997			
Year 1998	dlnY	+	5%
Year 1999	dlnY	+	5%
Year 2000	dlnY	+	5%
	dccl	–	10%
	I/Y	–	5%
Year 2001			
Year 2002	dlnY	+	5%
	Constant	–	5%
Year 2002	dlnY	+	5%
	Constant	–	5%

Table 7
Model: 2 digit level with CCC, cross section, real prices

Model year	Significant variables	Sign	Significance level
Year 2000	dlnY	+	5%
Year 2001			
Year 2002	dlnY	+	5%
	Constant	-	5%
Year 2002	dlnY	+	5%
	Constant	-	5%

Table 8
Model: 2 digit level, pooled regression with time dummy, real prices

	Significant variables	Sign	Significance level
With CC1	dlnY	+	5%
	year 1998	+	5%
With CCC	dlnY	+	5%
	year 1998	+	5%

Table 9
LSDV (least-squares dummy variable model), 2 digit level

	Significant variables	Sign	Significance level
With CC1	dlnY	+	5%
	industry 30	+	5%
	industry 35	+	10%
With CCC	dlnY	+	5%
	industry 30	+	10%
	industry 35	+	10%

Table 10
LSDV (least-squares dummy variable model) + time effect, 2 digit level

	Significant variables	Sign	Significance level
With CC1	dlnY	+	5%
	year 1998	+	5%
	industry 30	+	5%
	industry 35	+	5%
With CCC	dlnY	+	5%
	year 1998	+	5%
	Industry 29	+	10%
	industry 35	+	10%

CONCLUSIONS AND POLICY RECOMMENDATIONS

According to recent data, Hungary has exhibited outstanding performance in terms of competitiveness. Foreign capital played a decisive role in this, as well as in the restructuring of the economy in general. The importance of foreign investment is also clear in terms of employment. Although inactivity is still very high in Hungary even compared to the other Central and East-European candidate countries, FDI has certainly helped ease tensions on the labour market. Its key role in creating jobs in the corporate sector is particularly evident: 80% of the net increase in corporate jobs has occurred in the foreign enterprise sector (Fazekas, 2003.)

Rapid devaluation of obsolete skills and increasing returns to education may also have helped improve competitiveness. Although similar developments can be observed in other CEE-countries, skill-biased technological development, introduced mainly by foreign enterprises may have played an important part in helping Hungary attain its present position. The inflow of foreign capital however has slowed down recently. Thus it remains to be seen whether the current level of competitiveness can be sustained in the future.

Summarizing the empirical portion of our research, the results show that the employment level of the Hungarian manufacturing industries is only slightly and negatively correlated with change in market share (our competitiveness indicator in this research), during the second half of the 1990's and the first few years of the new Millennium. We have however found strong evidence that change in sales revenues is strongly correlated with the level of employment. This suggests that during this period Hungarian manufacturing had arrived at an expansive period of development. Though we know that in some industries, particularly in some firms, productivity increased very quickly, these (typically foreign-owned firms) were counterbalanced by other "sleeping" market players. However, we have to consider the possibility that problems with our data may also be behind our negative results.

Though it is very difficult to provide policy recommendations based on research findings that provide only relatively weak results, from the point of view of productivity of the firms it is obvious that more liberal regulation of labour market would be desirable. Whether the social and political price of such liberalization would be to high, however, remains an open question.

LITERATURE

Buzás, Sándor, 2005, *Impact of Changes in Competitiveness on Labour Market Developments*, Budapest, Manuscript.

Fazekas, Károly, 2002, 'The Hungarian Labour Market during Transition and EU-Accession.' In: *Hungary and EU Eastern Enlargement*, eds.: Bernhard Felderer, Helmut Frisch, Bernhard Boehm, IHS, Workshop Proceedings, 3. October, 2002.

Fazekas, Károly, 2003, *Effects of Foreign Direct Investment on the Performance of Local Labour Markets – the Case of Hungary*, paper presented at the International Conference "Reinventing Regions in the Global Economy", organised by the Regional Studies Association 12th 15th April, 2003. Pisa Congress Centre, Pisa, Italy.

Filipová, Lenka; Gottwald, Jaromir and Simek, Milan, 2004, *Impact of Changes in Competitiveness on Labour Market Developments*, within the framework of the project on Changes in Industrial Competitiveness as a Factor of Integration: Identifying Challenges of the Enlarged Single European Market, Manuscript, Technical University of Ostrava, Faculty of Economics, (Czech Republic).

Fóti, Klára, 2002, *The EMU and the Social Dialogue in Hungary* (Outline of a national development programme for preparation for the EMU, within the context of the current political and economic situation and the present state of industrial relations), Manuscript, Budapest.

Fóti, Klára, 2003, 'State of Human Development in Hungary.' In: *Alleviating Poverty: Analysis and Recommendations* (Human Development Report for Hungary, 2000-2002), ed.: Klára Fóti, United Nations Development Programme (UNDP) and Institute for World Economics of the Hungarian Academy of Sciences, Budapest.

Fóti, Klára, 2003, *Changes in Competitiveness of the Economy and the Labour Market – Some Theoretical Considerations and Main Findings in the Case of Hungary*, Budapest, Manuscript.

Fóti, Klára, 2004, *Impact of Change in Competitiveness on Labour Market Development* (Unemployment and quality of labour force – the case of Hungary), Budapest, Manuscript.

Kézdi, Gábor, 2002, *Two Phases of Labour Market Transition in Hungary: Inter-sectoral Reallocation and Skill-biased Technological Change*, Budapest Working Papers, No. 2002/3. Labour Research Department, Institute of Economics, Hungarian Academy of Sciences, Department of Human Resources, Budapest University of Public Administration.

Kertesi, Gábor and Köllő, János, 2002, *Labour Demand with Heterogeneous Labour Inputs after the Transition in Hungary, 1992–1999 – and the Potential Consequences of the Increase of Minimum Wage in 2001 and 2002*. Manuscipt.

Köllő, János, 2001, *Meddig tart a rendszerváltás?* (How Long Does the Systemic Change Last?). Budapest Working Papers on the Labour Market, BWP, 2001/11, Labour Research Department, Institute of Economics, Hungarian Academy of Sciences, Department of Human Resources, Budapest University of Public Administration, pp. 1–49.

Kőrösi, Gábor, 2002, *Labour Adjustment and Efficiency in Hungary*, Budapest Working Papers on the Labour Market, BWP, 2002/4, Labour Research Department, Institute of Economics, Hungarian Academy of Sciences, Department of Human Resources, Budapest University of Public Administration, pp. 1–30.

Kőrösi, Gábor and Surányi, Éva, 2002, *Munkahely-teremtés és -rombolás* (Job Creation and Destruction), Budapest Working Papers on the Labour Market, No. 2002/4. pp. 1–30. Labour Research Department, Institute of Economics, Hungarian Academy of Sciences, Department of Human Resources, Budapest University of Public Administration.

Oblath, Gábor and Richter, Sándor, 2002, 'Macroeconomic and Sectoral Aspects of Hungary's International Competitiveness and Trade Performance on EU-markets (Competitive Positions and Sectoral Growth of the Hungarian Economy)'. In: *IHS*, pp. 5–43.

Wziątek-Kubiak, Anna, 2003, *Critical Synthesis, Review of the Main Findings, Methodologies and Current Thought on Competitiveness of Accession Countries. Mapping of Competence*, Manuscript, CASE, Warsaw.