IN FOCUS
LABOUR – THE DEMAND SIDE

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1. INTRODUCTION

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In labour economics, investigating demand trends is as important as studying supply. However, the tools used to analyse the two sides are quite different. When looking at supply we of course analyse the characteristics and behavioural specifics of the individual job seeker, while demand is determined by the labour market behavior of entrepreneurs, firms, and government. Therefore, the information and analytical methods we need are different from the ones used when studying the factors behind supply.

It is, however, expedient to narrow the scope of the investigation. The number of persons employed in the public sector has been essentially unchanged throughout the past decade. There have been some major and minor fluctuations, but on the whole, 800,000 people have been employed in the public sector in the broad sense of the term.[1] While economic crisis has left its mark on this segment, instead of making adjustments through the level of employment, the response has been manifest almost exclusively through adjustments in the level of (real) wages.

Transitional crisis also forced the business sector to adjust significantly its wages in the early 1990s, but its most significant consequence on the labour market was a drastic reduction in business sector employment. This was the factor behind the sudden and huge drop in employment portrayed in *Figure 1* of the Foreword. The early 1990s process of cutting down on the over-employment that is so typical for socialism coincided with growing market competition made feasible by liberalisation, and with a loss of markets as COMECON collapsed, triggering a wave of bankruptcies. For that reason, we chose to begin our analysis of labour demand with 1992, when these rather chaotic labour market flows came to an end.

1 That figure does not include employees of business operations run by central or local government bodies (such as the postal service and the railways) but for the sake of simplicity, it does include foundation schools and hospitals.

The investigation of business sector labour demand is based fundamentally on data from annual company balance sheet reports. This limits the range of conclusions that analysts can draw. For all practical purposes we only have substantive information on a certain part of businesses, the ones required to keep double entry accounting, separating inflow from outflow and employ at least five people.[2] This is rather unfortunate because the most rapidly changing segment of the labour market was the very one involving smaller businesses. Unfortunately, we have but little information concerning the labour market behavior of these enterprises, the ones employing only a few people, and since we lack the basic data necessary for substantive analyses, we are unable to investigate them here. As a result, the information we do have covers barely more than two-thirds of the nearly three million people who were employed in the business sector in 2000. It is worth using these data to compare the structure of the different economic sectors in 1992 and 2000, and to observe the sector-based distribution of employment in a period when the structure of the business sector changed significantly *(Table 1).*

2 Over time, there have been changes in the collection of employment statistics. In the early 1990s, the system was limited to businesses employing at least 20 people, and was only expanded to include statistics on smaller businesses in the mid-1990s.

Table 1: Sectoral distribution of employment*

	1992	1993	1994	1995	1996	1997	1998	1999	2000
1000 persons									
Agriculture	186.2	213.1	185.2	169.6	164.3	157.2	154.6	144.3	130.2
Mining and energy	107.1	112.6	114.5	108.6	104.5	98.2	94.4	88.0	79.3
Manufacturing	821.0	722.0	689.2	686.6	691.8	725.9	758.0	752.3	772.6
Trade	311.1	277.0	275.6	269.3	275.9	285.6	307.4	325.9	340.5
Construction	151.2	137.5	129.7	118.0	110.9	116.3	120.1	121.9	133.2
Services	601.9	585.3	533.7	518.9	527.7	539.7	559.3	573.3	599.3
Total	2,178.5	2,047.4	1,927.9	1,871.0	1,875.1	1,923.0	1,993.8	2,005.8	2,055.1
Share (%)									
Agriculture	8.5	10.4	9.6	9.1	8.8	8.2	7.8	7.2	6.3
Mining and energy	4.9	5.5	5.9	5.8	5.6	5.1	4.7	4.4	3.9
Manufacturing	37.7	35.3	35.8	36.7	36.9	37.7	38.0	37.5	37.6
Trade	14.3	13.5	14.3	14.4	14.7	14.9	15.4	16.2	16.6
Construction	6.9	6.7	6.7	6.3	5.9	6.1	6.0	6.1	6.5
Services	27.6	28.6	27.7	27.7	28.1	28.1	28.1	28.6	29.2
Total	100	100	100	100	100	100	100	100	100

* Average employment at the enterprises covered in the labour demand analysis.

In some cases we used Wage Survey data together with the balance-sheet reports. The Wage Survey covers the above-mentionedcompanies, taking random samples to collect information on the wages, qualifications, and exact jobs of about one-tenth of labour in the firms surveyed. We used these data primarily to measure employer qualifications.

Essentially, we studied demand trends on two levels. In Section 2 we present the process of job creation and destruction by industry/sector. There

are businesses that destroy jobs and also dynamic firms that create them in practically all sectors. Aggregate employment is given by the combined result. It is easy to imagine that even though two different economies might show employment changes that are quite similar on the national level, very significant differences could exist behind the aggregate figures. For instance, there might be hardly any change within companies in one economy and therefore, no substantive change in demand for labour. In the other economy, however, the business sector may be undergoing a dynamic transformation with new firms created, old ones disappearing, dynamic development in some, and others adjusting to changing market conditions through drastic cutbacks. Despite the overall similarity of aggregate employment flows, economic policy tasks and opportunities will be highly different. Subsection 2.1 presents the most important concepts, while 2.2 contains a summary of empirical results in other countries. Subsection 2.3 then presents a balance of job creation and destruction in Hungary between 1992 and 2000.

Section 3 presents models that describe the labour demand of enterprises. Subsection 3.1 contains a brief overview of the most important models used to study demand, subsection 3.2 summarises results for some the more interesting countries, and subsection 3.3 presents the Hungarian results using homogenous dynamic models. Subsection 3.4 studies demand adjustment over time, while subsection 3.5 demonstrates the consequences of the heterogeneity of demand. Subsection 3.6 tries to links the reported labour market flows to the economic transformation.

2. JOB CREATION AND DESTRUCTION

2.1 Concept and statistical indices

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Employment is traditionally described by aggregate employment/unemployment/labour force participation rates, by the proportion of long-term unemployed, and by similar aggregate indices. But, these indices contain no information on the structure of the labour market on the micro level – on how hard it is for the average person to find a job. In addition, the aggregate indices could describe both flexible and rigid markets. So, many researchers have chosen to follow the method of *Davis, Haltiwanger and Schuh* (1996), and use job creation, destruction and flow (reallocation) indices derived from firm-level data to describe the state and flexibility of the labour market. These indices reflect the phases of company life cycles and their impact on employment: when the business is established and undergoes initial dynamic growth it creates jobs, then when it becomes streamlined or liquidated, it destroys them. When jobs are destroyed, employees

might move on to the "neighbouring" company (in the same sector and/or region), or they might have to move on to other economic sectors if the economy itself is undergoing a structural transformation.

To measure these flows, the first thing we need to know is company employment data for (at least) two consecutive years. Average employment is the average of the two years.[3] Then we separate the companies where employment increased from those companies where it declined. The gross job creation rate is the total increase of the employment of all expanding companies in the industry, divided by the total average employment of the industry.[4] Similarly, gross job destruction is the total number of lay-offs divided by the total average employment of the entire industry. The difference between the two is net job creation or destruction. The sum of the two is also an important index: it shows the overall rate of change in the business employment pattern; we call this gross reallocation. The constant reallocation of demand for labour is a necessary by-product of economic growth, since this type of structural change is the basis of the adjustment of labour supply and demand.

2.2 International evidence

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The main characteristics of the labour flow in developed market economies

Davis and Haltiwanger (1997) studied data from 18 countries and found that the speed of job creation and destruction is surprisingly fast. Looking at annual data, they found that on average one in every ten jobs disappeared, and that on average one new job was created for every ten that already existed. Though this reallocation was somewhat lower in manufacturing than in other sectors, the generally high rate of job flow suggests that the high level of gross job reallocation tended to reflect *intra-industry* changes rather than an inter-industry flow. *Nocke's* (1994) results demonstrated that in France only 17 per cent of job reallocation occurred because of inter-sectoral labour flows. *Davis and Haltiwanger* (2001) also found that only a small proportion of aggregate job reallocation is due to inter-sectoral movements in the economy, and it is rather the consequence of company-level heterogeneous labour demand.[5] Some empirical research projects have also studied the persistency of changes in employment. Their general conclusion was that job creation and destruction reflects permanent changes in company-level employment. For instance, the above-mentioned *Davis and Haltiwanger* (1997) research found that on average seventy per cent

3 For a new company, employment figures for the previous year are 0, just as current employment is 0 for a company that was liquidated in the interim.

4 The staff increment of companies that cut employment is 0. The index can be calculated in a similar way for a region or even for the whole of the economy.

5 The Davis and Haltiwanger analysis defines the sectors by branches of industry, regions, size, type of ownership, and age of company.

of newly created jobs still existed after one year, and on average eighty per cent of the destroyed jobs were not re-created within one year.

Although the reallocation of jobs can be observed in all sectors, there were nevertheless sharp deviations in the abilities of individual companies to reallocate. Several studies noted that job creation and destruction were strongly concentrated and limited to a few companies, while others tended to be quite rigid (*Davis et al,* 1996; *Albaek and Sorensen,* 1996). This illustrates the important role of fixed costs in the process of labour and capital adjustments. It is quite difficult to explained the observed lumpiness with traditional labour demand models assuming a convex adjustment cost functions, and concluding that businesses will immediately adjust their labour demands (see e.g.: *Nickell,* 1986; *Hamermesh and Phann,* 1996). The result is that over the past decade, models of dynamic labour demand have increasingly emphasised the role of the fixed costs in the adjustment process (e.g.: *Caballero and Engel,* 1993; *Caballero et al,* 1997).

An interesting feature of comparative research on job flows is that the pattern of reallocation intensity has quite similar features in the different countries, and appears to depend mainly on idiosyncratic (company level) factors. Job reallocation in general is strongly influenced by the size and age of a company. If company *size* is treated as a constant, both net changes in employment numbers and (gross) job reallocation decline with the increasing age of the company. This suggests that the effects of the company life cycle play an outstanding role. At the same time, if company age is *constant*, the net change in the number of employees increases with the size of the company, while (gross) job reallocation declines (*Davis and Haltiwanger,* 1997). Of course, there are several other factors in addition to company age and size that influence individual company reallocation abilities. Some papers have called attention to the role played by ownership structure, pointing out that the labour flow rates in the public sector are significantly lower than in the private sector (*Chow et al,* 1996; *Konings et al,* 1996; and *Leonard and Zax,* 1995). In addition, *Davis et al* (1996) report that higher wages and higher capital intensity decrease, while higher industry-specific productivity increases the intensity of job reallocation.

Several authors have attempted to quantify the productivity benefits of reallocation (*Baily et al,* 1992; *Olley and Pakes,* 1996; *Bartelsman and Dhrymes,* 1998; *Foster et al,* 1998). These studies found that the reallocation of *outputs and inputs* from less efficient businesses to more efficient ones plays an important role in the sector's aggregate productivity growth. At the same time, studies on the relationship between the reallocation of *employees* and the growth in the productivity of labour lead to far more ambiguous results, and typically conclude that the reallocation of labour plays far less of a role in increasing efficiency (*Grilisches and Regev*, 1995;

Baily et al, 1996; *Foster et al,* 1998). *Davis and Haltiwanger* (1997) point out that a significant proportion of job changes are not movements from less productive to more efficient jobs. Several studies have documented cases when a decline in employment leads to a significant increase in efficiency (*Davis et al,* 1996; *Baily et al,* 1996). According to *Baily et al* (1996), neither the growth nor the decline of the level of employment is a particularly strong indicator of company productivity. This issue is likely to become an important one in the future research, because of the significance of the relationship between reallocation and productivity.

The main characteristics of the labour flows in transition economies

In Central and Eastern Europe and in the states of the former Soviet Union, the transition to market economy changed significantly the sectoral distribution of employment, and the ownership structure and operation of the business sector. Two very different trends evolved in the highly varied and assorted theoretical models of the transitional processes. One contends that the main cause behind the changes in the labour market was the sudden collapse of the public sector, which was unable to adjust to changed market conditions, together with the slow emergence of the private sector (*Aghion and Blanchard,* 1993; *Roland,* 1994). The growth of the private sector was not sufficient to absorb the workers dismissed from the public sector, which led to high and long-term unemployment, which in turn slows down the restructuring and reforming of the public sector.

According to other transition models, the main driving force of the transformation is the rapid growth of the private sector, which does absorb the labour laid off from the public sector. In this case, it is argued that unemployment is the result of efficient reallocation. It does not preclude the possibility of a high unemployment rate, but it differs from the previous approach in assuming rapid fluctuations among the unemployed persons, a constant inflow and outflow of unemployed individuals, which is a necessary condition for an efficiency-increasing transformation.

Davis and Haltiwanger (1997) in a summarising table report unemployment rate data, one of the most widespread indices of the gross job flows in transition economies. They received very low unemployment outflow rates everywhere except the Czech Republic, which suggests the existence of a group of permanently unemployed people. This, in fact, has become the main topic of several other international studies (*OECD,* 1994; *Commander and Coricelli,* 1995; *Blanchard,* 1997). *Blanchard* (1997) reports that 40 per cent of people filling newly created jobs in Poland and 71 per cent in Hungary were people who moved there from another position and were never unemployed. By comparison, the corresponding figure in the United States is only 20 per cent. *Sorm and Terell* (1999) studied the Czech

labour market and also found that the labour flow tended to be from job to job rather than an outflow from unemployed status. This suggests that the collapse of the public sector was most likely not followed by rapid emergence and growth of the private sector, or at least not at the beginning of the transition period. It seems that an unavoidable initial consequence of the earlier over-employment by public companies was the dominance of job destruction over job creation (*Konings,* 2002). *Konings, Lehmann and Schaffer* (1996) studied the (gross) job flows of the initial transitional period in Poland, and found that the high ratio of gross job destruction was principally the consequence of outflows from public enterprises, which at the beginning of the transitional period, was accompanied by a low level of job creation. Studying data on Romania, Bulgaria, and Hungary for 1991–1994, *Bilsen and Konings* (1997) found a high ratio (9–13 per cent) of job destruction for all three countries, while the level of job creation in all three was less than 1 per cent. The job destruction rate declined in the years following the regime change, but job creation rates stayed very low, which conforms the low unemployment outflow rates in these countries. In the later years of the transition, we could observe growing job creation rates, mainly in the newly emerging private sector. The job creation rates in public and privatised companies remained low. Although privatised companies showed a higher level of restructuring than public ones, the difference between the two was less than expected (*Konings,* 2002). This strongly suggests that creating incentives to establish new companies is just as important as restructuring and privatising old ones.

Nevertheless, following the initial shock, adjustment in most countries was quite rapid. Studying the years between the regime changes and 1997, *Konings* (2002) found that while in Bulgaria and Romania the job destruction rate remained higher than the job creation rate, in the more developed countries (Poland, Estonia, and Slovenia) the equilibrium between job creation and job destruction was restored by 1997. *Basu, Estrin and Svejnar* (1997) and *Estrin and Svejnar* (1997) similarly found that in the initial period of the transition, businesses in Czechoslovakia and Poland quickly changed their employment levels. A rapid reallocation *between sectors* after the collapse of communism (principally a movement from sectors that had been operating inefficiently until then towards the emerging new sectors – such as services and commerce) was followed by an *intra-sectoral* job reallocation (*Bilsen and Konings,* 1997; *Konings,* 2002). The extra reallocation rate, which can be interpreted as an index of successful adjustment to labour market conditions, has been slowly catching up to the values recorded in the more developed countries. According to *Konings's* (2002) empirical results, the extra reallocation rates of the most successful transition economies [Poland and Slovenia (13 per cent) and Estonia

(8 per cent)] are quite similar to those of the developed market economies. Interestingly, although Romania was also found to have a relatively high rate (8 per cent), it was behind the other countries regarding the aggregate employment level. Nevertheless, the high reallocation rate may be a good signal of the beginning of a restructuring process, thus it might be assumed that the transition period in Romania was already in a later phase than, for instance, in Bulgaria where the reallocation rate was only 5 per cent.

2.3 Job creation and destruction in Hungary

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Table 2 summarises the job creation and destruction calculated for the Hungarian firms, while *Figure 1* illustrates the trend for several industries/sectors. The registration number identifying the companies, changed for a relatively large number of firms – especially at the beginning of the period –, and this results in an upward bias in the indicators by increasing the number of firms that were apparently established or closed.[6] Of course, we get lower values of job creation and destruction, and a lower reallocation ratio if when we calculate these indices using only those companies that were in operation under the same registration number for both years, but that eliminates the really new businesses and gives the impression that net job creation was significantly lower after 1995. In other words, there is no good solution. But the trends in industry-specific differences are similar even if the newly established/closing businesses are left out.

It should not surprise anybody that farming, forestry, mining and energy production, and – with the exception of a few good years – traditional light industries, are net job destroyers. What is more interesting is that these industries, except mining, also experienced significant job creation, throughout almost the whole period.[7] The difference between engineering and the chemical industries is also interesting. The labour market situation "normalised" rather quickly in the chemical industries (where the pharmaceutical industry is the dominant employer) with a relatively low – though not negligible on an international scale – job creation and destruction rate of roughly 10 per cent, yielding a balance of nearly zero net job creation. At the same time, engineering, which initially suffered a much higher job-destruction rate, became an outstanding net job creator, with intensive reallocation. In other words, there are really big differences behind the stability of the industry-based distribution of employment shown in *Table 1,* when decomposing overall employment into its component factors. These differences are clearly related to the different market conditions under which the firms operate.

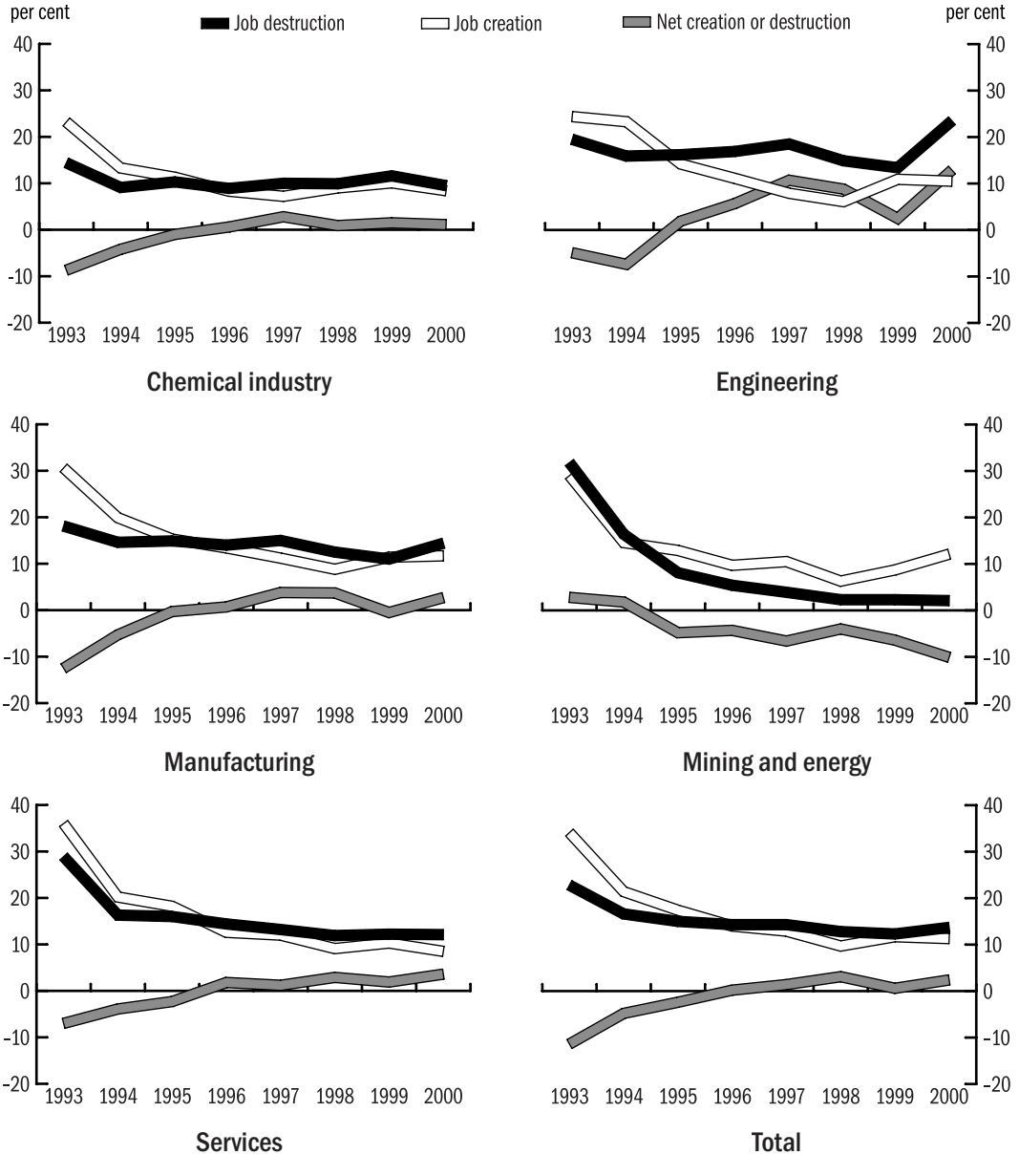
6 A business already in existence can have received a new registration number when privatised or when its organisation form changed (for instance, when being turned into a corporation), as well as when merged or dissolved.

7 The gross job creation indices for light industries (and even less surprisingly, for mining) are almost unchanged if new companies are left out, while for agriculture, the rate declines by roughly 50 per cent.

Table 2: Job creation and destruction in the Hungarian corporate sector (per cent)

	1993	1994	1995	1996	1997	1998	1999	2000
Job creation								
Agriculture	14.3	7.9	7.2	6.2	6.4	7.1	9.2	7.6
Mining and energy	31.8	16.4	8.1	5.4	3.9	2.3	2.3	2.1
Manufacturing	18.1	14.6	14.9	14.0	15.0	12.5	11.0	14.4
TCF	18.8	12.9	13.3	14.3	16.4	11.2	8.8	9.7
Chemical industry	14.4	9.1	10.3	8.9	10.0	9.9	11.6	9.5
Engineering	19.5	15.9	16.2	16.9	18.5	14.9	13.4	23.5
Trade	24.0	21.2	16.4	17.3	19.9	17.5	15.7	23.1
Construction	25.1	26.7	20.5	21.8	20.6	19.6	18.6	16.9
Services	28.9	16.3	16.0	14.4	13.2	11.9	12.2	12.1
Total	22.8	16.6	15.0	14.3	14.3	12.8	12.3	13.7
Job destruction								
Agriculture	40.1	22.0	14.6	10.2	11.8	8.8	14.6	15.5
Mining and energy	29.0	14.6	12.9	9.7	10.5	6.3	8.7	12.1
Manufacturing	30.6	19.9	15.3	13.4	11.2	8.8	11.4	11.7
TCF28.2	19.9	15.6	11.6	7.7	10.3	11.0	12.7	
Chemical industry	23.2	13.3	11.3	8.3	7.2	9.0	10.1	8.4
Engineering	24.4	23.3	14.2	11.1	7.9	6.1	10.9	10.5
Trade	34.9	26.2	24.1	22.9	17.7	15.0	13.8	15.2
Construction	36.7	27.6	21.7	18.7	18.5	12.8	13.5	11.9
Services	36.0	20.2	18.2	12.6	12.0	9.1	10.3	8.5
Total	34.1	21.4	17.4	14.0	12.9	9.7	11.7	11.3
Net job creation or destruction								
Agriculture	–25.8	–14.1	–7.5	–4.1	–5.4	–1.7	–5.4	–7.9
Mining and energy	2.8	1.8	–4.8	–4.3	–6.6	–4.0	–6.4	–10.1
Manufacturing	–12.5	–5.3	–0.3	0.7	3.8	3.7	–0.5	2.7
TCF	–9.5	–7.0	–2.4	2.7	8.7	0.9	–2.1	–2.9
Chemical industry	–8.7	–4.2	–1.0	0.6	2.8	0.9	1.5	1.1
Engineering	–4.9	–7.4	1.9	5.7	10.7	8.8	2.5	12.9
Trade	–10.8	–4.9	–7.7	–5.5	2.3	2.5	1.9	7.9
Construction	–11.6	–1.0	–1.1	3.0	2.1	6.8	5.1	5.0
Services	–7.0	–3.9	–2.3	1.8	1.2	2.9	1.9	3.6
Total	–11.4	–4.8	–2.4	0.2	1.4	3.1	0.6	2.4
Job reallocation								
Agriculture	54.4	29.9	21.8	16.4	18.2	15.9	23.8	23.0
Mining and energy	60.8	31.0	21.0	15.1	14.4	8.5	10.9	14.2
Manufacturing	48.7	34.4	30.2	27.4	26.2	21.2	22.4	26.2
TCF	47.0	32.8	28.9	25.9	24.1	21.5	19.8	22.4
Chemical industry	37.6	22.4	21.7	17.2	17.2	18.9	21.6	17.9
Engineering	43.9	39.2	30.4	28.0	26.4	21.1	24.3	34.0
Trade	58.9	47.4	40.6	40.2	37.6	32.5	29.5	38.3
Construction	61.8	54.3	42.2	40.5	39.2	32.5	32.1	28.8
Services	64.9	36.5	34.2	27.0	25.2	21.0	22.5	20.7
Total	56.9	38.0	32.4	28.3	27.2	22.5	24.0	25.1

Figure 1: Job creation and destruction (per cent)



Reallocation rates of the Hungarian economy show a significantly different picture from other former socialist countries. Since the upward bias caused by changes in registration numbers has more of an influence on the gross reallocation index than any other index due to the double accounting, *Table 3* illustrates the rates for continuing assuming that all compa-

nies that were closed or newly established according to the registration numbers are in fact only given a new registration number, and are actually surviving companies with the same number of employees. In other words, we assumed not only that there was no real firm creation and destruction, but also that employment figures of these relabelled companies had stayed the same in every single case. The actual values are obviously somewhere between the ones in the two tables.

Table 3: Narrowly defined job reallocation (per cent)

	1993	1994	1995	1996	1997	1998	1999	2000
Agriculture	30.0	18.9	14.7	12.1	12.6	11.8	14.8	15.2
Mining and energy	16.5	14.7	7.6	6.9	10.7	7.6	8.5	10.6
Manufacturing	23.1	16.1	15.5	15.1	15.8	15.7	15.9	16.0
TCF	15.4	14.1	13.9	14.2	14.8	14.2	12.7	12.8
Chemical industry	22.2	20.1	17.7	16.9	17.7	17.1	19.0	22.1
Engineering	20.9	10.1	12.0	12.0	11.3	16.4	17.0	13.8
Trade	20.0	15.1	14.6	14.8	15.8	14.9	16.3	14.1
Construction	29.8	23.0	20.9	21.3	21.1	21.9	21.5	19.7
Services	27.5	22.4	23.5	22.7	21.8	22.9	19.8	23.3
Total	23.9	17.4	16.0	15.7	16.4	16.1	16.7	16.2

It is easy to see that with the exception of mining, even though the values are downward biased (probably significantly), they are substantially higher than the ones in other transition economies. In addition, even the narrowly defined reallocation rates are higher than the ones received for most developed market economies. This shows that for the whole of the 1990s, both for the recession and the boom period, the Hungarian labour market responded flexibly to the factors affecting companies in the private sector.

3. LABOUR AS A FACTOR OF PRODUCTION

Section 2 described models to measure the balance of job creation and destruction, and investigated their trend since 1992. The measurements yielded interesting and sometimes surprising results, but did not provide explanation about the causes. In this section we look at the most important models to describe the labour demand, and investigate the reasons behind the high intensity of job creation and destruction, and the particularly high reallocation rate.

3.1 Demand models

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Labour is one of the most important production factors. Employment of a certain quantity and quality of labour is essential for the firms to achieve their goals. Companies differ in the number of workers they need, and

also in the necessary skills of those employees. Labour demand is also significantly influenced by the technologies and organisation structure of the companies. However, within certain limits, businesses can freely choose their level of activity, and the way they wish to combine the various production factors to achieve their goals. The behaviour of the firms can be described by a relatively simple model: firms maximise profits under given market conditions; market relations determine the demand for their products and/or services at given prices, and also the resources that can be used at various prices. We describe the transformation of resources into products and services with a production function: what kind of output level can be achieved with different input combinations. This production function essentially describes a technological relationship: in other words, it renders an output level to each combination of inputs. If the demand for company output is fixed, at given prices the company can determine how much it needs to use of the different production factors to maximise its expected profit. In other words, factor demand functions can be derived from this production model. We often assume that demand for the various factors can be separated, or that demand for the various production factors (such as labour) can be described without determining the other factor demands.

As a starting point, let us assume that the Cobb-Douglas model, one of the most popular models which contains one of the simplest production functions, gives a satisfactory description of a company's technology. We will stick to this assumption until we assume labour to be homogenous. Any description of differentiated demand for different quality of labour requires a more complex production function (such as a translog) model.

In the labour demand model derived from the production function, basically two factors determine the number of persons employed in a company: the level of the company's production (services),[8] and the market prices of the factors. The most influential factor price for the labour demand is of course the wage, but the costs of capital also may play an important role, since to a certain extent labour and capital can be substituted for each other.

Theoretically, firms can always adjust their optimal and profit-maximising factor demands to the market conditions. It is not certain, however, whether they will adjust instantaneously. They need a certain time to readjust the level of their factor demands to the new optimum, and this adjustment may also incur costs. For instance, if firms need more workers to increase output, then they have to find them and train them, and also may have to reorganise their production process. They may also need some investments to expand production, and that might require a significant amount of time. Similarly, if a company wants to cut production and its corresponding factor demand, this is also costly since several months' sal-

8 In what follows, we will use the term production for company performance irrespectively of the nature of the company's activity, such as services, commerce, etc. Generally, we use the net revenue from sales to measure company output.

ary will have to be paid to workers who are dismissed. So, depending on costs, it might be more rational for the firms to make only gradual adjustments to the new situation and therefore it will take a longer time to adjust their factor demands (such as employment) to the new circumstances. This adjustment process often makes it necessary to use dynamic models in which the actual demand for labour is influenced by both the contemporaneous and the lagged values of the variables.

The simplest way to describe the adjustment process is to assume that adjustment is symmetric. This means, for instance, that the adjustment costs are the same in both positive and negative adjustments of similar magnitude. In this case, we obtain a relatively simple model that is easy to solve. The model parameters give a direct description of the labour demand. However, it is possible that adjustment costs are in fact asymmetric: for instance, additional labour can begin work after only a few hours of training, but several months of wages would have to be paid as a compensation if employees were dismissed. It might also happen that an increase in capacity requires a significant investment both in time and money, while surplus capacity could be sold relatively easily at a good price. Modelling these asymmetric adjustment processes is much more complicated technically, and interpreting the results of the models is also more cumbersome.

Dynamic models assume that company behaviour is determined by a long-run equilibrium. This equilibrium describes the "ideal" operation of the firm: the company produces its desired output at the lowest possible costs. We assume that the adjustment process of the dynamic model will bring the firm's activity closer to this long-run equilibrium. As changes in market conditions (such as prices including the cost of labour) alter the equilibrium itself, the company is forced to make continuous adjustments. Thus, company behaviour can be described with two different sets of variables: short-run (e.g. wage) elasticity indicates the extent to which a change in the given variable modifies the firm's current labour demand, while long-run elasticity indicates the overall change in labour demand over time, leading to a new state of equilibrium. Static models essentially contain only the long-run elasticity.

This description has so far assumed that labour is homogenous, or that all employees perform identically. The model becomes more realistic and also more complicated if we also make a qualitative distinction in the labour demand. This makes it possible to study not only the substitutablilty/complementarity of capital and labour, but we can also treat the various types of labour in a different way, and we can investigate their complex interactions.

The database for the empirical analysis in the chapter contains those companies using double entry accounting (separating inflow from outflow)

which were included in the Wage Survey of the National Labour Centre between 1992 and 1999.

3.2 International evidence

Gábor Kőrösi – Éva Surányi

Many studies have attempted to estimate the elasticity of labour demand on the basis of the above theoretical considerations. They tend to be quite different regarding model specifications, investigated samples, and time frames. Despite that, results have been surprisingly similar. In the past few decades, assuming *constant output*, the wage elasticity of firm-level labour demand in the developed market economies has stabilised in the range of –0.15 to –0.50.[9]

The primary goal of static models is to estimate the elasticity of firm-level labour demand at constant output, but it is also worth looking at the issue of short-run behaviour. What happens to the elasticity if we also allow *output to vary?* This issue has been in the focus of economists investigating *short-run* macro-economic processes. *Symons and Layard* (1983) estimated the elasticity in six major OECD countries between 0.4–2.6, and found that the value was larger than 1 in four of the six cases. These relatively high values suggest that the role of wage increases in reducing employment may be larger on the short-run, when we also take into account the output effect of the changes.

The most consistent result of those papers that do not assume labour homogeneity has been that non-productive (assumed to be skilled, or white-collar) labour is less easily substituted with physical capital than productive (unskilled, blue-collar) labour. Several studies have found[10] that skilled labour and physical capital are complements, supporting *Rosen's* (1969) and *Griliches'* (1969) hypothesis on the complementarity of capital and skills. This is very important when investigating the employment effects of those economic policy tools that enhance investment (such as accelerated depreciation or tax allowances on investments). These policies are likely to increase the demand for skilled labour relative to the demand for unskilled labour.

Over the past thirty years, research on labour demand has increasingly focused on studying labour dynamics. The first paper that stimulated interest in this area is due to *Oi* (1962), which served as a benchmark for most of the later research on dynamic demand for labour. *Oi* was the first to point out that because of adjustment costs (costs of increasing and decreasing employment), labour is not a perfectly flexible production factor and therefore the adjustment to long-run equilibrium (as estimated by the static models) could be both time-consuming and costly.

9 For more details on empirical results see *Hamermesh* (1986).
10 See *Hamermesh* (1986).

Dynamic demand models use the adjustment process to separate the elasticity describing the short-run behaviour from the long-run elasticity describing the adjustment to a new equilibrium corresponding to the changed market conditions. Long-run elasticity is generally found to be between 0.4 and 1 (production), and –0.3 and –0.5 (wages) in developed market economies. The results for the American labour market are generally on the more elastic side of the range, while the European labour markets are generally on the more rigid side. In absolute value, short-run elasticity is generally lower, and in some cases it is not significantly different from zero (*Hamermesh,* 1986).

There have been surprisingly few investigations of labour demand in Central and Eastern Europe and in the states of the former Soviet Union. Nevertheless, the studies that use data from the labour markets of these transition countries have yielded surprising results: *Grosfeld and Nivet* (1997) found that there were no substantive changes in the labour market behaviour of Polish companies after 1992. *Basu, Estrin and Swejnar* (1997) and *Estrin and Svejnar* (1998) studied Czechoslovakia and the Czech Republic in its period of transition, and the results also suggest that the situation was normalised by 1993, after which there was no substantive change in the labour market behaviour of the firms. In both cases, the authors received very high elasticity values at the beginning of the transition period, but after stabilisation, the low elasticity levels similar to those in Western Europe appeared to become dominant.

A second possible goal of dynamic labour demand models might be to estimate the time frame needed for labour demand to adjust to its long-run equilibrium level, which would also predict the short-run labour market behaviour of companies. The general conclusion of studies using aggregate data is that the time lag of adjustment is quite short (6–12 months), and the adjustment is faster when the working hours rather than the level of employment is adjusted (*Hamermesh,* 1993). In other words, the adjustment costs of labour are not high; the slow adjustment of the relative wages is rather the consequence of slow retraining on the labour supply side and of low employee mobility. However, recent studies based on firm-level data seem to contradict this. Among various studies investigating the structure of adjustment costs, *Nickell and Wadhwani* (1991) analysed a British business panel of firms and found that only 20 per cent of the adjustment occurred within one year. *Bentolila and Gilles St. Paul* (1992) used Spanish data and found that only one-sixth of the adjustment occurred within one year. *Mairesse and Dormont* (1985) studied French and German panel data and found similarly slow adjustment, although their similar analysis of American firms showed a much more rapid adjustment.

3.3 Dynamic labour demand models

Gábor Kőrösi

Our starting point is a labour demand model used quite extensively in relevant literature.[11] In the model we assume that companies maximise profits. Let us assume also that firm-level production can be described with a Cobb-Douglas function. With this specification we assume that

– demand for the firms' products is lconstrained, and
– no company has a dominant market position – in other words, none of them can influence – – market prices (including wages);
– the adjustment costs of labour and capital are symmetric (quadratic);
– long-run equilibrium has a significant effect on factor demands ;
– labour is homogenous;
– changes in exogenous factors affect labour demand no longer than one year.

We analyse labour demand between 1992 and 1999 with a relatively large firm-level data set. It is probably true that the majority of the firms were demand-constrained in the investigated period. As a consequence, profit maximisation meant cost minimisation. There is no doubt that in the period under investigation cost-efficiency was more important to Hungarian firms than ever before.

The quadratic adjustment function means that increasing their factor demand is just as costly for the firms as decreasing their demand by a similar magnitude. This is clearly a simplification. We will give a more detailed description of this adjustment process in the next subsection. For the time being, we investigate only indirectly the assumed symmetry of the adjustment process – attempting to see whether the labour demand elasticity of expanding and contracting firms is the same or not, and whether the elasticities of upward and downward adjustments deviate significantly or not.

The model describes labour demand with contemporaneous and lagged values of three variables: production level, wage costs and costs of capital. In addition, employment in the previous period plays an important role in describing the adjustment process.

However, the values taken from two different time periods can be different simply because of inflation, and it is not likely that inflation would have a substantive influence on the firms' labour demand, since inflation also alters the firms' revenue proportionately, so, in itself it is not a significant explanatory variable. For this reason, we transformed our data to reflect constant prices, using the producer price index for the sector in which the company is located to deflate the data. The consequences of this were interesting in themselves. Since changes in producer prices were quite different between the sectors, the same change in wages had different effects

11 Derivation of the model can be found in *Nickell* (1986). The results summarised here are given in detail in *Kőrösi* (2000, 2002).

on the various companies. It is possible that the output price of a company grew more rapidly than wages,[12] so its (actual weight of) wage costs declined, while for another one the output price grew much more slowly, or even declined, so the same nominal wage increase actually increased the proportion of its wage costs. This is valid not only for the price differences of the various firms: until the mid-1990s, the consumer and producer price indices were quite different.[13] While employees' complaints about the decline in the purchasing power of their earnings were often justified, for a significant number of companies, despite the drop in real wages, the share of their wage costs increased as their output prices increased much more slowly.

The first important result of our study is that the cost of capital has no significant effect on labour demand. In other words, the effects of substituting capital for labour cannot be demonstrated when analysing labour demand. This is probably because we have assumed labour to be homogenous. In Subsection 3.5 we will demonstrate that the cost of capital cannot be ignored if labour is differentiated, and that different types of labour have significantly different interactions with capital. Clearly, it is the consequence of these significant differences that the effects of capital can only be measured with high imprecision when we assume labour homogeneity.

The elasticity of labour demand has changed significantly over time, therefore no uniform description, equally valid for the whole of the period, can be offered. This also means that the labour market has not reached its equilibrium, and firm-level behaviour is still not predictable, at least not in 1999. The instability was especially true for the wage elasticity of labour demand. Production elasticity has been relatively constant since 1995, but this is not true for the wage sensitivity of employment. However, since the mid-1990s, elasticities tended to fluctuate without any definite trend, so some kind of "normalisation" is nevertheless observable. However, this stability was valid only for short-run elasticities, with long-run elasticities fluctuating randomly in a very broad range, in some cases reaching theoretically unlikely values. This makes it rather clear that labour demand was not influenced by a stable long-run equilibrium, most probably because it did not exist.

The stability of elasticities was investigated over time, but we also over different groups of companies. We investigated the sample by industry/sector, ownership, and size, and found that there were significant differences between these different groups. This is not too surprising, since firms in different industries/sectors use very different technologies. It would be quite surprising if the labour demand in a plant that sews garments were to show the same trend characterictics, e.g., the same thelasticity as that of a nuclear reactor.[14]

12 Companies always calculate with total wage costs that include taxes and social security contributions, and their labour demands respond to changes of these indicators, not to the actual wages they pay out.

13 In 1992 the consumer price index was 23 per cent, in 1993 it was 22.5 per cent and in 1994 it was 18.8 per cent. The producer price indices were 12.3 per cent, 10.8 per cent, and 11.3 per cent in the same years . (Source: Central Statistical Office, Hungarian Statistical Yearbooks.)

14 This is particularly true since we found that the cost of capital did not influence the adjustment of labour demand. In other words, the completely different relative capital demands of two companies played no role whatsoever in the given model.

Investigating trends in the labour demand elasticities by groups of companies lead to an interesting consequence. When we separated elasticities by the direction of change in employment for the entire sample, we found very significant differences between the elasticities of upward and downward adjustment. Labour demand was far more elastic downward than upward, which means that negative effects (decline in production, rise in wages) reduced demand for labour to a far greater extent than the same level of positive effects increased them. This asymmetry disappeared, however, when we estimated the same elasticities for the different groups separately. We will attempt to explain this strange phenomenon later, after studying the main characteristics of the companies in the sample.

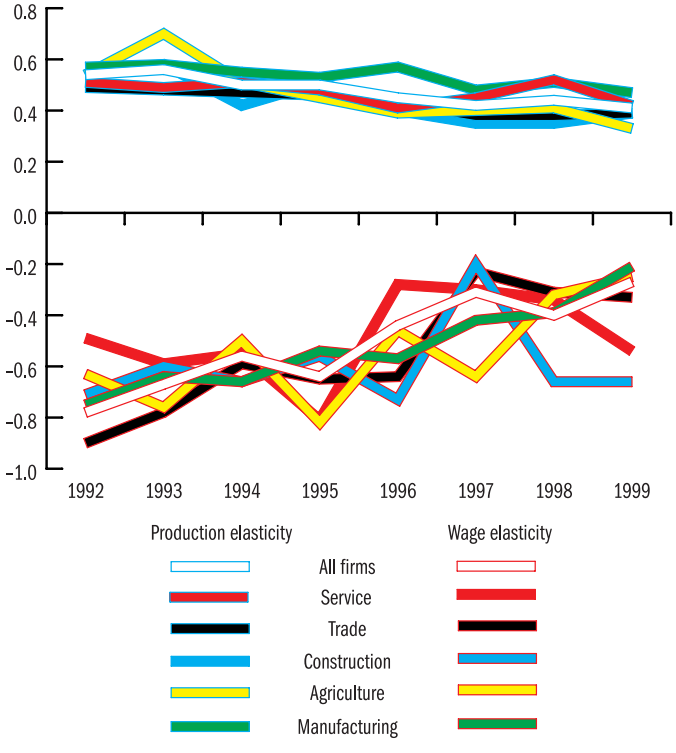
We also investigated whether long-run equilibrium played any role whatsoever in the labour demand, and found that this effect was negligible. The random fluctuation of long-run elasticities over time is clearly a consequence of this. But it means that we can describe labour demand by the short-run elasticities. For that reason we estimated a model containing only short-run effects, where instead of the contemporaneous and lagged explanatory variables, we only used the differences. Test results suggest no substantial loss of information when using the short-run equation instead of to the original model. Therefore, we only report the results of the short-run model.

Production and labour costs are equally important explanatory variables of firm-level labour demand. In most equations estimated for the different company groups, both variables were significantly different from zero at 1 per cent, and their signs, almost without exception, matched our theoretical expectations even in the non-significant cases: production elasticities were positive, wage elasticities were negative, and their orders of magnitude also were acceptable. In other words, the estimated equations give a correct description of enterprise behaviour. *Figures 2–5* illustrates the trends of the estimated elasticities for the major groups of companies in each decompositions of the entire sample.

Trends in production and wage elasticities were quite similar and followed typical patterns for the entire sample and for many of the company groups. While in 1993–1994, the earlier years of the sample period, the firms' labour demand was relatively elastic with regard to both factors, in some cases showing a significantly higher (wage) elasticity than is typical in a market economies in several cases. However labour demand generally became inelastic by the middle of the sample period. This clearly reflects the stabilisation of the corporate environments. In most cases, labour demand was more sensitive to changes in wages. From the mid-1990s, the production elasticity of labour demand became quite stable for most groups of enterprises and there were only relatively small differences in the val-

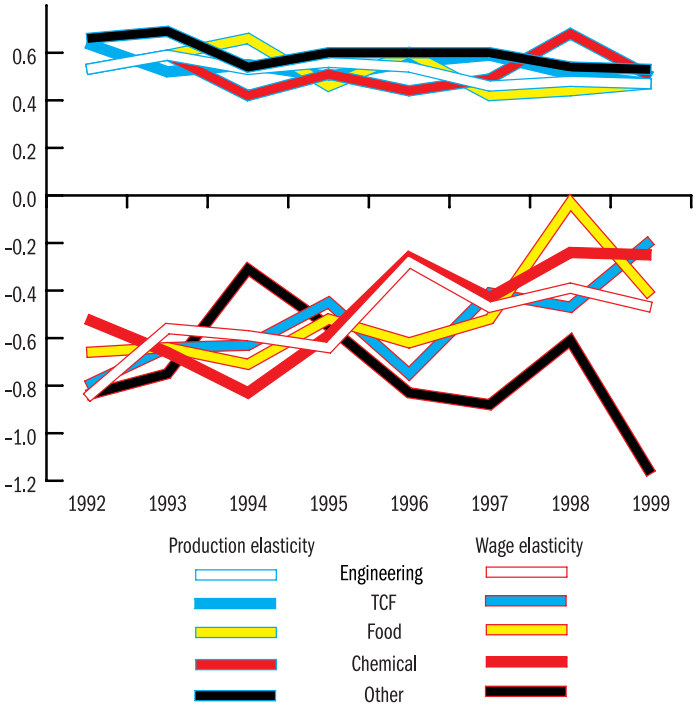
ues estimated for the different enterprise groups. At the same time, in the second half of the sample period the trend of wage elasticities broke: by the end of the 1990s, the wage elasticities of labour demand showed much higher variation, and they also increased for several important enterprise groups, and they also increased. While estimated elasticities were mostly in the range that is typical in developed market economies in the second half of the 1990s, it appears that firm-level labour market behaviour became much more uncertain towards the end of the decade.

Figure 2: Production and wage elasticities



Halpern and Kőrösi (2001) investigated trends in the efficiency of the production process for the same group of enterprises. Since that paper found quite substantial differences between the efficiency of individual enterprises and groups of enterprises, we extended the labour demand model to investigate how production efficiency affected firm-level labour demand. The results indicate a very characteristic process over time. Firm-level labour demand was essentially independent of production efficiency at the beginning of the sample period, until 1994–1995. By the middle of the sample period, the more efficient companies increased employment significantly more rapidly than the less efficient ones, with efficiency-related elasticity generally ranging between 0.2 and 0.4.

Figure 3: Production and wage elasticities, manufacturing sectors



Given that we often measured 20–30 per cent differences between the production efficiencies of the different enterprises, and that differences in excess of 50 per cent were not exceptional either, this in itself could have led to more than ten percentage points differences between the employment changes of two companies. In other words, given two enterprises where wages and production changed by the same rate, it is possible that overall employment declined by 2 per cent at the first one and increased by 10 per cent at the other, purely because the latter was far more efficient in organising its production.

However, the dynamic increase of employment in efficient companies only lasted for two or three years, and then the effects of efficiency on labour demand became insignificant again. Later the elasticity of demand changed only. While we received essentially the same elasticities for production and wages in both models with or without including efficiency in the two preceding periods, by the end of the period elasticities changed significantly in the extended models. However, the direction of the change and its significance is not yet clear. It is apparently another factor also leading to the observed uncertainty in enterprise behaviour.

Figure 4: Production and wage elasticities by ownership

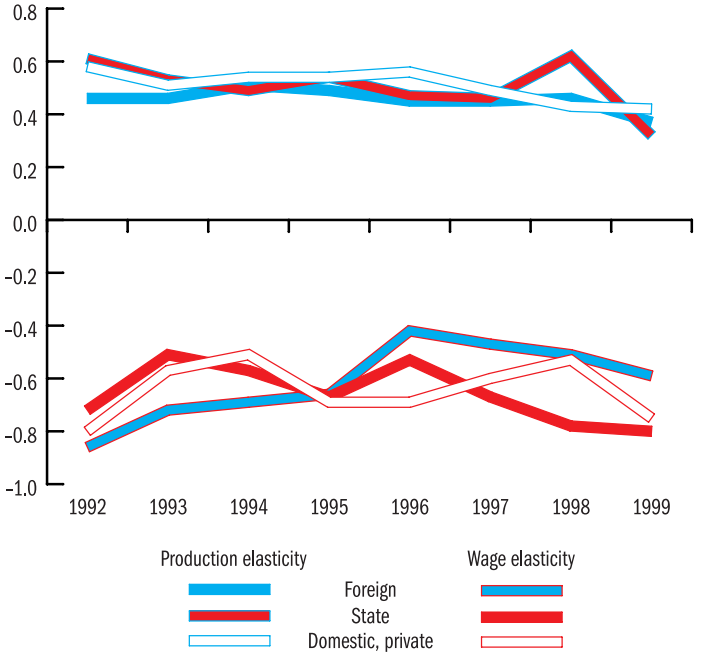
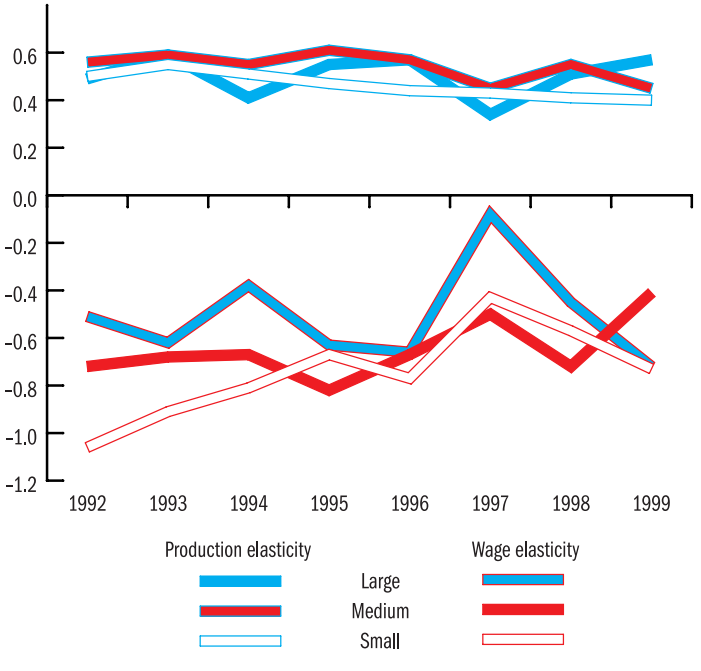


Figure 5: Production and wage elasticities, by size



We know that there are significant regional differences in the employment rate. We investigated whether these differences might stem from different labour market behaviours of the enterprises operating in various regions. The result was surprisingly strong: we did not find any sign that regional effects would influence the elasticity of labour demand. In other words, the differences in regional employment patterns were not because of regional differences in the labour-market behaviour of the enterprises.

3.4 Dynamic adjustment

Éva Surányi – Gábor Kőrösi

In the previous subsection we received slightly contradictory results regarding the symmetry of the adjustment process. Looking at the entire sample there was a strong asymmetry, but when estimating the same model for various groups of companies (sectors, for instance) the dynamics of the process no longer appeared to be asymmetric. Therefore, we have to investigate the validity of assumptions about the adjustment process.

We had two assumptions about the adjustment process and adjustment costs. The first was that the adjustment costs of labour and capital, and also the adjustment process could be separated, and investigated independently of each other. The other was that adjustment costs can be described with a quadratic function of the change in labour demand. Since the costs of capital did not have a significant effect on the labour demand so far, not even in a single case, we will stick to the first assumption. However, we try to find another functional form specification to replace the second assumption.

The major advantage of a quadratic cost function is that with this assumption we receive a simple linear dynamic model describing the labour demand. When replacing this with another adjustment cost function, we either end up with a very complicated non-linear model, or a model that does not have a closed-form solution. But with an estimation method becoming popular during the past decade (the generalised method of moments) it is possible to handle even those models that cannot be written in an "appropriate" form. However, the application of this method requires more information, and it is not possible to prepare annual estimates of the model. Therefore, we used all observations in the second half of the sample period (1995–1999) for our estimations. We investigated the properties of the adjustment costs of the Hungarian firms, how they influence the short-run labour market behaviour of the business sector, and also how firms could adjust to external changes. To do this, we specified six different adjustment cost functions, and used them to examine the marginal costs of adjustment. We of course took into account the differences in the

adjustment costs by sectors and industries, by type of ownership, and also the heterogeneity of short-run labour demand.

Model I is the reference model in which we use the traditional quadratic adjustment cost functions (*Eisner and Strotz,* 1963). It assumes that adjustment costs only depend on the absolute size of the changes in the number of employees, or that the cost of employing or dismissing ten workers are the same in a company with a staff of twenty as in one with a staff of one thousand. This assumption probably is not very realistic, so we may try to specify an adjustment cost function that considers relative changes rather than absolute ones (Model II.) In order to further generalise the specification of the quadratic term, we can apply the form used by *Meghir et al* (1996), originally proposed by *Summers* (1981), which simultaneously takes into account relative and absolute changes in the employment level, and tests for the existence of a learning process in the adjustment process (Model III).

All three models so far assume that adjustment costs are symmetric, or that the costs of hiring a given number of workers are the same as the costs of dismissing the same number of workers. There is no reason to make this assumption a priori, considering the very different nature of the costs of increasing and decreasing employment. One main reason why the quadratic form is used so often is because it is so easy to handle, as the resulting labour demand model (the well-known distributed lag model) is linear, which makes it simple to do the estimations with traditional regression methods. Following *Pfann and Palm* (1992) and *Pfann and Verspagen* (1989), we can generalise the adjustment cost function to include an asymmetric term. The remaining three models are variants of the first three, expanded to include an asymmetric term. A positive asymmetric term indicates that hiring costs exceed the costs of dismissal, while a negative one means that it is more costly to dismiss workers than to hire them.

When estimating the equations for the entire data set, the diagnostic tests indicated model-specification errors. We obtained far better results, however, when we did the same estimations for groups of enterprises. We only quote the results obtained for domestic and foreign owned companies, and for the two largest sectors (engineering, textiles).

It is quite interesting that the properties of the different models were quite robust. While the results for the different groups of enterprises were quantitatively different, of course, they were qualitatively quite similar.

In Models I and IV, the value parameter estimates of the quadratic terms were positive in both cases, which suggests the existence of a convex marginal adjustment cost. That indicates that the marginal costs of adjustment increases with the size of the adjustment. But the estimated parameter is

quite small, not significantly different from zero, which suggests that the model cannot be used for substantive analyses.

The specification of Models II and V is based on relative changes in employment. Although the parameter estimates are significantly different from zero in both cases, it is difficult to give an economic interpretation to their negative sign. Since the diagnostic tests also indicated model-specification errors, these models proved to be worse than the previous ones.

The relative changes and the possible learning or inertia effects were considered together in Models III and VI. A negative coefficient of the quadratic term reflects a learning effect and a positive one an inertia effect. When adjustment costs were specified in this way, the estimated parameters (for all company groups investigated) were significantly negative and the diagnostic tests indicated no problems either. In other words, these results demonstrated the existence of a significant learning effect in the adjustment process.

The difference between Models I–III and IV–VI was that the symmetric specification of the first group was generalised with the inclusion of an asymmetric term in the second group. The estimated parameter of the asymmetric term suggested an interesting difference between Hungarian and foreign-owned companies: at foreign-owned companies the cost of reducing the workforce was higher than that of increasing it, while at the Hungarian-owned companies this asymmetry worked into the opposite direction. We also found significant differences between the different sectors, but that was not surprising, since adjustment costs are closely related to the technology of the firms.

Although adjustment costs do not influence the desired employment level, if the costs of changing the quantity of labour are asymmetric, then the optimal adjustment process will differ from what derived in the symmetric model. With the exception of special cases that do not occur in practice, the estimates and forecasts of labour demand models based on aggregate data and therefore assume symmetric adjustment costs will be biased.

The estimates of the marginal costs of adjustments, listed in *Table 4,* were the other interesting results of the calculations. The adjustment costs were low relative to the values found in developed market economies. Costs per worker amounted to 3.6 times the monthly wages (on average), while in developed market economies they could be as high as 12–14 times the monthly wages (*Hamermesh,* 1996). The best model (IV) forecast a marginal cost of adjustment that was less than two times the monthly wage. At the same time, studying the various groups of companies, we found significant differences. We observed the highest difference when we investigated firms by ownership; the adjustment ability of Hungarian-owned firms to adjust is much lower than that of foreign-owned ones.

Table 4: Marginal adjustment costs, relative to the annual wage bill

Model	All firms	Domestic owner	Foreign owner	Textile	Engineering
Model I	0.16	0.13	0.02	0.20	0.10
Model II	0.20	0.19	0.07	0.14	0.13
Model III	0.48	0.64	0.42	0.62	0.27
Model IV	0.19	0.70	0.32	0.35	0.29
Model V	0.70	0.65	0.23	0.65	0.23
Model VI	0.13	0.32	0.15	0.28	0.13

3.5 Demand for skilled and unskilled labour

János Köllő

Demand for unskilled labour dropped much more significantly than its average decrease in the years following the regime change. The number of jobs available to people with primary school education or vocational school training dropped by 48 per cent between 1990 and 1995, and did not increase after that time *(Table 5)*. In the early 1990s, the job market for people with secondary and college education also dropped by 11 per cent, but for this group a consolidated market economy between 1995 and 1999 created roughly the same number of jobs that had disappeared after the collapse of the socialist economy.

Table 5: Employment by gender and education (in thousands)

	Male		Female		Total	
Educational attainment:	low	high	low	high	low	high
1990	1,803	845	1,387	1,055	3,190	1,900
1992	1,358	860	929	936	2,287	1,864
1995	1,225	824	759	869	1,984	1,693
1999	1,228	875	702	1,006	1,930	1,881

Note: High educational attainment: Completed secondary or tertiary.
Source: Fazekas, K. and Koltay, J. (Ed.) *The Hungarian Labour Market, Review and Analyses, 2002*. Institute of Economics, Budapest. pp. 285–288.

In terms of the labour market evaluation of the different jobs, a similar change occurred. Between 1989–1995, real wages dropped along the entire wage scale, increasing only for the highest, 100th percentile group. The low-wage groups saw their wages sharply cut in those years (in the 10th percentile, for instance by 30 per cent), but the decline in the higher earnings groups was also significant (20 per cent in the 90th percentile).[15] But inequalities in earnings did not decline even when real wages began to rise in 1997. In fact, they continued to grow somewhat, and this was triggered not only by what had become a permanent gap between skilled and

15 For details of the process see *Kertesi and Köllő* (2001).

unskilled labour, but also by another process – the deteriorating market value of older, educated labour.

The deteriorating value of the human capital accumulated during the socialist years is clearly reflected in the fact that employees with college degrees, born between 1950 and 1955 were earning nearly *25 per cent* less in the year 2000 (calculated in relative wages, relative to the average for college graduates) than the amount they could have been expected to earn according their earlier age-earnings profile. College graduates who were 20–25 years old at the time of the regime change profited the most, as they joined the labour market exactly when the intensive changes in economic structure occurred. There was a more modest, but similar generational re-stratification among people with lower levels of education. There is no doubt that the re-stratification process was fundamentally triggered by the demand side: the relative increase in the wages of young and educated labour occurred at a time when the supply of secondary school and college graduates increased significantly. In addition, it can be demonstrated that (at least among large firms) highly productive and capitalised companies employed a much higher than average proportion of *young* secondary school and college graduates (*Kertesi–Köllő,* 2001, *Köllő,* 2002).

Table 6: Data on unemployment beneficiaries, March-April 2001 (per cent)

Educational attainment	In unemployment register for at least the third time[a]	Re-entry to former employer[b]
0–7 classes	50.5	70.9
Primary	40.1	56.6
Vocational	39.6	51.3
Secondary	27.3	27.7
College	19.9	17.4
University	14.0	16.1
Total	36.1	47.8

[a] Number of beneficiaries, March 2001: 105,864 persons.
[b] Employed between 22 March and 6 April 2001: 7,599 persons.
Source: Survey on unemployment benefit recipients finding jobs, Employment Office.

Declining supply also contributed to the decrease in the number of unskilled workers, since older people with low education levels retired, but the extremely high unemployment rate of this group clearly indicates that demand is also insufficient to meet the supply of those job seekers. Employees belonging to this group have hard time finding stable, registered, full-time employment, as data in *Table 6* on unemployment beneficiaries in 2001 indicates. Forty to fifty per cent of unemployment beneficiaries with low education levels became beneficiaries for at least the third time or more, and 50–70 per cent of those who did find jobs (March) had returned to former workplaces – for the most part in the construction industry or

farming.[16] These are typical symptoms of an emerging "secondary" labour market segment, with a high level of labour turnover, instability, seasonal work, and repeated unemployment.

Can we expect that these phenomena that evolved during the years of regime change come to a stop or turn around? The fact that the value of unskilled labour dropped so much during the transition does not necessarily mean that the economy – or even its modern sector consisting of large firms – cannot find ways and means of a beneficial employment of unskilled labour. The chances that it can do so depend on the *relationship* between productivity and costs of employing capital as opposed to various types of labour, and on how efficient are combinations of the various types of labour with each other and with capital. If unskilled labour is sufficiently cheap, and if it can substitute for capital or skilled labour without raising costs – or if combined with other resources it can increase company productivity –, then it will be in demand.

The significance of the various factors that influence labour demand can be approached by calculating the quantity and the combinations of resources that companies choose to employ at market equilibrium prices. Assuming that the various resources are employed until their marginal cost and marginal revenue are equal – considering the total costs and total benefits from using various input combinations – it is possible to estimate the own- and cross-price elasticity of the demand for various resources on the basis of observed labour composition and productivity.

The own-price elasticity of the demand for an input shows the percentage change in the demand of a given input that would occur if its price increased by 1 per cent, ceteris paribus. It encompasses complicated substitution, complementarity and scale effects into a single index (to be discussed later), and is the basic measure of the demand for any input. According to theoretical and empirical studies (at least, to the ones that have been published) own price elasticity is negative: the quantity demanded decreases with the price.

Cross-price elasticity measures the percentage change of the demand for *one* resource as a consequence of a one per cent change in the price of *another* resource, all other things being equal. If input prices change, on the one hand the firms try to substitute the more expensive inputs with cheaper ones: labour with capital, or one type of labour with another. On the other hand, if any input becomes more expensive, then the total cost of production increases, which forces the company to decrease its output. The overall result of the two effects is that a rise in the price of input *A* can increase demand for input *B* (when the substitution effect dominates), but it can also reduce it (if the two inputs are complements in the production process, or if they are substitutes, but demand for both declines because

16 In other months, the proportion of returnees is clearly lower. When calculating the proportion of returnees to former jobs in *Table 6,* we ignored people who had had found jobs according to computerised records, but with whom no interview had been prepared.

of the rise in total costs). If the observed elasticity is positive – demand for *A* increases when the price of *B* goes up –, then we speak about *gross substitution*, while if it is negative, we speak about *gross complementarity.* (If it is around zero, we consider the two factors to be independent.) By investigating the cross-price elasticities, or the elasticities of "substitution", we can look "behind the scenes" how different adjustment processes influence the own-price elasticities of the demands for inputs.

When trying to calculate the above indices from cross-sectional data – observing the cost structures and input prices of several firms at a given point in time – we actually observe the final results of earlier adjustment processes. During this, we assume that the decrease or increase in the use of the different production factors has been optimal, which made it possible for the company to produce the given output at the lowest possible costs (or, which is the same thing: to attain maximum production level at given total cost level). In brief: we assume that the companies are operating at their optimum, or if they do deviate from it, the deviations are occasional and random.

Of course, this is not always true. If some firms make more efficient use of certain inputs than others – if a foreign owned large firm profits more from having specialists who speak several languages than a small machine shop, or if a medium-sized farm can use a tractor more efficiently than a small family farm –, then the total output will differ even with identical input prices and cost shares. It is important to investigate these "non-neutral efficiency differences", along with the possible decision-making constraints. The explanatory variables included into the demand models can reflect firm-specific, sectoral, or regional differences in the structure of input demands – taking the relative wages and the costs of capital as given.

Because of insufficient amount of data, demand estimation of those models that distinguish between different types of labour is only possible for companies employing more than 300 people, and for only a short time period. The estimation presented here makes distinction between three types of labour and capital.[17] The groups of labour: 1. *uneducated:* having completed a vocational school as a maximum, 2. *young educated:* secondary school or college graduate, with fewer than median years of experience in the labour market, 3. *old-educated:* secondary school or college graduate with more than the median years of experience in the labour market.[18]

In the model used, the optimal cost shares depend on their price and their contribution to productivity. Raw material costs are assumed to be identical on both the cost and the revenue sides, and were therefore ignored.[19] The production costs of a company, not including its raw material costs, can be defined as the sum of labour costs and depreciation costs, and when calculating the cost shares, we can relate the labour costs of the three types of

17 The estimations (*Köllő*, 2001) were prepared with a translog cost function using companies in the 1996–1999 waves of the Wage Survey. The number of companies included in the study was 458, 605, 455, and 436.

18 Labour market experience is an estimated value: age – number of years of education – 6. The median of experience is 21 or 22 years, depending on the year of the investigation.

19 This assumption is not necessarily true. Several researchers have demonstrated that raw materials and unskilled labour can be substituted for each other, and therefore when studying the demand for the latter, trends in raw material costs also have to be analysed. However, this could only be done in time-series settings, when we have reliable raw material price indices on an appropriately disaggregated level.

labour, and also the capital cost to this total cost. Input prices are defined as the ratio of the total costs spent on an input and the amount of the input used in production, which yields the mean unit labour cost of the labour types, and the depreciation rate (amortisation divided by the net value of tangible assets) for the capital. When calculating labour costs we included all wage-type payments, fringe benefits and contributions. We controlled for the scale effects with the inclusion of the value added, and the influence of non-neutral (related to the composition of labour) efficiency differences with a variable measuring majority foreign ownership. In the latter case, we assumed that at given wages, foreign owned companies tried to employ more young and skilled workers, because they were able to employ them more efficiently than the average (see *Kertesi–Köllő,* 2001).

Table 7 contains a summary of the most important results. Before interpreting them, we have to stress again that they are based on the analysis of a single sample with a single model. All conclusions are conditional ones and need further confirmation. Hoping in this, the results in *Table 7* can be summarised as follows.

In all cases the estimated own-wage elasticities are negative, and their magnitudes are in line with international experience (*Hamermesh*, 1993, pp. 110–111). Demand for unskilled labour is particularly wage-sensitive. While for the two groups of skilled labour we found that the elasticities were below –1.0, in three out of four years the elasticity of demand for unskilled labour was around –1.5, and it was –0.9 only in 1998.

This means that a one per cent increase in labour costs reduces demand for unskilled labour by more than one per cent, and demand for skilled labour by less than one per cent. That also means that when the average wage increases, the total earnings of the former group decline, while for the latter group they increase. (Based on this, using accepted terminology, we can say that demand for unskilled labour is elastic and demand for skilled labour is inelastic.)

These differences are in line with theoretical considerations and international experience. The wage elasticity of the demand for a given type of labour depends basically on three factors.

In the case of a company, the more elastic is the demand *of its products* relative to the rising costs, the higher is the probability that a wage increase will reduce its demand for labour. This condition will raise the relative wage elasticity of the demand for unskilled labour, because this type of labour is employed primarily by large companies that face strong international competition (such as assembly facilities), by farms, and by construction firms and wholesalers that are also price sensitive.

Table 7: Skill-specific labour demand of large firms*

	1996	1997	1998	1999
Cost shares in sample				
Unskilled	0.318	0.298	0.292	0.268
Skilled, old	0.202	0.189	0.205	0.195
Skilled, young	0.184	0.182	0.199	0.212
Capital	0.296	0.331	0.304	0.325
Total	1.000	1.000	1.000	1.000
Own-price elasticity				
Unskilled	–1.528	–1.528	–0.875	–1.768
Skilled, old	–0.543	–0.687	–0.986	–0.997
Skilled, young	–0.949	–1.026	–0.745	–0.647
Capital	–3.507	–2.485	–2.610	–2.573
Cross-price elasticity				
Unskilled – Capital	1.832	1.828	1.646	2.187
Skilled, old – Capital	0.541	0.509	0.555	0.340
Skilled, young – Capital	1.100	0.996	1.010	0.862
Unskilled-Skilled, old	–0.007	–0.229	–0.278	–0.170
Unskilled-Skilled, young	–0.309	–0.584	–0.949	–0.956
Skilled, old – Skilled, young	–0.285	0.165	0.575	0.612
Effect of other variables on optimal cost shares				
Sales total				
Unskilled	–0.073	–0.069	–0.080	–0.071
Skilled, old	–0.004	–0.004	0.005	–0.002
Skilled, young	0.012	0.010	0.019	0.016
Capital	0.065	0.099	0.056	0.057
Majority foreign ownership				
Unskilled	–0.006	–0.029	–0.005	0.008
Skilled, old	–0.026	–0.031	–0.054	–0.061
Skilled, young	0.010	0.022	0.014	0.030
Capital	0.022	0.038	0.045	0.023

* See *Köllő* (2001) for estimation details.

Secondly, wage elasticity depends on whether it is possible to use another type of labour or capital to *substitute* for a given type of labour. Restrictions on substitution are the weakest for unskilled labour. Not only is it easier to replace this type of labour with machinery, or with a technical change in the production process, but it is also easier and cheaper to dismiss workers, or even to close down or relocate the production. "Virtual" losses stemming from dismissals are also significantly lower: in contrast with laying off skilled workers, when firms have to give up some of the possible returns from earlier investments in training, laying off unskilled workers is virtually cost-free.

Thirdly, the cost of substituting an input that has become more expensive also depends on the price elasticity *of the supply of substitute inputs.* If

input *A* becomes more expensive and as a result the demand for, and the price of input *B* go up, this is still not sufficient for the actual substitution. It is also necessary that there should be an increase in the *supply* of the input whose demand and therefore also the price has increased. It is very difficult to decide whether the elasticity of the supply of *capital resources* substituting for unskilled or skilled labour are different or not, but it seems to be true that it is easier to substitute unskilled labour with subcontractors or outsourcing. (We often saw, particularly during the first years after the regime change, that unskilled and semi-skilled workers previously held by employees with only a primary school education were easily filled by more educated unemployed people. It would not be worthwhile for neither the company nor the employee to make substitution in the opposite direction, assuming that wages are proportional to performance.) This factor also increases the price elasticity of demand for unskilled labour.[20]

Therefore, the elasticity of demand for unskilled labour is fundamentally determined by the high level of *substitution* that is possible for this type of labour (and products). Several additional details on this can be seen in *Table 4.*

According to the results, all three types of labour can be substituted with *capital*, but unskilled labour is particularly easy to substitute if the wage becomes higher than the cost of capital. While the estimated cross-price elasticity was between 0.3 and 1.1 for skilled labour, the figures for unskilled labour were between 1.6 and 2.2. The elasticity – as already mentioned – measures the percentage change in capital usage as a consequence of a one per cent increase in the cost of the various types of labour and vice versa. A positive value (gross substitution) means that a rise in the cost of capital increases demand for labour while a negative one means that it reduces demand for labour. A rise in the price of one type of labour – particularly if unskilled – will increase the demand for capital resources. A high capital substitution elasticity such as the one estimated here is relatively rare, but several studies did report values nearly as high or even higher in the 1970s, when raw labour began to be substituted intensively in western countries (see: *Hamermesh,* 1993, pp. 110–111, comprehensive table).

The substitutability between older and younger *skilled* labour has increased somewhat. Demand for unskilled and older skilled labour seems to be more or less independent, while results suggest a gross complementarity between unskilled and young skilled labour: an increase in the price of unskilled labour also reduces demand for young skilled labour. Theoretically it is possible that in the production technology these two types of labour are complements. However, it is more likely that the increase in total costs resulting from the higher wages of unskilled labour is reducing the demand for young educated labour. This could be linked to the fact

20 A fourth possible reason for high wage elasticity is the high share of a given type of labour within total costs. In contrast with the Hicks-Marshall law already mentioned, this fourth factor is not necessarily valid. In addition, in the sample investigated, the distribution of unskilled labour was not more concentrated than the average.

that these two types of labour are often combined in manufacturing companies with assembly facilities and belts run by new management schemes, or in wholesaler firms.

The estimates also show that larger companies employ somewhat more capital and less unskilled labour, while demand by foreign-owned companies – as expected – was distorted towards more capital and (far) less old educated labour. The results of the model that distinguishes between several types of labour are in line with *Kőrösi's* (2000) conclusions that demand for labour in the Hungarian economy is currently wage sensitive, and also indicate that this is particularly true for unskilled labour, which, in addition, can easily be substituted with capital. The resulting social tension and economic policy dilemmas are likely to influence Hungary in the future as well.

In the process of closing the gap between the Hungarian economy, still in relative capital shortage, and its developed western trade partners, the costs of capital relative to the wages will gradually decline, which is likely to further reduce the demand for unskilled labour. This story will probably not be finished on that point. If the number of available jobs continues to decline, probably even more unskilled people will stop looking for a job, and will be forced to live on unemployment benefits, or will have to find employment in the informal economy. If future governments – similarly to the one that left office this year – believe that the (apparently) increasing "incentive problem" can be remedied by radically increasing the minimum wage and cutting unemployment benefits, the problem will become even more serious: any further decline in labour demand can destroy the positive effects of the policies designed to create incentives to work.

It is very hard to predict the effect that the unprecedented growth in the skilled labour supply will have on the market. The wage elasticity reported here (if we accept it at all) refers to a state of equilibrium that evolved in the mid-1990s, when the supply of college graduates was too low relative to the demand. At most, we can predict the consequences of the increasing supply in a hypothetical economy where the demand conditions reported in *Table 4* were to remain valid also in the long run. In an economy of this type, as a consequence of the excess supply, the wages of fresh college graduates would go down, reducing the risk of unemployment. An increase in the employment of fresh graduates would have a positive effect on the demand for unskilled labour, and at the same time it would increase competition between younger and older college graduates, to the extent that these can be substituted with each other. Unemployment of college graduates would be only one of the consequences (and it is not certain that it would be the most serious one).

It would be irresponsible rather than brave to draw any more definitive conclusions from the currently available data. The adjustment process may also be influenced by other important factors (demand could go up as a result of an increase in the quality of supply, foreign job opportunities could improve, there could be a major political intervention because of the particular sensitivity to what happens to college graduates). These factors are currently impossible to predict, not to mention that our results based on data about a few large firms can not be extended to the entire economy. It would be easier to assess chances if the analysis of labour demand could be continued on a richer database than the one used here.

3.6 Company characteristics

Gábor Kőrösi

So far, this section has suggested that while the Hungarian labour market has some specific characteristics during the transition period, the situation is in many aspects quite similar to the processes that determine labour demand in developed market economies. The most important difference is that in contrast with the labour markets of developed market economies, there is still no stable equilibrium that affects the behaviour of the Hungarian firms. As a result, all we can observe is rapid, short-term adjustment. However, the elasticity of labour demand is in line with the figures measured in developed market economies. While demand for Hungarian labour is somewhat more elastic than on the extremely rigid markets of some of the West European countries, it is quite similar to the American and some of the more flexible European markets.

This appears to contradict to what we have said about job creation and destruction, when we emphasised the extraordinary elasticity of the Hungarian labour market, but there is no sign of this extraordinary elasticity in the parameters that define firm-level labour market behaviour. What made the Hungarian market appear to be elastic?

To find the answer, it is wise first of all to investigate the companies themselves. *Table 8* presents several important statistics of the entire sample used to model labour demand, while *Table 9* presents the same descriptive statistics for the manufacturing sector.[21]

21 Forint data is always given in 1992 constant producer prices. Annual changes are always for the companies in the same group in the given year, even if the company was in a different group in the previous (base) year.

Table 8: Descriptive statistics on firm characteristics

	1992	1993	1994	1995	1996	1997	1998	1999
All firms								
Number of firms	4,287	6,992	8,507	9,254	9,,858	11,448	11,485	11,207
Employment	290.3	174.7	165	152.2	138.8	124.3	126.9	123.6
Employment (%, change)	–16.8	–12.7	–4	–8.6	–3.5	–1.3	0.7	–3
Labour cost (1000 HUF/cap)	380.4	461.5	463.8	417.1	395.2	396.6	417.2	444.8
Labour cost (%, change)	7.2	6.4	2.9	–9.5	–4.5	–0.1	1.9	6.4
Output (HUF, million)	542.1	443.5	453.8	430.7	428.8	435.5	498.7	562.4
Output (%, change)	–16	0	8	0.2	3.7	9.8	13.5	11.9
Profit margin (%)	–36.2	–42.7	–31.5	–3.2	–13.1	1.1	–22.7	–10.1
Increasing output								
Number of firms	917	3,125	4,463	3,873	4,269	5,473	6,713	5,633
Employment	331.9	179.2	166.3	167.5	144.8	130	136.4	150.8
Employment (%, change)	1.7	–1.5	6.4	3.4	4.3	6.8	7	3.9
Labour cost (1000 HUF/cap)	471.7	513.4	495.7	447.5	426.6	425.3	443	464.8
Labour cost (%, change)	8.7	8.7	4.2	–5.9	–0.7	3.8	1.1	7.5
Output (HUF, million)	966.8	545.8	578.6	581.7	560.3	602.5	614.5	776.9
Output (%, change)	69.4	36	27.8	25.3	28.2	32.9	31.3	30.5
Profit margin (%)	–4.4	–21.4	–7	14.3	–4.5	1.9	4.6	–5.8
Decreasing output								
Number of firms	3,370	3,867	4,044	5,381	5,589	5,975	4,772	5,574
Employment	278.9	171.1	163.6	141.3	134.3	119.1	113.6	96.2
Employment (%, change)	–21.4	–20.4	–13.5	–16.9	–9.1	–8.2	–8.3	–12.4
Labour cost (1000 HUF/cap)	355.5	419.5	428.6	395.2	371.2	370.4	380.9	424.6
Labour cost (%, change)	6.7	4.3	1.3	–12.3	–7.7	–3.8	3.3	5.2
Output (HUF, million)	426.5	360.8	316.1	322	328.4	282.5	335.8	345.7
Output (%, change)	–35.9	–24.5	–17.8	–20.6	–16.9	–18	–15.9	–15.5
Profit margin (%)	–44.9	–59.9	–58.5	–15.8	–19.7	0.4	–61	–14.5
Domestic owner								
Number of firms	3,588	5,422	6,656	7,254	7,739	8,894	8,954	8,739
Employment	299.1	166.1	151.6	134.1	116.5	102.3	102.4	97.9
Employment (%, change)	–17.7	–13	–7.3	–10.4	–4.8	–3.1	–1.2	–4.6
Labour cost (1000 HUF/cap)	347.3	408.9	413	370.8	343.8	331.2	348.8	369.8
Labour cost (%, change)	7.9	7.3	1.6	–10	–6.1	–1.5	0.2	5.8
Output (HUF, million)	499.5	362.3	323.1	268.3	242.4	220.2	239.3	241.5
Output (%, change)	–18	–6	1.1	–5.4	–2.1	–0.4	6.6	2
Profit margin (%)	–39.3	–46.1	–36.2	–8.6	–12.1	–4.7	–29.7	–7.8
Majority foreign owner								
Number of firms	348	964	1,193	1,367	1,500	1,887	1,935	1,919
Employment	233.3	194.5	182.4	203.1	209.7	194	221.8	227.3
Employment (%, change)	–7.9	–3.1	3.4	2.3	0.9	4.1	6.2	2.3
Labour cost (1000 HUF/cap)	588	681.5	683.6	629.1	634.2	666.5	701.5	752
Labour cost (%, change)	5.7	4.2	6.6	–7.3	–0.1	3	5.9	7.5
Output (HUF, million)	807.9	771.2	856	934.3	1,052.1	1,155.1	1,606.5	1,950.4
Output (%, change)	11	18.6	27.2	8.4	12.9	23.8	21	20.8
Profit margin (%)	–9.6	–19.1	–16	29.6	–21.1	31.6	5.2	–7.9

Table 9: Descriptive statistics on firm characteristics, manufacturing

	1992	1993	1994	1995	1996	1997	1998	1999
All manufacturing firms								
Number of firms	1,458	2,215	2,811	3,066	3,251	3,793	3,914	3,844
Employment	314.8	215	191.3	178.8	170.1	155.3	159.5	158
Employment (%, change)	–15.8	–13.6	–5.6	–1.9	–1.6	2	2.9	–2
Labour cost (1000 HUF/cap)	367.4	425.8	438.8	411.1	392.8	392.8	402.7	425.6
Labour cost (%, change)	9	12.6	3	–5.6	–3.1	1.1	6.4	7.8
Output (HUF, million)	688.7	530.5	544.3	557.4	564.8	593.6	677	810.3
Output (%, change)	0.4	5.6	10.2	10.2	7.3	19.1	16.7	18.6
Profit margin (%)	–40.3	–17	–19.7	–9.5	–4.6	15.3	0.4	–1.4
Increasing output								
Number of firms	424	1,209	1,665	1,594	1,536	1,970	2,315	1,901
Employment	327.4	218.7	197.4	192.8	174.5	181.2	154	167.6
Employment (%, change)	–1.9	–8.7	1	5.5	7.7	8.7	11.2	7.5
Labour cost (1000 HUF/cap)	417.3	445.5	465.2	439.8	422.7	409.9	423.2	454.2
Labour cost (%, change)	12.7	17	3.1	–0.1	2.9	5.6	9.1	10
Output (HUF, million)	1,250.8	643	708	756.9	609.5	891.8	760.3	1,075.4
Output (%, change)	87.2	28.7	24.2	25.1	35.9	38.1	41.6	43.7
Profit margin (%)	–4.7	–4	–1.7	–0.9	2.7	3	3.9	3.3
Decreasing output								
Number of firms	1,034	1,006	1,146	1,472	1,715	1,823	1,599	1,943
Employment	309.6	210.5	182.4	163.7	166.2	127.2	167.5	148.7
Employment (%, change)	–20.7	–19.1	–14.5	–10	–9.1	–6.9	–6.4	–10.7
Labour cost (1000 HUF/cap)	346.9	402.2	400.4	380.1	366	374.3	372.9	397.6
Labour cost (%, change)	7.3	7.3	2.7	–11.8	–8.7	–3.9	2.2	5.6
Output (HUF, million)	458.2	395.2	306.6	341.3	524.8	271.4	556.5	551
Output (%, change)	–33.9	–21.9	–20.2	–14.4	–12	–20	–13.4	–11
Profit margin (%)	–54.8	–32.6	–45.7	–18.8	–11.2	28.6	–4.7	–6.1
Domestic owner								
Number of firms	1,063	1,457	1,873	2,033	2,176	2,528	2,598	2,559
Employment	324.4	199.7	164.7	149.5	134.1	113.7	112.8	106.4
Employment (%, change)	–17.5	–11.3	–8.7	–4	–3.4	–0.8	0.6	–5.1
Labour cost (1000 HUF/cap)	326.6	371.2	382.2	355.6	334.7	327.5	337.5	358.9
Labour cost (%, change)	10	14.1	–0.5	–9	–5.5	–1.8	6.7	8.5
Output (HUF, million)	704.9	460.4	306.1	294.6	249	226.3	222.7	222.1
Output (%, change)	2	–1.1	1.2	4.2	–3.1	3.3	5	2.1
Profit margin (%)	–50.6	–20.6	–17.1	–10.7	–5.5	–1.6	–0.2	–2
Majority foreign owner								
Number of firms	216	504	647	755	811	982	1,036	1,029
Employment	251.2	234	218.9	223.6	234.2	225.2	257.3	272.6
Employment (%, change)	–7.5	–5.2	2.1	2.5	2.7	6.1	7.2	3.4
Labour cost (1000 HUF/cap)	518.8	553.4	572.5	547	537.1	551.7	556.8	582.5
Labour cost (%, change)	9.8	9.9	7.6	0	0.4	5.8	6.3	7.2
Output (HUF, million)	640.9	682.5	813.2	914.4	1,085.4	1,238.8	1,804	2,322.6
Output (%, change)	12.1	21.7	27.2	19	19.3	34.2	23.4	25.7
Profit margin (%)	–7.8	–9.9	–26.3	–8.7	–2.5	62.9	2.4	0.4

It is instructive to look at the changes in the output of companies increasing and reducing their production. There was not a single year in the entire sample when the *average* growth rate of the expanding firms was less than 25 per cent, or when the *average* decline of the contracting ones was less than 15 per cent. If we look at the manufacturing industry only, we see a somewhat more moderate rate in the latter half of the period, but even *average annual* changes in excess of 10 per cent are very high. Similarly, in the first half of the sample period, and sometimes even later on, the rate of change of *real* wage costs was also quite high, particularly if we compare that with, for instance, the output dynamics of contracting or domestically-owned firms. Having seen these changes it is not at all surprising that contracting firms dismissed at least 8 per cent of their employees each year.[22]

We see that the situation has improved gradually after 1995: relatively more companies were able to increase their production, and the expanding firms have increased their output significantly more rapidly than the rate with which contracting firms declined. As a consequence, from the mid-1990s firm-level average output (particularly in manufacturing) grew very rapidly. Obviously, there were major differences between the firms behind this definitely positive average trend: some of the firms – particularly those in foreign ownership – grew very dynamically, but the market situation worsened significantly for as much as nearly half of them.

Therefore, despite the low elasticities of labour demand, with the enormous changes, even moderate elasticities generated huge changes. For instance, in 1999, the production elasticity of labour demand for the entire sample was 0.41, while the wage elasticity was only –0.27. These figures describe a very rigid labour market. Let us consider, however, an average contracting firm, where real wage costs increased by 5.2 per cent and production declined by 15.5 per cent. On this basis, an 11.8 per cent decline in the number of employees should be expected, and the actual average reduction was quite close to this (12.4 per cent).

At the same time, if a company could increase its output by 30 per cent, it is obvious that it had to employ many new workers: an elasticity of 0.4 would increase firm-level employment by 12 per cent, that could be reduced somewhat by the effects of wage increases. This explains the apparent contradiction between the very inelastic labour demand and the very elastic job reallocation.

The unusually high job creation and destruction rates reflect an exceptionally rapid and broad structural transformation of the Hungarian business sector, rather than the particularly high elasticity of the Hungarian labour market. Therefore, it was not the labour market that was extremely elastic in the 1990s, but the economic structure changed very rapidly. This

22 Of course, it is quite possible for the production of a company to decline in one year and rise in the next.

is the most likely explanation of the phenomenon that the labour market behaviour of the firms was characterised on the one hand by very rapid adjustment, and on the other, that labour demand was not influenced by the long-run equilibrium. And probably this is the reason why in the entire sample we found a significant asymmetry in the elasticities, despite finding no similar effects in the sectoral estimations. It is possible that elasticities were relatively higher in the crisis sectors, and this was the reason behind the surprising phenomenon on the aggregate level.

When the market situation of firms changes or can change at this rate, it is necessary to adjust to these changes quickly and it is not possible to consider long-run issues. This is particularly true because the rapid growth was far from being general. In 1997–1999, output in the manufacturing industry increased by an annual average of nearly 20 per cent, but there were huge differences in that growth. The half of the companies increased their production by an average of twice that rate, while the other half, unable to expand, declined by over 10 per cent a year. This should also make it clear that based on the past, it is nearly impossible to reliably predict the operation of the labour market in a much less dynamic period.

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